Financial Instability and Foreign Direct Investment

Submitted by Olafur Margeirsson to the University of Exeter as a thesis for the degree of Doctor of Philosophy in Economics in October 2014.

I certify that all material in this thesis which is not my own work has been identified and that no material has previously been submitted and approved for the award of a degree by this or any other University.

Signature: ……..

This thesis is dedicated to my late grandfather, Björn Hjálmarsson.

I hope this and other future works of mine will prove him right.

Acknowledgments

Nobody writes a PhD thesis on his or her own.

First and foremost I would like to thank my supervisor, Prof. John Maloney, for invaluable help and guidance. He is at the top of most “Best Teacher” nominations for a reason.

My Exonian friends – too many to mention, you know who you are – made my stay in Exeter fun and interesting and I will miss our chats and times together.

My family has supported me to the brim and for that I cannot thank them enough. Special thanks go to my six siblings whose words, encouragement and support was always there when I needed them.

University of Exeter made it financially possible for me to conduct and finish my research and for that I am very grateful.

Victoria Chick, Leigh Harkness, Sir Thomas Harris, Róbert Helgason, Jan Kregel, Ásdís Kristjánsdóttir, Ronnie J. Phillips, the Positive Money Staff, Þorbjörn Atli Sveinsson, Gunnar Tómasson and L. Randall Wray get my utmost thanks for comments, discussions, clarifications, food for thoughts and assistance. If any faults have sieved through, despite your helpful inputs, they are mine and mine alone.

Finally, the most special thanks go to my Bene, whom I cannot thank enough for finding me, and whose love I treasure so much.

La vita è bella con te!

Abstract

Hyman Minsky's Financial Instability Hypothesis is used to construct two different indices for financial instability: a long-term index (Long Term Financial Instability) and a short-term index (Short Term Financial Instability). The former focuses on the underlying fragility of financial structures of units in the economy while the latter focuses on more immediate developments and manages to follow turmoil – "a financial crisis" – in the economy. The interplay of the indices with each other, with economic growth and with Foreign Direct Investment, both in general and in the financial industry, is probed.

In short, we find that long term financial stability, i.e. secure financial structures in the economy or a low level of Long Term Financial Instability, is sacrificed for maintaining short term financial stability. However, more Long Term Financial Instability is associated, as Minsky expected, with more fluctuations in Short Term Financial Instability: market turmoil is more common the more fragile underlying financial structures of units in the economy are. This signals that markets are ruled by short-termism. Economic growth is harmed by Short Term Financial Instability but the effects of Long Term Financial Instability are weaker. The common expectation that FDI activities strengthen financial stability is not confirmed. The relationship found hints rather in the opposite direction: FDI activities seem to cause financial instability.

Based on the those investigations and a further empirical work using data from Iceland, Leigh Harkness's Optimum Exchange Rate System (OERS) is developed further with the intention of solving "The Policy Problem" as described by Minsky. Insights from control theory are used. The OERS, along with public debt management as carried out by Keynes, is argued to have the ability to keep economic activity in the state of a permanent "quasi-boom". The policy implications are that the OERS should be considered as a monetary policy as it permits a free flow of capital, thereby allowing economies to reap the possible positive benefits of foreign direct investment, while still conserving financial stability.

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Introduction

> The main aim of post-Keynesian economics is to provide a clear understanding of how the economy works, by relating economic analysis to real economic problems.
>
> Philip Arestis (1996, p. 112)

Financial stability and how to maintain it has got considerably more attention in the post-2008 world than before. In its 84th annual report the Bank of International Settlements (BIS, 2014, p. 139) said that "[t]he global financial crisis underscored the crucial supervision for financial stability and the effective functioning of the policy framework." Indeed, central banks increasingly turned their attention to maintaining asset prices and financial stability rather than continuing their old focus on keeping inflation at bay: keeping inflation down has now been recognised as not being enough to maintain financial stability (Bank of International Settlements, 2014). As the Great Moderation turned into the Great Recession, "macroprudential policy" became "[t]he new fad in central banking" according to the Wall Street Journal (Izzo, 2013).

But that idea is old even if the term is new. Hyman Minsky, an American economist who died in 1996, had already realised many years ahead of most others that "macroprudential policy" was needed to control what he considered to be an endogenous and natural – in the sense that it was a normal and an expected part of the system – build-up of instability in the financial system. He called it "systemic regulation" (Kregel, 2014). So in a similar fashion to when Minsky (1987) realised the potential impacts of securitisation years before subprime mortgages were packaged, sliced and sold in tranches to anyone willing to buy them, he also anticipated the need for "macroprudential policy" long before it became "the new fad".

This work is driven by my personal experiences. I, having been a junior economist in an Icelandic bank before October 2008, had major problems understanding how the financial system of my home country collapsed in a fashion that I, and so many other economists, considered impossible at that time. A dumbfounded me, with a fresh BSc. degree in economics, understood that my understanding of the real processes of the economy was limited, to say

the least. The quest for understanding the real world in the wake of that event was a driving force during the time it took to get this work done. It will be in the future as well.

To some extent, Iceland, my home country, has a more prominent role in this work than the reader may understand. It was the Icelandic financial crisis in 2008 that sparked my interest in understanding financial instability. It was the Icelandic banks that performed the Foreign Direct Investment (FDI) in other countries that sparked my interest in understanding the effects of financial FDI on financial instability and the interaction there between. And it was Iceland, as the host country of FDI, especially in aluminium smelters, that sparked my interest in FDI in general and financial stability. Therefore, Iceland plays a larger role in this work than one might imagine from reading it.This thesis rests on the work of Hyman Minsky. This work is also, predominantly, an attempt to understand the real world as it is. Empirical work is at the heart of it and the proposed theoretical improvements to the current monetary system set forth in the fifth and the last chapter are based on observed behaviour of our monetary system. As such the work is, I hope, in accordance with the post-Keynesian chosen method of approach to forming and basing theories: relevant, representing reality and explanatory for the real world (Arestis, 1996) for "[p]ost-Keynesian theory... begins with observation and proceeds to build upon 'realistic abstractions' rather than 'imaginary models'" (ibid, p. 116).

What is post-Keynesian economics?

> [E]conomic theory [has] to explain why our economy is so given to fluctuations rather than being content with abstract arguments that a decentralised market system can yield coherence. Minsky (2008b, p.133).

Post-Keynesian economics grew, predominantly, on the works of John Maynard Keynes.[1] Keynes was stationed at Cambridge, England, and studied economics under Alfred Marshall, who was also a family friend. Marshall is today considered as one of the founders of the Neoclassical School of economics (Harcourt, 2012).

[1] Another fundamental contributor to post-Keynesian economics was the Polish economist Michał Kalecki.

Keynes was “Marshall’s most distinguished pupil” and “driven by an intense seriousness: a desire to understand the real world, especially why it malfunctioned, and how to make it a better place” (ibid, p. 63). Driven by his “desire to understand the real world” Keynes rejected most of Marshall’s, and other neoclassical economists’, ideas about the workings of the economy. For Keynes (1936, p. 8), “the difficulty lie[d] not so much in developing new ideas as in escaping from the old ones” and he urged his fellow economists to open their eyes to what he was saying for “the ideas which are here expressed so laboriously are extremely simple and should be obvious” (ibid). Those ideas – which culminated in Keynes’s *magnum opus* The General Theory of Employment, Interest and Money, published in 1936 – formed the outlines of the current post-Keynesian economic theory.

It is important to repeat it here (Arestis, 1996, p. 116) that “[p]ost-Keynesian theory... begins with observation and proceeds to build upon ‘realistic abstractions’ rather than ‘imaginary models’”. For post-Keynesian economists, contrary to neoclassical economists such as Milton Friedman, “the starting point of theory [is] the nature of the real world” and that it is “crucial that there be some correspondence between a theory and the real world, something that Friedman denied” (Dow, 2001, p. 12).[2] Post-Keynesian economic theory is “Economics without Equilibrium” (Arestis (1996, p. 115), referencing Kaldor (1985)) in the neoclassical-economics sense and post-Keynesians have long rejected the existence of neoclassical equilibrium. Joan Robinson e.g. wrote (Robinson, 1980, pp. 227-228):

> We must throw out concepts and theorems that are logically self-[contradictory], such as the general equilibrium of supply and demand, the long-run production function, the marginal productivity of capital and the equilibrium size of firms... In commodity markets, prices fluctuate under the influence of changes in the relations of supply to demand, without ever tending towards stability.

[2] Dow was referencing Friedman’s words that the quality of theories should be deemed on their predictive value rather than their realism or structure (Friedman, 1953).

Instead, the post-Keynesians consider the economy as being non-ergodic[3] and a collection of dynamic subsystems (ibid). In fact, the concept of equilibrium in post Keynesian economics has a different meaning than in neoclassical economics: it "refer[s] to stable states rather than the market clearing and satisfaction of expectations that characterize the orthodox concept of equilibrium" (Dow, 2001, p. 13). In other words, "equilibrium" in post-Keynesian economics does not mean that the supply and demand are equal, i.e. that the "market clears". Rather, "market clearing" is only a specific case that is a part of the general case: normally, one side of the market, supply or demand, is inadequate compared to the other and prices do not automatically adjust so that the market clears. Rather, in post-Keynesian economic theory, the theory of price formation is built upon the real-world phenomena of firms' mark-up on top of the cost of production (Lee, 2004) and conventions, where current price levels are projections of the most recent ones. Prices, in post-Keynesian theory, are not a market-clearing mechanism for the simple fact that in the real world, they are not.

Following Keynes (1936, 1937) a great emphasis is put on the passing of historical time – i.e. "where the past is immutable and the future is uncertain and unknowable" (Arestis, 1996, p. 115) – and the fact that industries are not perfectly competitive. This leads to the conclusion that regular equilibrium analysis with well-behaved supply and demand is not applicable to the real world: in fact, the supply curve does not exist (Dow, 2001; Keen, 2011a). Exactly because of the existence of uncertainty and time, money, its existence and creation, are taken seriously. Post-Keynesian theory, following Keynes's approach, focuses on the money-value of production: production theory, i.e. the theory of real activity, must be based on the monetary theory of real activity (Tily, 2010). Money is not a "veil" on real economic activity, the quantity of which does nothing in the long run but to determine the price level, but a non-displaceable part of the economy and a necessary building block of any realistic approach to economic theory. Banking, financial institutions and their effects on the economy must consequently be taken seriously. As Minsky (1977, p. 141), as quoted by Dymski and Pollin (1992, p. 28), put it:

[3] A process, such as time series of employment, GDP or interest rates, is considered ergodic if its statistical characteristics can be derived from a single long-enough sample. A process that moves in an erratic and unpredictable manner is non-ergodic. Post-Keynesians reject the assumption of neoclassical economists that the economy is an ergodic process.

> In our economy the behaviour of “Wall Street” is a determinant of the pace and direction of investment. A model of the economy from the perspective of “Wall Street” differs from the standard model of economic theory in that it first sees a network of financial interrelations and cash flows and then a production and distribution mechanism. A “Wall Street” paradigm is a better starting point for theorizing about our type of economy than the “barter” paradigm of conventional theory.

Furthermore, institutions and the “rules” guiding economic behaviour in the economy are considered important as they can determine the path that the economy takes. The fact that institutions chance, and with them “the rules of the game”, makes it difficult to draw direct comparisons between different time periods if the “rules” or units’ economic behaviour have changed. Economic models must consider this fact, otherwise risk being useless at best, misdirecting or harmful at worst. A case in point is the perceived trade-off between unemployment and inflation – the Philips curve – which, according to Minsky, writing in 1986, (Minsky, 2008, p. 321)

> only existed for a brief period after World War II and that there is little, if any, evidence to support the idea that it still exists. Yet because this trade-off is built into the economic theory and the econometric models of the policy-advising establishment, the problems of policy are phrased in its terms.

What all this means is that post-Keynesian economic theory applies inductive reasoning rather than a deductive one. Werner (2005, p. 17-18) explains what this means from the scientific point of view when it comes to how post-Keynesian economic theory is formed compared to neoclassical economic theory:

> [The inductive] approach examines reality, identifies important facts and patterns, and then attempts to explain them, using logic, in the form of theories. These theories are then tested and modified as needed, in order to be most consistent with the facts of reality. This methodology is called inductivism. All the natural sciences and most scientific disciplines use this approach. Inductivism is not only

> dominant in science, it also describes how we learned as infants about this world. When we touched the hot stove in the kitchen and burnt our fingers we learned inductively that doing so again would also hurt again.
>
> ...
>
> Unhindered by economic reality, deductive economists [such as neoclassical economists] can start with their preferred axioms, which do not need to be supported by facts – such as the axiom that individuals only care about the maximization of their own material benefit. Additional unrealistic assumptions produce the theories that are so removed from reality.

Finally, for a view of Keynes, who lends both his name and ideas to the post-Keynesian school of thought, and how accurate and realistic his theories were, even in their heydays, compared to other schools of thought, we can go to Bruce Bartlett, an American (right wing) historian. His words are admirable for the simple fact that they describe the view of a person who has carefully reconsidered his opinion in the light of historical and empirical facts – and as Keynes (1924, p. 345) himself pointed out: "after all there is no harm in being sometimes wrong – especially if one is promptly found out." In the article "Revenge of the Reality-Based Community", published in *The American Conservative*, Bartlett writes (Bartlett, 2012):

> I had written an op-ed for the New York Times in 2007 suggesting that it was time to retire "supply-side economics" as a school of thought. Having been deeply involved in its development, I felt that everything important the supply-siders had to say had now been fully incorporated into mainstream economics...I said the supply-siders should declare victory and go home.
>
> I decided to write a book elaborating my argument. I thought I had a nice thesis to put forward...
>
> [For my research for the book] I hit upon the idea of ignoring the academic journals and looking instead at what economists like John

> Maynard Keynes, Irving Fisher, and others said in newspaper interviews and articles for popular publications...
>
> After careful research along these lines, I came to the annoying conclusion that Keynes had been 100 percent right in the 1930s. Previously, I had thought the opposite. But facts were facts and there was no denying my conclusion.

The construction of the thesis and its contribution to knowledge

There are five major chapters in this thesis. Together, they are intended to form a comprehensive and coherent whole: “together we stand, divided we fall”.

Chapter one acts as an introduction, in the form of a literature review, to FDI. Some of the adherent issues to FDI are focused on. Those are FDI and economic growth, FDI and other types of international capital flows, FDI and the balance of payments and, what is most relevant to the chapters to come, FDI and financial stability.

In short, based on the literature, we conclude that FDI *can*, albeit not with certainty, increase economic growth, in particular FDI in Greenfield investments rather than via mergers and acquisitions. But FDI can also negatively affect economic growth and, indeed, we find that inward FDI flow in the financial sector can harm real GDP growth (see tables 4.14 and 4.15), a result that clings well with the literature: surges in FDI in the financial sector have been identified with serious fluctuations in the economic growth (Reinhardt & Dell’Erba, 2013). Importantly, more FDI may not always be better. FDI is concluded, on the basis of the literature, to have a very complicated relationship with other capital flows where the former may act as a substitute or a complement to the latter. The relationship between the balance of payments and FDI is equally not straightforward either. Albeit FDI may prove to be helpful in the times of need (of foreign capital) and in the short term, the long term effects of FDI may actually be detrimental to the balance of payments in the form of exported profits and losses of foreign exchange. And, finally, the relationship between FDI and financial stability may be equally complicated. Clearly, it is important to have no preconceived and immovable ideas in mind when the effects of FDI on the economy are discussed and each case should be carefully addressed and investigated.

In chapter two, we turn our focus more on FDI in a particular sector: financial services. Special interest is given to banking services and banks' activities in the economy are probed into in order to better understand the processes that are under the bonnet. FDI in banking and its relationship with economic growth and financial development are discussed. It is also argued that FDI in financial services has unique effects on the economy due to the centre-like place of the financial system in the modern economy. All other economic activity and all other sectors in the economy are greatly influenced by FDI in financial services because of this. That is unique. Therefore, FDI in financial services must be properly understood in order to better comprehend the effects of it on economic development. This is especially relevant when it comes to financial stability.

Chapters one and two are one set of foundations for chapter four. Chapter three is the other leg of the foundations for chapter four. In chapter three we turn our attention to what financial stability is. Financial stability, it is argued, is important for the long-term growth prospects of the economy. To understand it, measure it, monitor it and maintain it should therefore be of utmost importance. This, as already noted, has indeed got more attention in the post-2008 world than before.

We carry out a short literature review of past attempts to define and measure the subject. Hyman Minsky's Financial Instability Hypothesis (FIH) is the centrepiece of the work developed in chapter three. The development of financial instability, according to Minsky's FIH, is retold to gain perspectives of how to use the theory to measure financial instability. It is argued that two time horizons are needed when attempting to measure financial instability following the FIH: a "long term" and a "short term" view. In doing so, an attempt is made to focus on the underlying development of fragility to financial structures of units in the economy on one hand and the bursts, or outbreaks, of severe financial panics on the other. The severity of panics should be more prominent the more fragility – in the sense that cash-flow mismatches may form – there is in balance sheets of economic units. Some clues provided in chapter four do point in this direction.

In chapter four, we make an attempt to quantitatively follow the development of financial instability in two economies, the US and the UK. The impact of

financial instability on growth is confirmed to be negative. Insights are provided that Minsky was right: structurally fragile financial structures – here measured with a high value of Long Term Financial Instability (see chapter 4) – do lead to more common outbursts of financial turmoil: this is one of numerous insights derived from the Financial Instability Hypothesis. To use a parable given by Steven Fazzari: the more stress there is put on the bar, the likelier it is that it will break (Fazzari, 2014). The relationship between FDI activities and financial instability are neither fully confirmed to be positive nor negative. Nevertheless, the results do hint towards there being a negative impact on financial stability from FDI activities. Therefore, even if FDI may be more stable than other capital flows, as discussed in chapter one, the net effects of FDI activities on financial stability may still be negative.

Chapter five is the last chapter. It offers further empirical work, in addition to the work done in chapter four, and this time the focus is certain empirical effects of credit expansions which, not only according to Minsky's FIH but empirically as well, are the main reasons for decreasing financial stability. Relying on literature and own empirical work based on data from Iceland, a policy recommendation is made on how to structure the monetary system such that Minsky's identification of the "policy problem" is recognised (Minsky, 2008, p. 328): "The policy problem is to devise institutional structures and measures that attenuate the thrust to inflation, unemployment, and slower improvements in the standard of living without increasing the likelihood of a deep depression." Offering a theoretical solution, based on empirical investigations, to the policy problem is a sound contribution to post-Keynesian economic theory.

The essence of the institutional structure of the system is to recognise the capitalistic economy as a non-equilibrium system: this is the post-Keynesian approach to economics. Insights from engineering, control theory to be specific, are used to set up automatic governors on banks' credit creation and credit allocation such that the effects of credit expansion are automatically responded to. A fail-safe is incorporated in the system in the form of focused deficit expenditures by the government in case the governors do not work as theorised. The financing of an Employer of Last Resort program is but one possible public expenditure policy. The existence of those deficit expenditures by the government not only acts as a fail-safe but as an encouragement for the

banks, on which the governors of the system are applied, to fulfil the economic goals of the nation. The reason is simple: within the system as proposed, deficit expenditures impair their ability to expand the credit in the economy, thereby hurting their profits.

Some of the contributions to the literature in this thesis are therefore the following:

- A focused literature review is provided on FDI and its relationship with economic growth, other types of capital flows, balance of payments, and financial stability. Theoretical arguments are given for why FDI, especially in financial services and banking in particular, can be a catalyst for financial instability and the transfer of financial shocks.
- It is argued, on the basis of Minsky's FIH, that measuring financial instability must be done with, at least, two time horizons in mind.
- Empirical quantification of financial instability is provided with the previous point in mind.
- Using the quantification of financial instability in the previous point, an empirical investigation is made into the causal relationship between FDI, both in general and in financial services, and financial stability.
- The effects of FDI on financial stability are not to be expected to be strictly positive. Rather, they are negative. This opinion results from the empirical work done in chapter 4.
- The causal relationship from financial instability onto economic growth is confirmed to be negative. But high economic growth also spurs fragility to build up and instability to form. This empirically supports the insights of Minsky in his FIH.
- Empirical work is provided on the effects of credit expansion in Iceland. In short, it is found that credit expansion causes a) the exchange rate to fall, b) a deficit on the current account, c) inflation to increase and d) the depletion of foreign exchange.
- A theoretical case is made for institutional changes in the monetary system such that, using insights from control theory, credit creation and allocation are improved such that the economy reaches and stays close to the economic goals of high employment, low inflation and a flexible yet stable nominal exchange rate.

I, humbly, hope the current work fulfils the standards set for it. I also hope that this work is a genuine contribution to economic theory, as it dives into empirical investigations and makes a theoretical contribution, the post-Keynesian way, to understanding how the “policy problem”, as Minsky described it, can be solved.

Chapter 1 - Foreign Direct Investment: a focused literature review

> [Foreign] direct investment is a category of cross-border investment associated with a resident in one economy having control or a significant degree of influence on the management of an enterprise that is resident in another economy... Immediate direct investment relationships arise when a direct investor directly owns equity that entitles it to 10 percent or more of the voting power in the direct investment enterprise...
>
> International Monetary Fund (2011, pp. 100-101)

The definition of FDI comes from the International Monetary Fund: 10% ownership or more of a foreign party in a domestic corporation. This distinguishes FDI from other capital flows such as portfolio flows which are "defined as cross-border transactions and positions involving debt or equity securities, other than those included in direct investment or reserve assets" (International Monetary Fund, 2011).

It is Multinational Corporations (MNC) – defined by Encyclopædia Britannica (Encyclopædia Britannica, 2013)[4] as "a corporation that is registered and operates in more than one country at a time" – that mainly carry out FDI projects which can be, in general terms, either horizontal or vertical.

Horizontal FDI is when the whole production process is copy-pasted between economies; the production facilities are set up with the aim of servicing that specific economy. Horizontal FDI is therefore often used instead of exports to get past trade barriers such as import tariffs (Helpman, Melitz, & Yeaple, 2003). Vertical FDI on the other hand is where the production process is broken down in stages between economies. Each economy takes care of only a part of the whole production process of the relevant good and the outputs are then transported to their final assembling place. Vertical FDI can be used to gain from international differences in price of inputs, such as labour (Helpman,

[4] The full definition: "multinational corporation (MNC), also called transnational corporation, [is] any corporation that is registered and operates in more than one country at a time. Generally the corporation has its headquarters in one country and operates wholly or partially owned subsidiaries in other countries. Its subsidiaries report to the corporation's central headquarters."

1984), although the empirical records for this proposition are mixed (Braconier, Norbäck, & Urban, 2005).

The definition of FDI has not always been the same. The 10 percent threshold was used in 1993 in the 5th edition of IMF's Balance of Payments manual:

> A [foreign] direct investment enterprise is defined… as an incorporated or unincorporated enterprise in which a direct investor, who is resident in another economy, owns 10 percent or more of the ordinary shares or voting power (for an incorporated enterprise) or the equivalent (for an unincorporated enterprise).
>
> IMF (1993)

This slowly became the globally accepted version as other global institutions, such as the OECD, adopted it. Nevertheless, in 1996, OECD still defined FDI without mentioning the 10 per cent benchmark:

> Foreign direct investment reflects the objective of obtaining a lasting interest by a resident entity in one economy (''direct investor'') in an entity resident in an economy other than that of the investor (''direct investment enterprise''). The lasting interest implies the existence of a long-term relationship between the direct investor and the enterprise and a significant degree of influence on the management of the enterprise. Direct investment involves both the initial transaction between the two entities and all subsequent capital transactions between them and among affiliated enterprises, both incorporated and unincorporated.
>
> OECD (1996, pp. 7-8)

Besides the unavoidable opaqueness of what is a "long-term" relationship – Kalecki (1971) held the position that the long-run was "but a slowly changing component of a chain of short-period situations; it has no independent entity" – the 10% benchmark is debatable as well: why not 5% or any other ratio? Both IMF and OECD recognise this issue but "to ensure statistical consistency" it is recommended to apply it without exceptions:

> In practice, effective control or influence may arise in some cases with less than these percentages. These definitions should be used in all cases, however, for international consistency and to avoid subjective judgments.
>
> International Monetary Fund (2011)

> Foreign direct investment reflects the objective of establishing a lasting interest by a resident enterprise in one economy (*direct investor*) in an enterprise (*direct investment enterprise*) that is resident in an economy other than that of the direct investor. The lasting interest implies the existence of a long-term relationship between the direct investor and the direct investment enterprise and a significant degree of influence on the management of the enterprise. The direct or indirect ownership of 10% or more of the voting power of an enterprise resident in one economy by an investor resident in another economy is evidence of such a relationship. Some compilers may argue that in some cases an ownership of as little as 10% of the voting power may not lead to the exercise of any significant influence while on the other hand, an investor may own less than 10% but have an effective voice in the management. Nevertheless, the recommended methodology does not allow any qualification of the 10% threshold and recommends its strict application to ensure statistical consistency across countries.
>
> OECD (2008, pp. 48-49)[5]

Even the term "foreign" can be obscure, especially in a world with trade blocs and different regulations depending on the origin of the investor. This is perhaps best explained by an example.

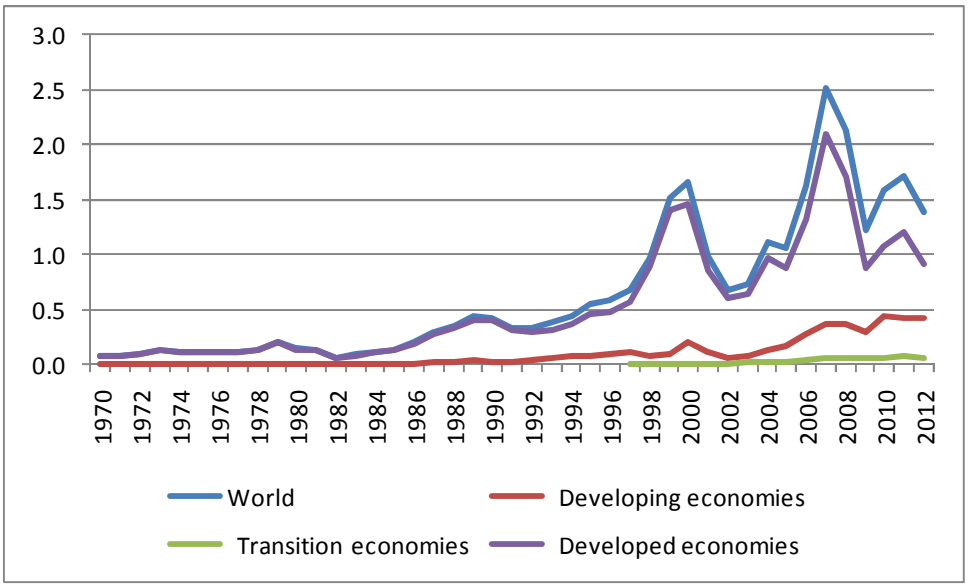
In 2010, a Canadian energy company, Magma Energy (today: Alterra Power), wanted to make an investment in Iceland by buying an Icelandic energy company, HS Orka. The catch was that non-EU companies must follow a

[5] The definition of FDI as a long lasting relationship gives rise to the fact that intercompany debt can be defined as FDI like equity ownership as long as there is a direct investment relationship between the companies in question. Furthermore, affiliate relationships, subsidiaries, and fellow enterprises make their mark on the measurement of FDI as well. Those issues will not be covered here. Further information on the matter can be found in IMF's Balance of Payments Manual, 6th edition.

different and stricter set of regulations than EU companies when investing in Iceland, which is a part of the EU common market through its European Economic Area membership. Magma Energy tried to circumvent this obstruction by setting up a Swedish holding company, with very limited operations, and channel the ownership recording through Sweden, an EU country, rather than directly from Canada. It worked: Magma Energy Sweden A.B. has, in 2013, a 66.6% stake in HS Orka.[6] This story is an example of how definitions regarding the origin of the investor can be slippery to apply and circumvented in the real world.[7]

Worldwide foreign direct investment has grown significantly in the last decades. In 2012, nearly 1.4 trillion USD flowed out of the world's economies, first and foremost from developed ones.

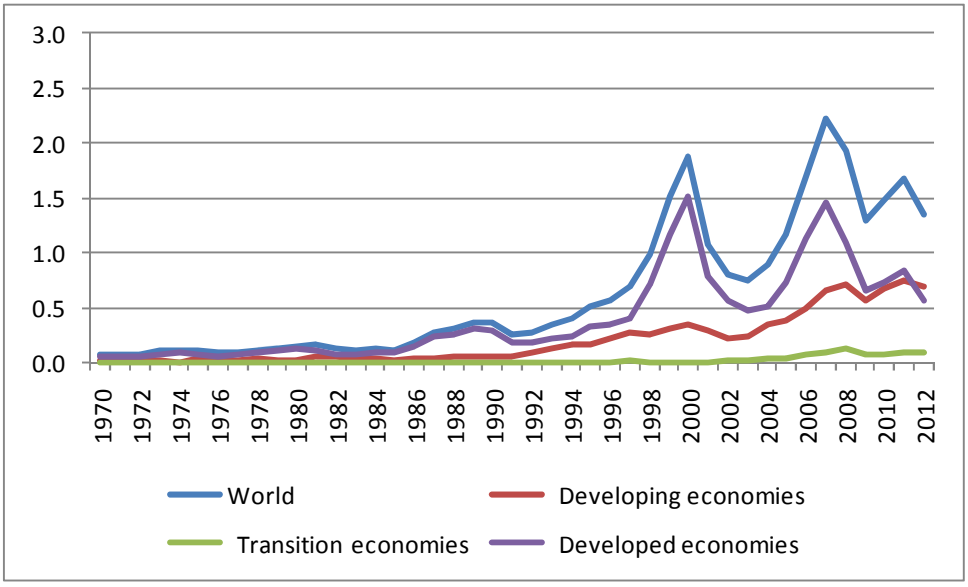
Figure 1.1 – Outward Gross FDI Flows (trillion of USD, 2012 prices)[8]



The main destination of those funds was, for the first time, not the developed economies themselves but developing economies.

[6] According the company's website: www.hsorka.is (HS Orka, 2013)
[7] For an introduction to the "Magma málið" in Iceland, see e.g. Vísir (2010).
[8] Data comes from United Nations Conference on Trade and Development, UNCTAD. They are presented in2012 prices (using CPI of USA (data from OECD, author's calculations)).. This applies to figures 1.1 – 1.4. See also Appendix 3.3.

Figure 1.2 – Inward Gross FDI flows (trillion of USD, 2012 prices)



However, although the developing economies were in 2012 the main receivers of FDI flows, the gross inward stock of FDI is mainly concentrated in the developed economies of the world (figure 1.3).[9] In fact, at the end of 2012, 62% of the world's gross FDI was stationed in developed economies. At the same time, almost 80% of world's gross FDI originated from those same economies (figure 1.4).

[9] On a net basis it is the developing countries that receive the FDI coming from rich developed countries, see Appendix 3.3

Figure 1.3 – Inward Gross FDI Stock (trillion of USD, 2012 prices)

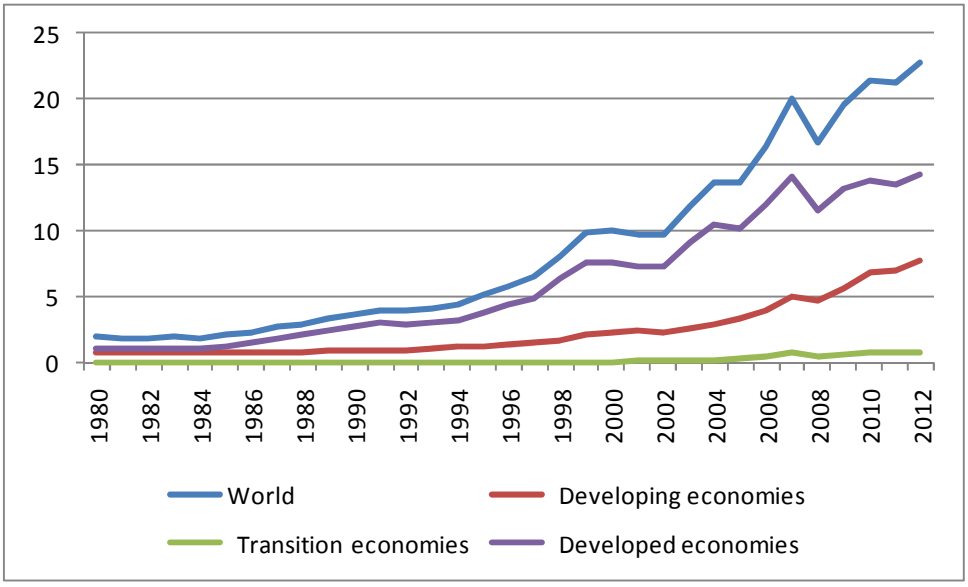
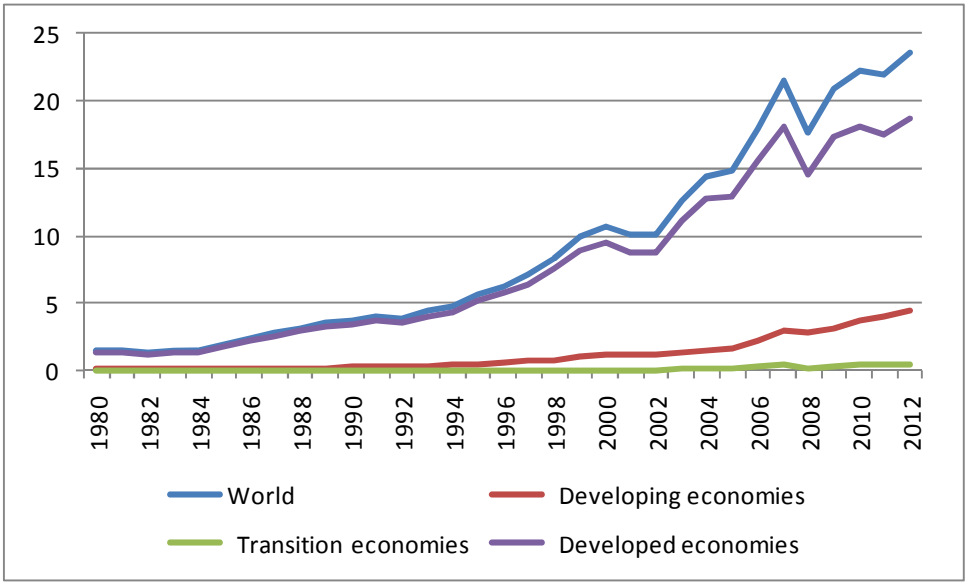


Figure 1.4 – Outward Gross FDI Stock (trillion of USD, 2012 prices)



Getting into the general characteristics of FDI, Markusen (2002) provides a taster list. According to Markusen, there are 13 points to be made:

1. FDI flows have increased substantially. Consequently, so have the stocks of FDI. We see from the figures above that since Markusen's article, this development has continued.
2. FDI flow has historically been to a large extent between developed countries but not from rich countries to poor. This is "The Lucas Paradox" (Lucas, 1990). However, Fajgelbaum, Grossman, and Helpman (2011) show that this "paradox" can be explained by the Linder hypothesis (Linder, 1961): like trade, FDI between economies is related to

similarities in demand-preference structures which again hinge to a large extent on the level of income in the economies. Building on this hypothesis, we can speculate that the reason why developing economies are getting a larger share of the global FDI flows than before is because their demand structure, due to e.g. higher income, has become more similar to the one in developed economies where most of the FDI flows from.

3. Pairs of developed countries have commonly large FDI flows between them, even within the same industry.
4. Most of FDI seems to be horizontal although this observation depends on how "thick" each stage of the production process of goods and services is defined. Thinly defined production stages lead us to conclude that many subsidiaries of multinational corporations produce very specific inputs for another company in the overall production process (Alfaro & Charlton, 2009). In other words, horizontal FDI can be considered vertical FDI if the definition of a stage of the production process is made slimmer.
5. Intra-firm trade of MNCs stands behind a "large" share of total world trade.[10] Intra-firm trade is a larger share of total trade in the case of rich economies than poor (Lanz & Miroudot, 2011). FDI and trade do show some signs of having a positive causal relationship (Bajo-Rubio & Montero-Muñoz, 2001; Dritsaki, Dritsaki, & Adamopoulos, 2004; Xiaming Liu, Wang, & Wei, 2001).
6. In the light of how much of FDI is horizontal, it should not be surprising that FDI seems to be positively correlated with labour skills in the host economy. This has been empirically confirmed and the human-capital variable seems even to have become more important than before (Noorbakhsh, Paloni, & Youssef, 2001).
7. Political unrest and instability scare off potential foreign direct investors (Schneider & Frey, 1985). Corruption correlates negatively with FDI inflows (Habib & Leon, 2002) and democracies attract more FDI than autocracies (Guerin & Manzocchi, 2009; Jensen, 2003). Generally, uncertainty about political policies and the commitment to property rights

[10] According to Lanz and Miroudot (2011) it is unclear how large exactly, both due to lack of data and the definition regarding what ownership level is needed to mark a trade transaction as "intra-firm".

has a negative impact on foreign direct investment (Henisz, Mansfield, & Glinow, 2010).

8. FDI is not prominent in all industries. Within the OECD countries, at year end 2011, 52% of inward FDI positions were in services, of which financial intermediation represented 20% of the total FDI inward positions. At the same time, FDI inward positions in agriculture and fishing hardly registered (0.1% of total FDI inward positions).[11]
9. FDI is prominent in industries
    a. where research and development is important
    b. where demand for skill-abundant labour is high (high ratio of professionals compared to total workers)
    c. in which high-tech goods and services are produced and sold. This generally applies to any "high-tech" good at all, let it be something tangible or not. In this manner e.g. a legally complicated good or service may be considered "high-tech" since it needs a professional (a lawyer) to be produced. Financial services are another example. This underlines point b.
    d. in which a wide range of products is sold and/or produced, with high level of advertising.
10. The value of intangible assets, as a proportion of the value of total assets, has the tendency to be higher in the case of firms carrying out FDI than in other firms.
11. FDI can lead to economies-of-scale that might be impossible to reach without the FDI activity, e.g. due to a small home market. This improves the use of resources but also makes it possible that FDI corporations may never become too large since, in that case, larger is better. Economies of scale in a multinational corporation can be achieved through the common use of e.g. advertising material, product design ("blueprint sharing") and cheaper per-unit cost of input, due to e.g. bulk discounts (Davidson, 1980).
12. Generally, firms seem to have to grow up to a certain size before FDI becomes feasible. However, although most FDI, by value, is carried out by large MNCs the share of small and medium sized MNCs of total FDI

[11] Data from the OECD online database, extracted 31 July 2013.

grows significantly when looking at the absolute numbers of FDI projects (Fujita, 1995).

13. Trade barriers can encourage FDI in the sense that companies will simply choose to carry out (horizontal) FDI rather than export to the host economy (Brainard, 1993). The development of the 90s, perhaps especially in Europe with the progress of the single market, when freer trade and FDI increased at the same time, does not need to contradict this. That apparent paradox can be explained in two ways: non-EU countries enter the EU via FDI, and use the receiving country as an export hub to the rest of EU, and M&A activity over borders is encouraged as trade costs fall (Neary, 2009).

It is not the plan to discuss here every aspect of the effects of FDI for that would be too large a task. For the purpose of this literature review, we will focus on merely four themes: FDI and economic growth; FDI and other types of capital flows; FDI and the balance of payments; and FDI and financial stability.

1.1 FDI and economic growth

One of the arguments for FDI is that it should increase economic growth in the host economy (Alfaro, Chanda, Kalemli-Ozcan, & Sayek, 2010; Mencinger, 2003) and even be more effective in boosting economic growth than domestic investment (Borensztein, De Gregorio, & Lee, 1998). The ways foreign direct investment should have positive effects on economic growth in the host economy are five, given the “appropriate host-country policies and a basic level of development” (OECD, 2002, p. 5): FDI can facilitate the transfer of technological advances and know-how; it can increase competition; human capital can be improved by it; it can integrate the economy towards the world economy; and it canpush for more positive development of firms.

But FDI can also negatively affect economic growth. Moura and Forte (2009) point out that although, as OECD (2002) states, there are five channels through which FDI can have positive effects on economic growth there are five channels through which FDI can have negative effects on economic growth. Four of them are the aforementioned channels mentioned by OECD through which FDI can positively affect economic growth, except the positive development of firms. Additionally to those four, FDI can also negatively impact the implementation of

domestic economic policies. Furthermore, Mencinger's (2003) study pointed out that funds raised through the FDI flows in the form of M&A activity can simply be spent on imports. Profit repatriation comes on top of that. This can have a negative impact on the balance of payments and, following Thirlwall's Law, have a negative impact on the long term economic growth of the country. [12]

Overall, FDI does seem to have positive effects on GDP growth (Iqbal, Shaikh, & Shar, 2010; X. Li & Liu, 2005; Moura & Forte, 2009) although the effects may be questioned when it comes to their strength (Alfaro et al., 2010). The effects of horizontal FDI are also stronger than vertical FDI (Beugelsdijk, Smeets, & Zwinkels, 2008) and developed economies benefit more than developing ones, where the effects can be insignificant (ibid). Some evidences show that FDI does not always increase economic growth and can even decrease it. In chapter 4 of this work (see *4.2.1 Annual data*), a negative Granger-causality link from FDI to economic growth is established and, rather, the relationship between those factors hints that economic growth draws in FDI. To find a neutral or a negative relationship between FDI and economic growth is not unique. In a recent paper, Ocaya, Ruranga and Kaberuka (2013) used Granger causality tests to test the relationship between FDI inflows into Rwanda and economic growth. They conclude that they are independent of each other. Mencinger (2003) looks at eight Central and East European Countries and finds a negative correlation between FDI and economic growth. Eller, Haiss & Steiner (2006) were stimulated by Mencinger and deduced that (p. 305) "FDI might not have an unlimited positive impact on growth, but presumably there is a certain threshold from which on negative effects [such as crowding out of domestic investment] dominate"[13] – so more is not always better. They find this position holds in the case of financial sector FDI in nearly the same set of countries as Mencinger looked at.

The approach to the question seems to matter as well: microeconomic-level studies have the tendency, rather than macroeconomic-level ones, to find that

[12] Thirwall's Law links together long term economic growth of a country to world economic growth and the income elasticity of demand for the country's export and imports. Outflow of capital in the form of royalties to foreign corporations would decrease the long term economic growth of the country according to Thirlwall's Law.

[13] The answer to the question whether FDI crowds in or out domestic investment is inconclusive. Some research tilts towards the "out" answer (Agosin & Machado, 2005; Mišun & Tomšk, 2002) while other answer it with "in" (Mišun & Tomšk, 2002) or that they cannot reject the hypothesis that FDI crowds out domestic investment (Kim & Seo, 2003).

FDI does not increase economic growth. Furthermore, the micro-level studies often find that the acclaimed spillovers between foreign and domestic firms do not seem to be prominent (Carkovic & Levine, 2005). Other studies have said the supporting evidence for spillovers is “limited” (Görg & Greenaway, 2003) and still others have pointed out that the causation link between FDI and economic growth may not necessarily be only from the former to the latter: economic growth can cause FDI to come into the economy and the causation may also run both ways (Chowdhury & Mavrotas, 2006; Xiaohui Liu, Burridge, & Sinclair, 2002).

It seems that it is not enough to simply attract the FDI and expect it to have automatically positive effects on economic growth. Blomström, Lipsey & Zejan (1992) and Beugelsdijk et al. (2008) found that rich economies benefitted more from FDI than poorer ones. Gallagher and Zarsky (2006) simply put it “[t]he poorer the country, the more likely is the FDI impact negative.” Borensztein et al. (1998) show that FDI can have a negative impact on economic growth in countries with low level of human capital, a result they find “puzzling”. Somewhat similar effects seem to be in place in Alfaro et al (2010) and Choong (2012) where linkages are found between the development of the host economy’s financial system and the positive effects of FDI on economic growth: economies with more developed financial systems reap more benefits. This can help explaining the results of Blomström et al as rich economies have normally more developed financial systems.

Borensztein et al (1998) hold the position that the host economy must have an “absorptive capability” when it comes to absorbing the spillovers that the FDI brings: the application of more advanced technologies brought over by FDI projects calls for a sufficient level of human capital to use them, education being an important part of that factor. Therefore, if the capability to absorb the spillover – a sufficient quantity of human capital – is not in place, FDI is not effective in promoting economic growth. The quality of education matters as well (Wang & Sunny Wong, 2011).

The education factor is not only a determining factor when it comes to the absorptive capabilities of the economy but it also stimulates more FDI to come into the country (Noorbakhsh et al., 2001). Institutions also matter: the better the

institutions – especially property rights – the higher the FDI will be (Ali, Fiess, & MacDonald, 2010). The institutional factor can in fact be interpreted as a part of the “absorptive” capabilities of the host country and should therefore not be surprising in the light of Borenztein et al.

Also, how the FDI is done matters: the host country’s capital stock does not develop as much when the FDI is in the form of mergers and acquisitions compared to when a “Greenfield” investment – i.e. when the foreign corporation actually constructs the new facilities connected to the FDI instead of buying existing ones – takes place (Harms & Méon, 2012). Given that capital stock is used in the production of goods and services we could expect economic growth to be lower in the wake of an M&A FDI activity compared to a Greenfield FDI activity. Wang and Sunny Wong (2009) found similar differences in the impact of FDI on economic growth depending on whether it was a Greenfield investment or M&A activity: the former encouraged economic growth while the latter only did if there was enough human capital in the host country prior to the FDI inflow. They also explain the ambiguity regarding the effects of FDI on economic growth with the explanation that in most FDI investigations there is no distinction made between Greenfield and M&A related FDI.

Mencinger’s (2003) study somewhat lends support to the view of Wang and Wong. According to him, mergers and acquisitions were the most prominent form of FDI into the sample of Central and East European Countries he had and the money so raised was used to finance imports and consumption rather than investment which would have had more positive effects on economic growth. On top of the Greenfield/M&A factor comes the question of the sector in which the FDI takes place. FDI in primary sectors does not seem to have positive effects on economic growth while the opposite is the case when it comes to manufacturing. The results for the service sector are unclear (Alfaro, 2003). Alfaro looked at 47 countries and later, Cifticioglu, Fethi and Begovic (2007) found supporting evidences for Alfaro’s view when they looked at nine CEE countries. They held the view that Alforo’s results were worth taking “seriously”.

1.1.1 Technological spillovers and growth

Technological spillovers and know-how is often quoted as one of the positive side effects of FDI as it should improve economic growth. The way this should

happen is through quicker innovation and general improvements in the rate of development. Eaton and Kortum (1996) show, using a growth accounting approach, that within a sample of OECD countries most of innovation came from only three of them: USA, Japan and Germany. FDI, perhaps especially from these countries, should increase the level of technology in the host economy. These technological spillover effects have been empirically confirmed although there is a lack of consensus on how strong they really are and what determines them (Blomström, Globerman, & Kokko, 1999; Crespo & Fontoura, 2007).

But, according to Moura and Forte, technological spillovers can negatively affect growth through the host country becoming dependent on technologies introduced by the foreign firm. This dependency is linked to the fact that a "substantial" part of world's research and development is done by international corporations (Borensztein et al., 1998). An example is the payment of royalties from the host economy to the foreign firm for the use of their technology as Moura and Forte mention. This would negatively affect the balance of payments and therefore economic growth through Thirwall's Law.

1.1.2 Increased competition and economic growth

Dragging FDI into an industry with a low level of competition can be an incentive for other firms in the industry to innovate faster and lead to improved allocation of resources. Together it can lead to positive effects on economic growth due to FDI-fuelled competition (Fortanier, 2007).[14]

On the other hand, increased competition from a large and significantly more efficient international corporation can negatively affect economic growth through bankruptcies of domestic firms. Bankruptcies of domestic firms lead again to a more concentrated industry where the MNC dominates, possibly even monopolising the host economy's market. That sort of monopolisation can lead again to economic rents, deterioration in the allocation of resources and a slow-down the rate of competition-induced innovation (Fortanier, 2007). Somewhat

[14] Competition can increase total factor productivity, which would increase growth (endogenous growth theory). Werner (2005), who is a skeptic towards foreign investments in general, including FDI, and states that they are "usually... unnecessary" (p. 217), traces the ultimate reason for economic growth to credit creation.

contradictory, the entry of a foreign firm into the market can therefore, in the end, decrease the level of competition in the market.

However, the FDI activity of a foreign company in a particular industry can increase competition, and general development, in other industries in the host economy as well (Markusen & Venables, 1999). The way this can happen is through “backward” and “forward” linkages with other industries. Backward links act through any inputs that the FDI-industry needs, creating incentives for (domestic and foreign) firms to enter and develop the industry that produces that input. The forward link works if the output of the FDI industry is used as an input in another. The increased competition in the FDI industry and potential improvement of the produced good lowers the price and improves the quality of any goods that use it as an input.

Also, the presence of foreign firms may not only bring previously nonexistent know-how, which can spur growth of domestic firms in that same industry (Mottaleb & Sonobe, 2011), but also be supportive in providing better inputs, which were previously unavailable or substandard, to that industry and even others (Lin, 2012). Focusing on the FDI-receiving industry is therefore not enough when the competition effects of FDI on economic growth are analysed.

1.1.3 Labour force and economic growth

FDI is one of the channels that can improve the level of human capital in the host economy, again through spillovers and on-the-job training (Ozturk, 2007). Improving the human capital level, FDI can therefore boost economic growth.

The way FDI can have a negative impact on economic growth through the labour force is through the higher use of technology in FDI performing firms (Moura & Forte, 2009). Such usage of technology can lead to layoffs, having potential negative impact on overall demand in the economy as wage income can decrease. Lack of demand can again lead to lower economic growth. The possible positive spillovers that FDI performers have on the level of human capital in the host economy are therefore potentially counterweighted by this decrement in demand for labour.

However, weighing against this come the effects on demand for labour if the FDI performer is carrying out investments in the economy, especially those that

create new real-capital. Often, FDI is found to have a positive impact on employment levels (Subramaniam, 2008) although its impact on job creation cannot be taken for certain (Seyf, 2000). Furthermore, wages in foreign-owned companies have been found to be higher than in domestic firms (Griffith & Simpson, 2003) although it is not certain that there is a causal relationship between higher wages and a foreign ownership, i.e. there may be correlation but causality is unclear (Martins, 2004).

1.1.4 FDI, trade and economic growth

FDI and trade can be either substitutes or complements. Vertical FDI where production of the good is split into stages is likely to stimulate trade while horizontal FDI is more likely to be a substitute for trade (Markusen & Maskus, 2001). However, Neary (2009) points out that (horizontal) FDI and trade can go together if liberalization within trade blocs draws outside companies to set up an affiliate in only one area of the trade bloc and export to the rest of it from there. Potential chances for increased economies of scale, resulting from a larger market as trade costs are eliminated, can also spur M&A activity across borders as companies seize new opportunities in sharing technologies and strengthening their place in the market. Collie (2011) uses a Cournot duopoly model to explain how trade liberalisation and increased FDI can increase at the same time. Horizontal FDI and trade are therefore not necessarily substitutes.

Increased trade caused by FDI can have a positive impact on economic growth (Makki & Somwaru, 2004). But this channel can also negatively affect economic growth. A shock in one economy can translate into a lack of demand for another country's exports or higher price of imports, leading to lower and/or more variable economic growth than before.

However, even if this impact is not unrealistic in some short-term periods, the long-term effects of FDI on economic growth through the integration into the international economy seem to be positive in many cases (Dritsaki et al., 2004; Makki & Somwaru, 2004; Zhang, 2001a) although it strengthens the positive effect on economic growth through trade when export-oriented FDI is encouraged and the trade regime liberalised in general and not only in the FDI-receiving industry (Zhang, 2001a).

1.1.5 Domestic policies and economic growth

Finally, there is the possible negative impact FDI can have on the execution of domestic economic policies and so economic growth. OECD (2002, p. 6) writes that "some host country authorities perceive an increasing dependence on internationally operating enterprises as representing a loss of political sovereignty." The fact of the matter is that foreign firms invest considerable time and effort in influencing regulations and policies in the host economies, often reaping some harvest for their struggles (Desbordes & Vauday, 2007; Huang, 2005). Foreign firms holding a large stock of FDI in a country can not only gain control over significant share of the local assets but also jobs, thereby gaining political power to influence national policies towards their aims (Zhang, 2001b).

An example of this problem has developed in Iceland where heavy-industries, most notably foreign-owned aluminium smelters, consume 80% of all produced electricity in the country.[15] The prominent role of the aluminium companies (Rio Tinto Alcan, Alcoa and Century Aluminum) has put them in a monopsonist position, making it possible for them to influence the price of electricity downwards. This hurts the largest energy company in Iceland, state-owned Landsvirkjun, by lowering its profits. This also puts Landsvirkjun and the Icelandic government – there is a government guarantee on Landsvirkjun – in a tough negotiation position as Landsvirkjun has entered into debts to build up the energy production facilities. The aluminium companies can therefore have serious influence on the national policies of the Icelandic state, possibly running against national interests – such as preserving the environment – and economic growth.

1.1.6 Attracting FDI

Despite the perhaps uncertain benefits of attracting FDI, numerous countries have actively done so (Hanson, 2001). Tax concessions – similar terms include "tax incentives", "investment incentives" and "tax holidays" – are one way of doing so. Others are e.g. image building, investor facilitation and servicing, investment generation and policy advocacy (Rajan, 2004).

[15] On the per-capita scale, Iceland is the largest electricity manufacturer in the world: 53,000 kWh compared to 26,000kWh in the case of #2, Norway (author's calculations, based on CIA World Factbook data).

African countries have used tax holidays to attract the FDI while Western European countries have instead allowed faster depreciation of capital or investment allowances (Morisset & Pirnia, 2000). The argument is, of course, to attract FDI with offers of a low tax burden, or other attractors, and hope that the positive impact of the FDI will outweigh any potential costs in offering such preferential policies.

Despite its initial attractiveness, this argument seems to have limited support in practice. True, lower taxes seem to attract FDI (de Mooij & Ederveen, 2003) although the effects are stronger in the case of developed countries than in developing ones (Goodspeed, Martinez-Vazquez, & Zhang, 2011). But the costs are high enough to make it questionable whether this strategy should be adopted. Blomström and Kokko (2003) point out, as previously discussed, that since the positive spillovers of FDI do not happen automatically, then it is not an efficient way to improve national welfare to naively divert public policies only towards attracting foreign firms: the host economy must be able to reap the whole benefits, such as by having a high enough level of human capital ("absorptive capacity"). The cost of such attractions can indeed be significant. In the case of Eastern Caribbean Countries, the tax concessions ranged between 9.5% to 16% of GDP during the 1996-2000 period (Chai & Goyal, 2008). Chai and Goyal therefore ask if such a high cost of tax concessions is worth it, proposing rather pushing for better infrastructure and labour productivity.

Hanson (2001, p. 14) argues that "the only justification for favouring FDI [with e.g. tax concessions]... is the existence of market failure that is specific to multinational production." Such market failures could perhaps be the positive spillovers that FDI would bring but Hanson (p. 2) also notes that

> [s]pillovers associated with FDI are supported by casual evidence from many countries, but their existence and magnitude are... difficult to establish empirically. Indeed, micro evidence from large samples of manufacturing plants in developing countries fails to support the existence of positive productivity spillovers related to FDI.

Therefore, favouring FDI with tax concessions is debatable and it is perhaps more appropriate to emphasise building up fundamentals (education, infrastructure, legal framework, etc.) that will benefit all industries rather than

focus solely on a single one or a set of specific investments (Görg & Greenaway, 2003).

Overall, based on the review done here, we can cautiously conclude that FDI does seem to have somewhat positive effects on economic growth. However, the positive effects are more prominent in richer countries where “absorptive” capabilities of the economy are larger (Blomström et al., 1992; Borensztein et al., 1998; Gallagher & Zarsky, 2006), where the financial system is more developed (Alfaro et al., 2010; Choong, 2012), when the FDI takes place up to a certain degree (Eller et al., 2006) and when it is in the form of Greenfield investments rather than M&A activity (Harms & Méon, 2012) although a high level of human capital can improve the positive effects of M&A FDI (Wang & Sunny Wong, 2009). Using tax concessions to attract FDI may work (de Mooij & Ederveen, 2003) but such policies can be fruitless or suboptimal (Blomström & Kokko, 2003; Görg & Greenaway, 2003). Furthermore, the possible influence of FDI performing firms on national policies (such as taxation and regulation) must be kept in mind (Desbordes & Vauday, 2007).

1.2 FDI and other types of capital flows

An important issue on foreign direct investment is its connection to portfolio flows and other flows, international bank-lending in particular, between economies. One stance of the literature argues that FDI and other capital flows are substitutes for each other. The other argues differently: FDI and other capital flows are complementary to each other.

This difference matters for FDI flows are normally considered less volatile than portfolio-type flows. Volatile international capital flows that may leave the country at the first sign of economic problems will only intensify them; capital flows that are procyclical instead of countercyclical can increase economic instability (see e.g. Stiglitz (2000)). So if “cold” FDI flows act as substitutes for “hot” flows, then we can argue that macro-wide financial structures, where FDI stocks are relatively prominent, are more stable than when the balance sheets are ripe with volatile portfolio-flows stock. Indeed, Frankel and Rose (1996) note that currency crashes are less likely when the ratio of FDI to debt is high, underlining the importance of the substitutes/complements issue. Just as importantly, if FDI acts as a stimulus for portfolio flows, then it can possibly have

a negative impact on the overall stability of the economy even if the FDI stock itself may be illiquid and FDI flows possibly even countercyclical, thereby smoothing out the performance of the economy.

Claessens, Dooley & Warner (1995) look at the interaction between (net) "long term", "short term", portfolio equity and FDI flows in the case of some developed and developing countries.[16] They find that the correlation between the flows is negative and comment (p. 172) that "[different] capital flows are... highly substitutable."

Ruffin and Rassekh (1986) make an empirical test on the hypothesis that FDI flows and portfolio flows are substitutes. They use US data. Their conclusion is "that every dollar of U.S. FDI results in one less dollar being invested in foreign portfolio investment. Thus, the way [multinational corporations] finance their operations may be irrelevant to the net flow of capital between countries." (Ruffin & Rassekh, 1986, p. 1126). Ruffin's and Rassekh's methodology can be questioned though as they assume the US economy is a small economy, allowing them to treat foreign (i.e. non-US) interest rates as exogenous in their model and not under any influence of US capital flows. Although they point out (p. 1128) that US net capital outflow is "about 1 or 2 percent of the total world capital market" it is questionable to assume that the world's largest economy is "small".[17] But Werner (1994) looks at Japanese data and finds support for the hypothesis of substitution between indirect foreign investment and direct foreign investment as well.

Looking from the institutional point of view, one can argue that portfolio flows and FDI flows should be substitutes, especially in the case of a corrupt receiving country. Papaioannou (2009) points out that corrupt countries have problems attracting FDI which means that they will have to rely on international (bank) lending instead. This observation can be connected to the "Original Sin" problem of developing countries. In this case, one can argue that if the

[16] Their definitions of "short-term" and "long-term" flows are based on IMF classifications. Short-term flows: change in bank deposit claims, change in bank deposit liabilities, change in other short-term claims, change in other short-term liabilities, change in short-term official claims, change in official liabilities. Long-term flows are everything else, save FDI and portfolio equity. Errors and omissions are ignored.

[17] Magee, Yoo, Choi & Lee (2007) would probably disagree as they say that the US economy is not a large country in world trade since its market share is not high enough and it cannot change world prices by applying protection.

countries were not as corrupt as they are, they would be able to attract FDI instead of portfolio flows which often will be directed through the nation's banking system – especially if the banks have an explicit government guarantee, making it safer for international investors to lend to the banks. Wei and Wu (2001, p. 20) find that "corruption in a capital-importing country tends to tilt the composition of its capital inflow away from foreign direct investments and towards foreign banks loans." Therefore, decreasing corruption and consequently, hopefully, improving the inflow of FDI can lessen the need for foreign lending. In that case, FDI flows and portfolio flows could be considered substitutes. One must however contrast Wei and Wu's result with Albuquerque (2003) but he notes that economies where the government has a low credit rating, which is negatively correlated with corruption (Depken & Lafountain, 2006), have a higher share of FDI in their capital inflows than economies with a high credit rating, the reason being that due to intangibility of some FDI assets, such as human capital, they are more alienable than other assets, making them harder to expropriate. This gives FDI assets a lower default premium, making them the preferred type of capital flow when entering a lowly rated country. Albuquerque's conclusion can be interpreted as the different flows being substitutes, at least for these lowly rated countries, but he comments (p. 380) that FDI is simply "all that they can get." The implication seems to be that if a country's credit rating is improved, it will receive more of *both* flows although FDI's share of total inflows drops as their credit rating improves.

Finally, there is the "information-based trade off" (I. Goldstein & Razin, 2006) between investing in an enterprise via direct investment or portfolio investment. If an investor decides to invest in a company via a direct investment link (FDI) then (s)he will acquire superior information about the company, information that may not be publicly available or simultaneously available to other investors. But this knowledge comes with a cost according to Goldstein and Razin: an investor that holds an FDI investment in a company risks running into a "lemon" problem: if the investor does not have full information about the company when (s)he decides to acquire an FDI-share in it, (s)he risks that the company is a lemon and if the investor wants then to resell the company after having bought it in the first place, the market realises it is a lemon and demands a large cut in the price. Minimising this information problem is costly. A larger share of the

company – an FDI-share rather than a smaller portfolio share (less than 10% of equity) – is also less liquid so the investment cannot be easily disinvested if the investor changes his mind. Therefore, the investor may in the beginning decide not to enter the company as a direct investor but merely via a portfolio investment. In this respect, the FDI and the portfolio investment are substitutes as well.

But the substitution-story may not be so robust in all cases. Dasgupta and Ratha (2000) looked at developing countries and found that private portfolio flows, which they define (p. 12) "as the sum of commercial bank loans, bond financing from private creditors and private equity flows", increased along with FDI flows into the economies. This can hardly be interpreted in favour of the "substitutes" view but it does not reject it either since there may be another factor that is driving FDI and other capital flows at the same time.[18]

Dasgupta and Ratha explained why the FDI flows had a positive impact on the portfolio flow by simply pointing out (p. 13) that "FDI adds to the liquidity of the [financial] system in the short-term and improves the medium-term outlook on a particular sector or the economy as a whole." Other authors have highlighted this conclusion of Dasgupta and Ratha as well (Bird & Rajan, 2002). A study conducted by the United Nations found that foreign credit was positively connected to foreign direct investment in the case of Central and Eastern Europe countries (Krkoska, 2002). Bosworth and Collins (1999)[19] reach the "complements" conclusion as well, although their conclusions can be scrutinised by the fact that the positive correlation coefficients between FDI flows and portfolio flows are statistically insignificant (Bird & Rajan, 2002).

It seems then that international private portfolio flows can gravitate towards the FDI receiving economy, simply because it is doing better: FDI flows stop being, as Albuquerque would perhaps phrase it, "all that they can get." All this rhymes well with a Keynesian "Beauty Contest" basis of foreign capital flows: international capital flows follow each other, constantly seeking "the prettiest girl in the paper".

[18] Werner (2005) identifies credit creation as a causal factor of both. See also, in relation to this, Kouri and Porter (1974).
[19] Comment from Reinhart

Then there is the final thought that there need not be any certain correlation between the flows, i.e. they need not be either complementary all the time nor substitutes all the time. Reinhart (1999) points out that if it is the case that different types of capital flows respond differently to factors, they need not co-vary at all. This basically means that any possible correlation, negative or not, between different types of capital flow can perhaps be a "spurious regression" and may not necessarily be a stable relationship. A reason for this possible neutrality, according to Reinhart, can be the fact that portfolio flows are influenced by factors such as international interest rates while FDI flows are not so much, the reason being that FDI is more focused on economic fundamentals than portfolio flows.[20] Therefore, portfolio flows can move for different reasons than FDI flows and not be affected by the FDI flows themselves. The argument goes the other way around as well; FDI flows may not be influenced by portfolio flows, either positively or negatively. In this regard though, there have been some arguments for the case that interest rates of the home region can affect the FDI flows from it: higher rates of interest in the US and in Europe reduce the outward FDI from these areas (Levy Yeyati, Panizza, & Stein, 2007). So we cannot argue that FDI flows are not affected at all by international interest rates.

With this in mind, we need to remember the difficulty of correctly identifying capital flows. Bird and Rajan (2002) highlight that the issue whether a capital flow is of FDI nature or not is not clear cut. Furthermore, in the case of Malaysia, they explain how FDI flows can turn into portfolio flows later: "bolted down" equipment, financed with pre-years' FDI inflow, can be used as collateral in the host-economy financial market and the credit so raised moved out of the country, registering as portfolio flows on the way out. Albuquerque (2003) draws attention to this as well, reminding us that capital flows can change labels. It is interesting to connect this story to that told by Werner (1994), previously mentioned above, where he connects land-collateralised bank loans in Japan and the outflow of capital.

Besides the problem of identifying the label of capital flows, the issue of "complements-or-substitutes" between FDI flows and other capital flows is

[20] Fernández-Arias (1996) estimates, looking at some emerging and developing countries, that 86% of portfolio flows are explained by moves in foreign and not domestic interest rates, a phenomenon he calls "push" influence. Montiel and Reinhart (1999) conclude that interest rates have no statistical significance in determining FDI flows.

unresolved. Statistically, “substitutes” seems to come out on top. It is perhaps possible to reconcile the two views to some extent by looking at the problem from a dynamic point of view.

It might be possible to reconcile the two views above by arguing that FDI flows and portfolio flows, in their widest sense and including bank loans, are complements in the short run but substitutes in the long. Bandwagon effects and herd behaviour can be influential factors in the short run, explaining why FDI flows and portfolio flows can be complements rather than substitutes while investors are under the spell of the “beauty contest”. However, more sober thinking may compel investors to favour one flow over the other.[21] The more favoured flow can then become dominant and the capital needs of the economy will be dominantly serviced by that type of inflow alone. This can apply in the long run. In this context, it is interesting to see that in 1993-1994 portfolio flows were a very prominent share of the private capital flowing into Latin America. But during 1999-2001, the capital inflow was mainly in the form of FDI (Levy Yeyati et al., 2007): FDI flows had substituted portfolio flows as time passed.

It is also possible that FDI flows continue based on long-term possibilities of the economy while portfolio flows are more based on short-term perspectives. Although in some periods the long-term possibilities and the short-term perspectives may go hand in hand, leading to a high correlation between inflows of FDI and other types of capital, giving the impression that the flows are complementary to each other, the situation can change such that short-term perspectives turn sour and portfolio flows turn around. However, long-term possibilities can still be in order, staying attractive for FDI to continue to flow in. Therefore, the substitutes-complements effects between FDI and other types of flows may turn out to be time-period dependent.

Those propositions – that FDI flows and portfolio flows can either be complements in the short run but substitutes in the long run or complements in one time period but substitutes in the next – need however further research which is outside the scope of this text.

[21] This potential switching behaviour is not impossible and has been found in other economics related issues: Frankel and Froot (1987) found that the JPY/USD exchange rate was under bandwagon effects in the short run but the contrary in the long run.

1.3 FDI and the balance of payments

The relationship between FDI, the balance of payments and capital flows is not straightforward.

The reasons for this are mainly two. First of all, although FDI inflow shows up on the financial account of the balance of payments, it is not necessarily true that an actual capital flow takes place. The reason is that the FDI can be financed with domestic funds from within the host economy itself.[22]

Second, FDI is often mentioned as a good way of financing a current account deficit as such financing makes the current account deficit more sustainable (Fischer, 1997; Roubini & Wachtel, 1999) and less open to a "sudden-stop" crises of inflow of capital (Calvo, 1998). But FDI can in fact worsen the current account deficit in the long-run through repatriation of profits. This is so especially if the original FDI was financed with host-economy funds, possibly leading to the situation where there is only outflow of capital (in the form of repatriation of profits) from the host economy.

1.3.1 The origin of funds for FDI

MNCs have more possibilities in financing their investment than domestic corporations as they can raise funds in both the host and the home economy (Marin & Schnitzer, 2011).[23] MNCs may also have better access to international capital markets which can lower their cost of raising capital compared to purely domestic firms. They can furthermore use internal debt between the mother company and its subsidiaries to make use of possible tax incentives and opportunities (Desai, Foley, & Hines, 2004). The choice of how to finance the FDI project is influenced by those factors.

An early observation that domestic savings seemed to be highly connected to total domestic investment, carried out by domestic and foreign investors alike, was made by Feldstein and Horioka (1980). Their point – there is a high positive correlation between domestic savings and domestic investment – raises the impression that domestic savings are used by investors to invest in that economy rather than transporting the funds between economies. Feldstein (2000) states that FDI is "often" financed from the host economy. Marin and

[22] This, obviously, links to the substitution thesis of international capital flows.
[23] See previous footnote.

Schnitzer (2011) argue that FDI is “frequently” financed from the host economy. They also point out that if the FDI is financed from within the host economy, it can lead to portfolio inflows from other multinational investors into the economy, the reason being that the portfolio inflows are used to buy host-economy issued financial instruments used to locally finance the FDI. This can then lead to net capital inflow in the form of more liquid portfolio flows even though those portfolio flows are used to finance an FDI. The *actual* capital flow is however *not* in the form of FDI although the investment is. This relates to Werner’s (1994) point that FDI in a country may not mean that the capital flow, if it takes place in the first place, towards that economy is of the same type as well since the FDI may be financed with local funds. If that is the case, which is “often” or “frequently”, there is FDI in place but not necessarily any capital flow.

The effects of foreign firms raising the funds in the host economy can be negative for other firms. Harrison and McMillan (2003), using data from the Ivory Coast, report that if foreign direct investors rest heavily on the domestic banking sector it can have a negative impact on the borrowing constraints of other companies. But that may not always be so. Harrison, Love, and McMillan (2004), looking at 39 countries, estimated that FDI inflows lessen the financing constraint for other firms in the host economy. That paper, however, does not take into the account where the funds are raised.

The topic of why MNCs choose one economy as the source of financing rather than another has been probed into. Desai et al. (2004) find that external financing, rather than internal financing from the mother company, is less used when the affiliate is stationed in an economy with weak creditor rights or underdeveloped capital markets. Hooper (2004), looking at US and UK multinationals, shows that MNCs prefer to use host-economy debt in case of high political risk in the host economy. In the case of high political risk, financing is sought both from host-economy’s banks and governments, practically to get them “on board” the FDI project. The thought behind such financing, one is inclined to guess, is to lessen the risk that the FDI assets will be expropriated (because they are already on board it through their debt financing), which has happened in both democracies and autocracies (Q. Li, 2009), in case of political turmoil. Another part of the reason seems to be that in order to lessen exchange

rate risk MNCs try to borrow in the weak currency of a high political-risk country, i.e. the host economy.

It is certainly worth mentioning Marin and Schnitzer (2011) in this respect. First, they concluded that high exchange rate risk increases the use of local bank credit. Second, FDI tends to call for an actual capital flow between economies – FDI is not financed from the host economy – whenever managerial problems in the host economy are low. If corruption or political risks are high, (local) bank credit is used to incentivise the manager to show all returns of the investment project rather than funnel some of them for himself. The reason is that in that case, the local bank must be repaid the credit, or it will liquidate the investment – and the manager of the FDI project loses his job. Therefore, the manager has the incentive to show all returns of the FDI rather than funnelling them to his own pocket. The lesson is that in order to attract actual FDI-capital flow into the economy corruption of managers and political risk should be low.

An empirical example even exists for the possibility of the financing of an M&A-type FDI not only coming from the host economy but from the operations of the target corporation itself.

In 2009, the Canadian firm Magma Energy Corp. (today: Alterra Power) bought a 32% share in HS Orka in Iceland (through a subsidiary in Sweden, Magma Energy Sweden A/S) off Reykjavik Energy. The total price of this FDI was 12.3 billion ISK (100 million USD) and Magma paid 70% of the investment with a single-payment bond. The bond was issued by Magma Energy Sweden A/S and transferred into the ownership of Reykjavik Energy, the seller of the share. The collateral of the bond was the stock in HS Orka itself, i.e. the 32% share that was changing hands.

In this case, no funds were raised for this part of the total payment. The ownership of HS Orka was transferred off the books of Reykjavik Energy onto the books of Magma Energy Sweden and instead, Reykjavik Energy got 3.7 billion ISK in cash and held a single-payment bond issued by Magma Energy Sweden.

Of course, Magma Energy Sweden could essentially finance the cost of the bond to a large extent with the profits of HS Orka itself; accumulated profits of HS Orka 2009-2012 amounted to 7.3 billion ISK.[24]

Only a small part of these profits were paid out in dividends[25] however but this example serves the purpose of showing the possibility of financing the cost of FDI with the operations of the target company itself, especially since most of the contractual cash flows of the bond have not matured and there is still time to extract profits out of the company to be used to service the cost of the original FDI.[26]

1.3.2 The effects on the balance of payments

We have seen that FDI is claimed to be the most advantageous way of financing a current account deficit. There exists the possibility however that the net effects of FDI on net receipts of foreign funds can be negative: although the money can flow into the economy through the capital account in the balance of payments they can later flow out through the current account.

The reason is not only repatriation of profits but the possible impact the FDI can have on the nature of international trade: if the FDI is into an export industry, it is less likely that the net effects on the net receipts of foreign funds will be negative than if the FDI is of the horizontal type, the reason being that profits from horizontal non-export FDI can be made locally but siphoned out of the economy (Brouthers, Werner, & Wilkinson, 1996). The risk of negative net impacts on the receipts of foreign funds is also prominent if the FDI is financed from the host economy itself, calling for no net capital flows through the capital account in the beginning. Mencinger (2008) asserts that the outflow of capital can be accelerated by the entry of an MNC to an economy but claims at the same time that sudden stops in the inflow of FDI can cause an exchange rate crisis. He therefore calls FDI inflows “addictive”. Levy Yeyati et al. (2007) point out that since the surge in FDI flows has been so “spectacular”, a sudden stop in FDI inflow can have “consequences” for receiving emerging markets and their finances.

[24] According to company records.
[25] 2013 was the only year HS Orka paid out a dividend since 2009, 150 million ISK in total.
[26] Some sources for the FDI of Magma in HS Orka: (Gunnarsson, 2010a, 2010b, 2010c)

The net effects of FDI on the balance of payments are an empirical issue for theoretically, the balance of net receipts of foreign funds can tilt both ways. Studies focusing on the overall net effects of FDI on the net receipts of foreign funds seem to be scant.[27] Studies focusing on the effect of FDI on the current account are more numerous however and many of them reach either an inconclusive or a negative conclusion.

Hailu (2010) finds that FDI in some African countries[28] has a negative impact on the balance of trade, which is a "major component" of the current account. N. Campos and Leal (2013), looking at Brazil, reach inconclusive results regarding the net effects of FDI on the trade balance: FDI inflow boosts both export and imports in the short run – foreign-owned exporters can have the need to import inputs – but only exports in the long run. The net effects on the trade balance are uncertain. In India, inward FDI has a negative impact on the current account (Sarode, 2012). And in the case of China, Zhang and Song (2001) find that inward FDI boosted China's net exports.

The inflow of FDI into the economy can also affect the current account through the exchange rate. FDI inflow, like general inflow of capital, strengthens the exchange rate and can divert domestic spending towards imports rather than domestic production. This would lead to negative impacts on the current account.

1.4 FDI and financial stability

The connection between financial stability and FDI has conventionally been investigated in relation to capital flows and their nature. The reason why is that financial crises have often been connected with capital flows and their reversals (Fernández-Arias & Hausmann, 2000). The usual view is that since FDI flows are "cold" the risk of sudden flow reversals leading to balance-of-payments crisis is lower than in the case of "hotter" portfolio flows. Sudden hot money movements are also supposedly due to interest rate differences and expected exchange rate changes while FDI is more based on long-term profit incentives (Sarno & Taylor, 1999). Therefore, the conventional view is that if a country

[27] One study claimed the overall effects of FDI on balance of payments and the earnings of foreign exchange to be negative (Gallagher & Zarsky, 2006).
[28] Burundi, Cameron, Ivory Coast, Gabon, Gambia, Ghana, Lesotho, Malawi, Morocco, Nigeria, Sierra Leone, South Africa, Tunisia, Togo, Uganda and Zambia.

wants to reduce the financial instability arising from capital flows reversals, FDI should be increased as a share of total capital inflows (Bird & Rajan, 2002). Furthermore, if a country is running current account deficits, they should be financed with FDI inflows rather than portfolio inflows due to the former's relative irreversibility. We should, however, remember that financing the current account with FDI inflows can be "addictive" (Mencinger, 2008).

Empirically, FDI flows have been shown to be more stable than other flows. Lipsay (2001) looked at three famous financial crises (Latin America in 1982, Mexico's Tequila Crisis in 1994 and East Asia's problems in 1997) and found that inflows of direct investments had been more stable than portfolio or other types of inflows. Albuquerque (2003) has similar results and Wei (2006) finds out that FDI flows (as a ratio of GDP) are less volatile than bank loans (as a ratio of GDP), especially in emerging markets.

The apparent difference in the volatility between FDI flows and portfolio flows can be explained by investment irreversibility. FDI – especially Greenfield investments – is fixed (real capital assets), has sunken costs that call for further inflow of funds to finish the investment (a half-finished manufacturing site is practically useless and worthless except for scrap) and cannot be picked up and taken out of the country. In the meanwhile, portfolio flows can be more easily liquidated, as they are often in the form of marketable financial assets, and the proceeds taken out of the economy. Even a psychological argument can be put forward for why FDI flows are more stable than portfolio flows. It is well known that humans suffer from "sunk cost effects" which can be described as the tendency to continue an investment which money, time and effort has been put into although new information reveal the investment not to be as profitable as previously assumed – and even not profitable. This has also been called "to throw good money after bad" symptom (Arkes & Blumer, 1985; Garland, 1990; Navarro & Fantino, 2005). An FDI performing investor which experiences a financial crisis or a general deterioration in the investment outlook is subject to the sunk cost effects. This is so especially if the FDI is in a Greenfield investment project which is only partially finished when the crisis happens and new information about the profitability of the investment and the macro environment are revealed. Rather than cutting his losses and stopping the investment – rationally thinking on the margin – the FDI investor can decide,

perhaps wrongfully and under the spell of sunk cost effects, to continue the investment. The FDI inflow therefore continues despite the weakened outlook. In the meanwhile, the portfolio investor leaves the economy, turning his previous inflow into an outflow. All this can have the effects of FDI flows coming out as a more stable capital flow than other more marketable investments that are not as strongly influenced by the sunk cost effects.[29]

On the connection between FDI flows and financial stability, we have already mentioned Frankel and Rose (1996) and their finding, looking at emerging markets, that there is a less risk of a capital-flow induced crisis if the FDI is larger as a share of the total inflow of capital. But this result does not seem to be entirely robust and even country specific. Fernández-Arias and Hausmann (2000, pp. 8-9) find that although for developing countries "non-FDI exposure appears to increase the probability of currency crisis while FDI appears to be neutral and, if anything, seems to lower it" this does not apply to industrial countries: "the evidence suggests that FDI is safer than non-FDI only when we restrict the sample to developing countries." And Babecký et al. (2013, p. 12), in looking at leading indicators for crises in developed countries, find that "[t]he inflow of foreign direct investment turns out to be associated with the severity of crises as well. According to our results, countries which have enjoyed an abundance of FDI inflows tend to suffer more in crises."

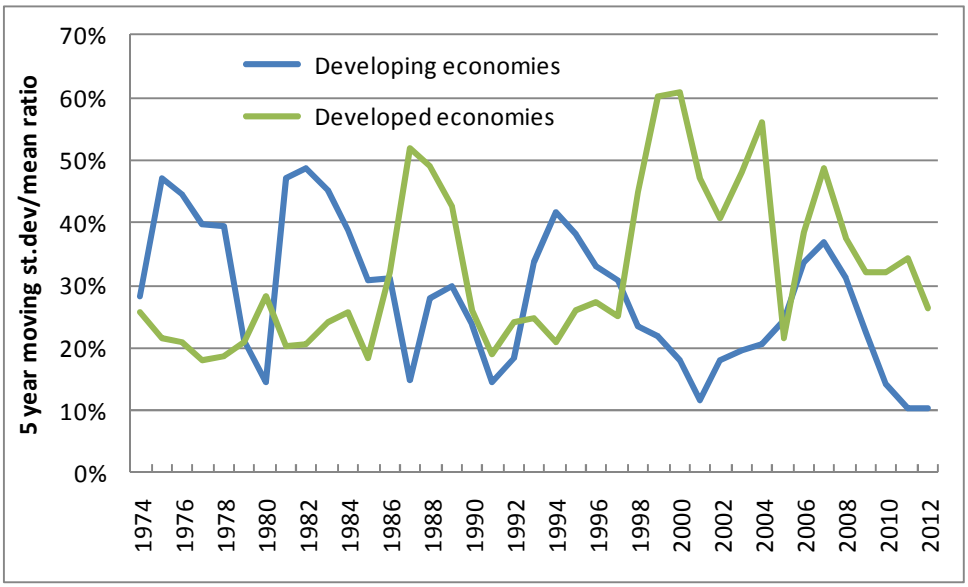
Notice also that Fernández-Arias and Hausmann (2000) and Nitithanprapas and Willett (2000) point out that the high-FDI ratio of total external liability exposures is connected to *currency* crises. But financial instability[30] can break out in other forms than in a currency crisis. Examples are e.g. banking crises and unstable asset prices in the wake of excessive credit expansion.

This leads us to ask an important question: although FDI flows can have a positive effect on the occurrence of a currency crisis, does the same happen to be the case in other types of financial instability? The answer to this question is not straight forward.

[29] To the author's knowledge, this potential link between FDI inflows, their stability and psychological sunk cost effects has not been researched.
[30] See chapter 3 regarding the definition of financial instability.

First, it should be recognised that although FDI flows are more stable than other types of capital flows, the variability in their levels is considerable. Interestingly, the variability is often higher in the case of developed economies than in developing economies. Figure 1.5 is based on the data from UNCTAD. It shows that the variability of FDI inflows into developed economies has been larger on many occasions than into developing economies. This variability in FDI flows brings in itself instability, just as unstable portfolio flows can have adverse effects on the economy.

Figure 1.5 – FDI inflows' variability



Second, FDI inflows may act as complements to other flows. This has been probed into in earlier sections in this chapter. But by attracting other less stable capital flows into the economy, FDI inflows indirectly lead to instability. In other words, if FDI is "smart money" which is channelled to economies only after a careful consideration of the economy's prospects – rather than "dumb money" which is more subject to ever-changing crowd sentiment – FDI flows can act as a signal to other investors that it is safe to invest in the economy. These signalling effects can not only drag in other FDI flows, as Sarno and Taylor (1999) point out, but other types of capital flows as well, less stable in nature. Therefore, FDI flows can indirectly increase the instability of the economy by complementing other less stable capital flows just as the FDI flows themselves can be destabilising.

Third, as Bird and Rajan (2002) point out, FDI flows can flow in under the label of FDI but flow out in the form of portfolio flow when the capital assets are used as a collateral to raise funds in the host economy which are then exported through the capital account. The actual stickiness of FDI inflows can therefore be questioned, perhaps especially so in developed economies with highly developed financial sectors where one can find the experience in and the supply of financial goods and services (such as derivatives, forward contracts, options, etc.) which can be used to more easily collateralise real capital assets which have been built up with FDI inflows in the years before. The stickiness of FDI can therefore, potentially, be dependent on the development level of the banking system which can have an impact on the real economy, especially after the banking system has reached the stage where its liabilities are considered a final payment in commerce.[31]

Fourth, FDI can have – with some notable limitations as previously discussed (see *1.1 FDI and economic growth*) – a positive impact on economic growth in the host economy. This should improve the foundations of the economy and make the general populace better off. However, if FDI has a positive impact on growth and that leads to excessive private credit growth in the economy – which can have a negative impact on financial stability (International Monetary Fund, 2004; Keen, 1997; Minsky, 1984, 2008a, 2008b; Werner, 2005) – the risk is that FDI will have a negative impact on financial stability despite its possible positive impact on economic growth. And FDI can have a boosting impact on the rate of growth of credit in the economy. Bird and Rajan (2002, p. 200) claim that it is a "fact that FDI tends to be accompanied by an increase in bank loans." Hegerty (2009) found that FDI inflows, as well as non-FDI inflows, encouraged credit growth in Bulgaria over the time period 4Q97-1Q08. FDI can also boost the overall sentiment of economic players in the economy and improved belief in the economy can boost credit growth, both through consumer credit (Lamdin, 2008) and investors' "animal spirits" (Keynes, 1936), which can later lead to financial crises (Minsky, 1984, 2008a, 2008b). Improved investor sentiment can also lead to stock-market booms and busts, especially in "countries culturally more prone to herd-like behaviour and overreaction and countries with low efficient regulatory institutions" (Zouaoui, Nouyrigat, & Beer, 2011, p. 745).

[31] See e.g. Chick (1986) on the evolution of the banking system and its impact on the real economy.

Finally, FDI has been found to contribute to aggressive investment growth in the host economy (Henry, 2000). Although such investment growth can be considered advantageous the risk is always that it develops into "euphoria" as Minsky highlighted in his Financial Instability Hypothesis (Minsky, 1984).[32]

Fifth, especially if the FDI is financed from within the host economy, which is often the case (Feldstein, 2000),[33] the risk is that once the profits of an FDI project are repatriated home, the balance of payments of the host economy will suffer in the long run. Related to the effects on the balance of payments is the impact FDI inflow has on the current account. Since the inflow of capital can strengthen the exchange rate it can divert domestic spending towards imports rather than domestic production. This can affect the stability of the economy as such developments would have a negative impact on the current account and the net earnings of foreign exchange (Gallagher & Zarsky, 2006; Hailu, 2010; Sarode, 2012).

Sixth, it is not certain that FDI flows are in fact FDI flows or even capital flows between countries in the first place. IMF (1998, p. 82) mentions that "questions may be raised about the reliability of data that distinguish [foreign] direct investment from other capital flows". Furthermore, the FDI can be financed from within the host economy itself (Feldstein, 2000; Marin & Schnitzer, 2011; Werner, 1994) so there is potentially no capital or a limited amount of it flowing between economies although FDI activity takes place. This can misinform policy makers into assuming that the underlying external position of the economy is better than it actually is. Market participants can also be misinformed, leading to wrong policy and commercial decisions based on incorrect information. Potentially, this can have unfavourable effects on the financial stability of the economy.

Seventh, Geršl & Hlaváček (2006) make the point that if the FDI is not financed from within the host economy but through the MNC itself, it can lead to less demand by large, international companies in the host economy for bank loans from the domestic bank sector. This, according to Geršl & Hlaváček, can slow down the development of the host economy banking sector and potentially hurts its profits, the reason being that the banks do not find any secure borrowers like

[32] Financial instability will be discussed in further detail in Chapter 3
[33] This can be interpreted in favour of the substitution thesis. See also Werner (1994).

the MNCs. The banks can be tempted to respond to this lack of credit-demand from international companies by increasing their extended credit to domestic corporations, which may well be riskier borrowers than the geographically better diversified MNCs. Therefore, credit risk of loans lent out by domestic banks can increase. Geršl & Hlaváček then join this with the point that FDI can, like other investment, go through a life-cycle where the final stage is a relocation decision of the MNC: the FDI is wound down. This relocation, especially if small, domestic firms were servicing the FDI investor, can hurt the host economy and the banking system as well when the domestic firms, previously servicing the FDI investor, lose income. The credit risk subsequently materialises. Therefore, through this channel, FDI can adversely affect financial stability.

Notwithstanding all this, financial stability can, theoretically, also be improved by FDI.

First, if FDI flows into an economy during a period of financial stress, the foreign capital so received may be much welcomed. This is particularly so if other foreign capital is flowing out of the economy during an episode of a currency crisis. In that case, the FDI inflow can provide much needed foreign exchange into the currency market, dwindling the fall of the local currency. Nevertheless, despite this positive side of FDI, the "fire-sale" aspect of such FDI inflows at times of crisis should be kept in mind. Krugman (2000, p. 44) asks the question: "[A]re foreign corporations taking over control of domestic enterprises because they have special competence, and can therefore run them better, or simply because they have cash and the locals have not?"[34] The fear of foreign influences can be present as Krugman shows when he quotes (p. 44) the prime minister of Malaysia during the Asian crisis in 1998, Mahathir Mohamad: "We must realize the great danger facing our country. If we are not careful, we will be recolonized."[35] The possibility of such opinions developing into political instability is not nonexistent.

[34] Krugman gives two different answers to this question. One is when foreign firms are indeed more efficient than domestic ones and should and do control them through FDI. The other – "the financial panic point of view" (p. 55) – is where the domestic firms are liquidity constrained and the foreign firms only get involved when a crisis hits.

[35] The Associated Press (Joshi, 1998) quotes him: "We know there are attempts to recolonize us."

Second, opening up the possibility of FDI may stabilise asset prices as it opens up the possibility of increased liquidity (Krugman, 2000). Therefore, liquidity crises may be averted. This would improve financial stability.

Third, if the FDI helps diversifying the economy towards less economic dependence on one prominent sector, it can help building up resilience against any shocks in that sector; it is wise not to put all one's eggs in the same basket. FDI has, as an example, been found to support export diversification in developing countries (Iwamoto & Nabeshima, 2012). This strengthens the diversification of the relevant economies as they become less dependent on one single type of exports.

Fourth, if FDI activity stimulates gross investment, this may provide wage income for workers, especially in the Greenfield-FDI case (the contrary may in fact be the case in M&A FDI due to temporary layoffs). This would improve household income, making it easier for them to service debt. We can therefore assume that this strengthens financial stability.

Fifth, opening up and welcoming FDI may increase the economy's access to foreign capital, i.e. it can complement other flows (see *1.2 FDI and other types of capital flows*). This is not only important in situations such as those described by the first point here above but in non-crisis environments as well. Increased liquidity and access to capital can lower the rate of interest. Since high rates of interest are an important reason for why financial instability can develop (Keen, 1997; Minsky, 1984; Tily, 2010)[36] we can think FDI to have positive impact on financial stability through this channel.

Sixth, as already mentioned, *if* – it is far from certain, see *1.1 FDI and economic growth* – FDI improves management and productivity of inputs in production processes then this improvement can have a positive impact on financial stability via improved allocation and usage of resources.

Finally, the other side must be mentioned as well: what are the effects of improved financial stability on FDI? Naturally, we should expect the relationship to be positive. Indeed, one merely needs to take a glimpse at figure 1.1 to see

[36] Low interest rates can induce instability, especially if they are accompanied by strong credit growth. But then, the ultimate problem is not the low rate of interest but the too easy access to credit (Tily, 2010).

that FDI flows between economies fell sharply around the recent episodes of financial instability in the 2000s. However, it is possible that FDI inflows can, at least in certain cases, increase in the wake of a financial crisis or general slowdown in the business cycle. The most obvious candidate is of course "fire-sale FDI" (Krugman, 2000) which would flow into an economy to buy existing assets for cheap prices due to a financial crisis and a consequential drop in asset prices. Such FDI is not necessarily positive – the foreign parties are not inevitably better at running the companies, their dominant advantage is that they have cash to pay for the asset while nobody else does – and it is hard to imagine that it would be a smart policy to induce a financial crisis merely to attract such FDI into the economy.

Furthermore, it would be unwise to trust blindly that FDI inflows would come or continue at times of financial crises and assist in stabilising or restarting the economy. In a recent paper, Solomos, Papageorgiou and Koumparoulis (2012) find that FDI inflows were procyclical and not countercyclical in the case of the European Monetary Union during 1996-2011. Alas, the possible procyclical nature of FDI inflows can be a source of instability on its own. Ahmed and Martinez-Zarzoso (2013) concluded that FDI inflows into Pakistan were procyclical and destabilising. But FDI does not need to be procyclical as Contessi, De Pace and Francis (2013) found out. They in fact stated that FDI inflows were the only type of inward capital flows that was not procyclical in emerging economies.[37] We can therefore not securely claim that FDI inflows are either pro- or countercyclical.

Overall, as evident from the discussion above, there is a considerable ambiguity whether FDI will lead to improved financial stability or not. Not only is there ambiguity in the net effects in any given time period but we cannot rule out the possibility that the net effects will change between time periods: an FDI project that has a positive/negative impact on the level of financial stability in one time period may not necessarily do so in the next. A potential example is easy to imagine: during the construction of a Greenfield FDI project the capital inflow provides foreign exchange receipts and the investment itself demands labour which receives wage income, strengthening the cash flows of the economy.

[37] The following emerging economies are in their study: Argentina, Brazil, Indonesia, Mexico, Peru, Philippines, South Korea, Thailand, and Turkey. They use quarterly data, 1992-2005.

Later, when the construction is finished and profits are repatriated, the economy experiences both increased unemployment and lower foreign earnings. Initial positive influences of FDI on financial stability have turned negative.

Conclusion to chapter 1

So far, we have focused on only four aspects of FDI. Its impact on economic growth has been discussed. We can, cautiously, state that FDI *can* increase economic growth but it will not do so with certainty. Certain conditions, such as a developed financial system, a high level of human capital and FDI in the form of Greenfield investments rather than mergers and acquisitions, improve the effects. Furthermore, more FDI may not always be better: the economy needs time to absorb it. Despite the perhaps illusive positive effects of FDI, many countries have actively tried to attract it. The costs of such policies may not always be justified.

FDI's relationship with other types of capital flows was also probed into. This relationship can be very dynamically complicated and the issue of whether FDI flows and other types of capital flows are complements or substitutes is unresolved.

The connection between FDI and the balance of payments was investigated. FDI can alleviate balance of payments pressures by providing foreign exchange at the time of need. However, through the leakage of profits back to the home country and potential import-oriented effects of FDI, the net long-term effects of FDI on the balance of payments can be negative.

Finally, the complex effects of FDI on financial stability were discussed. FDI can have both negative and positive effects on financial stability. Negative ones include e.g. the variability in the FDI inflows themselves, their uncertain stickiness which can give the false feeling of stability and the possible stimulus FDI flows can have on the development of an investment boom. Positive impacts include diversification of the economy's industries, welcome foreign capital in times of capital flight and stabilisation of asset prices. However, there is ambiguity in which effects will come out on top and it is furthermore possible that the net effects can change between periods.

There is furthermore an important aspect that must be kept in mind: are the effects of FDI on financial stability the same no matter which industry the FDI takes place in?

In next chapter, we will focus on one sector in particular – the financial sector – and argue that the nature of the effects of FDI on financial stability is different in that industry compared to others.

Chapter 2 – FDI in financial services and its uniqueness

> And I sincerely believe, with you, that banking establishments are more dangerous than standing armies; and that the principle of spending money to be paid by posterity, under the name of funding, is but swindling futurity on a large scale.
>
> Thomas Jefferson, 3rd President of the USA (Jefferson, 1816)

> It is not by augmenting the capital of the country, but by rendering a greater part of that capital active and productive than would otherwise be so, that the most judicious operations of banking can increase the industry of the country.
>
> Adam Smith (1776, p. 307)

2.1 What do banks do?

Before we get into discussing the specifics of FDI in banking it is best to make it clear immediately what banks do. This discussion will not cover the full depth of the topic but merely clarify the most important parts.

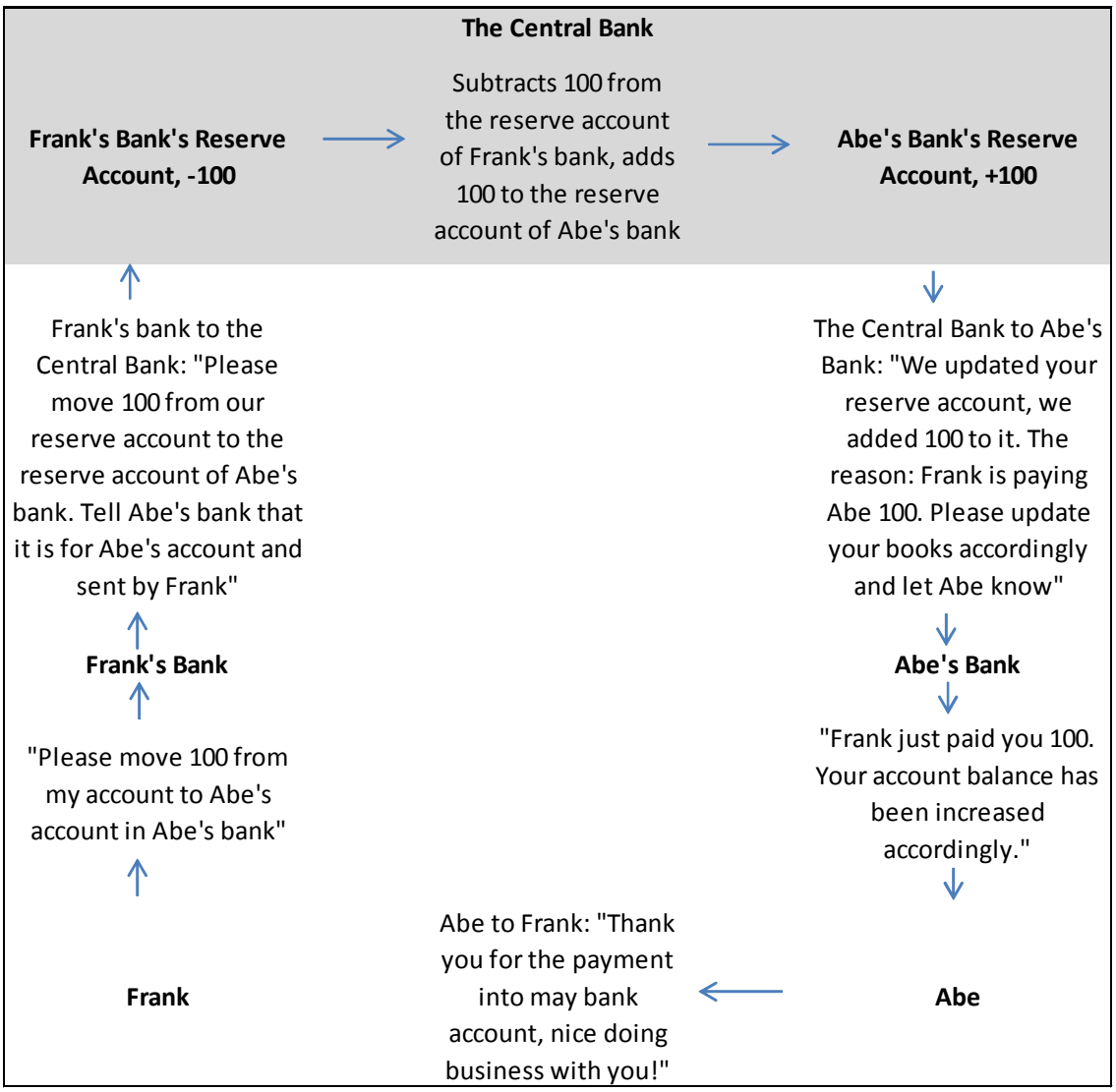
2.1.1 Banks and the payment system

Most money that is used in a modern economy is bank deposits, making banks an important link in the payment system.[38] When a payment is done with a bank deposit – say from a deposit account in Bank A to a deposit account in Bank B – Bank A asks the central bank to transfer reserves from its reserves account to the reserves account of Bank B. At the same time, Bank B gets information informing it that the transfer of the reserves is due to a payment into one of its customers' deposits account. Banks A and B then update the customers' deposit accounts accordingly (Ryan-Collins, Greenham, Werner, & Jackson, 2011). This transfer of banks' reserves – a central bank liability – as an accepted means of payment, not only between private individuals but towards and from the state as well, is a common practice: "In modern sovereign nations

[38] Werner (2005, p.161) points out the banks' importance in the payment system, practically calling them, and the central bank, the payment system itself: "[L]ess than 5%, most likely between 1% and 2%, of all transactions takes place in cash. The rest is settled as non-cash transfers. Since even non-bank financial institutions, such as credit card companies, ultimately settle their accounts through the banking system, virtually all non-cash payments are settled in the accounts of banks (and the central bank)." He was speaking especially about Japan but the argument can be applied to most economies.

with their own domestic, floating, currencies, [the money accepted in payment of taxes] is always an inconvertible, high powered, money (liabilities of the treasury and central bank)" (Wray, 2007, p. 11). The payment of a certain amount is best described with a simple flow-chart, see figure 2.1 (based on Figure 12, p. 61, Collins, Greenham, Werner, & Jackson (2011)) where the payment of a certain amount from Frank to Abe using a bank deposit, e.g. because Frank bought a used mobile phone of Abe, is described.[39] Do note that this describes a domestic transfer of a payment (£ in the UK, $ in the US, ¥ in Japan, etc.).

Figure 2.1 The payment of 100 money units of account from Frank to Abe



[39] We ignore the possibility of any netting out between banks of their gross liabilities before the reserves are moved between the reserve accounts, i.e. this is a Real-Time Gross Settlement payment and not a Deferred Net Settlement. See e.g. Dent and Dison (2012) for an introduction to the UK payment system.

We see here that payments between individuals, using bank deposits, are in fact settled with the movement of central bank reserves from the reserve account of the payer's bank to the reserve account of the payee's bank.

The steps are similar when an international payment is made except an additional layer comes on top. We can, as an example, take the case where US dollars are transferred from one country to another. Wray (2012, loc. 2814) explains: "The domestic central bank [of the payer's country] will have a Dollar account at the US Fed. When payment is made to a foreigner, the central bank's account [at the US Fed] is debited, and the account of some other foreign central bank's account [at the US Fed] is credited (unless, of course, the payment is made to the United States)." With this in mind, we can amend figure 2.1 with a foreign payment in US dollars in mind, see figure 2.2.

One note is in order however. Although it is depicted in figure 2.2 that the domestic banks will go through their relevant *central banks* to clear the payment this is not always the case. Instead of going through the relevant central banks, which then go to the US Fed, the banks can to their foreign "correspondent banks" instead. The correspondent banks are banks that operate in the state where the relevant currency is issued and have a reserve account at the relevant central bank. The banks of the payer and the payee have an account at their correspondent banks, denominated in the relevant currency of that state (Ásgeirsson, 2003).

In our case the domestic bank of Frank, the payer, would have a US dollar account at its correspondent bank in the US instead of going through its domestic reserves account at Central Bank A. Likewise, the domestic bank of Abe, the payee, would have another (or perhaps the same) correspondent bank in the US with a US dollar account in its name as well – and its reserves account at the Central Bank B would be untouched. The correspondent banks would then have reserves moved between them at the US Fed, similar to a domestic payment as explained in Figure 2.1. See figure 2.3 for this version of how international payment is carried out.

It is left unsaid here which settlement process of international payments is more common but going through correspondent banks is, according to Ásgeirsson (2003), "traditional".

Figure 2.2 An international payment in US dollars, $, following Wray (2012)

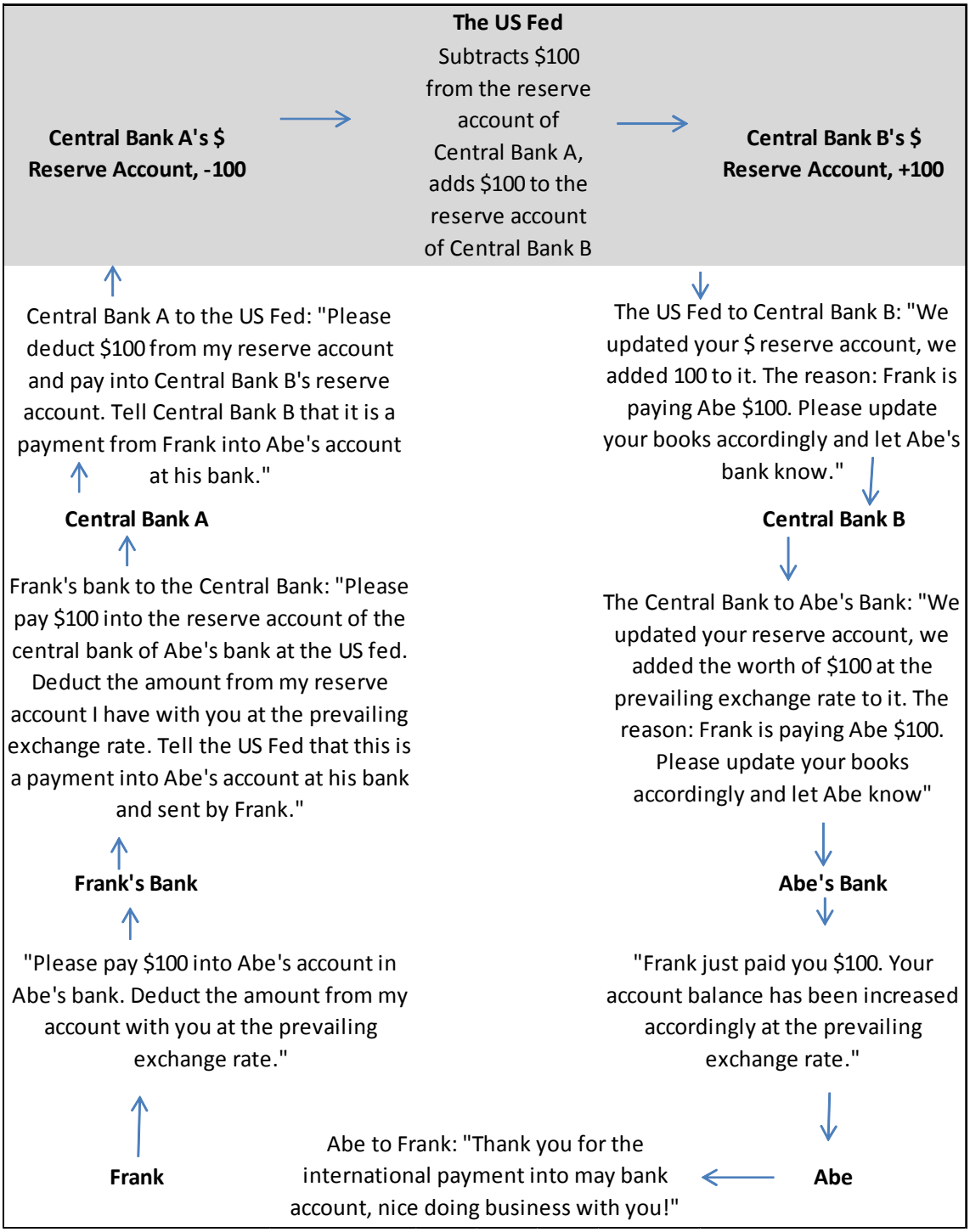
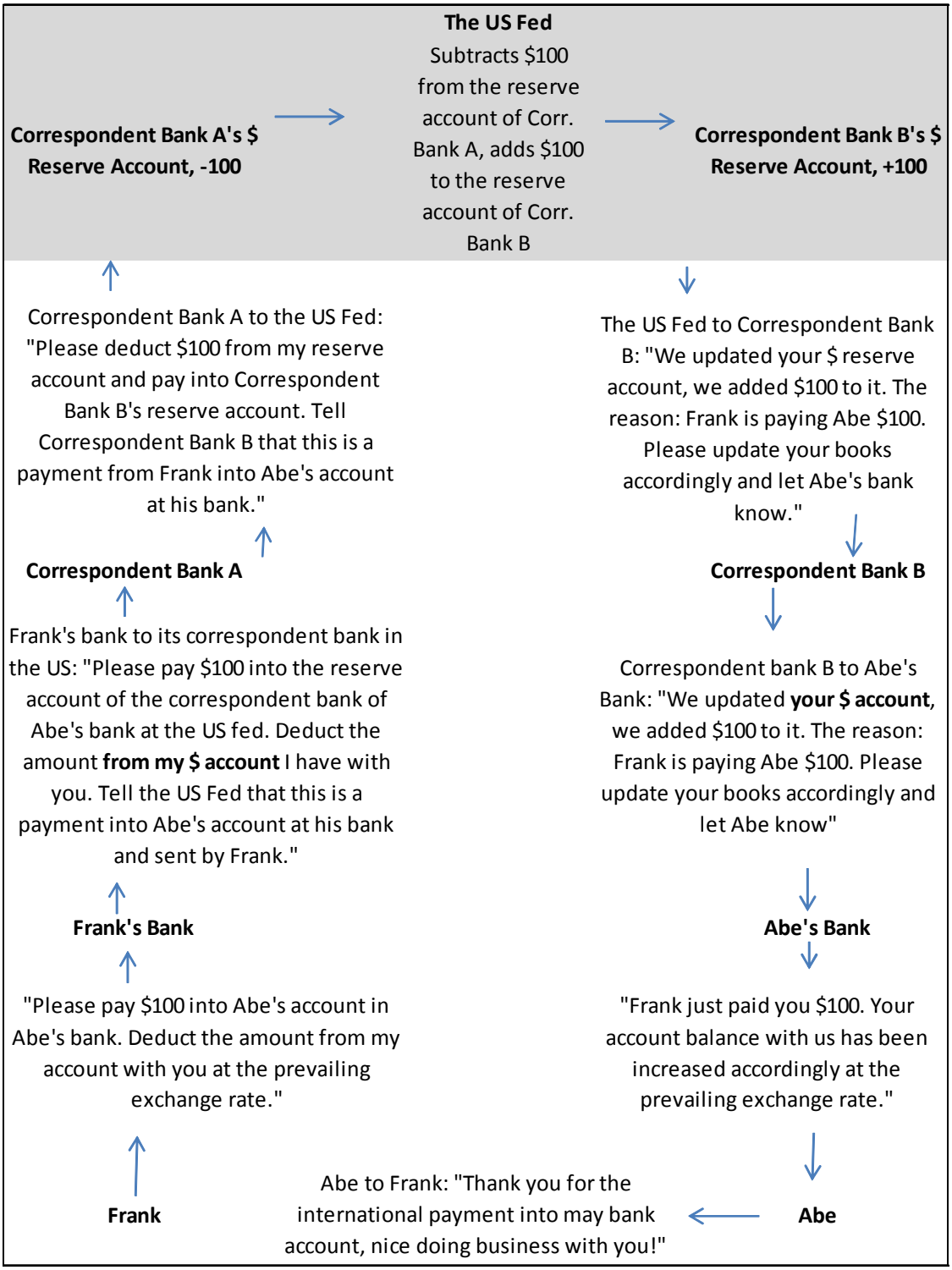


Figure 2.3 An international payment in US dollars, $, following Ásgeirsson (2003)



So banks have an intermediary role in the payment system, both on national and international level. They also have an important role in the creation of credit. Next section clarifies this in more detail.

2.1.2 On money, credit and banks

Money is defined by what the state accepts as payment for tax debts (Wray, 1998). Money is, in other words, "a creature of the state" (Wray, 1998, p. 7). Since bank deposits are, in many if not all countries, accepted, by the state, as payment for taxes bank deposits are money: banks' debts, i.e. bank deposits, are money. This definition, this Chartalist approach to money, is adopted here.[40]

According to the endogenous view on money, money is created parallel to the creation of bank credit. The theory of endogenous money contrasts with that of exogenous money. Wray (1992) provides an excellent discussion on the matter.

In short, according to the exogenous view, money is exogenously determined by the central bank or a public institution: "exogeneity really refers to the ability of the government to control the quantity of money" (Wray, 1992, p. 1152). The first step taken in the process of determining the total supply of money is taken by the central bank according to the exogenous view when it decides how much reserves ("high powered money") it should supply into the economy. The supply of "loanable funds" – the savings curve – is a function of the time preference of consumption today versus later. *Banks act as intermediaries between savers and borrowers*, utilising the money multiplier, which is exogenously determined by the central bank via its reserve requirement ratio, to "relend" the same money again and again: deposits *lead to* loans. The investment curve is determined by the marginal product of capital which again is determined by changes in the technology level of real capital. The real equilibrium rate of interest then adjusts to equate the demand and supply of loanable funds. Changing the money supply, such as if the central bank "prints" more reserves or changes the reserve requirement ratio, will only affect real variables in the economy if people are subject to a "money illusion" or if prices are sticky in the short run. In the long run, changes in the nominal money supply will only increase prices accordingly. The money supply is vertical in the money-interest space (Wray (1992) referencing Moore(1988)).

The endogenous view is quite different. Banks create, *by simply writing it down on their balance sheets*, the spendable bank deposits, i.e. money, for the borrower at the same time as the borrower agrees to owe the bank the same

[40] For discussion about the Chartalist approach compared to other approaches to what money is (such as commodity-money) see e.g. Wray (1998), Graeber (2011) and Arestis and Sawyer (2006).

amount, written on the asset side of the bank's balance sheet, plus interest (Keen, 2009a). Contrary to the exogenous view, *it is the banks which act first in the money creation process*: "new loans create new deposits" (Howells & Hussein, 1999, p. 441), i.e. loans *lead to* deposits. This, that loans lead to deposits and not the other way around like the exogenous view claims, has been shown to be empirically true (Werner, 2014). Then, once the creation of money has taken place alongside the granting of the loan, if the banks must meet reserve requirements they will buy or rent the needed reserves on the interbank market and if supply on that market is short, the banks will seek the needed reserves from the central bank. The central bank will simply create the reserves accordingly at a price (such as a rate of interest in a repurchasing agreement) solely chosen by the central bank itself (the policy rate). If the central bank refuses to create and supply the reserves it will create a liquidity panic in the interbank market and force banks to liquidate illiquid assets to raise cash or reserves to meet their liquidity needs. This can force prices of banks' assets down, seriously impacting the level of equity of banking institutions and create financial instability. Therefore, if the central bank does not want to create instability in the financial system, it will *have to* supply the reserves when needed (Wray, 1992).

The rate of interest in the endogenous view is determined by other factors than in the exogenous view. There are generally two different opinions on the determination of the rate of interest (Wray, 1992). One view, originating from Moore (1988), is that the rate of interest is exogenously decided by the central bank through the price of reserves to banks. Another view, coming from Keynes (1936), is that the rate of interest is endogenously decided by the liquidity preference which is influenced by uncertainty about the future.

According to Wray, the most important contribution of the endogenous approach to money is the realisation that "spending must be financed and that deficit spending is closely tied to credit creation" (Wray, 1992, p. 1156). It is worth quoting Wray at length (p. 1156, original emphasis):

> It is this recognition, that money is privately created [by banks] to allow spending to grow, that separates the horizontalist position from the neoclassical synthesis [exogenous view]. In the ISLM framework,

> it is possible to analyze the effects of an increase in spending while holding the money supply constant, or vice versa. This dichotomy is rejected by the endogenous money approach: all spending must be financed; most finance in any modern capitalist economy is privately supplied by banks; growth of spending is always closely tied to credit expansion; and in modern economies, credit *is* money. In capitalist economies, money does not enter the economy through actions of the central bank, but through the actions of private agents who decide to deficit spend.[41]

There is a matter regarding which part of the credit market – demand or supply – is more determining. Wray comments that for a given rate of interest banks will "meet all loan demand at that interest rate by passively creating money" (Wray, 1992, p. 1154). This is the extreme "horizontalist" approach: "banks simply take the exogenously determined overnight rate set by the central bank, and then add a mark-up to determine the lending rate—with the supply of credit through bank loans infinitely elastic at that rate" (Wray, 2015, p. 3).[42] This implies that credit, i.e. money, is demand-determined rather than supply-determined. But other authors (Minsky, 2008b; Rochon, 2012a; Werner, 2005) have pointed out that supply can be the limiting factor. Minsky argued that "the supply of finance can become less than perfectly elastic as lending rates rise (Wray, 2015, p. 3). Indeed, in 1986 he was of the opinion that "[a]cceptable financing techniques... depend upon the subjective preferences and views of bankers and businessmen about prospects (Minsky, 2008b, p. 237).[43] Rochon comments that credit, i.e. money, "can be supply-constrained only in the sense that banks may not *want* to lend, but not because they *cannot* lend" (Louis-Phillipe Rochon, 2012a, pp. 296-297, emphasis added). This is not the same as the supply of credit being constrained by "loanable funds" (savings) but banks' willingness and capabilities to create the credit. This is the exact opposite to the

[41] Although Wray writes that "money does not enter the economy through actions of the central bank" this does not need to be so as the central bank is also a creator of credit and can equally supply it into the economy, just as banks can and do (Werner, 2005). However, Wray is describing the modern monetary system in where, as we will see, banks create the majority of credit, i.e. money. We can, as Werner points out, organise the system in a different way. But we will not dwell deeper into any such propositions as of yet but let them wait until chapter 5.

[42] To do Wray full justice, it should be noted here that he does not agree with this position.

[43] The standards which determine the supply of bank-finance are subject to change: "[S]uccess breeds a disregard of the possibility of failure; the absence of serious financial difficulties over a substantial period leads to the development of a euphoric economy in which increasing short-term financing of long positions becomes a normal way of life" (Minsky, 2008b, p. 237).

exogenous view where the supply of credit *is* supply constrained by the supply of savings and the central bank's reserve requirement ratio. Werner (2005, p. 58) holds the position that demand for credit is always large, and points out that banks shun away some of the people that try to take out a loan. Banks, in other words, will not, as horizontalists argue, "meet all loan demand at [a given] interest rate by passively creating money". Banks, according to Minsky, Rochon and Werner, not only restrict the supply of credit, compared to the demand for it, but they make allocative decisions for it as well, selecting the credit-demanders that actually get credit; they "cherry pick" the borrowers (we find later in this chapter that this is a recurring issue with foreign banks as they enter another economy). And the rate of interest will not be effective in controlling the creation of credit, not because of possible influences of the rate of interest on demand for credit but because it would not be sensible from the suppliers' (banks') point of view. Rather than increasing the rate of interest (price) of credit, and therefore the borrower's default risk, they limit the quantity of credit and allocate it to the best potential borrowers, leaving some demanders of credit with nothing (ibid).

Empirically, the case for endogenous money creation is stronger than that of exogenous money: bank loans do lead to bank deposits and not the other way around (Caporale & Howells, 2001; Howells & Hussein, 1998; Palley, 1994; Werner, 2014). And in case one wanted an opinion "from the front line" of the monetary system, one is to be found in the 2014/1 Quarterly Bulletin of Bank of England (McLeay, Radia, & Thomas, 2014, p. 12).

> Most of the money in circulation is created, not by the printing presses of the Bank of England, but by the commercial banks themselves: banks create money whenever they lend to someone in the economy or buy an asset from consumers. And in contrast to descriptions found in some textbooks, the Bank of England does not directly control the quantity of either base or broad money.

That on its own is not enough to properly support the endogenous theory for the theory also predicts that causation of money creation runs from economic activity to money – and not the other way around (Werner, 2005). Howells and Hussein (1998, p. 329, emphasis added) point out: "[i]f money is endogenous, it

is because causality runs from bank lending to deposits *and* because the demand for bank loans [i.e. credit] is strongly influenced by trends in nominal output." Werner (2005, p. 192) puts forward a similar question: "In the present framework, money (defined as deposit aggregates) is always endogenous – namely to the creation of credit. As we saw, the amount of deposits can only increase if banks create new credit. The more interesting question is whether credit creation is endogenous or exogenous [to economic activity]." It is therefore the second part of Howell's and Hussein's words that is interesting: is credit, i.e. money, endogenous to economic activity?

Traditionally, the validity of the endogenous view with regards to the proposition that "demand for loans is strongly influenced by trends in nominal output" has been empirically tested with GDP as a proxy for economic activity (Howells, 2000; Howells & Hussein, 1999). This has yielded unfavourable results so the validity of this part of the endogenous theory can be questioned as Werner (2005) points out.

But the reason for the apparent invalidity of this part of the theory may be due to the use of GDP as a proxy for the economic activity that the credit creation should be accommodating for. Howells and Hussein (1999) show that the *total transactions* in the economy – and not only those related to the GDP – are better related to the demand for credit than spending on final output alone. Werner (2005, p. 198) is of a similar opinion: "...we must expect causation to always run from the credit variable (C) to the transaction variable (PQ) or its components [which are GDP-related and non-GDP-related transactions]".[44] Howells (2000) argues that the demand for credit has changed from what it was: no longer is credit needed only for economic activity but for *asset transactions* as well, i.e. speculation processes. He further notes that "[w]hatever people are borrowing for, it is this borrowing which creates deposits and the desire for the borrowing still originates with other developments in the economy, whether it is booming asset prices or industrial production" (Howells, 2000, pp. 10-11). This is closely connected to what has been called the

[44] This opinion comes from Werner's (2005, p. 190) Quantity Theory of Credit. Instead of money (M) he represents economic activity in the MV=PQ style as CV=PQ, where C is credit, resting on the fact that money (M) is credit (C). He then breaks PQ, i.e. the value of transactions in the economy, into GDP-related (R) and non-GDP-related (F), i.e. speculative, so that $CV=P_RQ_R+P_FQ_F$. Credit (C) can, in other words, be used to finance GDP-related activities (P_RQ_R) and speculative activities (P_FQ_F).

“Walras-Schumpeter-Minsky Law” (Keen, 2011b): aggregate demand has three sources, namely income earned from sales of goods and services, which mainly finances consumption (Walras), new credit to entrepreneurs, which mainly finances investment in real capital (Schumpeter) and credit to speculators who buy existing assets (Minsky) without any direct impact on GDP.

It seems that this – that credit finances not only GDP-related transactions – was realised by Keynes himself. His realisation is in the “improved” liquidity preference theory which Keynes developed after the *General Theory* where the liquidity preference theory first appeared – and it should be noted that money was endogenous and an unmistakable part of the *General Theory* (Tily, 2010). The improvement was the addition of the “finance motive” which was not a part of the three motives that Keynes identified in the *General Theory* (which were the transactions, precautionary and speculative motives).

Wray (1992) argues that the “finance motive” – the fourth motive for holding liquidity and developed post *General Theory* – was omitted in the *General Theory* almost by mistake judging from Keynes’s own words. According to Wray (1992), Keynes (1973a) knew well that the demand for credit arose not only due to *current* spending on output but *current and planned* spending on much more than *only* output – “*any* type of spending” – such as speculation with existing assets, as Howells (2000) and Keen (2011b) argue. Wray (1992, p. 1158), quoting Keynes (1973a, p. 220), writes (original emphasis):

> Keynes argued that his "finance" is not identical with "investment funding" because *any* type of spending may give rise to a need for finance, including consumption spending or spending on the stock exchange. The finance demand for money was then added to the other motives for holding money in Keynes's liquidity preference theory: "I should not have previously overlooked this point [an increase of planned activity will increase the demand for money], since it is the coping-stone of the liquidity theory of the rate of interest. I allowed, it is true, for the effect of an increase in *actual* activity on the demand for money. But I did not allow for the effect of an increase in *planned* activity, which . . . may sometimes be the more important of the two."

With this in mind, Howell's and Hussein's (1999, p. 453) conclusion that "the demand for credit is better related to a measure of total transactions than it is to spending on final output" should not be surprising. The explanatory power of Werner's (2005) model, where he disaggregates credit creation based on what it is used for, i.e. speculative or real economic activity, should not be surprising either in light of this. Keynes himself expected this to be the case.

Furthermore, based on this, empirical investigations that find no or limited causality between the total creation of credit and changes in GDP *do not* invalidate the endogenous view on money when it comes to the theory's implication of a very close relationship between credit creation and economic activity. This is especially since "it is now abundantly clear that the demand for credit rests very heavily upon asset ('speculative') transactions which have grown much more rapidly than GDP. Changes in the quantity of money no longer reflect prior changes in the level and cost of production" (Howells, 2000).

It should be highlighted that the proposition of the endogenous school that deposits (money) creation is endogenous to credit creation is not disputed – and has a better track record than exogenous money creation theories. Whether money creation is entirely endogenous to economic activity is not empirically ascertained yet however. For as Werner (2005) points out: *if* credit supply is the determining side of the quantity of credit created, and not credit demand, which can be, as Keynes points out, due to planned activity as well as actual activity, then credit creation is *not* endogenous but exogenously decided by the suppliers of credit. [45] This implies that credit creation is not endogenous to actual *and* planned economic activity – because banks exogenously decide which planned economic activities are indeed financed.

But credit creation could still be endogenous to *actual* economic activity, i.e. total transactions in the economy, for once banks have accepted to create the credit for a certain economic activity, be it the construction of a house or speculation on the equity market, that credit creation is endogenous to that

[45] "Next we need to determine which of demand and supply is more likely to be the 'short' quantity, that is, whether the credit market is more likely to be demand- or supply-rationed. The question is whether the credit supply is more important (*in which case credit would be exogenously determined by the credit creating institutions*) or whether credit demand is more important (*in which case credit would be endogenous*)" (Werner, 2005, p. 194, emphasis added). His answer: the credit market is supply constrained, ergo, credit is not endogenous. See also next footnote.

activity. But until the credit is granted, it is exogenous and, if Werner (2005) is right about there always being plentiful demand for credit, limiting. Indeed, both Werner (2005) and Howells and Hussein (1999) agree that credit and total transactions (economic activity) are closely related.

Indeed, logically, credit creation is endogenous to actual economic activity even if credit is, as Minsky, Rochon and Werner hold, limited by the banking sector. As it is the banking system that decides which economic plans will be financed and which will not the banks are exogenously deciding the amount of economic activity when they decide who gets financed and who not. Then, they finance that activity and in fact, it is not an activity until it is financed and paid for! It is therefore perfectly logical to state that credit creation is endogenous to actual economic activity because that activity would not happen unless it was financed – and that financing comes from the banking system. Ergo, credit creation is endogenous to actual economic activity: they are two sides of the same coin.

We conclude that banks are creators of credit which is used to finance any kind of spending, both GDP related and speculation based. Deposits, i.e. money, are created at the same time as banks create the credit, i.e. the creation of money is endogenous to the creation of credit: (bank) loans *lead to* deposits. Credit creation also seems endogenous to *actual* economic activity but exogenous, and limiting, to some *planned* ("...*crank entrepreneurs with high-risk ideas...")* economic activity.[46] As long as banks are willing and find, in their opinion, creditworthy borrowers demanding credit for whatever purpose they see fit, the credit will be created and supplied. And finally, this credit is accepted as final payment for goods and services: money is credit.

2.1.3 Banks as intermediaries

That said, banks' role as intermediaries between savers (non-spenders) and borrowers is not non-existent. It does exist in the form of being intermediaries between suppliers of foreign currencies and domestic borrowers, such as in the form of foreign exchange loans. Indeed, banks often play a central role in

[46] The quote is from Werner (2005, p. 195, emphasis added). Some other relevant passages are: "The actual demand for credit is... always relatively large [compared to supply] (even if from crank entrepreneurs with high-risk ideas). Faced with the reality of many high-risk borrowers and imperfect information about their true intentions or the viability of their projects, banks would be unwise to raise interest rates until credit demand equals supply. ... Put simply, since demand for money or credit is very large (perhaps infinite), the supply is the short side, which determines the [credit] market outcome." See also previous footnote.

intermediating cross-border capital flows as a sizeable portion of those flows go through the banking sector (Brunnermeier et al., 2012)

Banks can, according to endogenous money creation, like in the case of domestic-currency-denominated loans, create credit in other currencies as well. An Icelandic bank could write down on its balance sheet that it has an obligation, an IOU, to pay dollars on behalf of its customer in the payment system, just as it can do so in the domestic currency, Icelandic krona. But, if we follow the "traditional" way of how international payments are carried out (see section *2.1.1 Banks and the payment system*, especially Figure 2.3), the Icelandic bank would need a US dollar deposit in its correspondent bank in the US in order to be able to actually carry out the US dollar payment on behalf of its customer. The IOU could also be converted into US dollar bills, i.e. cash, in which case the Icelandic bank would need actual US dollar bills to be present in its vault at the time of conversion of the IOU into cash.

This poses a liquidity problem for the bank as it would be a serious liquidity risk for the Icelandic bank to offer to pay certain amount of US dollars, i.e. create an IOU denominated in US dollar, when it has no US dollars available. And the bank could not trust in finding liquidity in US dollars at the domestic central bank, the reason for that being that contrary to domestic reserves, on which the domestic payment system rests, the domestic central bank cannot create foreign currency at will: the Central Bank of Iceland cannot create *any* US dollars reserves in case the Icelandic banks run into liquidity problems in US dollars, or any other foreign currency for that matter (a problem that was very acute before the collapse of the Icelandic banking system in 2008). The only currency that a central bank can create freely at will is its own currency; only the US Fed can US dollars reserves, and only the Central Bank of Iceland can create Icelandic krona reserves. Nor can the domestic central bank supply endless amount of bills in foreign currency. Only the relevant central bank can do that, e.g. the Federal Reserve in case of the US dollar.[47]

[47] Of course, if there is a cooperation agreement in effect between central banks, international swap lines can be set up between them. See e.g. (Federal Reserve Bank of New York, 2014). But to assume such swap line to be in place is heroic. There was e.g. no swap line in place between the Icelandic Central Bank and the Federal Reserve in 2008.

Domestic banks must therefore find the liquidity in foreign currency somewhere else, effectively *intermediating* funds from a foreign party to the domestic borrower. Of course, the domestic bank could *borrow* the foreign currency from a foreign bank – and the foreign bank would create that (foreign) money endogenously to the creation of credit as Werner (2005)[48] points out – and then relend it to the domestic borrower who wanted the foreign currency loan. The domestic central bank can also be an *intermediary* of foreign currencies to domestic banks. This intermediation could come from the central bank's foreign reserves. Or it could be in direct cooperation with other central banks, hence e.g. the liquidity swap lines between central banks that they set up in order to provide each other the capacity to supply funding to financial institutions that may need liquidity in foreign currencies (The Federal Reserve, 2012). But the domestic central bank cannot create the reserves in foreign currency, only the foreign central bank can. Banks therefore intermediate foreign currencies, both in the international payment system as we previously saw and when domestic parties borrow in foreign currencies.

The intermediation processes of the banking system between domestic and foreign parties can have various implications for the economy. First, by borrowing foreign currencies and relending them at home, banks are avoiding the domestic monetary policy, dampening its effectiveness (Chen, 2012). Also, this can impact the external balance of the economy. In Mexico, before the Tequila crisis of 1994-1995, the foreign capital that flowed into the economy was not only to finance investment in productive facilities. "Foreign capital flowed through the banking system, and bank lending financed purchases of luxury imports as well as capital goods" (Eichengreen, 2004, p. 187). The imports contributed to a pressure on the current account which created a pressure on the exchange rate. Somewhat similar development took place in South East Asia before the crisis there only a few years later since a large share of the capital inflow was denominated in foreign currencies, most notably in yen and dollars (Eichengreen, 2004). Icelandic banks, during the "golden years" of Icelandic banking, also issued foreign-currency denominated bonds and channelled the funds to the domestic corporate sector, which used them for

[48] "Why borrow from abroad and pay back interest and the principal in foreign currency, when one can create the money for free at home? After all, *the foreign banks are also merely creating the money 'out of nothing' through the process of credit creation* (Werner, 2005, p. 217, emphasis added).

both domestic and foreign investments: nearly three quarters of corporate loans (excluding holding companies) in Iceland were "foreign currency loans" in September 2008.[49] Interestingly, it is possible that the Icelandic banks were financing Icelandic capital outflows, at least a part of them, with domestic credit creation in Icelandic krona. In other words, they were not only intermediating foreign funds, via their foreign bonds issuances, but also creating domestic credit that led to capital outflows on top of that. This was possible because foreigners were willing to hold krona-denominated assets. This would chime with the development in Japan during the 1980s where banks' domestic credit creation led to capital outflows, i.e. foreign investments (Werner, 2005).[50]

Both Eichengreen (2004) and Kraft and Jankov (2005) point out that the moral hazard for systemically important banks, which will have a government backing in case of problems, can lure them into taking on too much foreign-currency denominated debt. This applies especially when the economy operates under a *de facto* or a *de jure* currency peg that is not realistic to hold, something that Kraft and Jankov call "a bad peg." By borrowing too much abroad and re-lending the capital to domestic parties, banks play down the importance of possible currency devaluation: although they may have limited net exposure to exchange rate changes their debtors do not. Home-currency devaluation will hit the borrowers hard and via domino effects the banks themselves. In such cases the banks carry out the intermediary process in an economically suboptimal way: they take on too much foreign-currency debt.

Finally, banks act as intermediaries, in all currencies, via their brokerage services in e.g. bond and stock markets. They furthermore offer consulting and advisory services, intermediating information that they may have processed in one way or the other. An example is market and economic research, for commercial purposes, carried out by banks. Banks also have an important intermediary role in the payment system, as previously discussed.

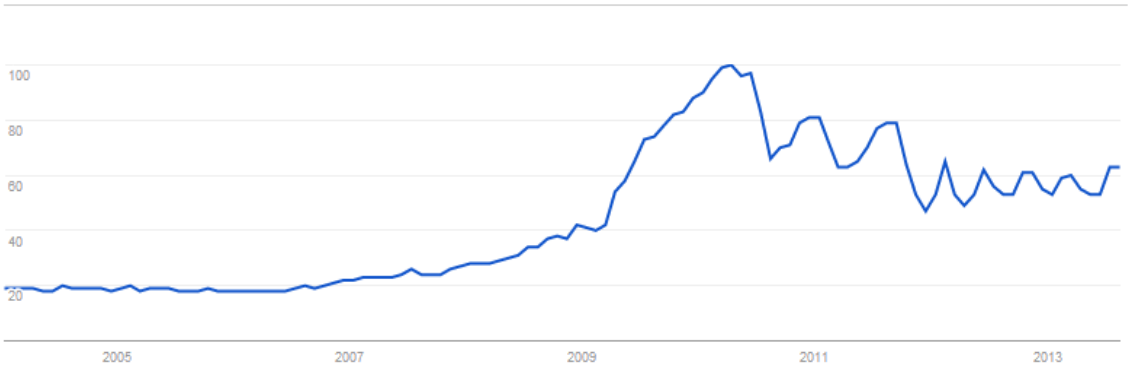
[49] Data from Central Bank of Iceland. An important note is necessary here. A considerable portion of "foreign currency" loans in Iceland were in fact not in foreign currency but loans in Icelandic krona but linked to the exchange rate. The Central Bank of Iceland nevertheless counted them as "foreign currency loans", making it impossible for us to know exactly how much of the total credit to corporations, and households ("foreign-currency" mortgages and car loans became increasingly popular after 2006), was in fact in foreign currencies. The "foreign currency loans", i.e. ISK credit with the principal linked to the exchange rate, were, generally, deemed illegal with a series of court rulings starting from 2009, resting on laws from 2001 (no. 38/2001) amongst others. Complications apply that will not be discussed here.
[50] More on this in Appendix 1.

Now that we have made it clearer what banks do, we can turn our attention to specific issues regarding FDI in the industry.

2.2 Specific issues on FDI in banking

The general interest in FDI in banking surged after the most recent financial crisis hit. Relying on Google internet searches, Figure 2.4 shows how Google searches for "FDI + banking" developed.

Figure 2.4 – Worldwide development of Google searches for "FDI + banking"



Source: Google Trends. Time period: 2004-Aug. 2013. 100=period's max value

The increase in the interest in FDI in banking in the wake of a great economic shift seems to be nothing new. Interest in general financial-FDI accelerated notably after the collapse of the Soviet Union and the increase of foreign ownership of banks in areas such as Central and Eastern Europe (Goldberg, 2004). That of course does not mean that the topic of multinational banking has not been probed into before. Aliber's (1984) survey was, according to Goodman who wrote an attached comment on the paper, the first of that kind of a survey on multinational banking. Aliber points out that the theory of banking-FDI has, to a great extent, been built on the theory of FDI. Indeed, Peek and Rosengren (2000b) discuss some of the issues of banking-FDI that seem familiar to those discussed regarding FDI in general, including the effects on competition, know-how spillovers, economic growth, access to international capital, the balance of payments and the transfer of economic developments.

However, it is not certain that answering the same questions posed in the general FDI literature is the proper way forward when it comes to multinational banks. The reasons for this will be discussed later and we will focus our attention in particular on its connection with financial stability. Before we get

there however, we must outline some of the topics that are prominent in the research on FDI in banking.

2.2.1 FDI in banking, financial development and economic growth

FDI in banking can be viewed as a part of the financial development of an economy. The entry of a foreign bank into an economy can enhance the efficiency of the domestic financial sector (Levine, 2001). Therefore, the relationship between FDI in banking or financial services in general is closely related to the subject of financial development and economic growth.

As Levine (1997) pointed out, economists do not completely agree on whether the financial system makes much difference for economic growth or not. Mainstream models do not consider money as important, look at it as merely a "veil" on real economic activity. Other schools, such as post-Keynesians, differ and consider and include money in their models in much more depth. Consequently, the view is similar on financial development. However, empirical work seems to confirm that financial development does affect economic growth. Levine (2001, p. 692), discussing the literature, notes that "(1) domestic banking system development has a large causal impact on economic growth; and (2) domestic banking system development influences growth primarily by affecting total factor productivity growth."

Later research seems to confirm this with one addition though: the effects of financial development on economic growth dwindle the richer the economy is. Bittencourt (2012) looks at Latin American countries and finds evidences for the Schumpeterian prediction that a well-functioning banking system is needed to finance real capital investment and thereby push growth onwards.[51] Hassan, Sanchez, and Yu (2011) find, using a neoclassical growth model, long-run linkages between economic growth and financial development in developing economies. Interestingly, the causality there between seems to run from growth to finance in the early stages of general economic development. Later on, the causality becomes two-way: growth and finance support each other. But others do not entirely agree. Fung (2009), separately looking at low-, middle- and high-income countries, concluded that the reinforcing effects between financial

[51] "Schumpeterian" because Schumpeter (1934) argued that the banking system created non-existent purchasing power for entrepreneurs who would (dutifully) use it to invest in improving production processes.

development and economic growth were only so in the beginning. Once the economy became a high income country the strength of the effects of financial development on economic growth diminished. Aghion, Howitt, and Mayer-Foulkes (2004) have a similar story to tell. Levine's (2001) previously quoted statement should be amended with this more recent research in mind.

Looking directly at FDI in banking and economic growth, rather than financial development and economic growth, the link is supposedly mainly through the improved efficiency link. And on the link between foreign banks and efficiency, Levine (2001, p. 697) writes concisely on the arguments for it:

> [E]asing restrictions on foreign bank entry may improve the quality, pricing, and availability of banking services directly and indirectly. Foreign banks may directly bring new and better skills, management techniques, training procedures, technology, and products to the domestic market. Foreign banks may indirectly enhance domestic banking efficiency by stimulating competition in domestic financial markets. This intensified competition could put downward pressure on profits and overhead expenses. Furthermore, foreign banks may accelerate the development of ancillary institutions that promote the flow of information about firms. For instance, foreign banks may encourage the emergence of better rating agencies, accounting and auditing firms, and credit bureaux that acquire and process information. Furthermore, foreign bank presence may stimulate improvements in domestic supervision and regulation.

Earlier, Levine (2001), while discussing financial intermediaries, notes that *if* the functioning of the domestic banking system benefits from international financial integration it *could* have large growth effects. Demirgüc-Kunt, Levine, and Min (1998) found no direct link between foreign bank activity and economic growth but claim that the link is indirect – through improved functioning of the financial system – and positive. They used both foreign banks' share of total domestic banking assets and the number of foreign banks as a share of total number of banks in the domestic market to measure foreign bank activity. J. Wu, Jeon, and Luca (2010), looking at emerging economies, have a similar story to tell. They found that the increased presence of foreign banks improved the effects of

real capital investment on growth. But Owen and Temesvary (2012), explaining themselves with a reference to the argument about necessary "absorptive capacity" (Borensztein et al., 1998), found that the effects of foreign banks on economic growth depended on the level of development. Furthermore, even if a high level of development was in place, the effects of foreign banks were only "insignificant" instead of "detrimental": foreign banks actually lowered economic growth in economies with an inadequately developed banking system. Eller et al. (2006), already mentioned in chapter 1, hold that the effects of FDI in financial services on growth are hump-shaped: some FDI is positive but more is not always better.

Finally, since foreign banks increase the competition in the domestic banking industry (Jeon, Olivero, & Wu, 2011), a notable input was made by Cetorelli and Peretto (2012). Using a theoretical model based on Cournot oligopoly they reach the conclusion that increased competition in the banking sector improves economic growth if "intrinsic market uncertainty" (p. 967) is low.[52]

The reason was that increased competition incentivised banks to cut back on costly (personal) relationship services between banks and investors – a phenomenon empirically confirmed by Unite and Sullivan (2003). The qualitative part of information about the borrowers was harmed because the banker did not know them personally anymore. We can speculate that the trust relationship between the borrower and the banker changes as well. Basically, banks cut back what Cetorelli and Peretto called the *quality* of loans, i.e. the banker's personal relationship with the borrower. Instead, banks, as competition increases, become first and foremost concerned about the *quantity* of loans and stop caring so much about making sure to make and maintain a personal contact with the borrower, because that is expensive and time consuming. But increased *quality* of loans – the personal relationship – reduces the "intrinsic market uncertainty" problem. Therefore, increased competition, leading to worse *quality* of loans (because maintaining personal relationships with the borrowers is time consuming and expensive), actually *reduces* bank lending in a

[52] By "intrinsic market uncertainty" they refer to the general uncertainty that any entrepreneur, in need of purchasing power which he raises via e.g. a bank loan, must meet. They refer especially to uncertainty about the timing of cash flows and the threat of cash-flow mismatches, leaving entrepreneurs, even if they are carrying out an investment project with a positive net present value, bankrupt as they run into liquidity problems. This is, in general, closely related to "uncertainty" as Keynes spoke of the matter (Keynes, 1936, 1937).

market with “intrinsic market uncertainty”. Consequently, economic growth slows down. This theoretical finding can be related to the fact that the potential positive effects of financial-FDI on credit availability are stronger when information on borrowers is more readily available, such as via shared databanks on credit rating (Houston, Lin, Lin, & Ma, 2010; Jappelli & Pagano, 2002).[53] In that case, “intrinsic market uncertainties” are low since information about the prospective borrowers is more readily available and there is less need to establish close personal relationships with them in order to decrease the risk of lending.

We can conclude that the entry of a foreign bank may contribute to the financial development of a country: competition increases and positive spillovers are in place on other domestic banks (Jeon et al., 2011), interest rate spreads are lowered and more attention is paid to risks based on e.g. credit ratings and general accounting information and not personal relationships between borrowers and bank managers (Unite & Sullivan, 2003) to name just a few influences. However, while this may be the case, it is not certain that the presence of foreign banks will increase the economic growth of the country.

2.2.2 Some reasons why banks go abroad and where they go

To cover the whole literature on why banks go abroad would be too great a task for the purpose of this work. However, some selective discussion on the most prominent factors is in order.

As already mentioned, one of the first comprehensive reviews on the theory of multinational banking is Aliber (1984). Having discussed different views on what “international” banking is,[54] he moves into discussing why some banks expand abroad and others not. He notes that since banks are highly leveraged companies, any slight advantages that some banks may have, due to e.g. superior operational or regulation advantages, will quickly transform into higher

[53] The connection between financial-FDI, information and credit availability will be dwelled deeper into in *2.3.5 Financial-FDI, credit availability, credit stability and capital flows*.

[54] “International banking” is not the same as “multinational banking”. The issue is discussed by Williams (2002). The difference between an “international” and a “multinational” bank is that the “multinational bank (MNB) is simply a bank that owns and controls banking activities in two or more countries” (Casson, 1990, p. 14) while an international bank does not. A bank can therefore be “international” but not “multinational” or as Williams (2002, pp. 129-130) points out: “[banking] activities that are international, but not necessarily multinational, include trading in foreign currencies, the provision of trade finance and ownership of securities issued by foreign firms.” It should be noted that some authors do not seem to strictly follow this distinction, e.g. Batten and Szilagyi (2011). An effort has been made to make this distinction in this work.

profits for the bank(s) in question. He therefore wonders if it is perhaps banks' different abilities to attract relatively cheap capital, either from home or abroad, that decides which banks will become multinational and which will stay behind.

Thornton (1992) found that the cost of capital did have an impact in the case of the expansion of Japanese banks and Moshirian (2001) confirmed it for UK, German and especially US banks. This low-cost-of-capital advantage is one of the microeconomic reasons for why banks go abroad. Generally, those firm-specific factors can be grouped into comparative advantages, efficiencies, strategic reactions and (geographical) risk diversification (Herrero & Simón, 2003). However, there are other factors that influence banks to go abroad than advantages in the form of lower costs and access to capital. The following are amongst the most notable ones.

The "Defensive Investment"/"Follow the client" argument

A key proposition in the literature is that banks follow their client abroad when they expand. The possible advantages are in place for both the client himself, who may e.g. want to limit the exposure of its financial information by continuing dealing with the same bank as before, and the bank which, by following its client abroad, will defend its current relationships with the client and possibly be able to expand them further. This has been called *Defensive Investment* or *Follow-the-client* (DI/FC) hypothesis (Aburime, 2011; Lensink & Haan, 2002; Williams, 2002) and can apply to both FDI activities of other firms and other general trade activities. Williams (2002) traces the theory back to Brimmer and Dahl (1975).

Empirically, the theory of DI/FC has yielded somewhat mixed results. In his extensive literature review on the subject, Williams (2002) notes that there are four possible relationships between general multinational corporations and multinational banks. First of all, there is the DI/FC relationship: an MNC entry into an economy is followed by an entry of a bank which has already established commercial relationships with the MNC. Second, it is possible that the multinational bank takes the first step and the MNC then follows, due to e.g. improved access to finance through the now-present multinational bank. Third, it is possible that there is no relationship between the multinational bank and the MNC. Finally, the causation may run both ways. Williams (2002) then notes that it has not been "entirely possible" to empirically tell which of the theories is most

appropriate. Correlation between trade and the presence of MNCs on one hand and multinational banks on the other has been found but causation is not certain (Lensink & Haan, 2002).

Since Williams, others have tried to decipher the relationship. In the case of emerging economies, more trade, per se, with the rest of the world does not seem to encourage banks to make a move to them (Reinhardt & Dell'Erba, 2013). The relationship between non-financial FDI and financial FDI is more complicated. Cazzavillan and Olszewski (2012) say the relationship is both ways: non-financial and financial FDI have positive effects on each other. Wesel (2004), looking at German banks, does not conclude that trade has any significant influences on their decisions to expand abroad but he does find non-banking FDI to have an impact. Specifically, German banks follow their customers to Asia but they need not be following their customers when they, the banks, invest in other geographical areas, they might then be front running their non-financial MNC customers. Japanese banks follow their customers abroad (Ruhr & Ryan, 2005). Some European banks said they had followed their clients into central and eastern European countries before they started focusing on local companies (De Haas & Naaborg, 2005). But Focarelli and Pozzolo (2005, p. 2461), using a probit model on 260 banks from the OECD countries, conclude that although the presence of other non-banking FDI has an impact, a theory "possibly grounded on the search for profits in the presence of barriers to entry in foreign markets, seems more suitable than the ''follow-the-client'' hypothesis to explain the pattern of bank internationalization". In accordance with this proposition, Molyneux, Nguyen, and Xie (2013) find that in the wake of the South East Asian crisis in the 90s, banks' interest in entering the area was not driven by a DI/FC incentive. What they were rather interested in was local profit opportunities such as lending to domestic firms and inefficiencies in the local banking sector.[55]

Overall, it seems that the DI/FC motive is in place. However, it is certainly not the only reason why banks seek to establish their presence in other economies.

[55] Although Molyneux, Nguyen, and Xie do not mention it, the application of Krugman's (2000) "fire-sale FDI" argument should not be outright ruled out. Further investigation is however needed to decide whether that argument was truly applicable in this case or not.

Macroeconomic factors influencing banks to expand abroad

Herrero and Simón (2003) pointed out that macroeconomic theories on why banks expand abroad are thin from both theoretical and empirical perspectives. Since their input however, there has been work put into explaining this part of banks' expansion. It is worth, especially given its recent expansion, looking further into this realm. Following Herrero and Simón, we will branch the factors into "push" and "pull", i.e. "home" and "host", macroeconomic factors.

Push factors

Push factors include the home-country economic cycle, low rate of interest at home and the exchange rate. Other push factors can also be international ones instead of those specifically connected to the home country, such as the general development of international capital markets (Brana & Lahet, 2011).

Herrero and Simon note that there is no clear consensus on what the effects of an economic slowdown in the home country should be. Low economic growth can both limit the financing possibilities of FDI (because profits are generally lower in a low-growth environment) and push firms to try and expand abroad instead of at home. The principle should be the same in the case of financial-FDI but (p. 19) "no literature exists yet". Since then, however, Hryckiewicz and Kowalewski (2010) show that relatively low growth in the home country pushes banks abroad. But they also show that during *global* economic slowdowns, multinational banks are more conservative in their expansion. Other researchers have confirmed this and even consider this factor to be more influential in determining financial FDI than in the case of non-financial FDI (Reinhardt & Dell'Erba, 2013).

When it comes to interest rates in the home economy and banks expanding abroad, Herrero and Simon again comment that the financial-FDI literature is limited but given that high interest rates normally hamper outward general FDI the same should be expected for the specific case of financial FDI. The literature is still limited. However, low cost of capital has been shown to have an impact on banks' expansions abroad (Moshirian, 2001; Thornton, 1992) and this can perhaps be related to the positive effects of low rates of interest on FDI. Nevertheless, these papers deal with the overall cost of capital for banks and not specifically the rate of interest at home: the capital used to finance an

expansion may be raised in some other markets than the home market. It is worth keeping in mind in this regard that a low rate of interest does stimulate general FDI as Herrero and Simon noted. Later research has reached similar conclusions (Dabla-Norris, Honda, Lahreche, & Verdier, 2010).

Then there are the effects of the exchange rate of the home currency on outward FDI. Stronger home currency increases the relative wealth of firms owning assets in that currency, making it easier for them to buy foreign-currency denominated assets. This was empirically confirmed in the case of Japanese banks: appreciation of the yen incentivised banks to increase their outward FDI (Ruhr & Ryan, 2005). This is mirrored by the weak exchange rate of the host economy acting as a pull factor.

Pull factors

Pull factors include high (expected) economic growth in the host economy, high per capita income[56] and economic volatility, or lack thereof (Herrero & Simón, 2003). The exchange rate of the host economy's currency can be interpreted as a macroeconomic pull factor as well.

High economic growth, or expectations of it, serves to increase the inward banking FDI (Focarelli & Pozzolo, 2005). They also found out that *low* per capita income encouraged banking FDI, being a proxy for upcoming profit opportunities as the host economy would converge towards other economies. This is perhaps in accordance with the classic idea of higher return on invested capital – and therefore an incentive for investors to enter the economy – in a low-income country, where capital levels are low, but it is contrary to what many other prior works found out as Buch and DeLong (2008) note. And although Fajgelbaum et al. (2011) apply the Linder hypothesis on FDI in general, it is tempting to consider the possibility that something similar applies to financial-

[56] Herrero and Simón rank income per capita as an institutional factor. The current author disagrees with this ranking and proposes ranking it with macroeconomic factors instead. Not only can we find per capita figures ranked as a macroeconomic variable (Haselmann, 2006) but it is also hard to see that income per capita has anything to do with the definitions of "institutional" (The Free Dictionary, 2013):

1. Of or relating to an institution or institutions.
2. Organized as or forming an institution: *institutional religion.*
3. Characteristic or suggestive of an institution, especially in being uniform, dull, or unimaginative: *institutional furniture; a pale institutional green.*
4. Of or relating to the principles or institutes of a subject such as law

FDI specifically, i.e. financial-FDI is drawn from high-income countries to other high-income countries due to similarities in supply and demand for financial services between the home and the host economies.

But the explanation power of income may not be so strong, one way or the other. Wesel (2004) holds that per capita income has no particular effects when he looks at German banks expanding to emerging markets in Latin America, Asia and central and eastern Europe. Wesel (2004) also mentions that German banks prefer to go to countries with low risks, backing up Herrero's and Simon's argument that banks are pulled into an economy by a stable economic environment. A negative economic outlook is a warning sign for banks to stay away.

A high rate of interest in the host economy works also as a magnet for foreign banks (Molyneux et al., 2013). Galac and Kraft (2000) asked foreign banks what was attractive about the Croatian economy. High interest spreads between loans and deposits – which can signal low levels of efficiency and competition in the financial sector (Chortareas, Garza-García, & Girardone, 2012) – was one of the answers. The power of this explanation variable for foreign bank entry can be questioned though. Both Wesel (2004) and Hryckiewicz and Kowalewski (2010) show that although the impact of this variable is positive, as Molyneux et al. conclude, its importance may not be significant and the reason for foreign banks' presence may be another, such as low (macroeconomic) uncertainties (which can lead to low rates of interest), development levels of financial markets and non-bank FDI entries (i.e. the DI/FC argument).

FDI in banking and regulation

Regulation has an important impact on banks' ability and willingness to expand abroad. The regulation can be in various forms, including direct entry and exit limitations, restrictions on allowed activities and interest rate limitations to name just a couple. In very short we can say that the freer the regulation, the more FDI in banking will take place.

An example of regulation that hinders financial FDI is restrictions of all sorts. Restrictions on foreign currency lending are an example of regulation that discourages inflow of financial FDI (Reinhardt & Dell'Erba, 2013). In the meantime, Thornton (1992) cited deregulation in Japan and the enlargement of

the set of permissible activities abroad as major reasons behind the expansion of Japanese banks. In that instance, deregulation increased *outward* banking FDI. Lensink and Haan (2002) look at the entry of foreign banks into transition economies and find out that political freedom and economic reforms, such as interest rate liberalisation, international trade and exchange rate liberalisation, and increased prominence of the private sector in comparison to the public sector, in transition host economies will attract foreign banks. Lack of deregulation in many Asian countries is one of the reasons why foreign banking-FDI is not nesting as much there as in other more deregulated Latin American countries of similar developing status (Moshirian, 2001). In Nigeria, stricter regulation regarding a minimum domestic ownership of domestically operating enterprises, foreign and Nigerian, effectively pushed banks out that had already set up operations there (Aburime, 2011). Regulation can therefore influence both outward and inward banking FDI.

Changes in regulation of banking institutions can have a significant impact on the financial sector and on where banks channel their investments. Stiroh and Strahan (2003) report that there is more competition amongst banks in the wake of deregulation. The best banks gain market share while other more inefficient banks exit the market or are taken over by efficient competitors. Jayaratne and Strahan (1998) report similar findings after restrictions on bank branching within the US were eased: the best banks grew fastest while the less efficient banks were left behind. Although the topic of Stiroh and Strahan (2003) and Jayaratne and Strahan (1998) is banking within the US it is tempting to conclude that something similar is in effect when it comes to multinational banks. Not only did Aliber (1984) point out that due to high leverage in the banking industry the most efficient banks would quickly end up on top of the rest but he also argued that nation-specific regulatory frameworks, such as differences in capital and liquidity requirements, could create cost-structure advantages for domestic banks that could quickly be applied in multinational banking. Indeed, regulatory changes can affect the economies of scope in banking (Gropper, 1991), leading to changes in the set of profitable investments – both international and domestic.

This influence of regulation on profits and investment activity in banking leads to the possibility of a “race to the bottom” where banks can “shop” for the

regulatory environment that fits them best by moving their headquarters (Pistor, 2010). The European passport in banking where banks can domicile themselves within one European Economic Area country and expand their operations into other EEA countries from there has introduced the possibility of a race to the bottom in banking regulation within the area, even though some minimum standards must be met (ibid). Empirical work on whether banks *actually* move their headquarters based on some race-to-the-bottom regulation seems to be in short supply however. Sometimes, the banks do not need to move as they simply threaten to move to encourage the domestic policy makers to make amendments in the direction of creating a profitable business environment. As an example, it was discussed pre-2008 to move the headquarters of the Icelandic banks to another EU economy. But the low tax on corporate profits was a strong incentive for the banks to stay put and the wages and tax income was an incentive for the government to keep them in as well (Vísir, 2007). So they stayed. Banks also funnel their investment flows to less regulated countries, especially if the host economy has well developed institutional factors such as property and creditors rights (Houston, Lin, & Ma, 2012).

But the EEA banking passport also introduces the risk of domestic taxpayers actually paying for the mistakes of foreign banks. An example is when the Icelandic banks collapsed and the British government stepped in with a GBP 2.35 billion bail-in to recompensate depositors at Landsbanki's Icesave deposit scenario (Aldrick, 2013). Although the final cost for the British taxpayer ended up being much lower and the normal depositor lost much less than originally expected, thanks to the Financial Emergency Act (law no. 125/2008) in Iceland that put depository claims ahead of all other claims in the bankrupt estate of Landsbanki, the whole Icesave spectacle showed that banks that operate a branch in another EEA country can create a considerable spillover if and when they get into trouble. The case when they operate a subsidiary can be different as the Icelandic case shows. In that case, Landsbanki was operating a branch (Icesave) that followed the regulatory guidance of the Icelandic Financial Supervisory Authority and was running under the deposit insurance scheme of the Icelandic deposit insurance fund. Kaupthing bank, on the other hand, was operating in the United Kingdom through a subsidiary (Singer & Friedlander)

which was supervised by the British FSA and covered by the British deposit insurance scheme. As such, the deposits of British domiciled depositors in Kaupthing Edge (the depository scheme of Kaupthing in multiple EEA countries, including the United Kingdom) were covered by the UK deposit insurance system already while the Icesave deposits were covered by the Icelandic deposit insurance fund. However, the Icelandic deposit insurance fund was as good as empty in comparison to the vast deposits that were snowing in through Icesave: the total assets of the Icelandic deposit insurance fund were GBP 59 *million* at end of September 2008 (Special Investigation Committee, 2010a). This compares to the GBP 2.35 billion bail-in of the British government. The Icesave debate was all about whether the Icelandic government was legally obliged to guarantee the payment of the Icelandic deposit insurance scheme. The EFTA court ruled that it was not the case (EFTA Surveillance Authority, 2013).

The connection between multinational banking and its regulation is also a question of the most appropriate quantity of regulation and the standardisation of it across countries. The race-to-the-bottom issue and possible limitations on applying the most appropriate mix of regulation are mitigated if the regulation is centralised over the whole multi-country area that multinational banks operate in (Buck & Schliephake, 2013). But centralising the regulation does not eliminate any possible conflict of interest, such as different preferences or needs for amount of regulation, nor is the cost of failure in the regulation process equally distributed unless the markets are fully integrated (Pistor, 2010). Moreover, banks can also enter the economy and influence the effective regulatory environment once they are in (Hermes & Lensink, 2004) making the argument about a possible race to the bottom all but more serious, especially as deregulation can increase banks' appetite for risks, depending on factors such as their risk profile (Klomp & Haan, 2012), market power and type of regulation (Agoraki, Delis, & Pasiouras, 2011).[57] That can have serious consequences for the economy as riskier banks tend to lead to more economic instability (Minsky, 1984). Interestingly, there exists the possibility of international spillover effects

[57] Specifically, Klomp and Haan show that regulation is more effective on high-risk banks than low-risk banks. Agoraki et. al show however that stricter capital requirements are more effective in lowering the risk of banks with high market power, perhaps due to the effect of low market power pushing banks to take risks in order to gain larger share of the market. Regulation that directly limits banks' activities (Glass-Steagall-type regulation) is effective on the risk taking of all banks, no matter their market power.

of regulatory changes: *stricter* regulation in one country can have the effect of banks that originate from that economy to become *riskier* in other economies where they operate, the reason being that the more restrictive home-regulation pushes them to "search for yield" in other geographical areas where they operate (Ongena, Popov, & Udell, 2013).

Becoming too big to fail: it pays to be big!

An interesting theme which has been livelily debated since the most recent financial crisis is the banks' willingness to seek and profit from a too-big-to-fail (TBTF) status: being and becoming systematically too important for the financial system and the economy can get banks an explicit or an implicit guarantee from the state, meaning that they will be bailed out in case of serious problems. The Squam Lake Report (French et al., 2010, pp. 19-20) offers an excellent extract of the main problems behind too big to fail:

> Too-big-to-fail policies offer systemically important firms the explicit or implicit promise of a bailout when things go wrong. These policies are destructive for several reasons. First, because the possibility of a bailout means a firm's stakeholders claim all the profits but only some of the losses, financial firms that might receive government support have an incentive to take extra risk. The firm's shareholders, creditors, employees, and management all share the temptation. The result is an increase in the risks borne by society as a whole.
>
> Second, these policies encourage smaller financial institutions to expand, or to become more closely interconnected with other firms, so they move under the too-big-to-fail umbrella. Firms have an incentive to do whatever it takes to make policymakers fear their failure, creating the very fragility the government wishes to avoid. Belief that a government rescue will protect a financial institution's creditors in a crisis also gives a firm a competitive advantage, lowering its cost of financing and allowing it to offer better prices to its customers than its fundamental productivity warrants.
>
> Third, inefficient firms that cannot compete on their own should fail. Otherwise, firms have less incentive to become and stay efficient. A government policy that props up inefficient firms is wasteful and

destructive. Allowing these firms to fail frees up resources and provides opportunities for more efficient and innovative competitors to flourish.

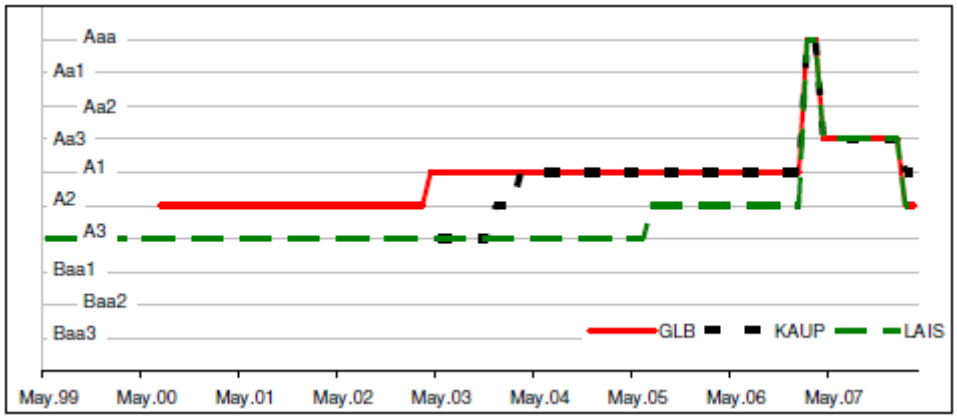
Fourth, and most generally, capitalism is undermined by policies that privatize gains but socialize losses.

Reaching a too big to fail status can benefit a bank, giving it an unfair competition position (O'Hara & Shaw, 1990). One estimate showed that US banks are willing to pay a notable premium in merger deals for reaching what could be considered a TBTF status: a 15 billion USD premium on merger deals that push the agglomerated balance sheet of the bank above a commonly viewed threshold (100 billion USD) to be viewed as a systematically important bank (Brewer III & Jagtiani, 2013). Both the stock and the bond market react positively to such mergers, pushing the capital cost of the TBTF bank lower, as French et al. point out. Warburton, Anginer, and Acharya (2013) estimate, for the time period 1990-2010, that the worth of the implicit TBTF subsidy for large US financial institutions is on average 28 basis points. Araten and Turner (2013) look at US bank holding companies, over the period of 2002-2011, and estimate that the subsidy is equal to 18 basis points on interest-bearing funding.

It is worth putting this in relation to the fact that banks can quickly put such advantages to use to expand further, including abroad (Aliber, 1984; Moshirian, 2001; Thornton, 1992). Effectively, a bank may not be expanding abroad because it is more efficient but because it can use the TBTF subsidy to lower its cost of capital in comparison to other banks, “allowing it to offer better prices to its customers than its fundamental productivity warrants” as French et al. put it. The high leverage in the banking industry then works with them to overtake other banks faster. TBTF banks can also benefit from their status in the form of depositors trusting them better, minimising the risk of such banks suffering a bank run (Oliveira, Schiozer, & Barros, 2011). This is so despite the fact that TBTF banks tend to take on more risk than other banks (Afonso, Santos, & Traina, 2014; Ennis & Malek, 2005). An obvious example of TBTF banks being rewarded for being so is when the three main Icelandic banks were, temporarily, awarded an Aaa credit rating by Moody’s in 2007. The reason: the rating agency expected the state to bail out the banks in case of any problems (18

months later they were all bankrupt and they proved to be too big to save). Becoming and being a TBTF bank can therefore be quite beneficial.

Figure 2.5 – The Icelandic banks' credit rating by Moody's (May 99 – Apr. 08)



Source: Margeirsson (2008)

Although Brewer III and Jagtiani (2013) focused on US banks, the TBTF issue is certainly alive and well in multinational banking. They point out that already in 1984 the TBTF issue was prominent in multinational banking when the Comptroller of the Currency implied in a testimony before the US Congress that banking agencies could not unwind any of the largest 11 multinational banks without it having a significant effect on the financial system in the US.[58] Today, there is even a list of 28 officially accepted "Global Systemically Important Banks" (Financial Stability Board, 2012). Gulamhussen, Pinheiro, and Pozzolo (2012) pointed out that multinational banks should be geographically more risk diversified, thereby decreasing their risk, but their large balance sheet and complexity in unwinding them gives them a TBTF status, influencing them to take on increased risks instead. They find clear evidences for the latter effects to be stronger during the seven years before the financial crisis that began in earnest in 2008: of 384 listed commercial banks from 56 countries (mainly Japan (17.0%) and US (9.4%)) with assets worth more than 100 million, internationally diversified banks were riskier than domestic-only banks. Their results were the same using two different risk measures (Expected Default Frequency (EDF) and Z-score). [59]

[58] An event that O'Hara and Shaw (1990) used to show that the market reacted by favouring those 11 banks over others the day after this comment.

[59] EDF and (Altman's) Z-score are forward-looking estimations of the risk of bankruptcy, looking at e.g. income and balance sheet figures. As an example, the Z-score is: $Z = 1.2\frac{current\ assets - current\ liabilities}{total\ assets} + 1.4\frac{retained\ earnings}{total\ assets} + 3.3\frac{EBIT}{total\ assets} + 0.6\frac{market\ value\ of\ equity}{total\ liabilities} + \frac{sales}{total\ assets}$

Although Brewer III and Jagtiani (2013) showed that US banks are willing to pay for becoming too big to fail, no empirical work seems to have been made on other banks such as those that originate from Europe. Furthermore, whether banks actively push for getting a TBTF status by expanding abroad, and not only domestically as Brewer Ill and Jagtiani looked at, is still unresolved empirically. Nevertheless, given that banks know that a TBTF status can be very beneficial for e.g. their capital costs and competition against other banks, it would be simple and careless to outright deny the possibility that banks try to get such a status by becoming multinational or further expanding their position as a multinational bank, especially as their multinational presence can make them TBTF, given the complexity of liquidating them in case of bankruptcy. Needless to say, given the preceding discussion, such activity and its repercussions, such as increased risks within the TBTF multinational banks, could have a negative impact on financial stability. Attempts are being made to counter this risk, such as planned demands for officially global systemically important banks to have an increased loss absorption capability (Financial Stability Board, 2012). It is yet to be seen however how effective that will be in watering down the TBTF problem.

Greenfield or M&A?

We will, in the end of this section, mention briefly the different entry modes into foreign countries. Banks, like other corporations, stand in front of a choice whether to enter an economy via building up their operations from scratch (Greenfield FDI) or to take over an existing domestic company, i.e. merger and acquisition approach (Haselmann, 2006). It turns out that the choice of entry can have different effects.

Clarke, Cull, Peria, and Sánchez (2001) comment that an important reason for M&A activity in banking is scale economies, especially with developments in technologies which can decrease the operational complexities in back-office operations of banks. This includes payment technologies and electronic banking. Such developments can increase the access to bank services, including for small customers. But this, they note, does not hinder the possibility that huge banking agglomerates will shun small businesses when it comes to credit supplementation. However, other smaller banks can potentially step up and supply the credit.

The effects on credit are different when it comes to Greenfield FDI (Clarke et al., 2001). In that case, the newly established bank is trying to get a foothold in the market as quickly as it can (when it takes over an existing bank, the customer base is already there). Young banks tend to lend more to smaller businesses than old and big ones (DeYoung, Goldberg, & White, 1999). A newcomer in the financial system that enters it by setting up a Greenfield FDI operation is therefore more likely than other "old players" to supply credit to smaller businesses, simply because it wants to gain a foothold in the market.

This may give the impression that a Greenfield FDI has more effects on, or at least different effects to, the host economy than M&A FDI. Not only is there a larger number of active players lending to borrowers but one of them, at least, is actively trying to get a larger piece of the action than it had before, i.e. some piece instead of none. It turns out that this is true. When a foreign bank enters another economy via a Greenfield FDI it has stronger effects on credit supplementation, especially to smaller businesses, and interest rates than when the entry is via M&A (Claeys & Hainz, 2013).

2.3 The Unique Effects of Investment Activity in Financial Services

At the end of chapter 1 we argued that we needed to focus especially on the banking and the financial sector when discussing the effects of FDI on financial stability. This argumentation will now be done in five parts.

2.3.1 The central position of the financial sector in the economy

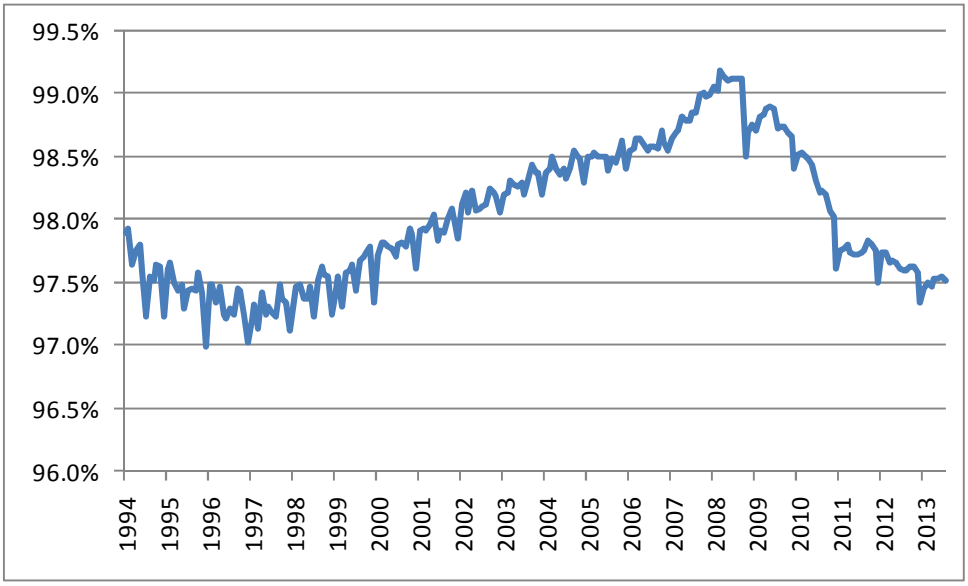
An important reason why FDI in the banking and financial sector can have different effects on financial stability than FDI in other sectors is the position of the financial sector in the economy. Most payment flows go through it. This central importance of the financial sector to general commerce is unique and therefore, the effects of FDI in this sector must be thoroughly understood.

2.3.2 The unique use of banks' product (credit)

The financial industry is also exceptional due to the unique use and demand for one of its most prominent products, i.e. credit. This product is widely used in investment projects as external financing and can either be directly intermediated, through e.g. pension and mutual funds and banks (via borrowing abroad), or directly created by the banking system itself. This bank-credit is then

used as money in the economy. A large majority of the money in the economy is so created, i.e. by the banking system. In Iceland, as an example, the proportion of existing money created by the banking system has fluctuated between ca. 97-99% of the total M3 since 1994. Similar ratios are in place in other economies (Ryan-Collins et al., 2011).

Figure 2.6 – The ratio of bank-created money of the total M3 supply in Iceland



Data: Central Bank of Iceland, author's calculations

No other firms in the economy issue money units as banks do every day through their lending decisions. Banks furthermore lend to anybody that they deem creditworthy at given point in time (Louis-Phillipe Rochon & Rossi, 2013). The decision of banks about whom and how much to finance via the creation of credit will affect the overall investment other firms in the economy, and hence their profits, given that profits equals investments (in a Kaleckian (Kalecki, 1969) skeleton model of the macro economy). This is why FDI in financial services may be felt through the whole economy on a much wider scale than FDI in other industries since the good in question – credit – is used every day, everywhere in the economy as general commerce is carried out and externally-financed investments made.[60]

2.3.3 The (possible) unique self-supporting mechanism of banking-FDI

Another reason why it is worth looking at FDI in banking and its effects on the economy and financial stability in particular is the fact that it, theoretically, can

[60] This is assuming that it is large enough as a percentage of the banking sector.

be self-sustaining. The possible self-sustainability arises from the fact that bank credit is normally supply-determined, not constrained by the supply of savings and there are, normally, willing borrowers around (Louis-Phillipe Rochon, 2012a; Werner, 2005) except perhaps during balance sheet recessions when borrowers' main objective is to deleverage as fast as they can (Koo, 2009).

The unquenchable demand for credit gives banks the opportunity to step into an economy and create the credit which can support their entry into the economy in question. The credit supplementation of banks, new and old, supports asset prices and even raises them, expanding the pool of available collateral which can be a limiting factor in banks' *willingness* to supply credit, especially in a non-relationship based banking (Binks & Ennew, 1996) which foreign banks tend to be more focused on due to comparative disadvantages related to distance (culture, agent enforcement costs, unfamiliarity with local businesses and legal framework, etc.) (Mian, 2006). By increasing the price of collateral, the credit expansion feeds on itself.[61]

The effect of lending in foreign currency, which a foreign bank has an easier access to than a domestic bank (e.g. because it operates in the foreign currency area and has direct access to the central bank), must be kept in mind as well. FDI in the financial sector has been associated with credit expansion (and bust) in foreign currency in the host economy (Reinhardt & Dell'Erba, 2013). The effects of this are self-reinforcing. Brunnermeier et al. (2012) tell a story similar to the following. A foreign bank lends its home-economy currency to a host-economy local borrower who then exchanges it for the host-economy currency, which consequently strengthens. That appreciation of the host-economy currency shows up on the borrower's balance sheet as lower liabilities measured in the local currency. The borrower's assets, denominated in the local currency, have an unchanged nominal value. His equity increases due to the appreciation of the local currency. Since the borrower has now greater equity than when he borrowed the foreign currency this shows up as lower risk for the

[61] The reader is reminded of Rochon's words, see previous discussion in *2.1.2 On money, credit* and banks: the supply of money is "credit-led and demand-determined; it can be supply-constrained *only* in the sense that banks may not *want* to lend, but not because they *cannot* lend" (emphasis added). The supply of credit is not constrained by savings but banks' willingness to create the credit when they lend money to their customers. If banks are fighting for a market share it is not heroic to assume that it has effects on their *willingness* to supply the credit: they may *want* to create more credit and, given the assumption of credit demand being in place, the credit, i.e. the money, will therefore be created.

lender: the borrower is more creditworthy due to his higher book-valued equity. That frees up equity on the foreign bank's balance sheet, creating capacity to lend further: the foreign bank has self-sustained, with the help of some local currency appreciation, its ability to lend into the host economy. Of course, the capacity to lend contracts if/when the local currency depreciates and so the bust happens even quicker than it would happen if the credit boom in the beginning had been in the local currency.

The credit allocation can also be qualitative instead of quantitative or currency based. By "cherry picking" the best borrowers in the economy – e.g. by offering them a better deal than a local bank does and snatching them – the foreign bank pushes other banks out of the high-quality section of the group of borrowers, pushing them to take on increased credit risk to maintain their businesses. If the domestic banks do increase their exposure to low-quality borrowers, they risk being hit by an economic slow-down harder than the foreign banks as their loan portfolios are of a lower quality. This will then make it easier for the foreign bank to outright take over the domestic bank, increasing its market share and even becoming a TBTF bank for the host economy, or use its superior balance sheet to extend credit to the best borrowers of the domestic bank. Slowly, the domestic bank loses ground. Badly developed domestic banks that expand their loan portfolio in response to a foreign bank entry can also introduce financial instability into the system as credit risk increases. If, however, the domestic bank does not respond to the cherry-picking of the foreign bank in the beginning the bank will contract immediately, losing market share. Either way, the chances are that the domestic bank is in a lose-lose situation. Its only way to endure is to become more efficient, something that FDI in banking can be a catalyst for.

Foreign banks that cherry pick the largest domestic firms and the multinationals in the host economy are also self-supporting their existence in that economy by increasing the competitive position of the cherry-picked firm. By providing low-interest credit relative to other (smaller) low-quality firms the foreign banks are increasing the competitiveness of the best borrowers, making it possible for them to expand further, both domestically and internationally. This growth of the best borrowers calls for more credit, which will be provided by the foreign bank. Therefore, by initially focusing on the best borrowers, the foreign bank is self-

supporting its existence in the host economy by tipping the balance in the favour of its very own picked borrowers.

This can put the SMEs in the economy in a tight spot. As their larger competitors get easier and cheaper funding their relative development can slow down. This can have serious overall economic consequences as SMEs can be more than 90% of the total firms in the economy, generating more than 50% of the labour demands and representing more than half of total value added by businesses (Cárdenas, Graf, & O'Dogherty, 2003; EU-Commission, 2013).

There are therefore some potentially serious repercussions for the economy that arise from foreign banks' possible self-supporting credit creation in the host economy. Empirically, this proposition – foreign banks support their market entry by simply creating and providing enough credit – has never been directly tested. However, some signs of the effects of foreign bank entry can be observed in some cases.

First and foremost, foreign banks have been found to have higher loan growth than domestic banks: in Argentina and Mexico during the mid and late 90s (Goldberg, Dages, & Kinney, 2000), in Chile and Colombia during the same time period (Crystal, Dages, & Goldberg, 2002) and in south-eastern Europe in the beginning of the 21st century (Haas, Korniyenko, Pivovarsky, & Loukoianova, 2012). Foreign banks have also introduced new credit instruments that assisted in their growth in the host economy, such as credit cards in Spain (Levine, 2001).

That foreign banks may have a faster loan growth than domestic banks is open for scrutiny for two reasons. First, small loan portfolios are easier to expand proportionally than large ones. Second, the fact that foreign banks are expanding their loan portfolios in new markets might be due to the fact that lending is much more profitable in that market than in others due to higher interest spreads than in other more developed financial systems in which they operate (Domanski, 2005). Therefore, the banks may not be intentionally thinking of self-supporting their growth in the new market but merely thinking of profiting from the larger interest spreads.

Second, when foreign banks enter an economy, both interest spreads and interest rates have been found to decrease. This has been interpreted as a sign of foreign banks being more efficient than domestic ones. However, this can be taken as a sign for the pessimistic view of banks supporting their own entry via lowering the interest rate spread on deposits in the banking system and thereby fighting to get a share of the market as quickly as they can. Werner (2005, p. 231) makes the point that at the introduction of competition[62] in the banking sector, "players are likely to respond by initially focusing their optimisation behaviour on market-share competition, even at the short-term neglect of profit maximisation (as such behaviour maximises their long-term profits)." In the case of financial FDI, players, foreign and domestic, fight for the market share by decreasing their risk aversion (lower quality of credit screening) and by generally having "a larger appetite to extend loans" (ibid).The simultaneous lower rate of interest and high credit growth spurred by foreign banks seems to have been the case in central and east Europe (Hilbers, Otker-Robe, Pazarbasioglu, & Johnsen, 2005).

Third, cherry-picking seems to be a recurring matter. Cárdenas et al. (2003) take a short look at then-recent research and claim that the evidence so far implies that foreign banks allocate a lower share of their loan portfolio to SMEs. Earlier, Stiglitz (2002) reported that in Argentina, before the 2001 crisis, foreign banks seemed to focus their lending to multinationals and large domestic firms. Small and medium sized corporations complained about not getting access to credit from foreign banks. Recent research seems to further back up this claim: foreign banks do cherry pick the best borrowers, such as those that they can get the most hard-information on, such as high-quality balance sheet and cash flow data (Detragiache, Tressel, & Gupta, 2008; Gormley, 2010; Mian, 2006). This problem does seem to be more prominent in poor and developing economies, perhaps due to less developed infrastructure in providing a general way of gathering information on the creditworthiness of borrowers, which makes them "informationally difficult" (Mian, 2006) for banks. Therefore, banks cherry pick those that are easiest to find credit information on and focus their attention on economies where credit information is easy to find. Tsai, Chang, and Hsiao

[62] He considers (p. 231) especially the abolishment of cartels but the argument can be used in general for any increase in the banking sector for any reason at all – including financial FDI.

(2011) found that banks preferred to expand to economies where availability of credit information was high, limiting their information screening costs.

The cherry-picking can in fact in some cases lower the total availability of credit to firms (Detragiache et al., 2008; Gormley, 2010) because the high-quality borrowers are “cream-skimmed” away from the aggregate pool of borrowers by the foreign banks. The “skimmed” rest has to pay a higher rate of interest, not only depressing SMEs’ willingness to borrow but even lessening the readiness of banks to supply credit to them due to higher default risks. If this happens, it can slow down economic development since SMEs are such a large share of the total economy. That said, the opposite seems empirically possible as well as one could expect if domestic banks seek new borrowers as they lose their best ones to the foreign banks. In Hungary, Bonin and Ábel (2000) found evidence that not only had foreign bank presence pushed for much welcomed development in the banking sector (such as ATMs expansions and bank cards) but credit to SMEs did not contract either. On the contrary, domestic banks seem to have increased their supply of credit to local SMEs exactly because the foreign banks cherry-picked the best borrowers and the domestic banks had to move their focus on SMEs. Giannetti and Ongena (2012) found the same effects in 13 emerging economies (European ex- Communist regime countries, including Hungary): domestic banks reached out to firms that previously had no or very limited banking relationships as foreign bank lending increased.

The entry of foreign banks into an economy is therefore special from the point of view that they can self-support their existence in the host economy by simply providing more of the product that they provide, i.e. credit, which is always in demand. Not only is this quite likely a unique function of FDI in banking compared to other sectors of the economy, arising from the unique use of bank-credit as money and the supply-determined quantity of it, but this can also influence macroeconomic structures and affect financial stability in much wider scale than other forms of FDI.

2.3.4 Contagion risks from financial-FDI

Another reason for looking in particular at the effects of financial FDI on financial stability is the increased contagion risk that comes with it. Arguably, this risk is in place in other sectors as well: if the parent company of a branch or

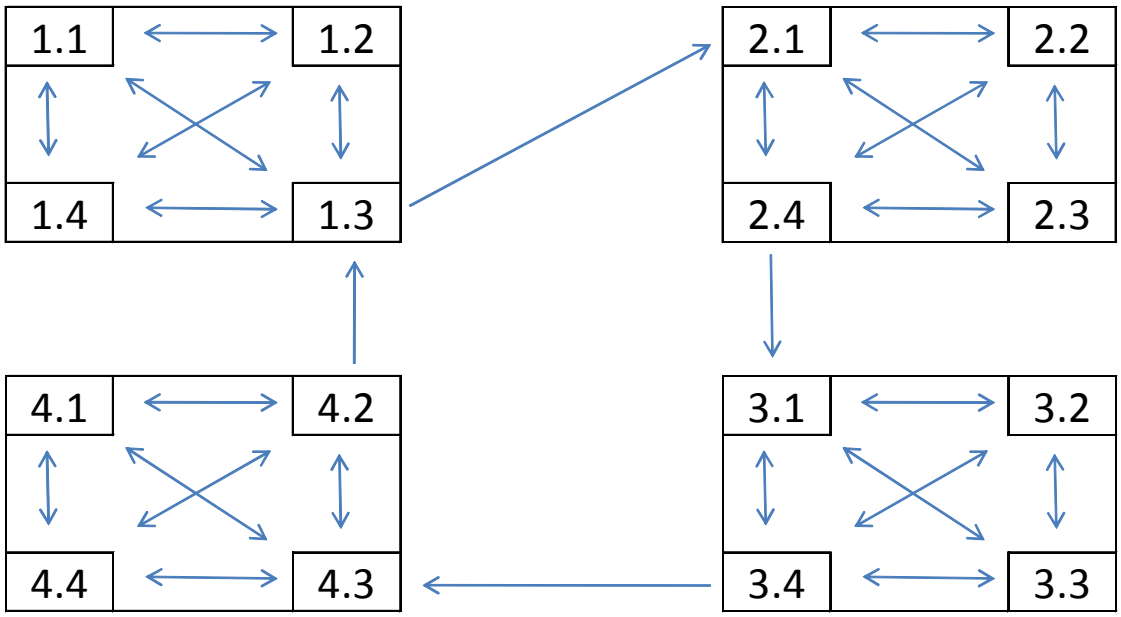
a subsidiary working in a host economy gets into trouble and needs to close or contract its operations in the host economy, this can have negative contagion effects on the latter, such as on labour demand, via the FDI link. However, because banks are in the centre of the economy, produce most of its credit and money supply and are a link in most of today's commerce making use of bank-deposits as a means of payment, the overall macroeconomic effects are likely to be more severe if/when a foreign bank goes bankrupt than when e.g. a foreign manufacturing firm closes down. This is especially so if the foreign bank is a TBTF bank in the host economy. Indeed, Reinhardt and Dell'Erba (2013, p. ii) "show that while FDI surges occur across all sectors, only surges in FDI in the financial sector are accompanied by a boom-bust cycle in GDP growth." Their possible explanation (ibid): "the expansion of credit in foreign currency that typically accompanies these flows, which might amplify the transmission of external shocks under the presence of collateral constraints." They also comment that capital flows, which can be destabilising, are more influenced by global and contagion effects in the case of financial FDI than non-financial FDI. All this makes it worth looking at the contagion risks that can develop in the financial industry and affect both the host and the home economy.

Theoretically, it is easy to picture the contagion risk and how the banking-FDI link can set up a possible conduit of contagion. F. Allen and Gale (2000) showed that, theoretically, the most stable (national) banking system against a liquidity shock is a banking system where all banks have a connection with each other: instead of asking only one bank at a time for liquidity assistance, it increases the system's resilience to a certain shock if a bank in need of liquidity can ask all the other banks at the same time. The liquidity shock is in that way more equally carried by the whole financial system instead of creating local "pockets" of shocks that can possibly spread later in a contagion-like sense.

It is easy to extend Allen and Gale's nation-wide financial system into a multinational banking system. In figure 2.7 there are four Allen-and-Gale complete (national) systems in the sense that all the banks in each have a connection with each other which allows them, theoretically, to disperse a local liquidity shock evenly over the whole system instead of burdening only a sub-set of the whole national financial system. However, some of the banks, such as 2.4 and 3.1, have a connection between them, such as in the form of a cross-

border loan or banking-FDI. In the case of financial fragility in e.g. bank 2.4 it can decide to seek liquidity from bank 3.1. If the financial situation of bank 3.1 is such that it needs to disperse this shock to other banks, they may need to find liquidity somewhere else, such as with bank 4.3 in the case of bank 3.4.

Figure 2.7 An Allen-and-Gale incomplete multinational financial system



Allen and Gale complete (national) financial systems but incomplete multinational financial system. A local national financial shock in any of the national systems can have a contagion effect on others, possibly causing them to experience a period of financial instability.

This way the incomplete multinational banking system can cause a contagion effect between national banking systems, even if each and every national banking system is complete in the Allen-and-Gale sense. Note that the link between the banks need not be an FDI link. It can e.g. be an international bank loan, something that has shown itself to be not altogether a robust external financing method of economies. An example can be found in the withdrawal of Japanese banks from lending to South-East Asian countries in the wake of the Thai devaluation, an act that had a negative impact on particularly Indonesia, Malaysia and South Korea (Kaminsky & Reinhart, 2001). Spillovers of changes in monetary stances in one economy can also spread to the next economy via this link, especially in the case of multinational banks (Correa & Murry, 2010). Lack of foreign currencies, such as because international banks loans need to

be repaid or refinanced, is one reason for instability as well and the connection in figure 2.7 can be depicted as such.[63]

Now, of course, the reality is that external financing of economies exists in one image or another. Ring-fencing the whole economy totally off from any possible contagion risks in cross-border capital flows may have a negative net impact on the country's ability to develop. The question then becomes not to forbid cross-border claims outright but to encourage those that are more stable than others while dissuading the rest.

This topic was covered in considerable depth, as mentioned briefly in chapter 1, by Eichengreen (2004). He proposed, when opening up the economy for foreign capital inflows, that policy-makers should allow FDI inflows to take place first, portfolio flows second and foreign bank loans last. This can be transferred onto financial FDI in particular: financial FDI should be allowed to take place first before cross-border bank loans are allowed. Banks that *borrow* from abroad open up a potentially more serious contagion channel for the financial system than foreign banks that directly operate in the economy via an FDI link (Schnabl, 2012).[64] Foreign banks, operating via an FDI link, can provide funding to the local economy and as such substitute the more unstable funding that otherwise would have come via an international bank loan to a domestic bank (Brana & Lahet, 2011). But the FDI link can also complement other capital flows.

It can be argued that if an economy wants to protect itself from possible contagion effects of foreign banks with FDI links in it the following should be done: favour secure and well capitalised banks over others and favour banks from economies with *low and stable* economic growth.

The reason for the first part of that argument is that a shock in the parent company or the home economy can spread to the host economy via the

[63] This has been responded to by central banks as they try to maintain liquidity in the financial system. The Federal Reserve in the US has e.g. foreign exchange swap agreements with many of the biggest central banks in the world, which are "designed to improve liquidity conditions in global money markets and to minimize the risk that strains abroad could spread to U.S. markets, by providing foreign central banks with the capacity to deliver U.S. dollar funding to institutions in their jurisdictions" (Federal Reserve Bank of New York, 2014).

[64] Schnabl finds that foreign-owned banks are more resilient to international shocks to liquidity than domestic banks that finance themselves abroad. As one could have expected, locally funded banks open the least serious contagion channel for foreign shocks.

banking-FDI link. Dedola, Karadi, and Lombardo (2013) present a theoretical model where, via global financial integration, a shock to either the quality or the valuation of capital, or both, in an international financial intermediary causes a global-wide contraction of credit. Empirical results back this up. Brana and Lahet (2011) show that foreign bank lending via local operations (via FDI) in CEE countries is notably under the influence of parent bank factors: if the parent bank is putting aside a lot of provisions for bad loans, lending in its banking-FDI connections contracts. Similar results are found by de Haas and van Lelyveld (2006): bad health of the parent bank – they used loan loss provisions to net interest revenues as a proxy for that factor – had negative effects on the lending activities of its foreign affiliations. They confirmed this result eight years later (De Haas & Van Lelyveld, 2014). Furthermore, better capitalised banks are able to grow faster than badly capitalised banks. Therefore, well capitalised and healthy banks should be welcomed into host economies if local policy makers want to minimise any contagion effects from the parent bank on the local supply of credit.

The reason for the second part of the argument – banks from economies with low and stable economic growth should be favoured over banks from other economies – is that it would improve the willingness of the foreign banks in question to supply credit in the host economy. Moshirian (2001) and de Haas and van Lelyveld (2006) found that strong economic growth at home damped the credit growth of banks operating via a banking-FDI abroad. Brana and Lahet (2011) report not only that the bad health of the parent bank negatively influences the credit supply of its foreign subsidiaries but increased profits of the parent bank *reduces* lending (p-value significant at the 90% level) in host economies via the FDI operations. Duenwald, Gueorguiev, and Schaechter (2005, p. 13) report that the then-recent credit growth in Bulgaria and Romania was pushed by foreign banks since "[m]any of the banks' foreign owners are domiciled in less profitable mature markets, so parents have encouraged their subsidiaries and branches to pursue aggressive loan portfolio expansion to gain market share and improve consolidated results, thereby contributing to the acceleration of credit [in Bulgaria and Romania]." In other words, low economic growth at home led the parent banks to push their foreign subsidiaries "to

pursue aggressive loan portfolio expansion".[65] But the home economy must be stable as well: Hryckiewicz and Kowalewski (2011) use an empirically based probit model to show that a crisis in the home country encourages parent banks to close foreign subsidiaries. Peek and Rosengren (2000a) have a similar story: when Japanese banks experienced a crisis in the 90s, they contracted their supply of loans in the US, which had a real economic impact there. Therefore, a crisis at home calls banks home just as high economic growth does. So in order to encourage the foreign banks to supply credit in the host economy the home economy's economic growth should be low (profit opportunities are higher in the host economy) *and* stable (a crisis at home makes the parent bank "call its troops home" so to speak).

This effect of the home market and the parent on the credit supply of subsidiaries can perhaps be explained with an opportunity-cost explanation similar to Moshirian's (2001): banks have a certain balance sheet (and a certain pool of consolidated equity to leverage via e.g. credit creation wherever they operate) but comparatively best information and customer relationship in the home economy, making it operationally cheaper and more secure to lend out to home customers compared to foreign customers. In short, multinational banks are naturally home-country biased: if economic growth and credit demand at home are strong, causing strong profits in the parent bank, why risk valuable equity in expanding abroad? Also, if there is a crisis at home and the parent company needs all its financial power, such as equity and liquidity, to stay alive, the foreign offices will pay the price.

Taken together, these empirical findings could lend support to arguments of policy-makers of host economies where they reason that well capitalised ("healthy") banks from economies with low *and* stable economic growth should be favoured over other banks that want to enter the economy. For if the policy-makers open their borders for an ill-capitalised bank that will turn back when economic growth returns *or* crashes at home, the host economy risks opening up for a bank that may cause more destabilisation in the supply of credit than

[65] Of course, in and of itself this "aggressive loan portfolio expansion" can lead to financial instability in the host economy according to Minsky's FIH. But that is a matter which is strictly not the topic here, i.e. the possibility of contagion effects on the credit supply in the host economy via the banking-FDI link with regards to the home economy's economic growth and the health of the parent bank.

not. However, it is not certain that such “cherry picking” would perfectly comply with international regulations on equal access and opportunities to businesses.

Finally, the contagion risk is an issue for the home economy as well, as the contagion channel can be a two-way street. As Herrero and Simón (2006, p. 16) point out, not a lot of work has been put into analysing the effects of banking-FDI on the home economy, with the results that “the effects that it may have on the home country are virtually unknown”. Contagion risk is one of those factors but, as Herrero and Simón point out, others include classic home-country impacts of FDI outflow in general such as financial, production, employment and structural influences. Some scarce work on the contagion front can be highlighted though and new work added.

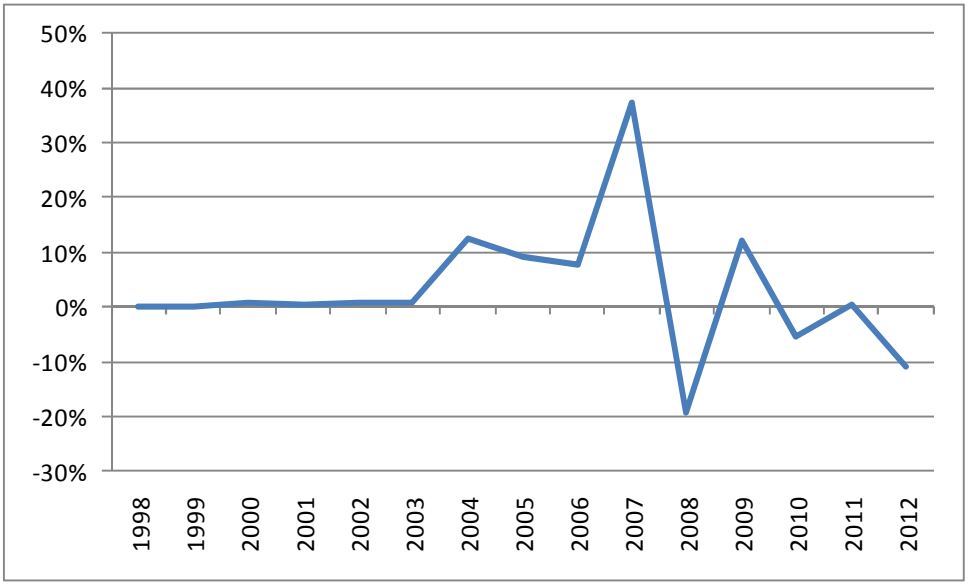
The work so far seems to first and foremost focus on the entry mode of the foreign bank, especially with regard to whether the bank chooses to enter the host economy via a branch or a subsidiary. The difference, as Brunnermeier et al. (2012) explain, is that if a bank sets up a branch, it is responsible for any problem that may arise in that office. But if a subsidiary is set up, the contagion from the foreign office onto the parent bank can be limited, simply by dumping the subsidiary as some foreign banks did in Argentina (Hryckiewicz & Kowalewski, 2011). Earlier, the same authors had shown that foreign banks choose to set up branches only in more developed (and stable) economies. Only a handful of foreign-bank branches were set up in emerging markets before the crisis in 2008 and no foreign bank used that entry method after the crisis started (Hryckiewicz & Kowalewski, 2010).

The method of financing a multinational bank is also a factor that influences potential contagion risks from abroad to home. Brunnermeier et al. (2012) point out that multinational banks that are funded by long-term liabilities and a stable deposit base pose less risk than those funded with wholesale or interbank funds, no matter if they operate subsidiaries or branches since, as F. Allen et al. (2011) point out, banks can transfer resources between their subsidiaries and parent “relatively fast”.

F. Allen et al. (2011) also briefly mention the case of Icelandic banks, which is an excellent example of outward banking-FDI opening up a contagion channel that in the end had catastrophic effects on the home economy.

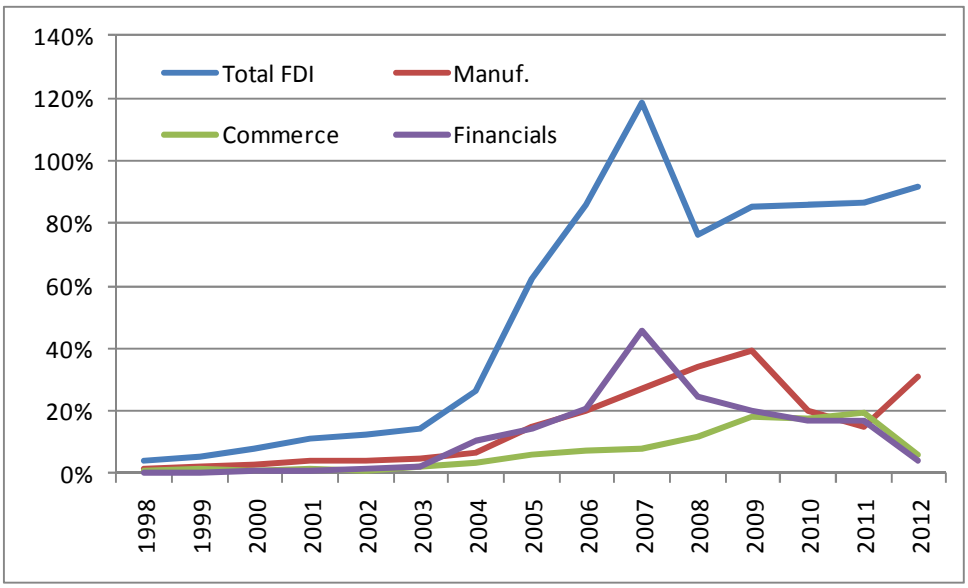
Icelandic outward financial-FDI flow was more than 37% of GDP in the peak year of 2007. It had practically been nonexistent only four years earlier, see figure 2.8. Outward financial-FDI stock was at the same time higher than in any other industry and represented 38% of total outward FDI stock. No foreign bank was or is operating in Iceland.

Figure 2.8 – Total outward financial-FDI flows as a share of GDP



Data: Central Bank of Iceland, Statistics Iceland. Author's calculations

Figure 2.9 – Outward FDI stock as a share of GDP, selected industries



Data: Central Bank of Iceland, Statistics Iceland. Author's calculations

This outward financial-FDI was, as F. Allen et al. (2011) point out, to a large extent financed with wholesale and interbank loans (see also Appendix 1). Deposits increased their prominence in the funding base after the "Geyser

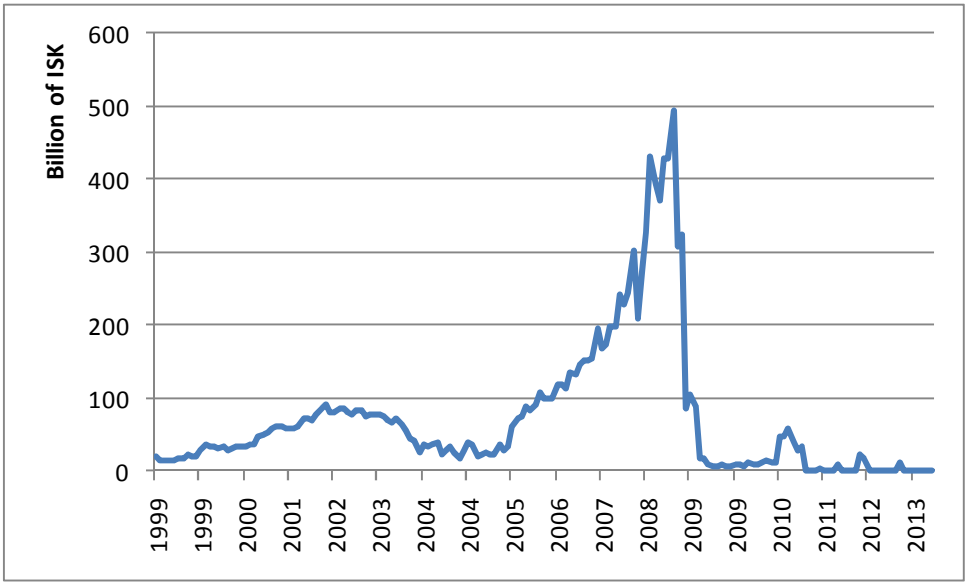
Crisis" in 2006 when foreign analysts highlighted the Icelandic banks' dependence on wholesale and interbank funding (see e.g. Thomas, Alamutu, and Lewis (2006) and Ashby and Henriques (2006)). The banks responded, most notably Kaupthing with its "Edge" and Landsbanki with its infamous "Icesave" internet-only banks. The banks then shifted the deposits so raised between the foreign offices and the parent banks, especially at the height of the crisis and during the final days of their lives when they were scrambling together whatever resources they had to stay alive. This money-shifting in fact reached such an alarming rate that the British government applied the Anti-Terrorism, Crime and Security Act 2001 against the then-failed Landsbanki to stop it from being able to shift deposits from its UK Icesave branches to anywhere (Braithwaite, Barker, Peel, & Burns, 2008; Donaldson & Vina, 2008; Roy & Watts, 2008).

When liquidity on wholesale markets diminished in the wake of the subprime bubble bursting in the US – Icelandic banks had minute direct exposure to US subprime loans[66] – the banks got into trouble funding themselves. They turned to the government and the central bank that tried to step in. Glitnir bank was first to turn to official assistance when it asked for an emergency loan in foreign currency from the central bank, effectively asking it to be a lender of last resort. The bank did not get the loan but an equity injection of EUR 600 million from the state (Vísir, 2008a). When Kaupthing turned up, hat in hand, on the central bank's step it got a EUR 500 million emergency loan. Its Danish subsidiary, FIH, was accepted as collateral (Vísir, 2008b). All three banks had before that received liquidity assistance in the form of "Love Letters" (i. ástarbréf) from the Central Bank, which were practically extra-easy REPO agreements.[67] The total outstanding REPO agreements skyrocketed during the months before the final crash in October 2008, see figure 2.10.

[66] Kaupthing Bank had some exposure to it, probably around 80 billion ISK, which an attempt was in fact made to hide by moving the subprime loans onto the asset site of a holding company which then took a loan from Kaupthing, thereby hiding the direct exposure for the bank (Herbertsdóttir, 2009).

[67] The "Love Letters" were bonds that the Icelandic banks issued *to each other* and the central bank made eligible as collateral in REPO agreements – on 17 January 2008, see Central Bank of Iceland (2008) – when the banks had run into serious liquidity needs. All other more creditworthy collateral, such as government bonds, was already used by the banks in their REPO agreements with e.g. the ECB from where they got euros, which temporarily alleviated their liquidity needs in foreign exchange. When the banks went bankrupt, the Central Bank was left with the Love Letters as worthless collateral. The Icelandic National Audit Office estimated that the total loss of the Love Letters was ISK 400 billion, 27% of 2008 GDP (Vísir, 2009).

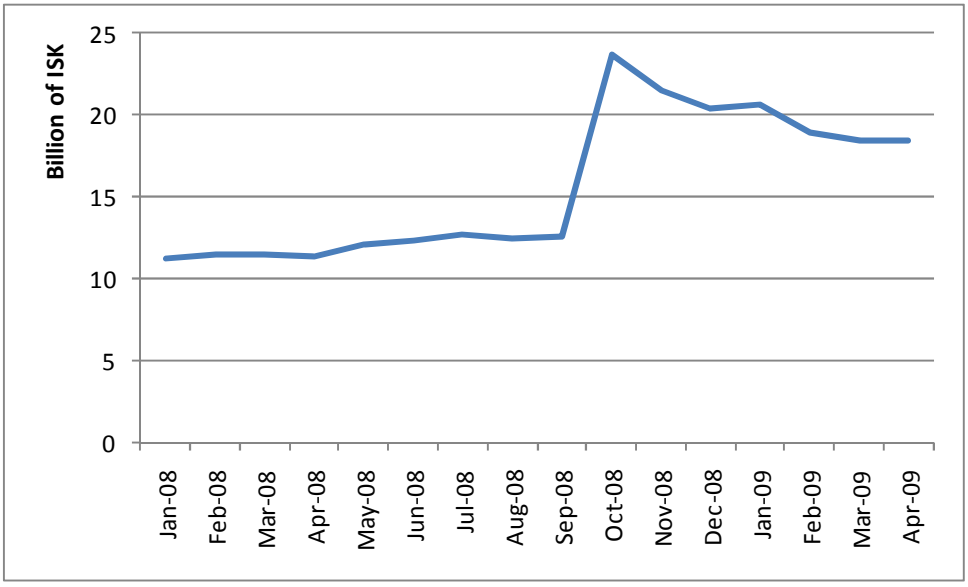
Figure 2.10 – Central Bank of Iceland, outstanding REPO agreements



Data: Central Bank of Iceland

Prior to the collapse of the Icelandic banks the currency had depreciated rapidly as well. From end of June 2007 to 1st of October 2008 the price of the USD had gone up 74% measured in Icelandic kronas. This currency collapse, to a large extent fuelled by the problems of the Icelandic banks, introduced a great burst of financial instability into the Icelandic financial system as foreign currency loans and inflation-indexed mortgages increased in nominal terms. Borrowers' debt burden increased sharply. When the banks finally collapsed the turmoil reached its height and there was even an old fashioned bank run but the Central Bank responded by putting increased cash and coins into circulation, alleviating the instability due to the bank run considerably (figure 2.11). Furthermore, since the emergency lending to the banks had gone south, both in the form of now-worthless Love Letters and special assistance such as the EUR 500 million loan to Kaupthing, the equity of the central bank took a hit. The state responded by issuing a government bond to the central bank, thereby rejuvenating its equity base but also increasing the public debt by 270 billion ISK (19% of GDP 2008).

Figure 2.11 – Iceland, coins and notes in circulation during the October 2008 crash



Data: Central Bank of Iceland

The story of the Icelandic banks is an excellent example of contagion risks that financial-FDI can introduce.[68] Not only did the home country suffer substantially from the contagion of subprime loans onto the Icelandic banks – a contagion that would not have had been as prominent had the Icelandic banks not expanded abroad – but host economies of the banks were hit as well as the parent banks were going bankrupt and branches and subsidiaries were left hanging. Had the Icelandic banks expanded more slowly, used more long-term financing and tested their methods in more rigorous ways instead of expanding fast by any means necessary, it is well possible that not only would they have made positive contributions to financial development in their host economies but they would not have introduced as much contagion risk to their home economy either. It is safe to say that Murphy's Law was in its prime concerning the financial-FDI of Icelandic banks.

2.3.5 Financial-FDI, credit availability, credit stability and capital flows

In continuation of the discussion of possible contagion risks of financial-FDI comes the issue of possible benefits such capital inflow may bring. Specifically, is financial-FDI associated with a) more credit availability, b) more stable credit availability and c) changes in the nature of capital flows? Regarding the last issue we should, having the potential financial-FDI effect on financial stability in

[68] The failed outward financial-FDI of German bank Hypo Real Estate Bank when it acquired Irish bank Depfa Bank in 2007 seems like another prime example of introducing contagion risks onto the home economy, see e.g. The Irish Times (Scally, 2013).

mind, specifically ask: does financial-FDI act as a substitute or a complement to other types of capital flows?

Financial-FDI and credit availability

Making credit more available can have a positive impact on economic development. Access to credit, in the Schumpeterian sense, can be the purchasing power needed for investments and general development, leading to increased production capabilities, less poverty, more income equality and economic growth. Access to credit and other general "financial inclusion" can therefore be interpreted as a positive aspect of financial and economic development (Beck & Demirgüç-Kunt, 2008).

At first, we could expect the entry of a foreign bank to increase the credit availability in the economy, especially since we have seen that foreign banks can have faster growth of credit than domestic ones (Crystal et al., 2002; Goldberg et al., 2000; Haas et al., 2012). The subject of credit availability is also closely connected to that of availability of information on the borrower in order for banks to be able to perform credit screening. Petersen and Rajan (2002) point out that greatly improved information technology has allowed banks to carry out banking services over longer distances than before. Multinational banks, operating over longer distances than domestic ones, benefit significantly from this development. Multinational banks can also have easier access to foreign capital in general, easing possible constraints that the host economy may have on accessing foreign capital markets (Claessens, Demirgüç-Kunt, & Huizinga, 1998). Therefore, we could expect the entry of multinational banks to improve credit availability in the host economy. The empirical record is however not straight forward, not least because of the risk of "cherry picking" by foreign banks due to lack of information that can help banks doing the screening of the potential borrowers (see *2.3.3 The (possible) unique self-supporting mechanism of banking-FDI*).

The topics of credit availability and information availability have shown themselves to be closely related. Jappelli and Pagano (2002) looked at 49 countries and found that in those where there was some sort of (public or private) credit-information sharing mechanism between lenders, lending was higher, credit risk lower and default rates lower. Houston et al. (2010) looked at

69 countries and made a connection between greater information sharing on one hand and higher bank profitability, lower bank risks, higher economic growth and lower likelihood of financial crisis on the other. Here, we can argue that the arrival of a foreign bank would improve financial stability, if the sharing of information is improved or if its arrival in any way improves the availability and the quality of data. Levine (2001) pointed this out, as we have already seen.

In light of this research it seems that the presence of a multinational bank is not necessarily what improves the availability of credit but rather improved information gathering and sharing on borrowers. This seems to be confirmed by De Haas and Naaborg (2005) who report that multiple multinational banks focus first on large borrowers, either from their own home economy ("Follow the Client" model) or the host economy, but gradually move towards host-economy SMEs as information on them becomes available. Examples include ABN AMRO, HVB/BA-CA, ING and Raiffeisen banks in central and east European countries. However, multinational banks' impact on e.g. information systems and credit screening should not be ruled out since we should, especially with Petersen and Rajan (2002) in mind, expect multinational banks to be in control of highly productive information technologies which can make improved use of the available information and even have spillover effects on domestic lenders.[69]

Financial-FDI and credit stability

As in the case of credit availability, the empirical record of the impact of financial-FDI on credit stability seems to be ambiguous.

On host-economy influences, de Haas and van Lelyveld (2010) used panal data to empirically investigate the matter. They find that when there is a host-economy downturn or even a crisis, subsidiaries of foreign banks do not contract their lending as much as domestic host-economy banks since the foreign banks can rely on support from the parent company. In Latin America, including Argentina and Mexico, foreign banks have been recorded having a stronger loan growth, a firmer response to asset deterioration and a greater ability to absorb losses, having the net result of improving the functionality of

[69] As an example, KBC bank developed and implemented new credit-score techniques for microentrepreneurs in the Central and East European countries after it entered the market (De Haas & Naaborg, 2005).

the financial system as a whole (Crystal et al., 2002). Previously, however, Goldberg et al. (2000) had reached the conclusion that although foreign banks had higher and more stable credit growth than their domestic counterparts it was not the ownership (state, private domestic, foreign) that was important but the health of the banks in question. They looked at Argentina and Mexico as well. They hold the position that foreign banks, due to their better health, have improved financial stability in the countries in question. From the study of Detragiache and Gupta (2006) we learn that foreign banks in Malaysia were unevenly hit by the Asian crisis. The crucial difference was how concentrated they were in the area and, unsurprisingly, if they were operating in the asset bubble sections of the economy. So not only do the foreign banks need to be healthy, they need to be diversified as well if they are to bring improvements to financial stability. Too much concentration will simply cause them to be hit as hard as domestic banks. If they are hit too hard, they may just pick up and leave, causing the volatility in credit stability to increase rather than decrease.

International and home-economy influences have effects as well and not just the health and the diversification of the banks. We can see that a slowdown external to the host economy may have adverse effects on credit stability. In Taiwan during the subprime recession – an international troublesome period – foreign banks cut lending to domestic SMEs (Shen, Chu, & Wang, 2012). And while de Haas and van Lelyveld (2006) note, as they did four years later, that foreign banks can support credit creation in the host economy during recessions they also highlight that the subsidiaries of multinational banks are dependent on the health of their parent bank – something Peek and Rosengren (2000a) pointed out in the case of Japanese banks in the US and de Haas and Lelyveld did themselves in the case of the financial crisis of 2008-2009, especially if the banks were relying on wholesale funding rather than local deposits (De Haas & Van Lelyveld, 2014).

Bottom-line then, the final effects on credit stability of financial-FDI in the host economy seem uncertain: although the foreign banks may seem more immune to host-economy shocks, thereby positively contributing to credit stability, they also open the host economy up for exogenous shocks, thereby negatively contributing to credit stability. The net effects are unclear but as is discussed in *2.3.4 Contagion risks from financial-FDI*, if host economies want to at least

partially protect themselves from exogenous shocks on the domestic supply of credit from multinational banks, they should prefer well capitalised banks from economies with low but stable economic growth. However, as will be explained in next section, although financial-FDI can introduce contagion risks into the host economy it should be preferred over general inflow of cross-border bank lending, at least from the point of view of maintaining financial stability.

Financial-FDI and capital flows

As already mentioned, Eichengreen (2004) recommends that FDI should be let first into an economy when liberalising the capital account. Bank loans, i.e. cross-border claims, should be let in last. Therefore, to maintain financial stability and avoid capital-flows crisis, specifically a capital flight, FDI should be preferred (although, as we argued in chapter 1, it is not impossible to see FDI flows flee as well).

There are two issues that arise from this. First, we must investigate whether the empirical record of *financial-FDI* and cross-border bank loans is according to Eichengreen's expectations, i.e. is the former more stable than the latter. Second, we should look into whether the financial-FDI acts as a substitute for cross-border claims, preferably not limiting ourselves to bank loans only but portfolio flows in general.

On the stability issue, financial-FDI inflow does seem to linger around more than cross-border bank loans. F. Allen et al. (2011) point out that due to possible regulatory framework there can be restrictions on multinational banks when it comes to drawing liquidity out of their subsidiaries back home to the parent bank. This is not so in the case of cross-border bank lending where the debt in question may even be "putable"[70] within a certain limit, making it possible for the lender to withdraw the liquidity much faster than if it were "stuck" in the host economy with a subsidiary subject to host-economy regulatory restrictions.[71] Schnabl's (2012) paper should be re-mentioned here as he showed that

[70] A "putable" security is one which's holder can demand immediate payment from the issuer of the security. A demand deposit is "putable" in this respect as the owner of the demand deposit can demand immediate payment whenever (s)he likes. Putable debt instruments have the benefit of normally carrying a lower rate of interest, exactly because its owner can demand immediate payment.

[71] Chatfield and Moyer (1986) reported, using Moody's Bond Survey, that 68 out of 90 putable corporate bonds were issued by banking and financial institutions. On top of that come bank deposits which can be putable (i.e. withdrawn) under certain circumstances. Putable cross-border bank liabilities are therefore not unlikely to exist to some extent.

domestic banks intermediating cross-border bank loans were harder hit by capital withdrawal than domestic subsidiaries of multinational banks. McCauley, McGuire, and Von Peter (2010) have similar results: local lending of multinational banks funded with local funds (via banks' local offices) was more stable than cross-border lending, particularly so in the case of emerging markets, during the subprime turmoil.

So financial-FDI is more stable than cross-border claims, which rhymes with Eichengreen's advice. The reason why this is so is perhaps best explained by F. Allen et al. (2011, p. 4) in the case of Central and East European economies during the subprime crisis (emphasis added):

> The CEE countries experienced a less severe reversal of capital flows than other regions of the emerging world... This can be attributed to foreign bank presence through subsidiary structure. Specifically, *many foreign banks were 'locked in'* because their local subsidiaries had given long-term loans in the host countries that could not be recalled.

The "locked in" reason for a multinational bank to sustain capital flows, rather than quickly pull out, seems also to have been confirmed by De Haas and Van Horen (2013) who noted that not only was it influential for a multinational bank to have a subsidiary in the host economy but how entangled they were with other host-economy lenders mattered as well: close integration into the network of other lenders discouraged multinational banks' retrenchment from that economy. Long experience in the host economy also encouraged them to stick around.

So not only does financial-FDI seem to be more stable funding than cross-border bank lending but it seems to substitute it as well, although that is not entirely certain. Going back to the regulatory framework point of Allen et al. we can understand it as bank subsidiaries being substitutes for cross-border bank lending: rather than lending to a bank in economy X, the bank simply sets up its own subsidiary there. Brana and Lahet (2011), in their study on CEE countries, note that not only is the presence of foreign banks a substitute for cross-border lending but it also encourages local-currency lending rather than foreign-currency lending in which the cross-border lending is often denominated in

(following the “Original Sin” problem). Therefore, cross-border bank lending and financial-FDI seem to be substitutes.

But going outside the relationship between financial-FDI and cross-border bank lending, we find evidences that financial-FDI is a *complement* to equity flows. Portes and Rey (2005) show that one of the most notable explanations for cross-country equity flows is the presence of a multinational bank in the host economy.[72] Multinational banks use their local offices as information hubs, increasing cross-country asset trade as information flow between the home and the host economy is improved. Following J. T. Harvey (2009), we can argue that increased equity flows are destabilising for the current account and exchange rates, having the potential to harm international trade (as exchange rate forecasting becomes harder) and introduce elements of financial instability into the economy. And we have also mentioned that the entry of a foreign bank into an economy can ease the access to foreign capital markets. Surely, in that case, financial-FDI is not a substitute but a complement to capital flows – at least it should encourage them.

Therefore, although financial-FDI may be preferable over cross-border bank lending when it comes to financial stability, its complementary nature to equity flows, and even portfolio flows in general, can counter such positive effects if Harvey is right on increased capital flows having destabilising effects on the economy. The net effects are unclear.

Let us now quickly draw some main points of the discussion so far together. Financial FDI deserves a special focus due to the centre-like role of the sector in the economy. FDI in banking and financial services has been shown to affect the interest spread on loans (Unite & Sullivan, 2003) and the rates of bank lending (Claeys & Hainz, 2013), especially since financial-FDI can feed of itself. It can also increase the competition in the industry (Jeon et al., 2011) and generally affect the overall supplementation of credit; foreign banks’ cherry picking can risk the soundness of the local banks and increase the chances of credit expansions as banks fight for market shares. This can lead to credit

[72] From a strict point of view we cannot write “portfolio flows” instead of “equity flows” here since Portes and Rey look explicitly at only the latter. However, they also note (p. 272, emphasis added) that “the equity portfolio flows that we study are a *very significant* component of international capital flows.” It would therefore not be a heroic assumption to consider as true, until proven wrong, that the presence of multinational banks is also complementary to portfolio flows in general.

booms and busts (Claessens & Horen, 2012; Rashid, 2011). Financial-FDI can also affect the currency composition of credit which can affect the overall development of financial stability (Reinhardt & Dell'Erba, 2013). Despite this though, financial FDI can also relieve pressures on emerging economies to find funding in foreign currencies as financial FDI can ease the access to credit in local currency, acting as a substitute to foreign currency bank loans (Brana & Lahet, 2011). However, financial FDI can also act as a complement to other portfolio flows into the economy, such as into the local securities market (Portes & Rey, 2005), which can have negative effects on the stability of the exchange rate and consequently financial stability (Harvey, 2009). All in all, the effects of financial FDI on financial stability are complicated. Theoretically, the net effects of financial FDI on financial stability are unclear and each case will only be settled via empirical investigation.

2.4 A focus case: Standard Chartered

In a series of reports, written for the multinational bank Standard Chartered, Kapstein and Kim (Kapstein & Kim, 2010, 2012, 2013) investigated the impact of the bank's operations in a number of African countries (Nigeria, Zambia, Kenya, Ghana) and Bangladesh. The reports are predominantly firm-level in nature and do not investigate many of the possible effects that an international bank can have as it enters an economy. Nevertheless, some of the effects, and the characteristics of the bank's operations, are certainly worth highlighting in the light of the discussion in this chapter.

First, we can see that the bank has considerable gross effects on employment, although we do not know whether the net effects are substantial. In Sub-Saharan Africa, the bank supports roughly 1.9 million jobs, directly and indirectly. In Bangladesh the figure is almost 470,000 jobs, excluding the bank's lending activities to other banks.

The bank has also used its international network to provide foreign capital to the host economies, implying that its presence has eased access to foreign capital. In Bangladesh, that foreign capital was used to invest in power and telecommunication infrastructure. In Africa, the bank, in 2012, channelled USD 3.5 billion from international capital markets to the region.

The bank's influence on the development of financial markets is certainly worth highlighting. In a number of its host economies, the bank is an active participant in secondary markets of financial assets, thereby deepening them and improving the pricing of products. The bank was a pioneer in the use of derivatives in Bangladesh. It provided the first Automatic Teller Machines, ATM, in Bangladesh, Uganda and Kenya. The first credit card in Bangladesh, the first internet banking for businesses in Tanzania, and the first currency hedges in Ghana all came from the bank as well. It assisted in the development of the electronic payment system in Ghana and provided education on derivative and risk management in Nigeria. The bank also played a role when Bangladesh got its first sovereign credit rating (in 2010). Numerous former employees of the bank have also assisted in spreading know-how in the financial sectors of the countries where the bank is stationed, including four alumni of the bank that are CEOs elsewhere in the Ghanaian banking sector. There are therefore strong qualitative evidences for the case that the bank has assisted in financial development in its host economies.

There are evidences for cherry-picking the biggest and best borrowers – the least "informationally difficult" ones – as well. Wholesale banking, i.e. dealing with larger institutions, is the main driver of the bank's business in African countries: 70% of its revenues in the region come from wholesale banking. Only a small fraction of on-shore lending goes to SMEs: 7% of the Kenyan loan portfolio goes to SMEs. The similar figures for Zambia, Ghana and Nigeria are 5%, 4% and 2% respectively. This must be considered small compared to the local banking industry's average exposure to SMEs. In Kenya, 50% of all bank lending goes to SMEs and in Zambia the figure is 18% (Calice, Chando, & Sekioua, 2012).

We saw earlier in this chapter that improved information about potential borrowers improve the credit screening process of banks, allowing them to better solve the problem of asymmetry of information. One way of knowing more about the potential borrowers is to gain experience in the economy, another is to improve information systems related to e.g. repayment capabilities and past borrowing. Indeed, as Standard Chartered has learned more about the host economy and developed its local credit screening and customer relationships it is in it has been able to expand its credit supplementation

process to other customers than in wholesale banking. An example of this: the bank's retail operations in Kenya and Zambia are more developed than in Nigeria, where it has not been stationed as long as in the other two economies. It should be noted here that the bank left its banking operations in Nigeria, due to political reasons, in 1996 but then returned to the economy in 1999 (Standard Chartered, 2014).

Conclusion to chapter 2

We began this chapter with the aim of arguing why financial-FDI should be focused on in particular when the effects of FDI on financial stability are investigated. Having explained the role of banks in the economy as both main creators of credit and intermediaries we showed how they are structurally in the centre of it: most commerce in today's modern economy is done with some sort of bank products.

On top of banks' role as the main creators of credit and intermediary roles in commerce we saw how financial-FDI can introduce contagion risks into the host economy. At the same time, given that most economies have some sort of international trade of one type or the other, closing the economy completely from foreign influences and capital may be suboptimal and hurt welfare. Financial-FDI's effects on credit stability, credit availability and capital flows were investigated and found to be ambiguous and potentially harmful to financial stability. Overall, we cannot tell for certain whether financial-FDI will be advantageous or not for financial stability, either in the home or in the host economy.

We have so far spoken of financial instability in an abstract way. Before we can make further investigations into the relationship between FDI, financial-FDI and financial (in)stability we must focus in more detail on what the term includes and how we should go along in measuring such a phenomenon. That will be the subject of chapter 3.

Chapter 3 – Financial stability

> Thus, the overall fragility-robustness of the financial structure, upon which the cyclical stability of the economy depends, emerges out of loans made by bankers.
>
> Hyman Minsky (2008b, p. 261)

The aim of this chapter is to discuss and clarify what "financial stability" is. The purpose is to edge ourselves closer to a measurement of the phenomenon which will in continuity be used to investigate the relationship, if any, between FDI in general and financial-FDI on one hand and financial stability on the other in order to empirically support the discussion in chapters one and two regarding the effects of the former on the latter. This chapter serves as a bridge between chapters one and two on one hand and chapter four on the other.

The outline of this chapter is therefore as follows. First, we will shortly mention past attempts at defining and measuring "financial stability". Second, we will ask ourselves why it is important to reach and maintain financial stability. Third, we will focus on a specific hypothesis concerning the formation of financial instability, the antithesis of financial stability. Fourth, and finally, building on that specific hypothesis we will justify how we could go along measuring financial stability (or its evil cousin, financial instability). This work, along with that of chapters one and two, will then support that of chapter four. In that chapter we will create a measurement of financial instability, following the discussion in this chapter, and investigate the connection between financial instability and FDI, making a connection between chapters one, two and three.

3.1 Defining and measuring financial stability

3.1.1 Defining financial stability

It is best breaking out the bad news immediately: contrary to e.g. FDI (see chapter 1) there exists no universally accepted definition of financial (in)stability (other related terms are e.g. "financial stress", "financial fragility" or "financial crisis"). Often the antithesis of financial stability – i.e. financial instability – is

used to convey the meaning of what the former is. The following are examples of proposed definitions:[73]

> Financial stress is defined as the force exerted on economic agents by uncertainty and changing expectations of loss in financial markets and institutions. Financial stress is a continuum.
>
> Illing and Liu (2006, p. 243)

> [F]inancial stability [is] the prevalence of a financial system, which is able to ensure in a lasting way, and without major disruptions, an efficient allocation of savings to investment opportunities. How close an economy is to the break point, exceeding which would impair the efficient allocation of savings, could be labelled the degree of financial fragility. This definition is very broad and - in my opinion - intellectually convincing. Due to the focus on the resilience of the financial system it would not classify each individual bank failure or each large swing in an asset price as proof of financial instability.
>
> Issing (2003, p. 1)

> A financial system is in range of stability whenever it is capable of facilitating (rather than impeding) the performance of an economy, and of dissipating financial imbalances that arise endogenously or as a result of significant adverse and unanticipated events.
>
> Schinasi (2004, p. 8)

> Thus we define episodes of financial instability as episodes in which a large number of parties, whether they are households, companies, or (individual) governments, experience financial crises which are not warranted by their previous behaviour, and where these crises collectively have seriously adverse macro-economic effects. In other words, a distinguishing feature of episodes of financial instability is that innocent bystanders get hurt.
>
> W. A. Allen and Wood (2006, pp. 159-160)

[73] Those definitions mentioned are only a small sample of the whole. See Houben, Kakes, and Schinasi (2004) for a more detailed list.

> A financial crisis is a nonlinear disruption to financial markets in which adverse selection and moral hazard problems become much worse, so that financial markets are unable to efficiently channel funds to those who have the most productive investment opportunities. A financial crisis thus results in the inability of financial markets to function efficiently, which leads to a sharp contraction in economic activity.
>
> Mishkin (1996, pp. 17-18)

Arguably, it is not optimal to discuss something that is vaguely defined. At least, in the case of foreign direct investment, there exists a quantitative definition that has been agreed upon by international institutions and policy makers, and therefore common and standard quantification methods have been developed. When it comes to financial (in)stability, no such thing exists as the above definitions show.

This does not rule out quantifying the phenomenon as multiple researchers have made an attempt to do (see *3.1.2 Measuring financial (in)stability*). In fact, as W. A. Allen and Wood (2006) point out, there is no universal definition of "price stability" either; central banks have different views of which price index to focus on and how and when to carry out their inflation targeting. Nevertheless, despite this lack of standardised definition of price stability, inflation targeting is widely carried out by the monetary powers in the world without any definite agreement what degree or measurement of inflation is "correct." Analogously, despite the somewhat fuzzy definitions of what it is, measuring financial stability on the basis of some sort of quantification should not be ruled out by definition.

Finally, two more characteristics of financial instability should be highlighted. First, it has gradations as Chant (2003, p. 8) notes:

> Financial instability is not an all or nothing condition; it has gradations. A financial crisis is an extreme degree of financial instability, where the pressures on the financial system are sufficient to impair its function significantly over a prolonged period. But financial systems can be subject to stress well before a crisis takes hold.

Furthermore, financial instability is macroeconomic and system-wide in nature. The characteristic of "episodes of financial instability" is that they hurt innocent bystanders (W. A. Allen & Wood, 2006). What Allen and Wood called "micro financial crises" – only one economic agent is harmed by either its own dim-witted investments, general lack of financial prudence or simple bad fortune – should, from a Schumpeterian "creative destruction" point of view, not be stopped. Issing (2003) furthermore points out that the failure of a single bank or serious asset prices movements should not always be taken as a sign of serious financial instability. We should, however, not forget that it is the system's reaction that matters. A failure of a single too-big-to-fail (TBTF) financial institution, as an example, can bring the whole financial system down and create a serious "episode of financial instability." This of course gives TBTF banks their name.

3.1.2 Measuring financial (in)stability

Multiple attempts have been made to measure financial stability, or its antithesis, despite a vague definition of the phenomenon. The old way was to monitor indicators that former empirical research had identified as valuable in giving an early warning on an upcoming financial crisis, i.e. Early Warning Indicators (EWI). Other similar terms include "Early Warning Systems", "Early Warning Models" and "Early Warning Signals".[74]

Relying on Yucel (2011) we see that the first EWIs focused on the micro-scale, specifically corporate bankruptcies (Altman, 1971; Altman & Loris, 1976; Moyer, 1977; Ohlson, 1980). The macro side received its interest somewhat later and then focused in particular on exchange rates and potential debt rescheduling of sovereign debt for developing countries (Eichengreen, Rose, Wyplosz, Dumas, & Weber, 1995; Feder, Just, & Ross, 1981; Fisk & Rimlinger, 1979; Folks Jr. & Stansell, 1975; Morgan, 1986). A noticeable surge in macro-focused contributions took place after the Tequila and Asian Tigers crises and this time the focus was moving onto "crises" in general and not only exchange rates and sovereign defaults (Demirgüç-Kunt & Detragiache, 1998; Kaminsky, Lizondo, & Reinhart, 1998; Kaminsky & Reinhart, 1999; Miller & Luangaram, 1998).

[74] EWI exist in other professions as well, such as engineering and medical sciences. As an example, Eidson, Kramer, Stone, Hagiwara, and Schmit (2001) discuss the use of dead birds as an EWI for the West Nile virus. The interest in EWI in finance and economics related fields came from their performance in engineering (Yucel, 2011)

The offspring of the EWI literature were financial (in)stability indices, perhaps more formally known as “composite quantitative measures” or “composite quantitative indicators of financial instability”. In those indices a group of underlying measures are joined together into a continuous measure and often presented in a graphic form. This approach has become quite popular, especially amongst central banks (due to their frequent legal mandate of maintaining financial stability), as such an index can a) improve the monitoring of financial stability, b) help anticipating causes of financial crises and c) give a better idea of the effects of financial crises (Gadanecz & Jayaram, 2009).[75]

The underlying indicators that are joined together in an index can be numerous and reflect different emphasis of the purpose of the indices created. Commonly, the indices are constructed of inputs from different sectors of the economy, i.e. the real (fiscal, households, corporations), external (e.g. exchange rate, balance of payments, reserves) and financial (e.g. bank profits, capital ratios) sectors along with indicators from the financial market (e.g. equity & bond prices), see table 3.1 (Gadanecz & Jayaram, 2009).

An early contribution on quantifying financial stability with a composite quantitative measure – an index – was Bordo, Dueker, and Wheelock (2002). They used annual data to construct an “Index of Financial Conditions” and stretched it back more than two centuries. Variables were only four: bank failure rate, business failure rate, (ex post) real interest rates and yield spread between low-quality and high-quality bonds. All of them have an equal weight in the index.

[75] Freedman’s (1994) work on a “Monetary Condition Index” deserves a mention here. Although its only components were the short term interest rate and the exchange rate it was arguably one of the first “composite quantitative indicators” that were developed to assist policy-makers. Those that came later mainly focused on financial conditions in general rather than monetary conditions specifically.

Table 3.1 – Some indicators in monitoring fin. conditions (Gadanecz & Jayaram, 2009)

Sector	Measure	Signalling properties
Real	GDP growth	Low/negative values indicate a slowdown. High values can signal unsustainable growth
	Public debt (deficit/outstanding debt)	High values can mean unsustainable fiscal position
	Inflation	High values can signal structural weaknesses and indebtedness. Low levels can increase risk appetite
Corporate	Leverage	High values can signal (upcoming) weakness in meeting cash flow oblications
	Earnings as a ratio of debt burden	Signals potential debt problems
	FX exposure	High currency mismatch can be problematic when/if exchange rates change
	Corporate defaults	High values signal cash flow problems, can lead to problems in the banking sector
Household	Household assets	Low(er) values can signal balance sheet problems
	Household debt	High value can lead to cash flow problems
	Net household income	Low value can lead to cash flow problems
	Consumption	Low value can be a sign of lack of net income. High values can signal increased indebtedness
	Household debt burden	High interest and principal payments can lead to cash flow problems
External	(Real) exchange rates	Over-,under- or fluctuating valuation can lead to lack of trust in the currency
	FX reserves	Low reserves can impact the trust in the economy & currency
	Current/capital account	High trade deficits can need unsustainable capital flows
	Maturity/currency mismatches	Can expose the economy when/if the exchange rate changes
Financial institutions	Monetary aggregates	Too much growth can signal inflationary pressures.
	(Real) interest rates	Can make debt/GDP ratio explosive. Can signal cash flow problems. Too low can signal problems for banks to attract deposits
	Growth in bank credit	Can signal greater risk appetites, higher leverage ratios, unsustainable growth
	Financials' capital ratio	Low levels can lead to crisis if loan losses increase
	Liquidity ratio	Low ratio can lead to liquidity squeeze, can signal high risk appetite
	Credit ratings	Can influence banks' funding costs
	Sectoral concentration	Can give an estimate of how quickly a shock will spread
Financial markets	Equity prices	Price growth-above-trend can be a sign of a bubble
	House prices	Price growth-above-trend can be a sign of a bubble
	Bond spreads	Spikes in yield differences between different types of bonds can be a sign of changes in risk appetite
	Volatility	Volatile price movements can be a sign of uncertainty, lack of trust, changes in risk appetite

Another noticeable contribution was Illing and Liu (2003) (which became Illing and Liu (2006)). They used surveys (40 questionnaires) sent to policy-makers and economists to establish the most severe financial instability bursts. They then chose variables, available on a daily basis, to construct the index with the purpose of using it as a "timely" indicator of a build-up of stress in the system, including bank-share returns compared to the share returns, the foreign exchange rate and bond yield spreads. Their total number of indicators is six. When it comes to the actual construction of the index they note that (Illing & Liu, 2003, p. 18; 2006, p. 255) "[t]he choice of how to combine the variables (the weighting method) is perhaps the most difficult aspect of constructing [a financial stability index]." They settle for the methodology that gives them the best forecasting ability (least Type 1 and Type 2 errors) when comparing the resulting index to the answers to the 40 questionnaires.

A Type 1 error is to forecast "no crisis" when the actual outcome is a crisis. A Type 2 error is to forecast "crisis" but the outcome is no crisis. "Crisis" in this instance is to show up as a significant event in answers to the questionnaires. "Crisis" is therefore totally subjective as Illing and Liu (p. 243 in 2006, p. 1 in 2003) note is normally the case:

> Financial stress is a continuum, measured in this paper with an index called the Financial Stress Index (FSI), where extreme values are called financial crises. The literature on financial crises devotes little attention to actually measuring the contemporaneous severity of these crises. In fact, crises are most often measured by simple binary variables.

Of course, their measure for a "crisis" is subjective as well: what is an "extreme" value? Ishikawa et al. (2012, p. 6) highlight this problem as well: "There is no quantitative consensus... on how to determine which conditions merit the overheated or overcooled labels [of financial activity]." Issing (2003), previously noted, has a similar point: the failure of a single institution should not always be considered a serious episode of financial instability. It looks as if the term "financial crisis" will always be subjective – like "high inflation".

The problem of how to combine the indicators in the index has lead to a number of different methods, none of them definitely the "most correct". There are

generally two approaches: a weighted-sum approach and a principal-component approach (Hatzius, Hooper, Mishkin, Schoenholtz, & Watson, 2010) although some want to categorise them as five: a common factor analysis, representative-weights, sample cumulative distributions, macroeconomic simulations and the variance-equal method (Gadanecz & Jayaram, 2009). The most favourable methodology of aforementioned Illing and Liu is to use credit weights when constructing the index. It is an example of the weighted-sum/representative-weights method (Illing & Liu, 2006, p. 255):

> [The] approach weights the variables [in the index] by the relative size of each market to which they pertain. The larger the market as a share of total credit in the economy, the higher the weight assigned to the variable proxying stress in that market. Therefore, the weights have some economic meaning. Since the relative size of each market varies over time, a chain-linked weighting scheme is used. Total credit in the economy is measured by the sum of bank credit, corporate bonds, government bonds, equities and U.S.-dollar credit. U.S.-dollar credit is the amount of loans to, and bonds issued by, Canadian residents denominated in U.S. dollars.

The thought behind the use of weighted sums is, as Illing and Liu mention, that they “have some economic meaning.” The principal component analysis (PCA) method rests on another argument. The advantage of such an approach is that it captures the interconnectedness of the indicators used. The more interrelated a specific indicator is with the rest, the higher its weight will be in the overall index. This means that a small deterioration in an indicator with a lot of weight in the index can signal a substantial increase in financial fragility. The principal component analysis therefore assigns indicators with weights which should represent their systemic importance, an importance that is signalled by the (historical) data itself (Brave & Butters, 2010). Since the interconnectedness of the indicators can change between time periods, it is not certain that the weights of the indicators in the index will stay the same when the sample of historical data used to evaluate the principal component changes. This introduces flexibility into a PCA-evaluated index, hopefully making its construction follow the development of the economy, its financial stability and the potentially changing interconnectedness of its components quite closely.

Examples of PCA approaches include Hakkio and Keeton (2009) and Hatzius et al. (2010).

It should be highlighted that the approach how to decide the weight of the indicators in the index being constructed is not standardised. Although we can see some commonly used indicators in the literature (see Table 3.1) the issue of how to combine them is still open to discussion. It is not unlikely that there will be many contributions on this topic until there is a stronger agreement on which methodology is most appropriate.

3.2 Why is financial stability important?

In as short space as possible: financial stability is important because it supports the long-term growth prospects of the economy. If the financial system is unstable, i.e. in the state of "financial instability", its capacity to support the "real" economy can be impaired.

Traditionally, examining how important financial stability was involved estimating the shock that financial crises or instability had on factors such as the fiscal deficit, the labour market or GDP. Examples include C. Reinhart and Rogoff (2009) and Furceri and Mourougane (2012). However, Joyce and Nabar (2009) pointed out that aggregate GDP growth and the shock it experiences due to financial turmoil may not be the crucial or the best way of estimating the long term costs of financial instability. The reason was that exports may pick up in the wake of e.g. a currency crash, thereby maintaining GDP levels to some extent and hide the real in-depth damage – like putting a band-aid on an infected wound. Instead the focus should be on investment levels.

Maintaining investment levels is important not only to add to the production capabilities of the economy, via an expanding and improving capital stock, but to maintain employment levels.[76] But as Hyman Minsky emphasised, exactly appropriate and stable investment levels are hard to attain and maintain.

[76] "Capital stock" can generally include different kinds of goods-creators such as real capital, education, learning-by-doing experiences and other physical and non-physical inputs for the creation of output.

3.2.1 Investment levels and financial stability

Economic agents use two different sources of funds for investment activity in capital stock that is meant to create positive present-value cash flows and therefore net profits: internal and external (Minsky, 1984, 2008b).

Internal funds are the agents' own assets or source of income, e.g. cash from sales or highly liquid financial claims with a well-known market value that can be raised in a quick and smooth manner in efficiently working markets. The nominal value of internal funds is rather well known, i.e. it is not subject to large assessing uncertainties, they are assumed to be easy to access and most importantly they are raised by the activity of the economic agent himself. Net cash and income after taxes are examples of internal funding.

External finances are on the other hand purchasing power which is mainly in the form of credit. An example is a bond or any other sort of a loan that a contractual cash flow is needed to serve.

Credit, i.e. external funding, is to a large extent created by banks or supplied by financial intermediary vehicles, such as pension funds. While a loan from a non-bank financial institution, such as a pension fund, is a transfer of existing purchasing power, the same does not apply in the case of banks. When a bank-loan is extended, money is created at the same time, thereby expanding the money supply within the economy by the same amount (Minsky, 1984; Werner, 2005, see also Chapter 2).

Minsky argued that the money supply is a decisive factor for the price of capital stock. That further impacts the demand for and supply of investment and therefore the general process of investment activity.

Minsky (1984, p. 134) describes the basic relationship as follows.

> For a given state of uncertainty and stock of real capital assets, the greater the quantity of money, other outside assets, and protected assets, the greater the price of units in the stock of real capital. Investment consists of producing substitutes for items in the stock of real capital; the price of the units in the stock is the demand price for units to be produced.

So investment activity, given a certain level of uncertainty, hinges on the growth of money supply. And that growth as we have seen hinges on the growth of credit. The money supply is a function of the will of the banking system to expand the money supply by creating loan contracts with investing economic agents that seek external funding, credit, in order to carry out their investment endeavours. This makes the functionality of the banking system a key factor of influence when it comes to investment activity, growth of capital and prosperity in the economy. A banking system in the state of financial instability would not be fully capable of supporting this development.

Financial instability has another negative impact on the level of investment in the economy than through the potential link via the banking system. That is via the connection between financial instability, uncertainty and liquidity preference.

Financial instability inherently creates uncertainty about the future. Excessive fluctuations in the price of assets, in different rates of interest and in expectations about the future, to mention just some of the characteristics of episodes of financial instability, lead to elevated uncertainty about the future. Such uncertainty will, as Minsky highlighted, following the argument of Keynes, lead to sometimes abrupt changes in liquidity preference. Economic units will consequently adjust their asset portfolios towards more liquid assets. Investment levels in capital stock and other illiquid asset classes, such as buildings, can decrease in the wake of such a shift in peoples' preference for holding more liquid assets. Lower investment levels lead to lower employment levels, which harms the general cash flows to workers and other firms in the economy as workers have less spending power from lower wage-income than before when investment levels were higher. Lower investment levels will also hold back the addition of productive capital in the economy, thereby harming the economy's long term production prospects.

Therefore, financial stability is important to achieve and to maintain because it affects the ability of the banks and the financial system as a whole to carry out the credit creation and intermediary services between savers and investing borrowers it is meant to fulfil, thereby nurturing normal investment activity and consequently the growth prospects of the economy. Financial instability adds to the uncertainty for banks when they try to screen the best borrowers from the

pool of potential borrowers because the instability makes it harder to estimate the development of borrowers' cash flows and price of collateral (and assets in general). A vicious cycle sets in as banks cannot screen borrowers and supply of credit declines, which negatively impacts the economy and feeds back onto other potential borrowers. In a similar fashion, financial instability adds onto the uncertainty for the borrower herself, making it harder to make reliable investment plans, thereby deferring capital investment. Similar opinions have been expressed by others (Barrell, Davis, & Pomerantz, 2006; Davis & Stone, 2004; Joyce & Nabar, 2009; Minsky, 1984, 2008b; Werner, 2005).

Finally, from a more humane rather than economic but equally important point of view, financial instability can impair the structure and the health of society itself. Financial crises bring unemployment and uncertainty about the future for today's households. Such factors can have a negative impact on individuals' overall health, social status and even mortality rate (Dorling, 2009; Paul & Moser, 2009). Knowles, Pernia, and Racelis (1999, p. 60) found that the financial crisis in Asia during the late 1990s had serious social effects "because the poor typically have fewer and more limited coping options available to them [to counter the negative effects of the financial crisis], the ones they use tend to be more harmful than those used by middle-income and upper-income groups." Examples of more harmful options included (ibid) "borrowing to maintain current consumption, selling productive assets, delaying needed medical care, and withdrawing children from school." If this applies to other financial crises in general, it means that the poorest can be relatively harder hit by turmoil and financial instability than the rich. Financial instability can therefore increase the inequality of income and assets between the poor and the rich, further destabilising the social profile of society and possibly leading to health and social issues such as obesity, increased teenage pregnancy, higher suicide rate, violent crimes rate and more (Wilkinson & Pickett, 2010).

3.3 The origin of financial instability: Minsky's view

Minsky (1984, p. 125) argued the following on why financial crises happen:

> Financial crises take place because units need or desire more cash than is available from their usual sources and so they resort to unusual ways to raise cash.

Two comments are in order. First, “unusual ways” to raise cash are not “unusual” from the market point of view but from the units’ own points of view, especially with recent history or their expectations in mind. *Exempli gratia*, selling an asset to raise cash in order to service some cash outflow which had previously been serviced or anticipated to be serviced with other sources of cash inflows could in this sense be categorised as “unusual” because the unit in question had to do something differently than he had done before or had anticipated to doing. Of course, this sale of an asset to raise cash is not unusual from the aggregate point of view: the unit would be just one of number of other units that partake in the asset market.

Second, notice that Minsky traces the cause of financial crises to different factors than e.g. Mishkin (1996). Rather than tracing the cause to the inability of financial markets to deal with adverse selection and moral hazard, like Mishkin does, Minsky seeks the cause in the form of cash flow problems.

Minsky’s intuition was that episodes of high financial instability take place because economic units need or want more cash (or highly liquid quasi-cash, such as bank deposits and Treasury bonds) than their regular cash flows, of whatever nature or sources they were, are supplying them with. This need, or desire, originates from the realisation, gradual or sudden, that the units’ *contractual and/or expected* cash flows do not fit the *actual* cash flows as they are realised as time passes; expectations about the (uncertain) future turn out to be wrong. As long as cash flows are adequately according to expectations or it is possible to find secondary types of cash flows that do not bring serious disruptions to other units’ cash flows, financial stability should not be seriously harmed. Minsky (1984, p. 128) further explains the causes of financial instability as follows (original emphasis):

> Financial instability occurs whenever a large number of units resort to extraordinary sources of cash. The conditions under which extraordinary sources of cash have to be tapped – which for financial units means mainly the condition in which positions have to be liquidated (run off or sold out) – are the conditions that can trigger financial instability. *The adequacy of cash flows from income relative to debt, the adequacy of refinancing possibilities relative to position,*

and the ratio of unprotected to protected financial assets are determinants of the stability of the financial system. The trend or evolution of the likelihood of financial instability depends upon the trend or evolution of the determinants of financial stability.

Judging from these words – that financial instability is a cash-flows-mismatch problem that develops into unusual ways to raise cash, rather than a Mishkinian moral-hazard/adverse selection problem – it seems that the trick to maintain financial stability is pretty easy; make sure that economic units can, in general, a) pay their debts with the income they receive from income operations such as work, sales of goods and services etc., b) refinance their non-income-covered debt positions whenever needed without trouble and c) keep the amount of protected assets, i.e. those assets that are valid as collateral in repurchase agreements with cash-unlimited institutions such as central banks, high in relation to other unprotected assets.

One could therefore argue, following Minsky, that to maintain financial stability is to maintain adequacy in units' cash flows and keep them according to the expectations of the investing economic units. But Minsky himself pointed out that this would be easier said than done.

Box 1 – Hyman P. Minsky

Minsky was a student of Schumpeter at Harvard University. Despite being his student, Minsky was not a 'Shumpeterian' any more than Keynes was 'Marshallian'. Minsky drew many insights from the work of Keynes and argued that Keynes had been grossly misrepresented and misunderstood (Minsky, 2008a). Or as Dymski and Pollin (1992, p. 29) put it: "Any understanding of Hyman Minsky should begin with John Maynard Keynes because Minsky regards his own work, above all else, as an interpretation and extension of Keynes." It was specifically Keynes's insights on the concepts of uncertainty and 'animal spirits' that Minsky used as building blocks in his Financial Instability Hypothesis. Other notable influencers were Fisher (debt deflation theory), Schumpeter (the use of external finance to finance investment) and Kalecki's principle of increasing risk (Keen,1997,

2011a).

Minsky's Financial Instability Hypothesis, FIH, rather than anything else, is introduced and used here for many reasons. First, it is applicable to the sub-prime crisis and the 'Great Recession' that started in 2008 (see e.g. Cassidy (2008)). It is also more comprehensive than e.g. Werner's (2005) Quantity Theory of Credit for Minsky did not only focus on the impact of credit on the economy but interest rates and other cash-flow inducing parameters as well. He also considered relative values of different qualities of financial assets in the economy and the nature of borrowers, nothing of which Werner considers. Furthermore, not only has Minsky's FIH been shown to be mathematically sound (Keen, 1997), even if Minsky did not use mathematical models to explain it, but it also, as pointed out by Keen (2011a) meets the criticism of Blatt (1983) when it comes to economic models: the FIH, contrary to most economic frameworks, *does* have an equilibrium which *is* unstable.[77] The reason why is that it directly incorporates the financial sector, money and business confidence in its framework. This means that the model can, and does (Keen, 1997, 2011a), accommodate cyclical behaviour, as is the characteristic of a capitalistic economy with a developed financial system. Therefore, the FIH is both comprehensive and exceptionally realistic.

Despite this financial stability indices relying explicitly on Minsky's approach and FIH have not been a great focus of research before. It is therefore deemed both appropriate and worthwhile to explore this

[77] Blatt (1983, p. 6) was clear on his opinion on equilibrium analysis in economics: "No progress can... be made by continuing along the road that economists have been following for two hundred years. The study of economic equilibrium is... little more than a waste of time". He considered the economy to be like the weather: the equilibrium state is not stable but open to constant and both endogenous and exogenous fluctuations; it is "essentially dynamic". This meant that the equilibrium state of the economy was even more unstable than e.g. that of the ocean. There, the equilibrium state *is* at least stable (flat and waveless) and there *is* a tendency towards that equilibrium state. Nevertheless, that equilibrium state is almost never reached and even if it is it is only for a short period of time. Therefore, according to Blatt, economic theories should be so that their equilibrium state is "essentially dynamic" for the simple reason that it is the most realistic approach to understanding the economy. Minsky's FIH fulfils this requirement as Keen (1997, 2011a) shows.

venue further.

It should be noted and emphasised here that despite the fact that Minsky perceived financial instability as being a "normal"[78] part of a capitalistic economy with developed financial system, he did *not* consider a financial crisis inescapable. A crisis, according to Minsky, can be avoided if the public powers design policies and the institutional framework of the economy such that cash-flows and asset prices will be supported in case of a debt deflation gaining pace in the economy. At the same time, that overall framework should not be too comprehensive or a catalyst for financial speculation that would end with a debt-driven deflation. This, according to Minsky, was the *policy problem* (Minsky, 2008, p. 328): "The policy problem is to devise institutional structures and measures that attenuate the thrust to inflation, unemployment, and slower improvements in the standard of living without increasing the likelihood of a deep depression." Those "institutional structures" included organising the corporate tax system so that it did not encourage debt financing, regulating finance ("finance cannot be left to free markets" (Minsky, 2008b, p. 324)), encouraging growth via consumption rather than capital investments and securing wage-income for workers by offering last-resort employment in case of redundancy (Minsky, 2008b, 2013).

Minsky's FIH has received criticism, see e.g. Louis-Philippe Rochon (2012b). Firstly, it is built on microfoundations – the behaviour of a single bank or a single borrower – that may not be fully representative of the macroeconomic picture. An example of this is that although the debt/income ratio of a single unit may increase during economic expansions, the same may not be the case for the macroeconomy. In other words, the FIH is open to the risk of Fallacy of Composition. Also, although interest rates should rise for the single unit as his debt/equity ratios rises, on the macroeconomic level the central bank can influence the interest rates in the economy towards different

[78] "To be exact, our economic leadership does not seem to be aware that the *normal* functioning of our economy leads to financial trauma and crises, inflation, currency depreciations, unemployment, and poverty in the midst of what could be virtually universal affluence – in short, that financially complex capitalism is inherently flawed" (Minsky, 2008b, p. 320, emphasis added).

levels.

3.3.1 Minsky's Financial Instability Hypothesis

Narrating Minsky's Financial Instability Hypothesis (FIH) and how it describes the development of financial instability is in order before continuing.[79]

The FIH is depicted in a (dynamic) capitalistic economy with developed financial institutions. The story begins at a point in time when financial structures of economic units within the economy are conservative, i.e. the use of leverage is limited and the ratio of equity in financing economic activity is high.[80] The reason for this is that the economy has recently been through a slump, or even an economic disaster, and people have a recent and strong memory of the recent hardship. They therefore want to be careful in their financial decisions. Both bankers and investors have a high-equity preference. However, although the general sentiment leans towards the limited use of leverage in financing economic activity, the financing structure of economic units is not homogenous. Some are more leveraged than others, although they may have more conservative financial structures than they would like to or used to have.

Due to the limited leverage the general operations of economic units are resilient to any unforeseen shocks: even though some barriers, entirely unforeseen or not, may appear in the way as investment and other general economic activity is carried out the ample use of equity provides resilience to the financial structures of economic units. Bankruptcy rates are therefore low and profits, although they can be small, are generally realised. The general realisation of profits makes both investors and bankers think that the ample use of equity is non-warranted: had they used a higher leverage, their return on equity had been higher. Those economic units that had used most leverage profited most (measured by return on equity) and by the word of mouth and via the news, this becomes public knowledge.

[79] See Minsky (Minsky, 1984, 2008a, 2008b) for detailed accounts of his theory. For an excellent recountal of the FIH, see Keen (1997).

[80] "The natural starting place for analyzing the relation between debt and income is to take an economy with a cyclical past that is now doing well... Acceptable liability structures are based upon some margin of safety so that expected cash flows, even in periods when the economy is not doing well, will cover contractual debt payments." (Minsky, 1984, p. 65)

Investors and bankers alike therefore realise that "it paid to lever... As a result, over a period in which the economy does well, views about the acceptable debt structure change" (Minsky, 1984, p. 65). The preferences for leverage will be revised upwards. Time has also passed and at least a part of the industrial leaders that had experiences from past economic cycles has retired and a younger generation, which possesses lesser real-life familiarity of leadership through booms and busts, has entered the stage. Especially amongst those newcomers the attractive profitability of using high leverage is rediscovered. Since it is assumed that both investors and bankers live in the same economic landscape and are under the influences of the same news flow of profit realisations, they both share the opinion that leverage could be increased without any serious risks. Consequently, since investors' appetite for leverage increases they demand more credit from the banking system. The banks will be happy to provide that credit and "'[t]his increase in the weight of debt financing raises the market price of capital assets and increases investment. As this continues the economy is transformed into a boom economy" (Minsky, 1984, p. 66). Furthermore, credit expansion takes place via increasingly more "adventuresome" ways (Minsky, 2008a, p. 125):[81]

> [S]uccess breeds daring, and over time the memory of the past disaster is eroded. Stability – even of an expansion – is destabilizing in that more adventuresome financing of investment pays off to the leaders, and others follow. Thus an expansion will, at an accelerating rate, feed into the boom.

The increased application of leverage increases the general amount of purchasing power in the economy since bank credit (money, i.e. purchasing power) is created alongside the increase in leverage. This newly created purchasing power is used to finance investment and speculation activities in all sorts of assets, both financial and real capital: "Increased availability of finance bids up the prices of assets relative to the prices of current output, and this leads to increases in investment" (Minsky, 1984, p. 66). The increased investment in real capital calls for increased labour. Economic growth and

[81] The reader is reminded of the endogenous process of credit creation, see chapter 2. The supply of money is "credit-led and demand-determined; it can be supply-constrained only in the sense that banks may not *want* to lend, but not because they *cannot* lend" (Louis-Phillipe Rochon, 2012a, pp. 296-297, emphasis added)

economic activities increase. As this happens, profits will be realised yet again according to expectations and the use of leverage will be rewarded further. This pushes for more debt-financing of units' investment and speculation activities as "success breeds daring". The boom feeds on itself.

By now, the previously rather credit-conservative tone amongst economic units has turned into a "euphoric atmosphere" where "optimistic views of the future prevail" (Minsky, 2008a, p. 86). The macroeconomic level of leverage increases still further as "others follow" the leaders.

However, people always had, have and will only have an uncertain knowledge about the future. Despite this, people will be "compelled" to act (Keynes, 1937, pp. 213-214):

> [B]y "uncertain" knowledge... [we mean that] there is no scientific basis on which to form any calculable probability whatsoever. We simply do not know. Nevertheless, the necessity for action and for decision compels us as practical men to do our best to overlook this awkward fact and to behave exactly as we should if we had behind us a good Benthamite calculation of series of prospective advantages and disadvantages, each multiplied by its appropriate probability, waiting to be summed.

This uncertainty about the future, in good times and bad, is individually dealt with by convention in our decision processes (Keynes, 1937, p. 214):

> We assume that the present is a much more serviceable guide to the future than a candid examination of past experience would show it to have been hitherto... We assume that the existing state of opinion as expressed in prices and the character of existing output is based on a correct summing up of future prospects... [or] we endeavour to fall back on the judgment of the rest of the world which is perhaps better informed.

The euphoric mood, the optimistic views of the future, the over-confidence in investment opportunities, and the recent profits, now generally firmly believed to be a mere taste of the future riches, weigh heavier in the decision process of investors than the distant less prosperous past. This leads people to gradually

adjust their liquidity preferences downwards. Short term debt becomes increasingly popular as it carries a lower rate of interest than long term illiquid assets yield: the yield curve is upward sloping and a carry can be made on the difference between the short term interest rate cost and the long term return on illiquid assets. An increasing number of people will want to profit from this spread between short term and long term returns, especially as the price of long term assets is likely to go up and some investors will want to buy the asset before it rises even further: certain bandwagon effects are to be found. Due to the euphoric atmosphere and the general prevalence of optimism about the future debtors believe they can get an easily available and cheap, compared to long term yields, refinance of their short term debt which they had raised to finance their positions in long term illiquid assets. This refinance is expected to be available at or just before the maturity date of the short term debt: the borrowers expect to continuously roll over their debts.

But economic units will also gradually prefer to put less emphasis on holding liquid cash-assets and near-cash assets (such as highly liquid short term notes and government bonds) and they will consequently progressively readjust their asset portfolios towards more illiquid assets (both financial and non-financial ones). This has the effects that "liquid-asset interest rates rise relative to other rates" (Minsky, 2008a, p. 86) or, in other words, the yield curve flattens or even becomes downward sloping.[82]

This relative rise of short term interest rates spells trouble for those investors that have used short-term debt to finance the positions in long-term assets. Past credit contracts were made to finance positions and investments in longer-term assets which now pay a lower relative yield to (short term) interest rate cost than before. As the contractual repayment date of their debts draws nearer, their need, if they have not the adequate cash income from their asset holdings, to find refinancing possibilities increases. But even if they find refinancing it will be at a higher rate of interest, relative to the yield they derive from their longer-term assets, than before because time has passed since their last liability contract was made and in the meanwhile the gradual decrease in general liquidity preference amongst economic units has had the effects that "liquid-

[82] The flattening of the yield curve has been found to predate and predict economic slowdowns (Estrella & Mishkin, 1996; C. R. Harvey, 1988, 1989).

asset interest rates rise relative to other rates". The lenders of those now-squeezed borrowers will, due to increased risk coming from a fall in profits and net-income-cover of debt, either demand a) a boost in the borrower's equity position or b) that the borrower pays a higher rate of interest still on their borrowed funds. The lenders can also demand a mix of both. Kalecki's Principle of Increasing Risk[83] adds further to the problems stemming from the relative increase in short term rates.

The requirement of higher interest charges will put further pressure on the profits of those leveraged units and the borrower may even simply reject such stipulations and decide, or desire, rather to liquidate his positions and pay up his debts. The requirement of higher equity pushes the borrower to find it. One way of doing that is to issue new shares and some of those highly indebted units will seek to do so. However, another choice is the same choice as in the case of rejection or inability to pay higher rate of interest: decrease the balance sheet by liquidating the positions, i.e. to "run off" or "sell out" of the positions previously entered. The leveraged unit is therefore likely to sell an asset on its balance sheet, either simply because he rejects the new loan stipulation or because he is forced to do so to increase his equity position. The asset in question can be of a financial or a real nature. But when the unit sells the asset, it means that its offered supply on the market will go up and, given unchanged demand, we can expect that this will lead to a fall in the market price of the asset, especially as the seller may have to liquidate the asset within a specific time frame, i.e. before his debt matures.

This price decrement will have the effect that other aggressively leveraged units will meet the same requirement from their lenders as the first one: as the equity on their balance sheet has decreased due to the fall in the nominal value of the asset, the lender will demand, on the principle of increasing risk and higher market rate of interest, a higher rate of interest on the borrowed funds than before and/or a boost in the equity position in the units' portfolio holdings. This will cause those units to run into the same problem as the first unit had before:

[83] "[T]he amount invested... must be considered as a fully illiquid asset in the case of sudden need for "capital." In that situation the entrepreneur who has invested in equipment his reserves (cash, deposits, securities) and taken "too much credit" is obliged to borrow at a rate of interest *which is higher than the market one*. If... the entrepreneur is not cautious in his investment activity *it is the creditor who imposes on his calculation the burden of increasing risk* charging the successive portions of credits above a certain amount with rising rate of interest (Kalecki, 1937, p. 442, emphasis added).

they must issue new equity or “sell out” of their asset positions. Their activity on the market will have the same effects as the activity of the one who liquidated his position ahead of them: the price will fall further. This then hits the nearest leveraged investor behind them and the self-enforcing chain reaction gathers pace. Leveraged units that do not manage to sell out of their positions in time before the market price of their assets falls start going bust.

The price decreases and the news of highly leveraged economic units going bust will cause other investors not only to be forced to sell their positions but they, and their financers, will reconsider the use of leverage, which now works against them: the young will learn the lessons the old had before. Liquidity and non-leveraged positions will be increasingly favoured again and the price of long-term, illiquid assets will fall as balance sheets will be readjusted back towards more liquidity and less leverage.

This aggravates the price decreases of long-term assets and their price falls further. Investment in those asset classes will consequently decrease for two reasons. First, the reconsidered preference for leverage makes investors and their bankers wary of investing with borrowed funds while they still have to repay their old debts. This decreases credit and money supply in the economy, pushing the price of assets downwards. Second, nobody will like to create a real capital asset, via real capital investment, whose price is not only falling but its bottomed-out price is still enshrined in uncertainty. Investment in illiquid real capital assets will therefore contract. A fall in labour demand will shortly follow and unemployment goes up. By now the euphoric environment has turned into that of pessimism about the future. Investment behaviour based on convention is now based on the recent past of bankruptcies but not increasing profits as was the case earlier in the cycle.

The primary consideration of economic units is now to reconstruct their balance sheets. This they will attempt to do by selling assets and by using wage and capital-asset income to pay down debts. If what Minsky called Big Government (fiscal expenditures) and Big Bank (Lender of Last Resort) step in and support this phase with cash flows activities (public investment projects, unemployment benefits, etc.) and price-supporting activities (e.g. Quantitative Easing) the asset price decreases will be slowed down and the reconstruction of balance sheets

sped up compared to if no such support had been in place. Economic activity will be subdued until balance sheets have been adequately reformed and enough profits return for investors to gain their confidence in the future again. That will lead us back to stage one of the story where leverage is limited and profits are realised due to now conservative financial structures.

The whole process can then start anew.

3.3.2 The nature of the cash flows within the economy

Minsky emphasised in his Financial Instability Hypothesis, as observable from previous discussion, that financial crises were the result of economic units' cash-flows miscalculations or misalignments from what had generally been expected. Observable characteristics of financial instability, such as collapsing property prices, rising risk-awareness, fluctuations in interest rates on interbank markets, uncertainty amongst investors, lack of real capital investments leading to slower economic growth and unemployment, and a general switch from euphoria amongst economic units to pessimism, were to him the by-products of economic agents scrambling for cash inflows via "unusual ways". Those are not the initial – though they may have feedback effects – reasons for increased financial instability but rather the symptoms. The "crisis" hits as multiple economic units "need or desire", all at the same time, to restructure their cash flows operations and sources; the reason for financial crises is *en masse* disappointment of cash flows to be realised according to expectations.

Cash flows can be classified into three different groups depending on their nature; income, balance sheet and portfolio flows (Minsky, 2008b).[84] **Income flows** are the results of production and consumption of goods and services. Workers' wages and firms' sales of goods and services are examples of positive income flows respectively for each group. Those same workers' consumption is an example of negative income flow and salaries are similarly a negative income flow for corporations. Income flows are generally a function of capital assets in all their forms, such as education (human capital) or factories (real

[84] Minsky focused also on the different sources of the cash flows (Minsky, 2008a, p. 116): "An ultimate reality in a capitalist economy is the set of interrelated balance sheets among the various units. Items in the balance sheets set up cash flows. Cash flows are the result of (1) the income-producing system, which includes wages, taxes, and nonfinancial corporate gross profits after taxes, (2) the financial structure, which is composed of as interest, dividends, rents, and repayments on loans, and (3) the dealing or trading in capital assets and financial instruments. For all except dividends, the cash flows determined by the financial structure are contractual commitments."

capital). The income flows are circular in the economy between producers of goods and services and their consumers. Schumpeter's "Circular Flow" (Schumpeter, 1934) and its stability in the economy were income flows as described here.

Balance-sheet flows are cash flows that arise from the unit's contractual position in its financial assets and debts (stocks). Those flows (such as the repayment, partial or whole, of the principal of a loan, or the payment of an insurance in the case of the insured event happening or the payment of a dividend) are the inheritance of financial contracts and the accompanied stocks (in this case: loans (dated & demandable), deposits (dated & demandable), insurances (contingent) and equity (contingent)).

Portfolio flows are transactions where the economic unit is changing its assets-debt portfolio of financial and capital assets through e.g. liquidation of one asset in exchange for another or borrowing in order to invest in another asset class or to service another old loan contract that is maturing in the present and thereby creating a balance-sheet flow. This act – i.e. relying on a new portfolio flow (loan) today in order to service a balance sheet flow that is maturing – is the act of refinancing an old loan. The portfolio of each unit is divided into two parts: (net) capital assets and (net) financial assets. The (net) capital-assets part of the unit's portfolio yields the income flow as production and prices are realised while it is the (net) financial-assets part of the portfolio that has consequent balance sheet flows, all according to the relevant contractual agreement. Portfolio flows are changes in the mix of capital and financial assets such as when a demand deposit (financial asset) is used to buy a new factory (capital asset). Portfolio flows can also be changes within the same asset class, capital or financial, towards more or less liquid asset. An example of this is e.g. when a stock on a thinly traded market (illiquid financial asset) is sold and the proceedings are kept in the form of a bank deposit or cash (liquid financial asset).

Note that when trade, i.e. cash flow, between two economic units takes place they will sort the cash flows into similar accounts – one unit's balance sheet inflow is another one's equal and opposite balance sheet outflow – with one exception: a purchase of an investment good is an income cash flow for the

producer[85] of that good but a portfolio flow for the buyer; the buyer is changing his capital & financial asset-debt portfolio in such a way that he is expecting higher positive income flows in the future once the investment good has been transformed into capital stock, yielding production, that will be part of his assets-debt portfolio of capital and financial assets.

Furthermore, by accounting identity, the sum of those cash flows must add up to zero at all time periods for each economic unit, i.e.[86]

$$\text{Income flow} + \text{Balance sheet flow} = \text{Portfolio flow} \qquad (1)$$

A few examples are in order to better understand the relationship between those different types of flows.

- If a worker has a negative balance sheet flow (e.g. a mortgage payment), he must service that flow by e.g. a positive income flow (such as after-tax wages) or by selling his assets, such as savings (a financial asset, a negative portfolio flow), or his car (a non-financial asset, a negative portfolio flow). Similarly, he could enter into another loan contract in order to pay of that mortgage which would show up as a negative portfolio flow (loan is raised, decrement of net financial assets).
- If a bank must pay out a deposit to its customer (negative balance sheet flow) it must meet that flow by e.g. an interest rate income on its outstanding loans (positive balance sheet flow), or by selling financial services (positive income flow) or by a negative portfolio flow, such as a REPO agreement with a bank or the receipt of a deposit from another customer. The bank can also sell some of its assets, such as Treasury bonds (a negative portfolio flow).
- A non-financial production firm that is meeting its payment on an outstanding bond (negative balance sheet flow) must meet that flow by

[85] It must be the producer of the investment good that is the seller of it. If the investment good is sold again later by another one than the original producer it is not income flow for that seller but portfolio flow as he is changing his asset portfolio by selling his investment good for cash. The seller could have bought the investment good from the original producer to speculate with its price. He might also have bought it as an insurance against a possible future need of it. Once that need is thought to have passed, the investment good can be sold again, thereby yielding a positive portfolio flow.

[86] This accounting identity is parallel to the current account = capital account identity, assuming that financial account is included in capital account on the right side of the equation; “income flow” compares to net balance of trade, “balance sheet flow” is analogous to net factor income and net transfers while “portfolio flow” is the change in net assets.

either having a positive income flow from productions and sales, sell its assets in the form of savings (negative portfolio flow), sell its capital assets in form of inventory (negative portfolio flow), refinance the maturing bond with an issuance of another (negative portfolio flow) or sell newly issued stock (negative portfolio flow).

In all those cases, (1) holds.

3.3.3 Minsky's hedge, speculation and Ponzi units

There were three types of economic units that Minsky distinguished between; hedge, speculation and Ponzi units. The nature of each of the units is quite different and it is the mix and the prevalence of each type compared to the other that decides whether the economy is stable: hedge units' income flows can service both their contractual interest payments and principal repayments; speculation units' income flows can only cover their contractual interest payments; and Ponzi units' income flows cannot even cover their contractual interest costs.

All the units have a certain individual mix of financial and capital assets, i.e. the units make their own personal choices how to construct their capital and financial assets to make up their portfolio of those asset types. Their income, balance sheet and portfolio flows are results of those individual choices on what sort of a mix of capital and financial assets and liabilities they prefer.

Hedge units are the most secure ones of the three types. Their portfolio of capital and financial assets, along with the accompanying contracts, makes it possible for them to meet their contractual income and balance sheet flows with each other; the left hand side of the accounting unity (1) above sums up to zero or a higher positive number.

A hedge unit is thus capable of meeting a negative balance sheet flow, due to e.g. negative net financial assets creating interest payments, with a positive income flow alone. The hedge unit can also meet a principal repayment of outstanding debt with his income flows, even if the repayment is demanded ahead of maturity date: this would be a part of the contract behind the debt. Therefore, in more general terms, a hedge unit can use his income flows to meet all and any contractual portfolio flows.

An example of a hedge unit would be a household that has wage income – a function of the households' education level, i.e. capital asset – that suffices to pay its monthly mortgage payment, bills, food and other consumption. The household may even still have reserves left of its wage income after having serviced its negative balance sheet flow. Those reserves are put aside e.g. in the form of a savings account at the bank (a positive portfolio flow).

A living-on-interests-only pensioner is another but opposite example; his positive balance sheet flow due to a positive portfolio of financial and capital assets is big enough to service his negative income flow in the form of consumption etc. If the pensioner wishes to consume (negative income flow) more than the sum of rents, interests and dividends (balance sheet flow) he receives, he must meet that increasingly negative income flow by selling his capital or financial assets (negative portfolio flow). He can also ask for credit at the bank (negative portfolio flow).

A **speculative unit** is one notch below the hedge unit in terms of robustness of his financial structure. The speculative unit has, at least temporarily, a net negative balance sheet flow and the unit must meet this contractual negative balance sheet one way or the other. Contrary to the hedge unit, not the whole negative balance sheet flow can be met with a positive income flow; the interest costs are covered but not the whole contractual repayment of the principal of outstanding debt.[87]

This means that the left hand side of (1) is negative for the speculative unit. The range of the negativity is somewhere between zero and the amount of the principal repayment that is due, i.e. the minimum amount that the positive income flow of the speculative unit can meet is the interest payment part of the balance sheet flow. The principal repayment part of the negative balance sheet flow, or at least a share of it, must be met with a negative portfolio flow. That negative portfolio flow can consist of selling net capital and/or financial assets. A refinancing of the due principal is also possible.

[87] The negative balance sheet flow can also be in the form of a non-contractual dividend payment, and its financing can be in the form of a negative portfolio flow, i.e. a new loan. An example is Byr savings bank in Iceland. In April 2008 it paid out a ISK 13.5 billion dividend that was higher than the ISK 7.9 billion profit of the year before. The difference was financed with borrowed funds. See e.g. Þórðarson (2009) and company annual reports. Arguably, Byr was a Ponzi and not a speculation unit.

An example of a speculative unit would be an individual that uses mortgage financing to acquire a buy-to-let property. Contrary to the original expectations when the house was bought – e.g. interest payments increased more than expected – the rent income (a positive balance sheet flow) cannot cover both the monthly interest rate expenses and the contractual principal repayments according to the mortgage contract; the net balance sheet flow is negative. The individual must meet the difference with either improved income flow (by e.g. working more or consuming less) or by e.g. short-term borrowing (a negative portfolio flow), such as in the form of an overdraft. He can also sell his car or stock and bonds holdings (negative portfolio flow). He can also decrease his balance sheet by selling the house he just bought (negative portfolio flow) and repay the mortgage to free him of future contractual principal and interest payments.[88]

Another very important and a prominent example of a speculation unit is a commercial bank. If, contrary to expectations, the commercial bank experiences a large number of deposit withdrawal requests, it must meet that surprisingly negative balance sheet flow by selling its (financial) assets or by asking for emergency liquidity from the central bank (both a negative portfolio flow).[89] This would be an example of a contractual – perhaps it was unexpected but it was still contractual, i.e. the deposits were available on demand – repayment of outstanding debt that cannot be fully met with an income flow.

The **Ponzi unit's** financial structure is, expectedly so, even less robust than that of the speculative unit. Again, just as the speculative unit, the Ponzi unit has, at least temporarily, a net negative balance sheet flow due to contractual cash flows. The left side of (1) is negative at its current situation. However, contrary to the speculation unit, not even the contractual interest rate cost of maturing debt repayments can be covered with its current sources of cash income: the left hand side of (1) is negative by more than the principal repayment part of the balance sheet flow that it must meet. This means that the Ponzi unit is actually

[88] The reader can see here that if many speculation units experience this position at the same time, the market price of properties is likely to decrease.

[89] The point should be highlighted here that even though the speculation unit may be in a positive equity position – assets are higher in value than debts – it can experience a bankruptcy if negative balance sheet flows, such as contractual debt repayments, are not met with available income flows or refinancing possibilities (negative portfolio flows).

increasing its (net) debt: it issues more debt, or sells some of its assets, to cover at least part of its interest payments.

For Minsky, the emergence of the Ponzi unit was a natural consequence of first of all the fact that the future, at any time, is uncertain and, second, the thought process of basing one's investment decisions on convention, in which the recent past got more weight in the decision process than the distant past. This had the effect that, during the phase of the Financial Instability Hypothesis when leverage was being rediscovered and profits were abounding, the recent past, mirroring those developments, got more weight in the investment decision process than the distant past and the Ponzi unit optimistically believed that the good times would simply continue. He therefore enters a "super-leveraged" financial position which is profitable as long as a) he can refinance the maturing principal and interest payments and b) the price of the asset which he uses the credit to take position in goes up faster than he accumulates debt.

This works while the good times roll and "others follow" the leaders into the speculation boom and the increased use of leverage. However, there comes the time when underlying profits of real capital assets cannot support the then leveraged financial structure of the economy. Refinancing dries up.

This forces the Ponzi unit, by all likelihood, to be the first economic unit to be forced to "run off" and "sell out" his positions. If many enough Ponzi units find themselves in this position at the same time, the price of the sold assets will fall as they liquidate their positions. The chain reaction of liquidation and lower asset prices then gathers pace as more Ponzi units sell out. The decrease of asset prices will harm the speculation units as their lenders, due to their lower net worth arising from the fall in the asset price, will demand a higher rate of interest or more equity. The speculation unit can therefore become a Ponzi unit as the price of its assets falls. Hedge units can become speculation units.

3.3.4 The effects of speculation and Ponzi units

We can see that the emergence and the position of Ponzi units in the economy have a major influence on the robustness of the financial structure of units of the economy. As the mix of hedge, speculation and Ponzi borrowers tilts towards less financially robust units, not only the need for an ever-lasting debt

refinancing possibilities becomes increasingly important but fluctuations in asset prices and incomes can have more serious knock-on effects (Minsky, 2008b):

> A unit in a speculative or Ponzi financing posture obtains the cash to satisfy its debtors by selling some assets, rolling over the maturing debt, or new borrowing; such units are dependent upon financial markets conditions in a more serious way than units whose liability structures can be characterised as hedge financing.

A characteristic of the dominance of speculation and Ponzi units is that new debt contracts are created increasingly due to refinancing of older and maturing ones but not because of external financing of entrepreneurship projects. Income flows from production no longer service balance sheet flows but new financial debt is created to service the maturing debt. Portfolio flows explode relative to income flows.

Once Ponzi units have emerged they will put increasing stress on the financial system as the deficit of their balance sheet flows will increase each time they roll over their debt. The net worth of their portfolio decreases due to their act of financing interest rates expenses with more credit. The more prominent Ponzi financing is, the more fragile the financial structure of the economy is (Minsky, 1984, p. 22):

> For any given regime of financial institutions and government interventions the greater the weight of hedge financing in the economy the greater the stability of the economy whereas an increasing weight of speculative and Ponzi financing indicates an increasing susceptibility of the economy to financial instability.

It is the Ponzi and speculation units that can deliver the fatal blow to financial stability if they are forced or desire to run off their positions at a similar time, Ponzi units more so since their reliance on external financing is more prominent. As Minsky (1984, p. 67, emphasis added) himself argued:

> *Ponzi financing units cannot carry on too long*. Feedbacks from revealed financial weakness of some units affect the willingness of bankers and businessmen to debt finance a wide variety of organizations... the decline in investment that follows from a

> reluctance to finance [maturing debt] leads to a decline in profits and in the ability to sustain debt. *Quite suddenly a panic can develop as pressure to lower debt ratios increases*.

3.4 Applying Minsky's FIH to measure financial stability

Minsky put his FIH forward in words but it has been mathematically backed up by Keen (1997). Despite its theoretical and seemingly empirical and historical allure, Minsky's Financial Instability Hypothesis has, as far as the author is aware of, not been directly used in an attempt to measure financial instability. The following is an attempt at outlining how that could be done.[90]

Minsky's own views and attempts to look into the stability of the financial structure of the economy should of course be relied on. The methodology of creating an index out of selected variables can then be applied.

3.4.1 The appropriate use of two time horizons

Minsky effectively looked at two time horizons when he discussed the stability of the financial structures in the economy.

First of all, he noted the "panic" phase when "pressure to lower debt ratios increases." This is similar to the financial instability indices that focus on market developments and consequently spike during panic episodes. Examples are Hakkio and Keeton (2009) and Holló, Kremer, and Duca (2012), covered in more detail later in this section.

Second, Minsky focused on the underlying financial structures of the economy. Included were stock-flow ratios such as households' liabilities divided by disposable personal income and stock-stock ratios such as non-financials' total liabilities divided by demand deposits. Flow-flow ratios, such as cash (out)flows from contractual liabilities compared to income from operations or assets, should be considered as well. Minsky (1984) believed that ratios such as those were informative when it came to estimating how resilient the financial structure of the economy really was. He furthermore wanted to take the nature of contractual liabilities into the picture. If, for example, liabilities were mainly composed of short term debts the financial structure of the economy would be

[90] Ishikawa et al. (2012) use the FIH as well. They, amongst other things, look at different time horizons. But they, for example, do not make an index resting on the FIH. Another potential approach would be to develop Vogel and Werner (2015) further but that is left to future researchers.

less resilient to a shock than when liabilities were mainly long term in nature. We can imagine that any new stipulates, such as interest-only and negative amortisation loans, can have effects as well: as long as the cash flows of two loans are different, their "nature" can be said to be different. This "nature" of liabilities was in fact so important, according to Minsky, that a high debt-to-income ratio of a sector in the economy *could* be more stable than if the ratio were lower *if* the contracts behind the debt in the high debt-to-income ratio had favourable characteristics for financial stability. Examples include e.g. a long and even repayment schedule of outstanding debt and a lower rate of interest.[91]

This Minskyian approach to estimating financial (in)stability would not be the same as looking at the ongoing market developments during the panic phase as is done in e.g. Hakkio and Keeton (2009) or *ex post* measures of the severity of instability such as in Bordo et al. (2002). Minsky's approach and understanding of financial instability was more wide-ranging. Minsky wanted to look at balance sheets and cash-receipts of not only one specific sector in the economy but all of them in order to estimate the potential build-up of stress in the underlying financial structure of the economy. He also wanted to look at the nature of the financial contracts in the economy and not simply overall stocks or flows. Unsustainable conditions, connected to speculation and especially Ponzi financing, would also have to be considered. An example of Ponzi conditions would e.g. be a rate of interest that would be higher than the growth of income or return on assets that would be smaller than the interest cost of credit used to create the asset. An increasing share of income used to service debt repayments and interest costs would also signal a deteriorating strength in the underlying financial structure and so would overall dependence on credit amongst economic units. Such indicators would give an idea whether there might be an underlying issue of potential financial instability, waiting to develop into an outright panic phase. It could also give an estimate on how the underlying financial structure of the economy is developing, i.e. towards or away from more robustness. This would of course put a Minskyian financial stability index close to early warning indicators. But the difference would be that

[91] Consider the following as an example of this argument: "As shown in Table 1 [not shown in this text], the debt-income ratios for both households and corporate nonfinancial business rose during the sustained expansion of 1922-29 and 1948-62... Inasmuch as the nature of mortgage debt changed markedly between 1929 and 1962, the larger household debt-income ratio in 1962 *may not* indicate a greater sensitivity to a shock" (Minsky, 1984, p. 10, emphasis added).

unsustainable conditions, such as comparisons in e.g. interest rates and income growth, economic units' increasing dependence on credit and overall deeper considerations about the size of different flows (income, portfolio, balance sheet) would have be to be considered as well. Furthermore, early warning indicators do not seem to be aggregated into a composite index so often although they have been combined into other graphical presentations, such as a "spider web map" by the International Monetary Fund (2013b).

Constructing an index, or a composite indicator, of financial instability including factors such as those just mentioned would be an attempt to follow the cycle in Minsky's Financial Instability Hypothesis. This would be in addition to pure "panic phase" indicators such as yield spreads, discrepancy in return on stocks or negative correlation between the price movements in stocks and bonds like Hakkio and Keeton (2009) do. The nature of the financial structures should be taken into account as well as much as possible. External and domestic factors should also be considered in the same composite index to grasp the possibility of weaknesses developing both in the internal and the external financial structures of the economy.

It can be argued that this Minskyian argument about how to monitor the state of financial stability in the economy has not been fully taken into account in existing financial instability indices (or composite indicators). Hakkio and Keeton (2009) focus on market developments and look past macroeconomic factors such as credit flows. Duca and Peltonen (2013) go down a similar road and construct a Financial Stress Index that includes 5 market variables that are all market oriented (yield spreads between 3-month government bills and interbank rates, equity returns, realised volatility of equity prices, realised volatility of nominal exchange rate, realised volatility of 3-month government bill rate). Holló et al. (2012, p. 2) construct CISS (Composite Indicator of Systemic Stress) the aim of which is to "emphasise the systemic nature of existing stresses in the financial system, where systemic stress is interpreted as an ex post measure of systemic risk, i.e. risk which has materialised already." This is not Minskyian in the sense that underlying financial structures of different economy segments are not looked at. Their variables in the CISS are market-based (prices, spreads and volatilities) with the exceptions of emergency lending from central banks to monetary financial institutions and price-book ratios for the equity index of the

financial sector, which naturally utilises the value of equity, i.e. a balance sheet variable. Brave and Butters (2010) get close to the Minskyian measure of financial instability though. Their financial condition index includes 100 variables, including numerous yield spreads, repo market volume (signalling emergency lending to banks), asset price volatility measures, outstanding debt stocks (as a share of GDP) and new debt issuances to name just a few. This excessive mix of current market developments and underlying financial structures can however be disadvantageous when considering the underlying development of financial structures and realised and current market developments. They also do not consider Ponzi-financing conditions.

We, therefore, will make a distinction between two different measurements of financial stability following Minsky's argument on how to estimate the level of financial instability in the economy. We will call the first one – similar, but not the same, to the indices developed by e.g. Hakkio and Keeton (2009) and Holló et al. (2012) – "short term" financial instability. Those will focus on more time-immediate factors such as emergency or short term lending, asset price movements and other market developments. We will then consider "long term" financial instability which will focus more on balance sheets, the fragility of underlying financial structures and, as should be evident, a longer horizon. This would be an attempt to edge ourselves towards looking at the financial stability of the economy the Minskyian way. The advantage of splitting the measurements up this way is that we get one which is more focused on the underlying financial structures of the economy (long term view) and another which is more concerned about the immediate developments (short term view). They may not be developing the same way which is why it is important to make this distinction.

3.4.2 "Short term" financial stability

We have already established the view that financial stability is a macro economical phenomenon. Not only did Minsky (1984, p. 128, emphasis added) speak of financial instability occurring "whenever a *large* number of units resort to extraordinary sources of cash" but W. A. Allen and Wood (2006) also focus

on the macro-wide sources and consequences of it. We will therefore not look at individual units but sectors in aggregate.[92]

Following Minsky's emphasis on cash flows and the need for and possibilities for finding a refinancing of maturing debt, such indicators should be included in a "Minskyian" financial instability index. This applies both to the short term and the long term measurements of financial instability. Liquidity ratios such as the current ratio (short term assets / short term debt) and the cash ratio ([cash + marketable securities] / short term debt) would be informative.[93] Flow-flow ratios and flow-stock ratios focusing on short term liabilities and cash-flows would be useful as well. An example is the ratio of income from operations to short term contractual liabilities (such as maturing rents, debt and interest costs). The prevalence of protected assets and near-cash assets, such as treasury bonds, should be compared to that of non-protected assets, given Minsky's own words, previously quoted: "....and the ratio of unprotected to protected financial assets are determinants of the stability of the financial system." The economy's external position – such as external contractual payments, their maturity profile and net receipts from abroad which can be used to service external debts – should also be considered for an open economy since those are cash flows as well and domestic units can have contractual obligations with foreign parties. This should preferably be done for all sectors of the economy (households, financials, non-financial corporations, government).

Furthermore, if possible, we should try and distinguish between income flows and portfolio flows when it comes to how contractual cash flows are serviced. The reason is that a balance sheet flow, even if it may be arising from short term financial contracts, that is serviced with income flows is a characteristic of a hedge financing: the units' cash income from operations covers the cash outflow from contractual liabilities. If, however, the cash outflow is serviced with a portfolio flow, such as new borrowings, it is a characteristic of a speculation or

[92] Minsky did realise the importance of interrelations between economic units and the potential domino effects of the default of one economic unit: "How do units get into a position where their cash outflow due to commitments is greater than their cash inflow due to operations? One way... is by having debtors on owned contracts default – which in a closely articulated set of layered financial relations can have a domino effect" (Minsky, 2008a, p. 85). However, to simplify things, we will ignore this complication here.

[93] We have already noted that Minsky considered the ratio of total liabilities of nonfinancial corporations to their demand deposits as informative to estimate the robustness of the financial structure of the economy.

Ponzi financing. Such financing structures are less stable than that of the hedge unit. Therefore, if it is possible, we should try and make the distinction between how contractual cash flows are serviced or will need to be serviced. This could give us a signal of whether "imminent" financial stress is building up in the financial system; it could give an estimate of how significant Ponzi and speculation financing is in the financial system which may lead to an outright panic.

A prime example of an "imminent" financial stress building up in the economy, while traditional panic indicators are doing well, is Iceland's economy before the Crash in 2008.[94] Before the Crash, dependency on available financing had been building up in the financial system. 1/3 of all corporate loans had become bullet bonds. Likewise, half of all loans to asset holding companies were bullet bonds (Ólafsson, 2013). From Minsky's point of view, this would have been a clear sign of increased weight of speculation and Ponzi units in the economy and a consequential threat to financial stability: if asset holding companies would not have been able to refinance their market positions, the resulting liquidation of assets would have been catastrophic for asset prices. This turned out to be the case. Traditional short-term financial instability indices, which focus mainly or only on ongoing market developments such as bond spreads and changes in asset prices, would not, however, have realised those cracks in the economy's financial structure until the market finally collapsed.

Nevertheless, as is done with traditional measurements of financial instability, market signals and the behaviour of market participants should be considered in a Minskyian financial instability index, just as they are in many others. That would fit well with Minsky's "panic" phase in the FIH where refinancing possibilities may be limited (pushing for asset sales), asset prices are fluctuating and the scramble for cash is prevalent. For this part of the measurement of short term financial instability, we can support our work with that of previous makers of financial instability measures, such as Hakkio and Keeton (2009).[95]

[94] "Crash" is written here with a capital C for Icelanders traditionally, by now, speak of the economic crisis in October 2008 as "Hrun(ið)" which directly translates to (the) Crash. A timeline reference to the event is common, e.g. "Did you move to Norway before or after the Crash?"
[95] The selection of indicators will be described in more detail in chapter 4.

Measuring "short term" financial instability should therefore be focusing on current developments in the economy that are related to the immediate stress put on economic units to serve their contractual debt obligations. This would be in accordance with Minsky's FIH. The "short term" measurement should be focusing on the "panic" phase of the FIH.

3.4.3 "Long term" financial stability

Estimating long term financial stability would be different from the traditional method of measuring financial instability. This would however, as already argued, rhyme well with Minsky's view of the necessity of estimating the resilience of the financial structure of the economy. The methodology in constructing the corresponding index could however be similar to that of constructing the short term financial stability index although the indicators would not be the same set.

The long term financial stability index would look at a longer horizon than the short term stability index. The long term index would serve as a measurement of "upcoming" contractual payments that would, as time passes and their maturity becomes shorter, naturally transform into short term liabilities. Such contractual payments *could*, as Minsky emphasised, be hard to service when they finally matured, forcing or making units desire more cash "than is available from their usual sources and so they [will] resort to unusual ways to raise cash." A financial crisis could ensue. The long term financial stability index would, properly designed, therefore give us an estimate of the resilience of the financing structure of the economy.[96]

We would, following Minsky's argument, still focus on flow-flow and flow-stock ratios.[97] Stock-stock ratios would be informative as well, such as to estimate leverage levels (using e.g. assets-to-equity ratio). The weight of external financing in investment operations would be informative to look at the development of leverage at the margin (complementing e.g. assets-to-equity ratio).[98] Indicators that would give us an idea of the development of contractual

[96] Note that although the index could convey the information that, say, resilience had decreased between periods, this would *not* say that a "crisis" *would* happen. It would simply just tell us that the economy's financial resilience had decreased, nothing more, nothing less.
[97] The emphasis on flow-flow and stock-flow ratios was not only emphasised by Minsky. Godley considered it as a valuable warning signal of unsustainable developments as well (Lavoie & Zezza, 2012).
[98] Minsky himself considered this ratio (Minsky, 1984).

payments compared to the development of income streams would also be useful. The difference between the yield on investment and the rate of interest would be an example as it can significantly influence the build-up of debt and therefore contractual principal and interest payments compared to the incomes that are received from the investment (Keen, 1997). A rate of interest that is higher than the rate of economic growth could also be signal of upcoming structural weaknesses in the financial structure: the macroeconomic level of debt would grow exponentially. Such an environment can in fact lead to a cyclical development towards an overall debt-induced economic breakdown (Keen, 1997).

As with short term financial stability, we should strive to make a difference between income flows and portfolio flows when it comes to looking at how contractual payments are serviced. An economy where long-term debts are mainly financed with new borrowings could signify a great weight of speculation and Ponzi units in the economy, making its overall financial structure less robust.[99]

It is necessary to stress here that a “long term” financial instability measure, if in accordance with Minsky’s FIH, should be constructed so that it can follow the development of the fragility of the underlying financial structure of units in the economy: are the financing positions of units in the economy of a hedge, speculation or Ponzi nature? Furthermore, it is vital to realise that if such a measure is constructed and it shows a value that indicates that the financial structure of units in the economy has become more fragile than it was it does *not* mean that there *will* be a financial crisis or a panic in the economy. It merely shows that the underlying resilience of financial structures of economic units has become more fragile than they used to be, not that they will necessarily break apart. Or as Minsky himself wrote, previously quoted, see *3.3.4 The effects of speculation and Ponzi units*: “Ponzi financing units cannot carry on too long... Quite suddenly a panic *can* develop as pressure to lower debt ratios increases.”

[99] As with short term financial stability, chapter 4 will cover in better detail which indicators can be used to measure long term financial stability.

3.4.4 The clash between long term and short term financial instability

Minsky (1984) argued that although short term financial stability could be supported by official intervention – Big Government and a decisive central bank – the consequence could be that economic units would take this into account when they decide how to finance their general operations. The consequence would be encouraged debt financing, i.e. a higher leverage.

But higher leverage increases the fragility of the financial system, making it less robust against endogenous and exogenous shocks. Temporary instability, or even a full scale debt deflation, is a consequence of the financial structures of economic units not enduring setbacks in asset prices (net worth of economic units) and incomes when they happen (ibid). That temporary (short term) financial instability or even deflation calls for a respond from the policy makers: Big Government steps in to support profits and the central bank supports asset prices. But that means we are back to square one where debt financing is encouraged because of policy makers' response to market turmoil.

Therefore, a government and a central bank that wish to support profits and asset prices, thereby supporting short term financial stability, could, possibly, increase the fragility of the financial structure of the economy, i.e. long term financial instability. This means that the causality between short term financial instability and long term financial instability can be positive but, somewhat counter-intuitively, running from the former to the latter. At the same time, more variance in short term financial instability should be expected as long term financial instability, i.e. the fragility of underlying financial structures in the economy, grows.

This also introduces the risk of long term financial stability being "sacrificed" if the gain is an immediate improvement in short term financial stability. The risk of this happening is not negligible. First of all, humans are "present-biased" meaning that they weigh the present and the close future a lot more into their decision making than can be accepted following a time-consistent discounting of the future. Our discount functions are dynamically inconsistent and a "hyperbolic discounting" is more realistic than time-consistent discount functions (Frederick, Loewenstein, & O'Donoghue, 2002; Thaler, 1981). On top of this come the effects of humans' loss averse behaviour, where the absolute impact

of losing wealth is perceived to be greater than the absolute impact of gaining the same amount (Tversky & Kahneman, 1991). The effects, especially as loss aversion combines with hyperbolic discounting, can be that we, possibly even knowingly, tend to sacrifice long term stability for the gain of short term stability: we want our comforts and wealth sustained in the immediate future, even if we potentially know that we can or even will have a more serious crisis coming upon us later.

Second, politicians' behaviour has an impact as well. It is documented that ruling politicians can have the tendency to expand government spending, decrease taxation, or postpone austerity measures, just before elections, the purpose being to stimulate the economy and get re-elected (Persson, 2002; Shi & Svensson, 2006).[100] Similarly, we should expect politicians to favour short term stability over long term stability, even if they, and possibly others as well, potentially know that they are threatening the resilience of the economy's financial structure by doing so. Given humans' loss averse and present-biased behaviour, we cannot confirmingly expect voters to make a great fuss about it.

Conclusion to chapter 3

We have discussed the term "financial stability" in this chapter and highlighted some of the contributions on how to measure the phenomenon. We have also introduced Minsky's contributions in this area, in particular his Financial Instability Hypothesis on the natural development of financial instability in the economy. Its cash-flow foundations and main players have been described.

Using Minsky's FIH we have laid out the ground methodology of which indicators should be used to measure financial instability in the economy. We have discussed how such "Minskyian" indices would be different from the traditional ones. We have also described the possibility of a clash between what we called "short term" and "long term" financial instabilities.

In next chapter we will put the theoretical basis of this chapter to the methodological test. Two "Minskyian" financial instability indices will be developed and their interrelations with some economic figures looked at. Their interrelationship will be probed into as well to see if there is any empirical

[100] This is not a generalisation and can depend on e.g. the institutional organisation, such as presidential or parliamentary rule (Persson, 2002) and the level of development in the economy (Shi & Svensson, 2006).

struggle between long term and short term financial instabilities. We will also see if we can make any empirical statements about the relationship between financial instability on one hand and FDI in general and in financial services on the other.

Chapter 4 - Methodology, Data and Results

> Measure what can be measured and make measurable what cannot be measured.
>
> Attributed to Galileo Galilei (see Strohmer (2012, p. 887))

In this chapter financial instability is measured, following the theoretical argumentation of chapter 3, with two indices, one for short term instability and another for long term instability. Hakkio & Keeton (2009) is used as a model of how to construct the indices with Principal Component Analysis.[101] Those measurements of financial instability are then investigated in relation with foreign direct investment, following the discussion in chapters 1 and 2, and economic growth. Data was collected for two major economies: the United States and the United Kingdom. Data sources were Bloomberg, Datastream, OECD, The Federal Reserve, Bank of England and national statistics agencies.

4.1 The construction of the indices

4.1.1 The Hakkio & Keeton methodology and the expansions made

When H&K (Hakkio & Keeton, 2009) measured financial instability in the United States, they used short term factors and proxies for investors' sentiments and beliefs on the market. This is in accordance with the panic phase of Minsky's FIH. The factors were uncertainty about the fundamental value of assets and the behaviour of other investors, the asymmetry of information, the (decreased) willingness to hold risky assets – termed "flight to quality" – and the (decreased) willingness to hold illiquid assets – termed "flight to liquidity".

From those key features, H&K constructed a financial instability index using monthly data. The index was successful in showing periods of market turmoil where newsworthy events in the markets took place. Examples included implosion of the US stock bubble in 2000, BNP Paribas's freeze on redemptions from three of its asset-backed securities funds in August 2007, and Bear Stearns's collapse in March 2008 to name just a few.

In H&K, the data samples were first standard-normalised so all of them had a mean value of zero and a standard deviation of one. The index itself was a sum

[101] Further details and reasoning for the selection of variables can be found in Appendix 2.

of the individual standard-normalised data samples of variables that were meant to represent one or more of the key features of financial instability mentioned here above. Principal Component Analysis (PCA) was used to decide the weight of each of the data samples when the index was constructed. This fundamental methodology is adopted in this work.

Other possible methodologies of constructing an index, or a composite indicator, include e.g. common factor analysis, representative-weights and macroeconomic simulations, see *3.1.2 Measuring financial (in)stability.* This research will only rely on PCA, as H&K do. PCA approach is one of the most common approaches in the literature (Carlson, Lewis, & Nelson, 2014) and other researchers have found that it is a very favourable approach compared to others (Thompson, van Eyden, & Gupta, 2013).

There were, however, expansions and tweaks made. The first obvious expansion was to divide financial instability features into long term and short term. “Short term” is in this research as close as possible to being within a year’s time. “Long term” is anything else. This line between short term and long term is far from being the only “correct” one. The division between “short term” and “long term” is indeed very blurred as Kalecki (1971, p. 165) noted (quoted by Duménil and Lévy (1999)): “In fact, the long-run trend is but a slowly changing component of a chain of short-period situations; it has no independent entity...”.[102]

The second expansion from the H&K methodology is to include factors in the short term that make an attempt to monitor debt and cash flows and not only investors’ sentiment as H&K did. Those include the change in the overall levels of debt, thereby attempting to proxy the net issuance of debt, and the change of change (acceleration) of debt, drawing on research on the effects of credit creation and credit and interests repayments on asset prices, investment, output and general financial stability (Keen, 2011c). The acceleration of debt has, as far as the author is aware of, never been included in research that attempts to create a composite indicator of financial stress.

[102] For the argument for the division between short term and long term financial stability, see chapter 3.

The third difference is that data used here is on a quarterly basis while H&K used monthly data. This is simply done for lack of monthly based data, such as in the case of national accounts which are generally in the form of quarterly data. In the cases where monthly data is available the average of the monthly values for each quarter is used as an input in the financial instability indices. Further aggregation is done when the indices are regressed against the data on foreign direct investment: the FDI data from OECD, from where they are drawn, are on an annual basis and so, to run regressions with annual data, the indices' quarterly data points are averaged over each year and the average used to run regressions with the annual FDI data. The FDI data is always divided with the nominal GDP in the relevant year, i.e. the FDI figures are not absolute numbers but relative to nominal GDP.

Fourth, the methodology on deciding which economic indicators are to be used to construct the indices is different. H&K decided, arbitrarily, to use 11 variables which they argued were useful in collecting data on how much instability is in the financial system. They then applied Principal Component Analysis on those figures.

The methodology applied here is to construct a "base" index with 10 variables, i.e. economic indicators. Those 10 economic indicators are chosen from the pool of available indicators that, using Minsky's FIH, are informative when trying to estimate the level of financial (in)stability in the financial system: see tables 4.1 and 4.2 and *4.1.2 Some notes on the methodology*. The total number of available indicators is not fixed, they are e.g. 22 in the case of short term instability for UK (see table 4.1).

The method of choosing which 10 indicators are used in the base index is as follows. A cross-correlation matrix is constructed between all the available indicators. Those 10 indicators that are on average most correlated to other indicators are then used to construct the index. An exception is made if indicator X is highly (>0.9) correlated with indicator Y, where Y has a higher average correlation to the rest of the available indicators. In that case indicator X is skipped and does not become building material for the index. Principal Component Analysis is then used on the 10 indicators to decide their weights in the index. If an indicator's weight is not significant from zero (with 95%

significance level) it is skipped and the index recalculated with the remaining indicators. This is repeated until all the indicators in the index have a weight that is not zero (with 95% significance level). The index with all non-zero-weight indicators is presented on a normalised form, i.e. with standard deviation of one and average of zero. This index is then used in regressions with FDI data.

4.1.2 Some notes on the methodology

There are several aspects about the methodology that need to be discussed. First, what is the purpose of choosing the indicators with a cross-correlation matrix? Furthermore, does that risk choosing spurious indicators: just because a particular set of indicators is closely correlated with each other does this say anything about causation, timing and the overall usefulness of the indicators?

The purpose of choosing the indicators with a cross-correlation matrix is to choose the most informative indicators and yet have flexibility in that choice. Selecting a specific and non-amendable list of indicators that shall be a part of the financial instability index, like Hakkio and Keeton do, risks focusing on a limited number of indicators that may or may not be the most appropriate ones when it comes to quantifying financial stability in the relevant economy during the time period in question. There is nothing that strictly says that a list of certain indicators of a certain number is the only or the most appropriate list of creating a financial instability index at all times. One list of indicators may be the most appropriate one in one economy at one time period while the selection of indicators should be different in the next economy or next time period. The reason is that economies develop and change. An indicator that may be very informative in one time period may not be so in the next nor have the same informative value between economies.

The methodology here applied is an attempt to tackle those issues. The methodology chooses the indicators that are most closely correlated to all the other indicators that, on the basis of Minsky's FIH, provide valuable information about the development of financial stability in that relevant economy during that particular time period under investigation. It does not fix the list of indicators to a certain number, although it is certainly arbitrary, up to a point,[103] to choose to begin with a "base" index of 10 indicators that may or may not be made fewer

[103] See last paragraph in this section for a reason why the number 10 is chosen.

as the final index is constructed. Using this methodology we are given the indicators that should be most relevant for that economy and that time period without any preconceptions about which indicators are “the best ones”.

It should be noted that this methodology can grasp what Minsky emphasised when he pointed out how financial stability can develop (improve) despite one indicator becoming worse, and the other way around. An example is household debt (Minsky, 1984, p. 10, emphasis added):

> Inasmuch as the nature of mortgage debt changed markedly between 1929 and 1962, the larger household debt-income ratio in 1962 *may not* indicate a greater sensitivity to a shock.

An indicator that would have focused on including debt of households at all times, because it was considered to be one of “the best ones” based on the simple and obvious argument that too much debt has implications for financial stability, could have *overestimated* the true development of financial *instability* in the economy during this time period. Minsky himself noted how financial stability in the US economy had been “unusual” and how the economy’s performance had been “more than adequate” in the post-war years (Minsky, 2008b, p. 77):

> The debate about the proper organisation of the monetary and financial system, which has been a continuing issue in U.S. history, was muted during the two decades of economic tranquillity and progress after World War II. The economy’s more than adequate performance and the unusual stability of the domestic and international banking and financial system were taken to mean that we had finally gotten things right after nearly two hundred years of experimentation.

What is interesting is that at the same time household debt was increasing both as a share of disposable personal income and as a share of money holdings (which Minsky held to be “a crude measure of liquidity” (Minsky, 2008b, p. 94)). This was happening while the stability of the financial system had been “unusual” and the economy’s performance “more than adequate”.

The development of household debt was, in other words, an outlier to the general development of indicators that offer valuable information about the development of financial stability. Consequently, financial stability during this time period was, indeed, "unusually" stable even if household debt was growing. Therefore, using the cross-correlation methodology adopted here would have resulted in an index where the indicator "household debt" would have been an *unlikely* candidate as one of the building blocks, exactly because its negative influences on overall financial stability in the economy were overwhelmed by other developments, resulting in an "unusually" stable economy. The development of "household debt" was not a good representative of the overall development of financial stability in the economy – it was an outlier – and should, in such situations, be discarded in attempts to measure financial stability. In other words, the "*may*" in Minsky's words was in effect.

But just because a particular set of indicators is closely correlated with each other does not say anything about causation and the overall usefulness of the indicators. If among N indicators, n ($n \leq N$) are misleading, but highly correlated, then this methodology would select them as the ones to be used.

To answer those criticisms, please consider the following. First, we are not, in any way, testing for causation between the indicators. They are chosen on the grounds of being the best representatives of measuring the underlying financial stability in the economy, following Minsky's FIH, and not the "causality" of them onto financial instability. This issue is therefore irrelevant.

Second, we should *expect* crisis indicators to have a high correlation with each other. M. Goldstein, Reinhart, and Kaminsky (2000, p. 98), discussing early warning indicators for crises in emerging markets, note that

> [i]n most banking and currency crises, a high proportion of the monthly leading indicators – on the order of 50 to 75 percent – reach their signalling thresholds. Indeed, both in and out of sample, we found that fewer than one-sixth of crises occurred with only five or fewer of the 15 monthly leading indicators flashing. In other words, when an emerging economy is lurching toward a financial crisis, many of the wheels come of simultaneously.

This, then, is an obvious argument for using correlation to determine the most informative indicators: those indicators are the ones that are the wheels that are coming of simultaneously.

Third, the issue of usefulness of the indicators rests on Minsky's FIH. Choosing whether an indicator should be amongst the potential inputs in the base index rests on whether it should be there with Minsky's FIH in mind! An obscure indicator, such as the number of cars in the economy or the tons of imported goods into it, may have a really good correlation with some other indicators on the list of potential inputs in the base index. Therefore, such an indicator would be chosen with this cross-correlation methodology and be a part of the indicators making up the index. There could be other indicators like this, such as six, or any other number. But having such an obscure indicator on the list of potential inputs would not make any sense in the first place: they are chosen on the basis of Minsky's FIH and are, therefore, not misleading for the purpose of measuring financial stability in the economy with the FIH in mind. In fact, they cannot be misleading as long as Minsky's FIH and the argument for choosing the indicator as a potential building block of the index on makes sense with the FIH in mind. Having the number of cars in the economy as a potential indicator would never make such sense. It would therefore never end up on the list of potential indicators in the first place.

There are two ways of having an indicator in the index that is misleading and works against the effort of measuring financial instability in the economy. The first is to incorrectly argue that it should be there, i.e. it does not follow Minsky's FIH well enough. The second is that Minsky's FIH is itself misleading in measuring financial instability in the economy. Minsky's FIH was discussed, and defended, in chapter 3. Appendix 2 provides reasoning for the selection of the indicators.

The reason why an indicator X that has a high correlation (>0.9) with another indicator Y that has a higher average correlation with other indicators is skipped as an input in the index is the following. We want to create an index that gives us as much information about the underlying financial instability as possible. In the case where indicator X has a high correlation with an indicator Y that has already been chosen to be in the index we have a situation where most of the

information that X would have contributed to the index is already there due to indicator Y. Including X therefore adds little information and it is more valuable for the reach and the depth of the index to skip indicator X and include the next indicator on the list. This decreases the potential threat of focusing too much on too few indicators that bring too little depth and breadth of information to the index.

Finally, a consequence of the methodology of choosing the indicators must be pointed out and discussed: the outputs, i.e. the values, of the index can, and most likely will, change as the time period over which the index is constructed is changed. What this means is that the output value for e.g. 1Q2000 in the relevant index could, and most likely would, be different if the time periods which the index is constructed for are different, e.g. the time periods 4Q1990 – 4Q2005 on one hand and 4Q1990 – 4Q2009 on the other.

This is likely to happen even though the economic indicators that are used to construct the index can happen to be exactly the same between the two different time periods. In other words, if e.g. the set **S** of economic indicators is chosen, based on the cross-correlation matrix, to be the building block in the relevant index both for, say, the time periods 4Q1990 – 4Q2005 and 4Q1990 – 4Q2009 it is very likely that the 1Q2000 point, as an example, will not have the same quantitative value in both cases.

The reason why this is likely to happen is twofold. First, in the case where the set **S** is indeed unchanged, we should remember that the outputs values of the relevant index are standard normalised to have the mean value of zero and standard deviation of one over the time period in chosen. It follows that because of the standard normalisation process it will, quite likely, change the individual output values if the time period is changed between constructing the index: i.e. the 1Q2000 value of the index, using data over the time period 4Q1990 – 4Q2005, is unlikely to be quantitatively the same as the 1Q2000 value of the index using data over the time period and 4Q1990 – 4Q2009. Remember, we assume that the set **S** is the same.

Also, the weight of the indicators in **S**, which we still assume to be unchanged between two different time periods, can change depending on the time period we use to construct the index. This is another reason why the output values of

the index may change depending on the time period we use to construct the index.

But **S** does not need to be the same. The indicators that are chosen as building blocks in the financial instability indices – the set **S** – are based on cross-correlation of each of them to the rest of available indicators over the time period which data is extracted from.

Some may consider this variability in the index and its building blocks, depending on the time period chosen to construct it, a drawback since comparison of the historical development of financial instability, according to the indices, changes depending on the time period chosen.

This criticism is acknowledged. Nevertheless, it must be pointed out that this may be a very important characteristic and lend flexibility to the index. First, the idea is that relevant economic indicators are chosen on the basis of how much information on financial instability they reflect. That can easily depend on the intrinsically dynamic and ever-changing characteristics of the economy at any time. Therefore, fixing the choice of indicators, and even their weights, for financial instability, with the purpose of standardising the measurement of it, no matter the time period in question, can have the unintended consequences of not observing the impact of exogenous or endogenous development in the economy that can impair financial stability. Standardising which indicators should be monitored, and even their weight as well, can reduce the ability of the index to give us valuable information of the state of financial instability. This has already been discussed in this section.

Furthermore, indices where the inputs, and their weights, change depending on the time period in question are already widely used in economics, despite their very much so well-known faults. The most obvious examples are price indices such as Consumer Price Indices (CPI) or Retail Price Indices (RPI). These indices are widely used, e.g. to guide monetary policy, and the weights of their inputs, which form the basis that the price indices are constructed on, change frequently. So even if the financial instability indices here developed may be, as price indices are, inaccurate to some extent (Joensen, 2009; Moulton, 1996; Wynne, 2005) and that the weight of their building blocks change, and the

building blocks themselves, those drawbacks certainly do not doom their use or the value of the information they give us.

Finally, why is PCA not applied to all available data and only 10 indicators? Because including more variables would complicate the data handling without improving or adding much, or any, information: “[in] multivariate analysis when a large number of variables, say 10 or more, is available the results are often little changed if a subset of the variables is used” and “[i]t is certainly useful to reduce the number of variables, if possible, for often variables are present which complicate the data but do not give any extra information” (Jolliffe, 1972, p. 160).

We therefore choose to select the 10 most highly correlated indicators to all the available indicators and then run PCA on them to create the “base” index. We see that reducing the number of indicators in the indices, compared to their relevant “base” index of 10 indicators, does not significantly change them (see figures 4.1, 4.2, 4.4 and 4.5). This signals that we are not losing much information when the indicators are discarded showing that Joliffe is exactly right: “the results are often little changed if a subset of the variables is used”. Joliffe comments that “[m]any methods are possible for deciding which variables to reject, but, in practice, experience and intuition often play a part in the selection” (ibid). The choice of method is, therefore, “in practice” at least partially subjective.

4.1.3 Data availability

Data availability and standardisation was the most severe problem this research had to deal with. Of the numerous indicators that were thought of as being valuable in measuring the state of financial stability in the economy only some of them were available, able to be constructed or estimated, even differing between economies that were under the scope. In the case of short term financial instability index table 4.1 shows which economic indicators were available and how they were constructed using available data.

The following tables describe the availability of data and the transformations that were done on the available figures. The last column of tables 4.3 - 4.6 is the average of correlation coefficients with all the other available data in the table. Tables 4.1 – 4.2 show on the other hand the economic indicators that

were available and used for the long term instability index. Data comes from the OECD, the Federal Reserve, National Statistics of United Kingdom, Datastream, Bloomberg and Reuters Financial.

Table 4.1 Available data for the short term instability index

Variable	UK	US
(Households' after-tax disposable income - net interest expenses all debt - households' current liabilities) / households' income	(Total resources (NSSF) - mortgages rates*loans secured on dwellings - outstanding consumer credit) / total resources	household debt burden, % of income
Credit growth	Change in debt/GDP	Change in debt/GDP
Credit acceleration or deceleration (credit impulse)	(Change in change in debt/GDP)^2	(Change in change in debt/GDP)^2
(Firms' cash flow from sales and operations [EBIT] - net interest expenses of all debt - firm's current liabilities)/Firms cash flow	[Gross op. Profits (4Q m.avrg) - Bond yields, Datastream average*sum(securites other than shares, loans) - Money Market Instruments - Finance Loans]/Gross op.profits	(Nonfinancial inc. before tax - avr. AAA&BAA int.rates*nonfinancial total fin. liab. -short term fin. liabil.)/nonfinancials' inc. before tax
(Government [tax] revenues - net interest expenses of long term debt - government current liabilities) / Government revenues	(Total Current Receipts - avr.interests 5,10,20yrs*securities other than shares - Money Market Instruments) / Total Current Receipts	Unavailable
(Banks' net interest income - banks' current liabilities) / Net interest income	(Gross op surplus - MMIs outstanding - Deposits) / Gross op surplus	Unavailable
([net] exports - net interest expenses of external debt - short term external debt) / exports	(net exports - avr.interests 5,10,20yrs*net foreign financial assets) / net exports	Unavailable
(short term debt + interest expenses - net income) / outstanding debt [households]	(Basic Mortgage Rate*loans secured on dwellings + unsecured loan int.rate*total consumer credit + total consumer credit -Total Resources) / Total Loans	Unavailable
(short term debt + interest expenses - net income) / outstanding debt [non-financials]	[Bond yields, Datastream avr*sum(securities other than shares, loans) + Money Market Instruments + Finance Loans - Gross op. Profits (4Q m.avr.)] / (Total Liabilities - Shares)	(Short term fin. Liabil. + avr. AAA&BAA rates*outstanding liabilities - inc. Before tax)/Short term fin. liabilities
(short term debt + interest expenses - net income) / outstanding debt [financials]	(Money Market Instruments + Deposits - Gross op. Surplus) / (Total Liabilites - Shares)	Unavailable
Newly issued debt / (matured debt - income) [households]	Unavailable	Unavailable
Newly issued debt / (matured debt - income)	Unavailable	Unavailable
The amount of protected assets / debt of financial obligations	Securites of central gov / Financials' liabilities	Unavailable
securities of central gov / financials' short term liabilities	Securities of central gov / sum(Money Market Instruments, Deposits)	Federal debt / commercial banks' liabilities
The amount of outstanding REPO agreements with the Central Bank	Unavailable	Federal bank total REPO agreements, 3mth average
The structure of the yield curve	20yr - 5yr zero coupon yield difference	10 year Treasury bill - 3mth T bill
The size of government expenditure (of GDP)	Gen. Gov exp / GDP (OECD figures)	Gen. Gov exp / GDP (OECD figures)
The spread between LIBOR and T-bill yields	LIBOR, T bill yield spread (3mth)	LIBOR, T bill yield spread (3 mth)

Table 4.1 (*cont.*)

Variable	UK	US
Interest rate swap yield spread	Unavailable	Unavailable
Yield spread between off-the-run and on-the-run treasury bonds	Unavailable	Unavailable
The yield spread between highly rated corporate bonds and treasury bonds	AAA, 10 yr Treasury yield spread	AAA, average 5,10,20,30 year gov bonds yield spread
The yield spread between highly rated corporate bonds and low rated corporate bonds	UK Corp BBB, AAA yield spread	Unavailable
The yield spread between "junk bonds" and low rated corporate bonds	Unavailable	Spread between BAA and AAA yield
The yield spread between consumer asset backed securities (CABS) and treasury bonds	Unavailable	Unavailable
The correlation between stock returns and treasury bonds returns	FTSE 100 and overall Treasury Index	DJ and Overall Treasuy Index 3mth correlation
Volatility of stock prices	VIX index	VIX index
Individualistic volatility of bank equity prices	Banks in FTSE 100 Banks index	Banks in Dow Jones Index
Dispersion of returns on bank stocks	FTSE 100 Banks and FTSE 100 indices	Variance of 3mth return, DJ Banks
(Stock) trading volume, turnover, IPOs and margin calls	Unavailable	(Quarterly change in volume/m.cap)^2
(Real) exchange rate quarterly change squared	Bank of England figures	JP Morgan real effective exchange index, sq. quarterly change

Table 4.2 Available data for the long term instability index

Variable	UK	US
Debt / GDP	Balance Sheet of UK: Liabilities; Loans / GDP	sum of Federal, state, nonfinancial, household debt
Change in Debt/GDP	Annual Change in debt/GDP	annual change in debt
(Change in change in debt/GDP)^2	annual change in annual change in debt)^2	annual change in annual change in debt)^2
Nom GDP growth - LT interest rates	Average 5,10,20 year UK Bond Yield - OECD GDP Growth Rates	GDP annual growth - OECD LT interest rates
Net External Debt	Balance Sheet of UK: Foreigners; Net Financial Wealth / GDP	Unavailable
Net External Debt / Exports (Goods and Services)	Balance Sheet of UK: Foreigners; Net Financial Wealth / Net Exports, 4Q average	Gross Debt / OECD GDP figures
Annual Change in Net External Debt	Annual change in Net External Debt / GDP	Unavailable
Net Exports / GDP	4Q sum net exports, goods and services / GDP, 4Q sum	OECD Figures
Annual Change in Net Exports	Annual Change in Net Exports / GDP	Annual change in CA / GDP balance
(Int rates on net foreign assets + net exports (annual)) / GDP	(Net External Debt * Int Rates on Treasury Gilts + Net Exports)/GP	Unavailable
Terms of Trade	OECD figures, Exports / Imports	OECD figures, Exports / Imports
Real Exchange Rate	Unavailable	JP Morgan Real Effective Ex. Rate
Current Account Balance / GDP	National Statistics Data	Federal Reserve Data
International Investment Position / GDP	BoP IIP Net / GDP	Unavailable
Assets / equity of non-financial companies	Balance Sheet of Non-Financials: Total Assets / Equity	Nonfinancials' assets at market prices / equity
Profitability of non-financial corporations (g.op.s/assets)	Gross op.surplus / assets	Income before taxes / assets
Assets / equity of financial companies	Balance Sheet of Financials: Assets / Equity	Commercial banks' assets / equity
Profitability of Financial Companies	Gross op.surplus / assets	Commercial banks' return on assets
Non-financials' and financials' collective leverage	Multiple of financials' and nonfinancials' leverage	Average of financials' and nonfinancials' leverage
Non-financials' net operating surplus / assets	Unavailable	Unavailable
Gross return of assets / cost of credit (non-fin)	Gross op.surplus / assets - Corporate Interest Rates	Unavailable

Table 4.2 (cont.)

Variable	UK	US
Gross return of assets / cost of credit (fin)	Gross op.surplus/assets - LIBOR Rates	Unavailable
Gross return of assets / cost of credit (gov.)	Unavailable	Unavailable
Productivity gains	Annual change in output per worker	Annual change in output per employee
GDP / AD	GDP / GDP + qu.change in outstanding debt	GDP / GDP + qu. change in outstanding debt
Cash flow governmental safety net size	(Gov exp - Invest) / GDP	(Gov exp - Investm)/GDP
Gov Expenditure Responsiveness	(Gov exp - Invest) / GDP annual change, squared	Unavailable
non-financials' usage of external funds in investment	Unavailable	Nonfinancials' gross investment/nonfinancial net borrowing
Structure of the yield curve	Unavailable	10 Yr Treasury Bond Yield - 3mth Treasury Bill Yield

As already explained the available data was used to build a cross-covariance matrix. That matrix was then used to find which economic indicators should be the concrete-and-brick in the relevant financial stability index based on which 10 indicators had the highest average correlation with all the available indicators. Variables with # are used to construct the relevant base-index. To save space, the full name of the variables has been shortened down.

Table 4.3 The correlation matrix from available data (UK, Long Term Instability Index)

Those marked with # are chosen for the base index	Avr. Correl	Rank	Debt / GDP	Change in Debt/GDP	(Change in change in debt/GDP)^2	LT int rates - Nom GDP gr	Net Ext Debt / GDP	Net Ext Debt / Exp	Ann. Ch. Net Ext Debt	NX / GDP	Ann. Change NX / GDP	(Int. Rat. N. For. A. + NX) / GDP	ToT	CA / GDP
Debt / GDP #	0.36	2	1.00	0.29	0.40	-0.14	0.77	0.76	-0.15	0.60	0.03	0.05	0.53	0.06
Change in Debt/GDP #	0.18	13	0.29	1.00	-0.26	-0.54	0.31	0.31	-0.07	0.49	0.35	0.32	0.43	0.32
(Change in change in debt/GDP)^2	0.16	17	0.40	-0.26	1.00	0.23	0.23	0.22	-0.04	0.16	-0.10	-0.02	0.12	-0.09
LT int rates - Nom GDP gr	-0.05	22	-0.14	-0.54	0.23	1.00	-0.37	-0.38	-0.17	-0.27	-0.51	-0.06	-0.31	-0.12
Net Ext Debt / GDP #	0.27	6	0.77	0.31	0.23	-0.37	1.00	1.00	0.21	0.36	0.17	-0.16	0.36	-0.06
Net Ext Debt / Exp *	0.27	8	0.76	0.31	0.22	-0.38	1.00	1.00	0.22	0.35	0.16	-0.17	0.36	-0.07
Ann. Ch. Net Ext Debt	-0.03	21	-0.15	-0.07	-0.04	-0.17	0.21	0.22	1.00	-0.04	0.07	0.06	-0.02	0.00
NX / GDP #	0.36	3	0.60	0.49	0.16	-0.27	0.36	0.35	-0.04	1.00	0.31	0.77	0.93	0.62
A. Change NX / GDP	0.08	20	0.03	0.35	-0.10	-0.51	0.17	0.16	0.07	0.31	1.00	0.07	0.43	0.25
Int. Rat. N. For. A. + NX / GDP #	0.18	12	0.05	0.32	-0.02	-0.06	-0.16	-0.17	0.06	0.77	0.07	1.00	0.68	0.71
ToT **	0.33	5	0.53	0.43	0.12	-0.31	0.36	0.36	-0.02	0.93	0.43	0.68	1.00	0.65
CA / GDP	0.18	14	0.06	0.32	-0.09	-0.12	-0.06	-0.07	0.00	0.62	0.25	0.71	0.65	1.00
IIP / GDP ***	0.27	7	0.77	0.32	0.23	-0.38	1.00	1.00	0.20	0.36	0.17	-0.16	0.36	-0.06
Nonfin. Leverage #	0.34	4	0.88	0.15	0.38	-0.01	0.49	0.48	-0.30	0.64	-0.01	0.20	0.57	0.09
Nonfin. Profitability #	0.37	1	0.88	0.31	0.28	-0.16	0.68	0.67	-0.22	0.71	0.16	0.21	0.68	0.23
Fin. Leverage	0.08	19	0.17	-0.34	0.35	0.62	-0.28	-0.30	-0.34	0.07	-0.32	0.09	0.00	0.08
Fin. Profitability #	0.22	11	0.54	0.26	0.15	-0.28	0.66	0.65	-0.12	0.25	0.27	-0.17	0.34	0.03
Nonfin. & Fin Leverage	0.16	18	0.41	-0.15	0.48	0.19	0.17	0.15	-0.31	0.07	-0.05	-0.08	0.02	-0.11
Nonfin ROA - Int.cost #	0.23	9	0.40	-0.02	0.26	0.47	-0.10	-0.12	-0.34	0.56	-0.30	0.56	0.44	0.39
Fin ROA - Int. Cost	-0.12	23	-0.45	0.40	-0.37	-0.42	-0.18	-0.17	-0.03	-0.09	0.14	0.10	-0.07	0.16
Pr. Gains #	0.22	10	0.42	-0.03	0.34	0.32	0.09	0.07	-0.11	0.43	-0.08	0.40	0.34	0.17
GDP / AD	0.17	15	0.28	0.92	-0.30	-0.68	0.36	0.36	0.02	0.51	0.27	0.37	0.45	0.36
Gov. Safety Net	0.17	16	0.60	-0.24	0.37	0.47	0.28	0.28	-0.19	0.09	-0.35	-0.25	0.02	-0.23
Gov. Exp. Responsiv.	-0.15	24	-0.37	-0.15	-0.21	0.22	-0.45	-0.44	-0.12	-0.32	-0.26	-0.10	-0.31	-0.10

Table 4.3 (cont.)

IIP / GDP	Nonfin. Leverage	Nonfin. Profitability	Fin. Leverage	Fin. Profitability	Nonfin. & Fin Leverage	Nonfin ROA - Int.cost	Fin ROA - Int. Cost	Pr. Gains	GDP / AD	Gov. Safety Net	Gov. Exp. Responsiv.	Avr. Correl	Rank	Economic indicator
0.77	0.88	0.88	0.17	0.54	0.41	0.40	-0.45	0.42	0.28	0.60	-0.37	0.36	2	Debt / GDP #
0.32	0.15	0.31	-0.34	0.26	-0.15	-0.02	0.40	-0.03	0.92	-0.24	-0.15	0.18	13	Change in Debt/GDP #
0.23	0.38	0.28	0.35	0.15	0.48	0.26	-0.37	0.34	-0.30	0.37	-0.21	0.16	17	(Change in change in debt/GDP)^2
-0.38	-0.01	-0.16	0.62	-0.28	0.19	0.47	-0.42	0.32	-0.68	0.47	0.22	-0.05	22	LT int rates - Nom GDP gr
1.00	0.49	0.68	-0.28	0.66	0.17	-0.10	-0.18	0.09	0.36	0.28	-0.45	0.27	6	Net Ext Debt / GDP #
1.00	0.48	0.67	-0.30	0.65	0.15	-0.12	-0.17	0.07	0.36	0.28	-0.44	0.27	8	Net Ext Debt / Exp *
0.20	-0.30	-0.22	-0.34	-0.12	-0.31	-0.34	-0.03	-0.11	0.02	-0.19	-0.12	-0.03	21	Ann. Ch. Net Ext Debt
0.36	0.64	0.71	0.07	0.25	0.07	0.56	-0.09	0.43	0.51	0.09	-0.32	0.36	3	NX / GDP #
0.17	-0.01	0.16	-0.32	0.27	-0.05	-0.30	0.14	-0.08	0.27	-0.35	-0.26	0.08	20	A. Change NX / GDP
-0.16	0.20	0.21	0.09	-0.17	-0.08	0.56	0.10	0.40	0.37	-0.25	-0.10	0.18	12	Int. Rat. N. For. A. + NX / GDP #
0.36	0.57	0.68	0.00	0.34	0.02	0.44	-0.07	0.34	0.45	0.02	-0.31	0.33	5	ToT **
-0.06	0.09	0.23	0.08	0.03	-0.11	0.39	0.16	0.17	0.36	-0.23	-0.10	0.18	14	CA / GDP
1.00	0.49	0.68	-0.29	0.66	0.16	-0.11	-0.17	0.09	0.36	0.27	-0.45	0.27	7	IIP / GDP ***
0.49	1.00	0.86	0.31	0.39	0.53	0.59	-0.52	0.62	0.14	0.63	-0.35	0.34	4	Nonfin. Leverage #
0.68	0.86	1.00	0.08	0.57	0.29	0.49	-0.41	0.38	0.29	0.52	-0.39	0.37	1	Nonfin. Profitability #
-0.29	0.31	0.08	1.00	-0.28	0.29	0.61	-0.37	0.24	-0.42	0.58	0.34	0.08	19	Fin. Leverage
0.66	0.39	0.57	-0.28	1.00	0.30	-0.04	-0.04	0.11	0.24	0.14	-0.41	0.22	11	Fin. Profitability #
0.16	0.53	0.29	0.29	0.30	1.00	0.25	-0.35	0.62	-0.16	0.31	-0.29	0.16	18	Nonfin. & Fin Leverage
-0.11	0.59	0.49	0.61	-0.04	0.25	1.00	-0.38	0.55	-0.07	0.46	-0.10	0.23	9	Nonfin ROA - Int.cost #
-0.17	-0.52	-0.41	-0.37	-0.04	-0.35	-0.38	1.00	-0.49	0.49	-0.72	0.10	-0.12	23	Fin ROA - Int. Cost
0.09	0.62	0.38	0.24	0.11	0.62	0.55	-0.49	1.00	-0.07	0.25	-0.35	0.22	10	Pr. Gains #
0.36	0.14	0.29	-0.42	0.24	-0.16	-0.07	0.49	-0.07	1.00	-0.34	-0.21	0.17	15	GDP / AD
0.27	0.63	0.52	0.58	0.14	0.31	0.46	-0.72	0.25	-0.34	1.00	0.09	0.17	16	Gov. Safety Net
-0.45	-0.35	-0.39	0.34	-0.41	-0.29	-0.10	0.10	-0.35	-0.21	0.09	1.00	-0.15	24	Gov. Exp. Responsiv.

* high correlation with Net External Debt / GDP so it' skipped

** high correlation with Net Exports / GDP so it' skipped

*** high correlation with Net External Debt / GDP so it' skipped

Table 4.4 The correlation matrix from available data (UK, Short Term Instability Index)

Those marked with # are chosen for the base Index	Avr. Corr.	Rank	(Hhld disp. Inc - int. Exp. - curr. Liabil) / hhld. Inc.	Ch. Debt/GDP	(Ch. in ch. in debt/GDP)^2	(Firm's EBIT - int. Exp - curr. Liab. / Firms' EBIT	(Gov. Tax Rev. - int. Exp. - curr. Liab.) / Gov. Tax Rev.	(NX - int. Exp - ST debt) / NX	ST debt + int. Exp. - inc. / Outst. Debt [househ.]	ST debt + int. Exp. - inc. / Outst. Debt [non-fin.]	ST debt + int. Exp. - inc. / Outst. Debt [financ.]	Prot. Assets / Debt of Financ.	Gov. Secur. / Financ. ST Liabil.
(Hhld disp. Inc - int. Exp. - curr. Liabil) / hhld. Inc. *	0.19	8	1.00	0.38	0.28	0.44	-0.22	0.62	0.98	-0.12	-0.41	0.94	0.90
Ch. Debt/GDP	0.02	17	0.38	1.00	-0.29	-0.28	-0.48	0.38	0.38	-0.42	0.20	0.34	0.49
(Ch. in ch. in debt/GDP)^2 #	0.14	14	0.28	-0.29	1.00	0.43	0.25	0.10	0.21	0.25	-0.48	0.29	0.15
(Firm's EBIT - int. Exp - curr. Liab. / Firms' EBIT #	0.26	1	0.44	-0.28	0.43	1.00	0.43	-0.13	0.40	0.78	-0.76	0.56	0.33
(Gov. Tax Rev. - int. Exp. - curr. Liab.) / Gov. Tax Rev.	-0.03	18	-0.22	-0.48	0.25	0.43	1.00	-0.35	-0.30	0.44	-0.37	-0.18	-0.34
(NX - int. Exp - ST debt) / NX	0.03	16	0.62	0.38	0.10	-0.13	-0.35	1.00	0.61	-0.57	-0.21	0.55	0.51
ST debt + int. Exp. - inc. / Outst. Debt [househ.]	0.17	12	0.98	0.38	0.21	0.40	-0.30	0.61	1.00	-0.15	-0.34	0.93	0.91
ST debt + int. Exp. - inc. / Outst. Debt [non-fin.] #	0.19	7	-0.12	-0.42	0.25	0.78	0.44	-0.57	-0.15	1.00	-0.45	0.04	-0.11
ST debt + int. Exp. - inc. / Outst. Debt [financ.]	-0.22	21	-0.41	0.20	-0.48	-0.76	-0.37	-0.21	-0.34	-0.45	1.00	-0.53	-0.17
Prot. Assets / Debt of Financ. #	0.25	3	0.94	0.34	0.29	0.56	-0.18	0.55	0.93	0.04	-0.53	1.00	0.92
Gov. Secur. / Financ. ST Liabil. **	0.18	10	0.90	0.49	0.15	0.33	-0.34	0.51	0.91	-0.11	-0.17	0.92	1.00
Strct. Of Yield Crv.	-0.07	19	0.00	0.32	-0.32	-0.62	-0.75	0.43	0.07	-0.56	0.42	-0.03	0.11
Gov Exp / GDP	-0.16	20	-0.67	0.01	-0.43	-0.74	-0.51	-0.21	-0.61	-0.26	0.63	-0.70	-0.55
LIBOR, T Bills spr. #	0.26	2	0.18	-0.06	0.13	0.49	0.03	-0.17	0.12	0.54	-0.56	0.26	0.10
High Rat. Corp. Bonds & Tr. Bonds Yield Spr. **	0.18	11	-0.20	-0.61	0.34	0.93	0.53	-0.53	-0.34	0.95	-0.72	0.25	-0.43
High Rat. & Low. Rat. Corp. Bonds Yield Spr. #	0.16	13	-0.15	0.20	-0.17	-0.05	-0.48	-0.28	-0.08	0.21	0.22	0.15	0.39
Stock & Tr. Bonds Return Correl.	0.12	15	0.02	0.01	0.20	0.04	-0.13	-0.03	-0.01	0.07	-0.08	-0.04	-0.08
VIX #	0.19	9	-0.21	-0.40	0.14	0.64	0.15	-0.58	-0.27	0.78	-0.41	0.07	-0.24
Ind. Volatil of Bank Stocks #	0.20	6	-0.01	-0.49	0.35	0.59	0.26	-0.23	-0.02	0.60	-0.52	0.07	-0.14
Disp. Of Bank Stock Return #	0.24	4	0.12	-0.22	0.14	0.61	0.24	-0.11	0.09	0.60	-0.60	0.25	0.04
Real Exch. Rate Ch. (Sqrd) #	0.24	5	0.09	-0.11	0.26	0.46	0.12	-0.23	0.03	0.49	-0.48	0.18	0.03

Table 4.4 (cont.)

Strct. Of Yield Crv.	Gov Exp / GDP	LIBOR, T Bills spr.	High Rat. Corp. Bonds & Tr. Bonds Yield Spr.	High Rat. & Low. Rat. Corp. Bonds Yield Spr.	Stock & Tr. Bonds Return Correl.	VIX	Ind. Volatil of Bank Stocks	Disp. Of Bank Stock Return	Real Exch. Rate Ch. (Sqrd)	Avr. Cor.	Rank	
0.00	-0.67	0.18	-0.20	-0.15	0.02	-0.21	-0.01	0.12	0.09	0.19	8	(Hhld disp. Inc - int. Exp. - curr. Liabil) / hhld. Inc. *
0.32	0.01	-0.06	-0.61	0.20	0.01	-0.40	-0.49	-0.22	-0.11	0.02	17	Ch. Debt/GDP
-0.32	-0.43	0.13	0.34	-0.17	0.20	0.14	0.35	0.14	0.26	0.14	14	(Ch. in ch. in debt/GDP)^2 #
-0.62	-0.74	0.49	0.93	-0.05	0.04	0.64	0.59	0.61	0.46	0.26	1	(Firm's EBIT - int. Exp - curr. Liab. / Firms' EBIT #
-0.75	-0.51	0.03	0.53	-0.48	-0.13	0.15	0.26	0.24	0.12	-0.03	18	(Gov. Tax Rev. - int. Exp. - curr. Liab.) / Gov. Tax Rev.
0.43	-0.21	-0.17	-0.53	-0.28	-0.03	-0.58	-0.23	-0.11	-0.23	0.03	16	(NX - int. Exp - ST debt) / NX
0.07	-0.61	0.12	-0.34	-0.08	-0.01	-0.27	-0.02	0.09	0.03	0.17	12	ST debt + int. Exp. - inc. / Outst. Debt [househ.]
-0.56	-0.26	0.54	0.95	0.21	0.07	0.78	0.60	0.60	0.49	0.19	7	ST debt + int. Exp. - inc. / Outst. Debt [non-fin.] #
0.42	0.63	-0.56	-0.72	0.22	-0.08	-0.41	-0.52	-0.60	-0.48	-0.22	21	ST debt + int. Exp. - inc. / Outst. Debt [financ.]
-0.03	-0.70	0.26	0.25	0.15	-0.04	0.07	0.07	0.25	0.18	0.25	3	Prot. Assets / Debt of Financ. #
0.11	-0.55	0.10	-0.43	0.39	-0.08	-0.24	-0.14	0.04	0.03	0.18	10	Gov. Secur. / Financ. ST Liabil. **
1.00	0.58	-0.21	-0.70	0.30	0.01	-0.42	-0.41	-0.34	-0.38	-0.07	19	Strct. Of Yield Crv.
0.58	1.00	-0.20	-0.48	0.54	0.06	-0.04	-0.23	-0.34	-0.25	-0.16	20	Gov Exp / GDP
-0.21	-0.20	1.00	0.62	0.35	0.28	0.64	0.48	0.72	0.72	0.26	2	LIBOR, T Bills spr. #
-0.70	-0.48	0.62	1.00	0.08	0.14	0.78	0.85	0.72	0.61	0.18	11	High Rat. Corp. Bonds & Tr. Bonds Yield Spr. **
0.30	0.54	0.35	0.08	1.00	0.13	0.31	0.09	0.23	0.42	0.16	13	High Rat. & Low. Rat. Corp. Bonds Yield Spr. #
0.01	0.06	0.28	0.14	0.13	1.00	0.25	0.11	0.10	0.38	0.12	15	Stock & Tr. Bonds Return Correl.
-0.42	-0.04	0.64	0.78	0.31	0.25	1.00	0.58	0.53	0.61	0.19	9	VIX #
-0.41	-0.23	0.48	0.85	0.09	0.11	0.58	1.00	0.70	0.53	0.20	6	Ind. Volatil of Bank Stocks #
-0.34	-0.34	0.72	0.72	0.23	0.10	0.53	0.70	1.00	0.65	0.24	4	Disp. Of Bank Stock Return #
-0.38	-0.25	0.72	0.61	0.42	0.38	0.61	0.53	0.65	1.00	0.24	5	Real Exch. Rate Ch. (Sqrd) #

* high correlation (>0.9) to "amount of protected assets / financial obligations" so it's skipped

** high correlation to "The amount of protected assets / debt of financial obligations"

*** high correlation to "(Firms' cash flow from sales and operations [EBIT] - net interest expenses of all debt - firm's current liabilities)/Firms cash flow" so skipped

Table 4.5 The correlation matrix from available data (US, Long Term Instability Index)

Those marked with # are ussed for the base index	Average correl	Rank	Debt / GDP	Ch. in Debt/GDP	(Ch. in ch. in debt/GDP)^2	Nom GDP gr. - LT int. Rates	Net Ext Debt / Exports	NX / GDP	Ann. Ch in NX	ToT	Real Exch. Rate	CA / GDP	Leverage [non-fin.]
Debt / GDP #	0.17	9	1.00	0.37	0.47	-0.04	0.76	0.54	-0.41	0.27	0.54	0.48	-0.32
Ch. in Debt/GDP #	0.26	1	0.37	1.00	0.13	0.29	0.56	0.55	-0.26	0.54	-0.17	0.52	0.32
(Ch. in ch. in debt/GDP)^2 #	0.11	11	0.47	0.13	1.00	0.14	0.24	0.08	-0.11	0.03	0.07	0.03	0.03
Nom GDP gr. - LT int. Rates	0.04	17	-0.04	0.29	0.14	1.00	-0.38	-0.48	-0.61	-0.50	0.03	-0.53	0.46
Net Ext Debt / Exports #	0.18	7	0.76	0.56	0.24	-0.38	1.00	0.85	-0.03	0.74	0.13	0.83	-0.35
NX / GDP #	0.22	2	0.54	0.55	0.08	-0.48	0.85	1.00	0.11	0.92	-0.03	0.99	-0.17
Ann. Ch in NX	-0.09	21	-0.41	-0.26	-0.11	-0.61	-0.03	0.11	1.00	0.32	-0.49	0.18	-0.17
ToT	0.19	5	0.27	0.54	0.03	-0.50	0.74	0.92	0.32	1.00	-0.29	0.93	-0.09
Real Exch. Rate	0.03	18	0.54	-0.17	0.07	0.03	0.13	-0.03	-0.49	-0.29	1.00	-0.07	-0.16
CA / GDP **	0.20	3	0.48	0.52	0.03	-0.53	0.83	0.99	0.18	0.93	-0.07	1.00	-0.23
Leverage [non-fin.] #	0.15	10	-0.32	0.32	0.03	0.46	-0.35	-0.17	-0.17	-0.09	-0.16	-0.23	1.00
Prof.bility [non-fin.] #	0.17	8	-0.16	0.43	0.06	0.41	-0.17	0.07	-0.20	0.13	-0.38	0.02	0.63
Leverage [fin. Comp.]	-0.05	20	-0.44	-0.17	-0.06	0.67	-0.69	-0.68	-0.31	-0.62	0.00	-0.71	0.52
Prof.bility [fin.comp.] #	0.19	4	0.24	0.42	0.29	0.68	-0.11	-0.11	-0.52	-0.19	0.24	-0.18	0.57
Collctv lvrg	0.09	13	-0.41	0.18	0.00	0.60	-0.53	-0.39	-0.24	-0.30	-0.12	-0.45	0.94
Productv. Gains	0.08	16	-0.05	-0.10	-0.08	-0.09	-0.21	-0.04	-0.11	-0.15	0.21	-0.05	0.25
GDP / AD #	0.18	6	-0.12	0.51	-0.12	-0.32	0.32	0.53	0.27	0.65	-0.31	0.53	0.38
TBTF Banks	0.09	14	0.76	0.29	0.28	-0.41	0.86	0.73	0.00	0.58	0.06	0.72	-0.63
CF Gov. Saf. Net #	0.11	12	0.54	0.27	0.44	0.62	0.05	-0.17	-0.60	-0.37	0.46	-0.27	0.28
Ext. Funds [non-fin.]	0.08	15	-0.27	0.04	-0.18	-0.31	-0.03	0.18	0.17	0.29	-0.11	0.23	0.13
Yield Crv	-0.03	19	-0.24	-0.23	-0.32	-0.45	-0.07	0.11	0.19	0.11	-0.07	0.17	-0.19

Table 4.5 (cont.)

Prof.bility [non-fin.]	Leverage [fin. Comp.]	Prof.bility [fin.comp.]	Collctv lvrg	Productv. Gains	GDP / AD	TBTF Banks	CF Gov. Saf. Net	Ext. Funds [non-fin.]	Yield Crv	Average correl	Rank		
-0.16	-0.44	0.24	-0.41	-0.05	-0.12	0.76	0.54	-0.27	-0.24	0.17	9	Debt / GDP #	
0.43	-0.17	0.42	0.18	-0.10	0.51	0.29	0.27	0.04	-0.23	0.26	1	Ch. in Debt/GDP #	
0.06	-0.06	0.29	0.00	-0.08	-0.12	0.28	0.44	-0.18	-0.32	0.11	11	(Ch. in ch. in debt/GDP)^2 #	
0.41	0.67	0.68	0.60	-0.09	-0.32	-0.41	0.62	-0.31	-0.45	0.04	17	Nom GDP gr. - LT int. Rates	
-0.17	-0.69	-0.11	-0.53	-0.21	0.32	0.86	0.05	-0.03	-0.07	0.18	7	Net Ext Debt / Exports #	
0.07	-0.68	-0.11	-0.39	-0.04	0.53	0.73	-0.17	0.18	0.11	0.22	2	NX / GDP #	
-0.20	-0.31	-0.52	-0.24	-0.11	0.27	0.00	-0.60	0.17	0.19	-0.09	21	Ann. Ch in NX	
0.13	-0.62	-0.19	-0.30	-0.15	0.65	0.58	-0.37	0.29	0.11	0.19	5	ToT	
-0.38	0.00	0.24	-0.12	0.21	-0.31	0.06	0.46	-0.11	-0.07	0.03	18	Real Exch. Rate	
0.02	-0.71	-0.18	-0.45	-0.05	0.53	0.72	-0.27	0.23	0.17	0.20	3	CA / GDP **	
0.63	0.52	0.57	0.94	0.25	0.38	-0.63	0.28	0.13	-0.19	0.15	10	Leverage [non-fin.] #	
1.00	0.40	0.52	0.62	0.19	0.24	-0.25	0.24	0.06	-0.17	0.17	8	Prof.bility [non-fin.] #	
0.40	1.00	0.41	0.77	0.07	-0.28	-0.75	0.34	-0.22	-0.28	-0.05	20	Leverage [fin. Comp.]	
0.52	0.41	1.00	0.58	0.18	-0.06	-0.24	0.63	0.01	-0.31	0.19	4	Prof.bility [fin.comp.] #	
0.62	0.77	0.58	1.00	0.21	0.18	-0.76	0.34	0.02	-0.25	0.09	13	Collctv lvrg	
0.19	0.07	0.18	0.21	1.00	0.06	-0.25	0.09	0.24	0.23	0.08	16	Productv. Gains	
0.24	-0.28	-0.06	0.18	0.06	1.00	0.02	-0.35	0.43	0.21	0.18	6	GDP / AD #	
-0.25	-0.75	-0.24	-0.76	-0.25	0.02	1.00	-0.01	-0.11	0.00	0.09	14	TBTF Banks	
0.24	0.34	0.63	0.34	0.09	-0.35	-0.01	1.00	-0.59	-0.64	0.11	12	CF Gov. Saf. Net #	
0.06	-0.22	0.01	0.02	0.24	0.43	-0.11	-0.59	1.00	0.68	0.08	15	Ext. Funds [non-fin.]	
-0.17	-0.28	-0.31	-0.25	0.23	0.21	0.00	-0.64	0.68	1.00	-0.03	19	Yield Crv	

* high correl to net exports / GDP so skipped

** high correl to net exports / GDP so skipped

Table 4.6 The correlation matrix from available data (US, Short Term Instability Index)

Those marked with # are used in the base Index	average correl	rank	(Hhld inc. - int. Exp - hhld curr. Liabil.) / hhld inc.	Change in Debt/GDP	(Change in change in debt/GDP)^2	(Fims' EBIT - int. Exp - curr. Liab.) / Firms' EBIT	ST debt + int. Exp - Inc. / Outs. Debt [non-financ.]	Gov. Securites / Financials' ST liabil.	Outst. REPO	Str. Of Yield Curve	LIBOR vs. T-bill Spread
(Hhld inc. - int. Exp - hhld curr. Liabil.) / hhld inc. *	0.23	6	1.00	0.55	-0.08	0.54	-0.50	0.90	0.63	0.22	0.09
Change in Debt/GDP #	0.23	7	0.55	1.00	0.13	0.30	-0.13	0.58	0.34	-0.23	0.15
(Change in change in debt/GDP)^2	0.05	14	-0.08	0.13	1.00	0.13	-0.25	-0.09	-0.14	-0.32	-0.14
(Fims' EBIT - int. Exp - curr. Liab.) / Firms' EBIT #	0.26	2	0.54	0.30	0.13	1.00	-0.13	0.66	-0.36	-0.04	0.12
ST debt + int. Exp - Inc. / Outs. Debt [non-financ.]	-0.03	16	-0.50	-0.13	-0.25	-0.13	1.00	-0.21	-0.65	0.15	0.32
Gov. Securites / Financials' ST liabil. #	0.26	3	0.90	0.58	-0.09	0.66	-0.21	1.00	0.28	0.17	0.16
Outst. REPO	0.08	13	0.63	0.34	-0.14	-0.36	-0.65	0.28	1.00	0.17	0.46
Str. Of Yield Curve	0.05	15	0.22	-0.23	-0.32	-0.04	0.15	0.17	0.17	1.00	0.14
LIBOR vs. T-bill Spread #	0.23	5	0.09	0.15	-0.14	0.12	0.32	0.16	0.46	0.14	1.00
High vs. Low Rated Corp Bond Yield Spread #	0.18	9	0.28	0.29	0.29	0.74	-0.22	0.37	-0.49	-0.43	-0.02
Junk Bonds vs. Low Rated Corp Yield Spread	-0.27	17	-0.28	-0.67	-0.25	-0.48	-0.08	-0.39	-0.09	0.30	-0.40
Correl of Stock & Treasury Bond Return #	0.12	11	0.30	0.23	0.19	0.16	-0.23	0.31	0.30	0.11	-0.04
VIX #	0.27	1	0.18	0.34	0.20	0.67	0.16	0.32	-0.28	-0.06	0.47
Ind. Volatil of Bank Stock Prices #	0.26	4	0.13	0.29	0.06	0.48	0.11	0.22	0.07	-0.06	0.60
Dispersion of Return on Bank Stocks	0.10	12	-0.11	0.18	0.15	0.08	0.10	-0.06	-0.03	-0.28	0.20
Trading Volume #	0.21	8	-0.01	0.32	0.02	0.33	0.07	0.07	0.18	0.05	0.41
Real Exch Rate Change, Squared #	0.15	10	0.09	0.20	0.00	0.26	0.02	0.11	0.06	-0.12	0.43

Table 4.6 (cont.)

High vs. Low Rated Corp Bond Yield Spread	Junk Bonds vs. Low Rated Corp Yield Spread	Correl of Stock & Treasury Bond Return	VIX	Ind. Volatil of Bank Stock Prices	Dispersion of Return on Bank Stocks	Trading Volume	Real Exch Rate Change, Squared	average correl	rank	
0.28	-0.28	0.30	0.18	0.13	-0.11	-0.01	0.09	0.23	6	(Hhld inc. - int. Exp - hhld curr. Liabil.) / hhld inc. *
0.29	-0.67	0.23	0.34	0.29	0.18	0.32	0.20	0.23	7	Change in Debt/GDP #
0.29	-0.25	0.19	0.20	0.06	0.15	0.02	0.00	0.05	14	(Change in change in debt/GDP)^2
0.74	-0.48	0.16	0.67	0.48	0.08	0.33	0.26	0.26	2	(Fims' EBIT - int. Exp - curr. Liab.) / Firms' EBIT #
-0.22	-0.08	-0.23	0.16	0.11	0.10	0.07	0.02	-0.03	16	ST debt + int. Exp - Inc. / Outs. Debt [non-financ.]
0.37	-0.39	0.31	0.32	0.22	-0.06	0.07	0.11	0.26	3	Gov. Securites / Financials' ST liabil. #
-0.49	-0.09	0.30	-0.28	0.07	-0.03	0.18	0.06	0.08	13	Outst. REPO
-0.43	0.30	0.11	-0.06	-0.06	-0.28	0.05	-0.12	0.05	15	Str. Of Yield Curve
-0.02	-0.40	-0.04	0.47	0.60	0.20	0.41	0.43	0.23	5	LIBOR vs. T-bill Spread #
1.00	-0.51	0.05	0.66	0.41	0.17	0.22	0.32	0.18	9	High vs. Low Rated Corp Bond Yield Spread #
-0.51	1.00	0.00	-0.68	-0.68	-0.31	-0.51	-0.57	-0.27	17	Junk Bonds vs. Low Rated Corp Yield Spread
0.05	0.00	1.00	-0.02	-0.07	-0.01	-0.11	-0.18	0.12	11	Correl of Stock & Treasury Bond Return #
0.66	-0.68	-0.02	1.00	0.56	0.13	0.48	0.50	0.27	1	VIX #
0.41	-0.68	-0.07	0.56	1.00	0.27	0.71	0.26	0.26	4	Ind. Volatil of Bank Stock Prices #
0.17	-0.31	-0.01	0.13	0.27	1.00	0.23	0.07	0.10	12	Dispersion of Return on Bank Stocks
0.22	-0.51	-0.11	0.48	0.71	0.23	1.00	0.09	0.21	8	Trading Volume #
0.32	-0.57	-0.18	0.50	0.26	0.07	0.09	1.00	0.15	10	Real Exch Rate Change, Squared #

* high correlation with securities of central gov / financial short term liabilities so it is skipped

4.1.4 The indices

Tables 4.7 – 4.8 show the weight of the indicators in the relevant indices.

Table 4.7 The weights of inputs in the relevant indices, United Kingdom

	ST 10	ST 8		LT 10	LT 9
(Ch. in ch. in debt/GDP)^2	0.055		Debt / GDP	0.124	0.134
(Firm's EBIT - int. Exp - curr. Liab. / Firms' EBIT	0.117	0.136	Change in Debt/GDP	0.054	
ST debt + int. Exp. - inc. / Outst. Debt [non-fin.]	0.113	0.134	Net Ext Debt / GDP	0.088	0.093
Prot. Assets / Debt of Financ.	0.050	0.056	NX / GDP	0.114	0.120
LIBOR, T Bills spr.	0.111	0.133	Int. Rat. on Net For Assts + NX / GDP	0.055	0.057
High Rat. & Low. Rat. Corp. Bonds Yield Spr.	0.025		Nonfin. Leverage	0.124	0.136
VIX	0.088	0.105	Nonfin. Profitability	0.128	0.138
Ind. Volatility of Bank Stocks	0.108	0.126	Fin. Profitability	0.073	0.078
Disp. Of Bank Stock Return	0.118	0.141	Nonfin ROA - Int.cost	0.080	0.090
Real Exch. Rate Ch. (Sqrd)	0.108	0.127	Pr. Gains	0.079	0.089

Table 4.8 The weights of inputs in the relevant indices, United States

	ST 10	ST 7		LT 10	LT 8
Change in Debt/GDP	0.089	0.120	Debt / GDP	0.122	0.161
(Fims' EBIT - int. Exp - curr. Liab.) / Firms' EBIT	0.126	0.178	Ch. in Debt/GDP	0.134	0.142
Gov. Securites / Financials' ST liabil.	0.101	0.145	(Ch. in ch. in debt/GDP)^2	0.073	0.097
LIBOR vs. T-bill Spread	0.067	0.072	Net Ext Debt / Exports	0.126	0.149
High vs. Low Rated Corp Bond Yield Spread	0.113	0.158	NX / GDP	0.118	0.128
Correl of Stock & Treasury Bond Return	0.016		Leverage [non-fin.]	0.027	
VIX	0.113	0.146	Prof.bility [non-fin.]	0.052	0.043
Ind. Volatil of Bank Stock Prices	0.095	0.121	Prof.bility [fin.comp.]	0.073	0.084
Trading Volume	0.059		GDP / AD	0.063	
Real Exch Rate Change, Squared	0.079		CF Gov. Saf. Net	0.074	0.101

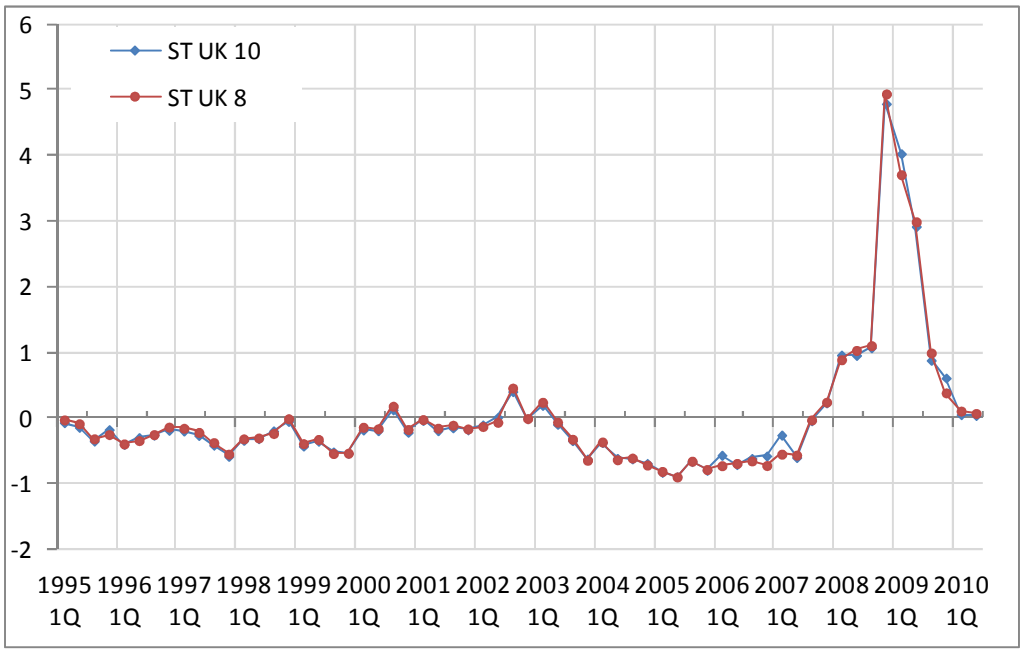
Notice that the inputs are both symptoms of financial instability (such as the spread between LIBOR and T-bills) and causation of financial instability (such as debt/GDP). This follows Minsky's FIH: he emphasised that high credit to income ratio would be the initiator of financial instability and he pointed out that interest rate increases would be the symptom of the problem getting very serious. The LIBOR/T-bill spread is but one measurement of this seriousness brewing. A high VIX value is another: it signals a sell-off on equity markets, i.e. that the speculative and the Ponzi borrowers are liquidating their positions.[104]

[104] This compares to other potential measures to follow financial instability, such as Werner's (2005) Quantity Theory of Credit which focuses only on credit and its allocation. Using the QTC rather than the FIH to construct the financial instability indices will not be done here. Following *lex parsimonie* Werner's Quantity Theory of Credit may be simpler than Minsky's FIH and therefore to be favoured. But to follow *lex persimonie*, we would have to create "a competition" between the FIH and the QTC to see which one of them is "better" or if they are equally as good when measuring short term and long term financial instability. That has never been done and is considered outside the scope of this text. Furthermore, the QTC has not been shown to meet the criticism of Blatt (1983) regarding being an economic model that is "essentially dynamic". The FIH, however, has been shown to meet that criticism, see Box 2. Therefore, it is deemed valid to focus on creating the indices using the FIH rather than the QTC.

The indices can be graphed using the available data, see the following figures. “ST 7” stands for 7 inputs in that index – see sections 4.1.2 and 4.1.3 for further discussion on the methodology of choosing the inputs in the indices. This is the reformed index as are ST 8, LT 9 and LT 8. The weights of all the inputs in those indices are significant at the 95% level (i.e. we can reject, with 95% certainty, the null hypothesis that the weights are, individually, equal to zero) and those are the indices that are used here to represent the financial stability measure in the regressions; ST 10 or LT 10 are never used in the regression analysis with FDI data.

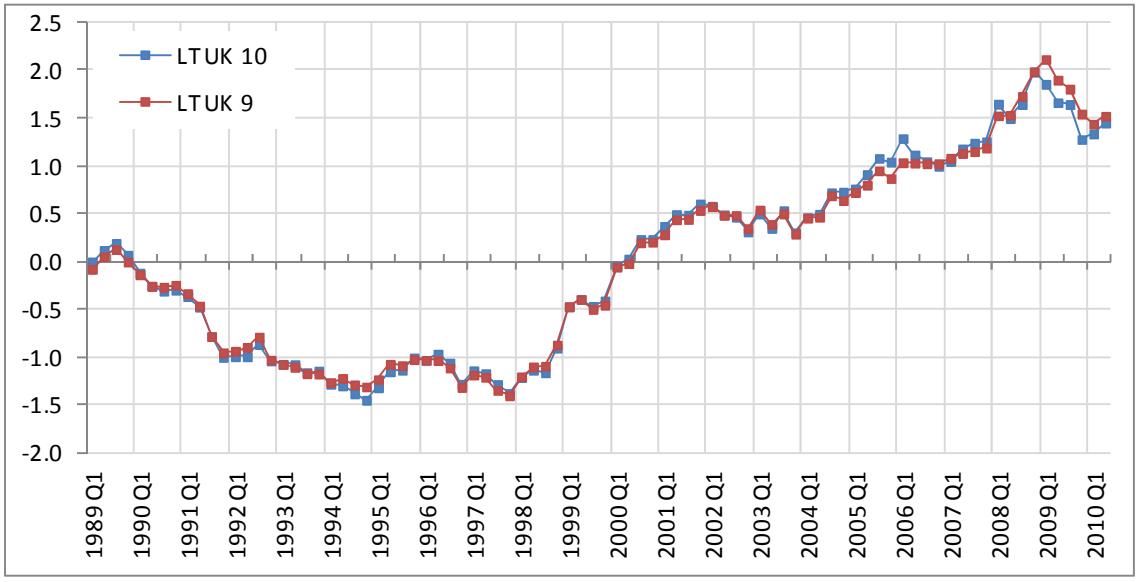
However, despite omitting up to three inputs, we can see that it does not make much difference on the value of the index, implying that we do not lose much information even if we cut down the number of indicators. This signals that not many indicators are necessary to give us much information about the status of financial stability in the economy. Figures 4.1 – 4.8 compare the indices.

Figure 4.1 The Short Term Financial Instability indices for United Kingdom



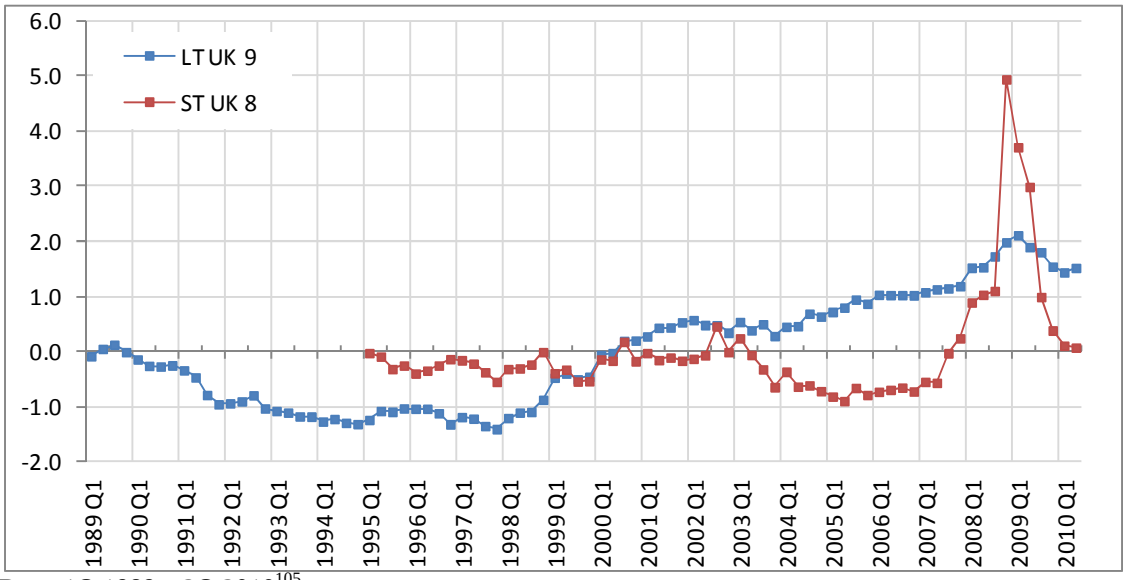
Data: 1Q 1995 – 2Q 2010

Figure 4.2 The Long Term Financial Instability indices for United Kingdom



Data: 1Q 1989 – 2Q 2010

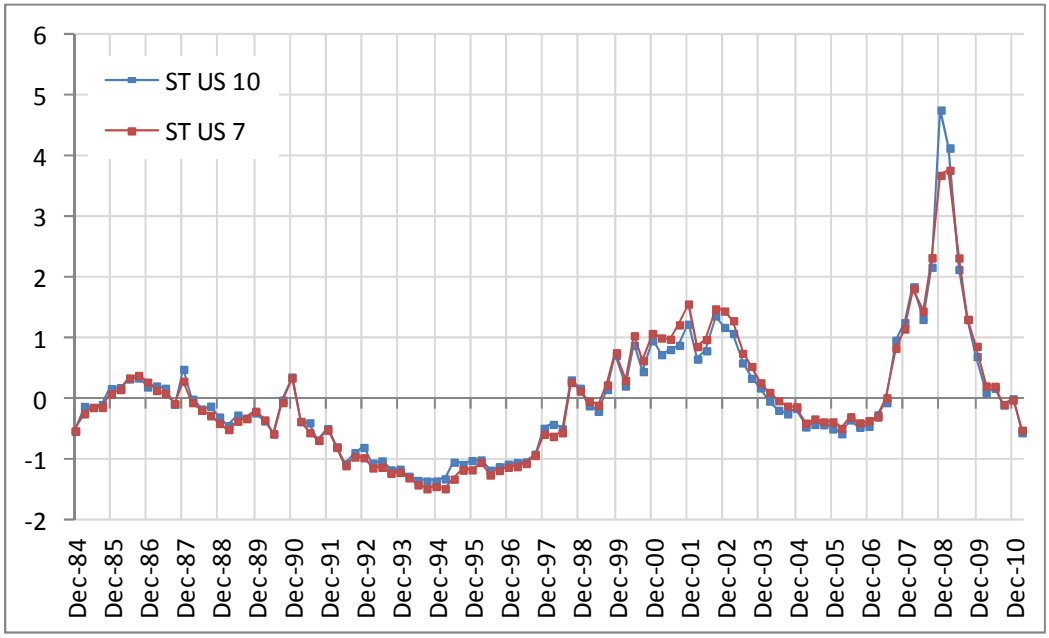
Figure 4.3 Short Term and Long Term Financial Instability indices UK



Data: 1Q 1989 – 2Q 2010[105]

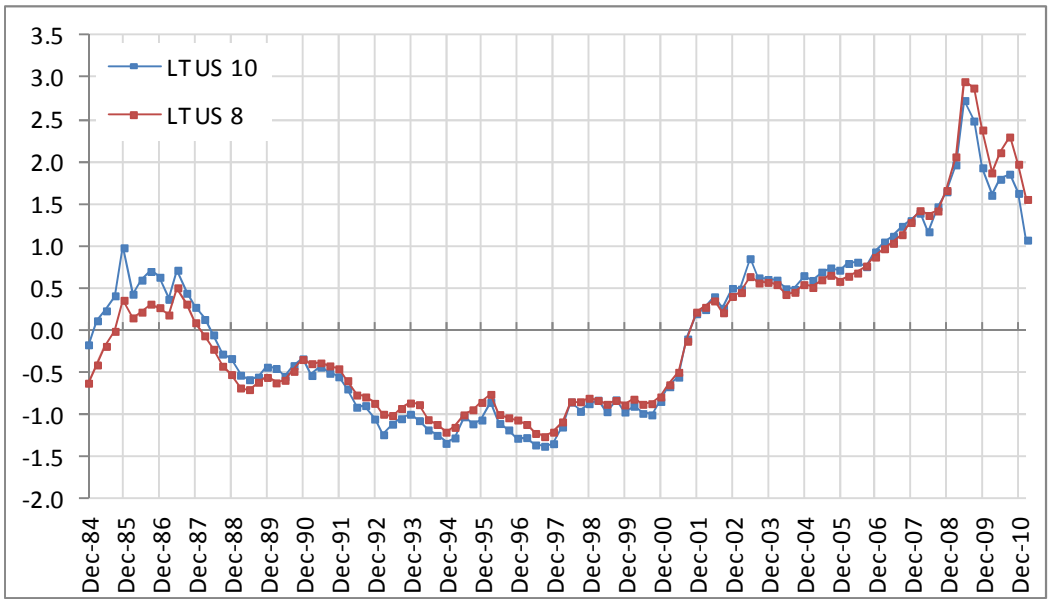
[105] A comment is in order on the big difference between LT and ST in figure 4.3 (the kernel of this comment also applies to figure 4.6). We can see that there is a big difference in the value of the two indices. We should however be careful in drawing interpretations from this difference. The biggest difference is in 4Q 2008, which is of course the height of the crisis period (since October 2008 is in 4Q 2008). The drop in ST in 1Q and 2Q 2009 shows how markets stabilized gradually as the crisis receded. The huge drop in 3Q2009 represents how markets had improved by then, showed e.g. by smaller spreads in credit markets and a rebound on the equity market. At the same time, only a small improvement was made on the long-term scale, such as in non-financials' leverage. Interpreting the difference between LT and ST is therefore not a straightforward matter. After all, LT and ST are not focusing on the same things anyway.

Figure 4.4 Short Term Financial Instability indices for the United States.



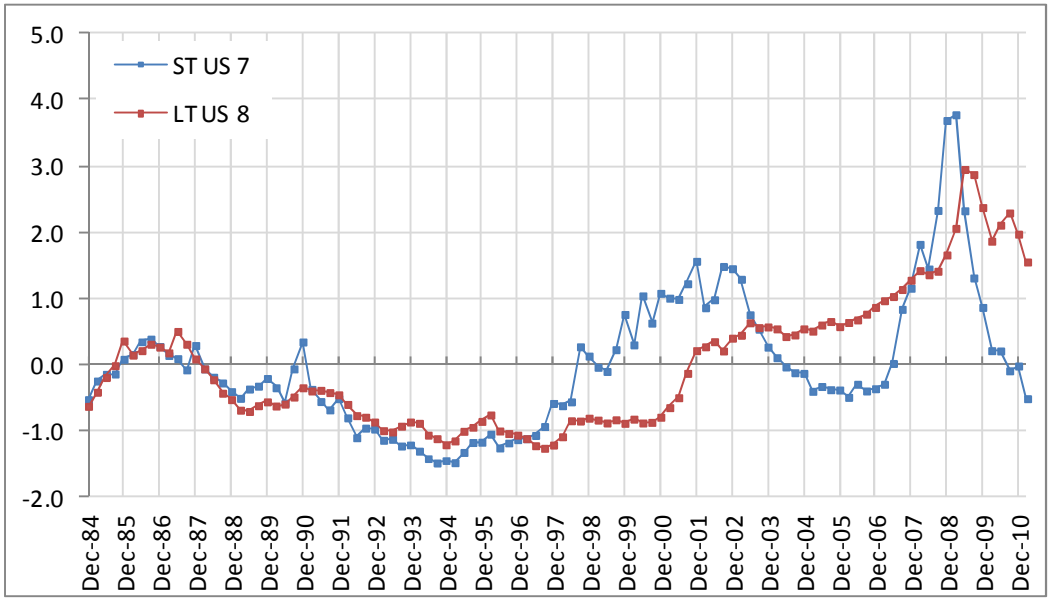
Data: 4Q 1984 – 1Q 2011

Figure 4.5 Long Term Financial Instability indices for the United States.



Data: 4Q 1984 – 1Q 2011

Figure 4.6 Short Term and Long Term Financial Instability indices for US



Data: 4Q 1984 – 1Q 2011

4.1.5 Do the indices tell us anything useful?

Now that we have seen the indices it is worth pondering their usefulness. First, let's see how major events register on the indices (figures 4.7 and 4.8).

Figure 4.7 Short Term Financial Instability in UK and US and notable news

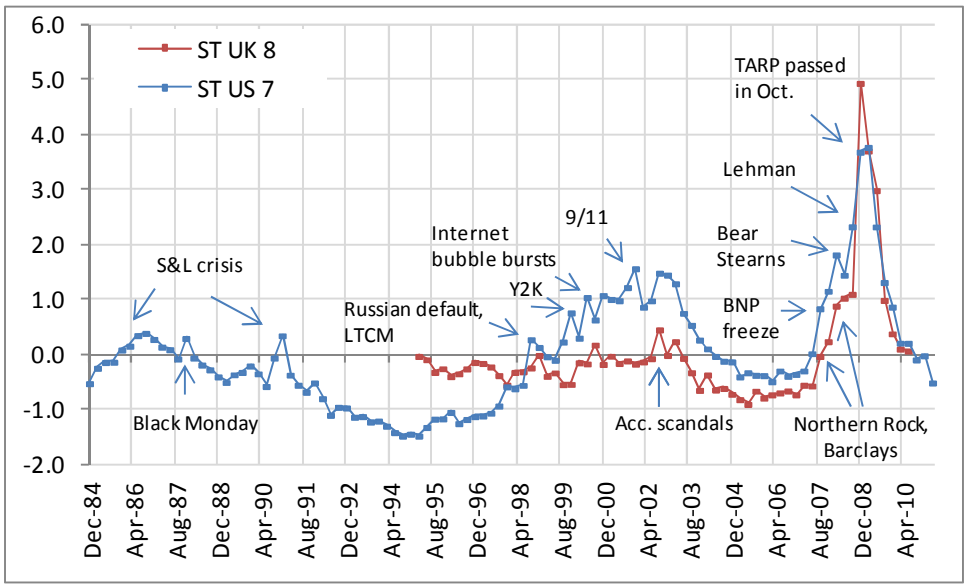
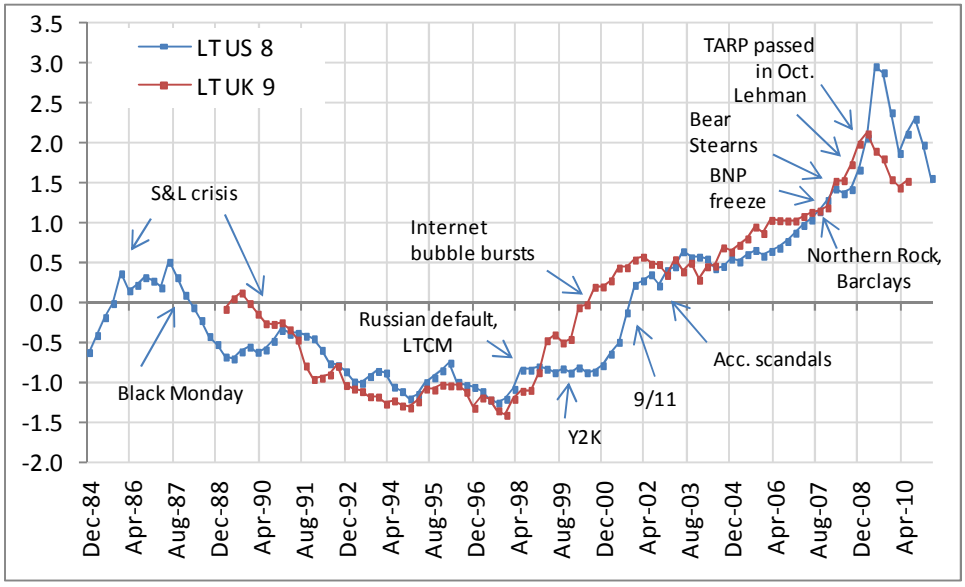


Figure 4.8 Long Term Financial Instability in the UK and US and notable news



We can see that most notable events in the financial press for the last 20 years or so register on the indices, in particular the short term indices. The reason why the long term index is not fluctuating as much during those events is that it, more than the short term index, focuses on the fundamental financial structure of the economy. The short term index includes “panic” factors that grasp the phases of sell-off and the scramble for emergency cash during episodes of extreme financial stress. The long term index does not. Therefore, we should expect the short term index to fluctuate more than the long term index, as it does.

A note is worth highlighting here. As we can see, the extreme values of the indices is in 4Q 2008. This might seem strange as the Trouble Asset Relief Program, TARP, was passed in early October 2008. The TARP calmed markets down after the collapse of Lehman Brothers the month before. Therefore, it may seem strange that the indices top in 4Q 2008 when it seems like the height of the instability was in September 2008.

The explanation for this is simple. The reason why the indices top in 4Q 2008 is that, although markets calmed down after TARP was passed in October 2008, the extreme instability before that heaves the whole quarter’s value up, creating the spike in the index despite the (relative) calmness of the second part of it.

Also, the instability was far from over although the TARP had been passed.

Another way of presenting the data is on a quarterly differential basis. Figures 4.9 and 4.10 show the quarter-over-quarter change in the value of the short term indices for the UK and the US respectively.

Figure 4.9 QoQ change in Short Term Financial Instability, UK

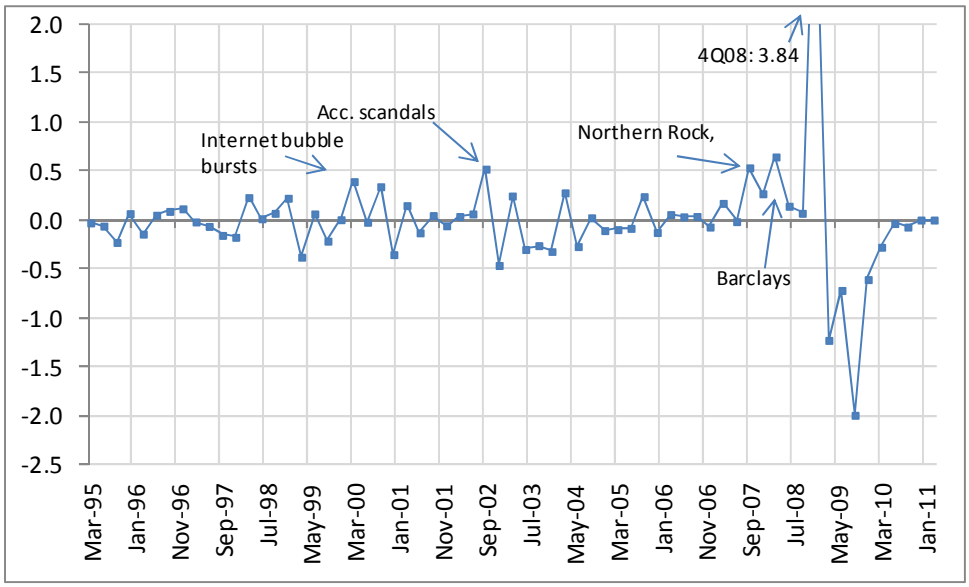
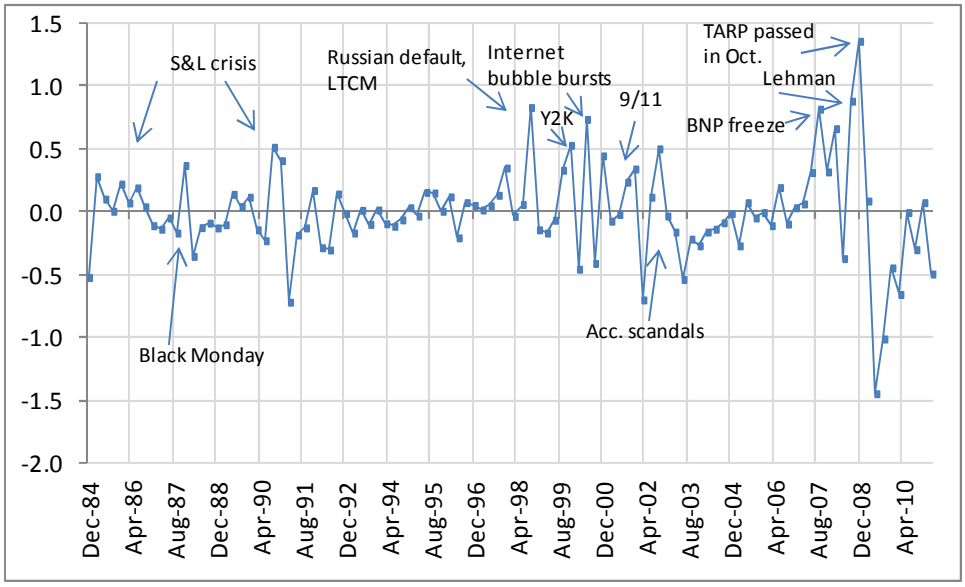


Figure 4.10 QoQ change in Short Term Financial Instability, US



Now, numerous issues should be highlighted as we look at figures 4.7-4.10.

First, notice that the strain of notable events does not seem to be identical in the US and the UK. As an example, the Russian default and the LTCM crisis in 1998 is much more stressful in the US than it is in the UK. This is expected: LTCM was an American firm. Another example of similar non-identical strains

from events is the burst of tech stocks in 2000 and the 9/11 terrorist attacks. With this in mind it is interesting to look at the development of the indices in late summer of 2007. In the US, BNP Paribas froze its securities accounts in August 2007. Around the same time, Bear Stearns was running into liquidity problems (Donnelley, 2008). In the UK, Northern Rock sought assistance from the Bank of England in September 2007 (which puts it in the same quarter as the BNP freeze), only a few days after Barclays asked for similar assistance from the Bank. Those events register as a notable increase in the short term financial instability index. Another similar parallel chain of events can be found in the first quarter of 2008 when Northern Rock was finally nationalised (February) and when Bear Stearns went bankrupt (March). Bear Stearns had offices in London.

So events of what could be called episodes of "notable" financial instability register on the short term index. The same cannot be said about the long term index. This is to be expected as explained above: the long term index is not designed in any way to grasp the panic phase of financial instability but rather to focus, as much as possible, on the underlying fundamentals of financial structures. The construction of those financial structures can, possibly, lead to cash flow problems and panic phases which are more focused on by the short term index. The lack of fluctuations in the long term index is therefore not surprising.

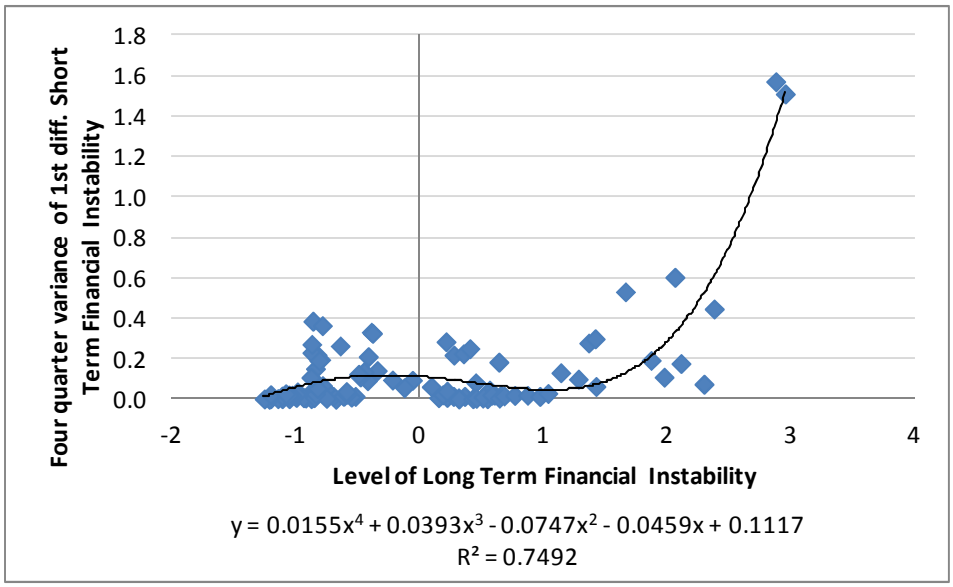
This implies that there should be some positive correlation between a high value of the long term index and bursts in the short term index.[106] The reason is clear: a high value of the long term index signals fundamental financial structures that are more fragile and more susceptible for "It" – i.e. a crisis episode – to take place. Or to use Fazzari's (2014) parable: a high value of the long term index means that "a lot of weight has been put on each side of the bar", i.e. financial structures – the bar – have been stretched and put to the test. Due to this the fragility of the bar, i.e. its vulnerability, has increased. The risk of the bar actually breaking – i.e. of "It" happening" as Minsky referred to a crisis event – is therefore higher. For that reason, seeing a correlation between "the increased weight on the bar" (a high value on the long term index) and the

[106] The mean of the short term index is still unchanged since the index has, by design, a mean of zero over the whole time period that is used to construct the index.

actual occurrence of the bar breaking (a burst in the short term index) is exactly what should be expected following Minsky's FIH.[107]

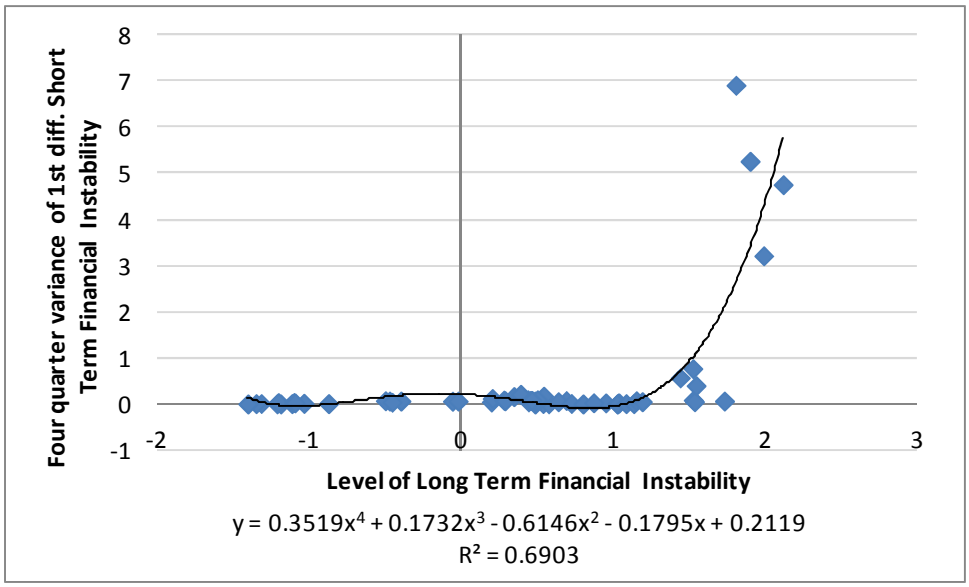
This is indeed so. Figures 4.11 and 4.12 show that a positive and complicated non-linear relationship is in place between the level of long term financial instability and the variation of short term financial instability. The relationship is best (highest R^2) described with a quadratic polynomial, included on figures 4.11 and 4.12. This relationship is not investigated further here but merely pointed out to strengthen the claim that the indices are properly designed and according to Minsky's FIH.

Figure 4.11 Long Term Financial Instability and four-quarter variance in Short Term Financial Instability (US)



[107] A parallel can be drawn here with geology. Seismic risk analysis (a pioneering paper on the topic is Cornell (1968)) attempts to measure the amount of stress, i.e. fragility, in the earth's crust to give an early warning of an earthquake taking place, its size, depth, velocity and even, to some extent, time. As expected, the higher the stress in the earth's crust, the higher the likelihood of a (severe) earthquake to take place. The Long Term Financial Instability index is them measuring the "tension" in the "crust" (the economy) compared to how it has been historically. It does not give us an exact estimate on *when* a crisis may take place, only, if its value goes up, that the risk of a crisis happening is higher than it was before. The Short Term Financial Instability index is, in the meanwhile, the severity of the "earthquake" itself. And, naturally, more "tension" (higher long term instability) means more severe and/or more frequent "earthquakes".

Figure 4.12 Long Term Financial Instability and four-quarter variance in Short Term Financial Instability (UK)



We have, however, still not argued for the usefulness of the indices. Can they e.g. tell us that things are unstable before major financial institutions go bankrupt?

From a strictly quantitative point of view: no, they cannot! And for good reasons. First of all, the indices do not act as a strict Early Warning Indicator as that is not their purpose. This should be clear for the short term index, which mainly tracks recent developments, but it also applies to the long term index. In order for the indices to be considered EWIs, which, given a certain threshold, provide the researcher with a “yes” or “no” answer when asked “is a crisis coming?”, it must give a quantitative answer to that question, even if it is only “1” or “0” as in the case of some EWIs (some EWIs give a probability estimate, rather than a “yes” or “no” answer (M. Goldstein et al., 2000)).

Neither of the indices does this. The short term index focuses on immediate developments in comparison to how they looked like in the past. The long term index is similar; it compares the current underlying financial structures to those of the past, given the indicators that are used to construct it. This is not to be interpreted as a “yes” or “no” signal about an upcoming crisis, but merely as a signal of the financial structure of the economy being different than it was in the past.

As an example, a high value of the long term index does not tell us that a crisis *is* coming, with so and so much probability or confidence behind such a forecast, but merely tells us that the financial structure of the economy has become more fragile than it was in the past. Yes, we can, intuitively, expect that a high value of the long term index would coincide with more fluctuations in the markets, hence the correlation of a high value of the long term index and the variations in the short term index (see figures 4.11 and 4.12). But the value of the long term index is not to be interpreted as a *quantitative* probability value of an oncoming crisis nor is it a warning of a crisis coming within a specific time period as EWIs signal. The indices are a *comparison* between the current and past states of financial stability.

Second, the indices can tell us different information from EWIs, exactly because they are a continuous measure of the developments of the economy. As an example, a system of EWIs can signal “a red light” or a certain (high) probability of a crisis on, say, 5 out of 25 crisis indicators at time t=0 and 4 out of 25 indicators at t=1. This could give the impression that the level of financial stability in the economy has improved. However, if we would construct an index out of those indicators and graph the development between periods, we could, possibly, see that in t=1 the financial stability had worsened compared to t=0.

How could this be? The reason is simple. EWIs will signal, rightfully or wrongfully so (they are subject to Type 1 and Type 2 errors), a certain probability of a crisis happening within a certain time period. EWIs, based on a “colour system” instead of a “probability system”, can signal a “red light” if the relevant indicator just crosses the predetermined threshold that draws the line between “red” and “green” lights (or “yellow”, or however many thresholds or “danger levels” are defined).

Now, assume that between t=0 and t=1, one of the indicators crosses back into “green” status, or it can signal a lower probability of a crisis happening in a probability system. Meanwhile, the rest of the indicators can worsen. If we are dealing with a colour system, they can stay within the same colour band even if they signal a different and a higher probability of a crisis taking place. In that case we have a situation where one of the indicators “turned green” while the

others stayed the same colour, despite a higher probability estimate. This signals an improvement, exactly the opposite of what could be the truth.

If we have a probability system, we have the problem that even if one of the indicators improves and some others deteriorate, we still do not know how much the situation has actually changed in comparison to other periods. The reason for this is that some indicators are more important than others for the economy. So what are the cumulative effects of the changes in the indicators? How much has the situation actually changed, compared to the past?

An index answers those questions. An index that is constructed out of the indicators in question could catch the development and could, contrary to a "colour system" EWIs, signal that financial stability had actually deteriorated between t=0 and t=1.[108] It could also, contrary to the "probability system" EWIs give us information on how much the situation has changed, overall (and not just focusing on some indicators, possibly not so important) compared to the past. An index can give us a system-wide *ranking order* of periods based on the probabilities of a crisis happening: a high value of an index would tell us that, relative to other periods with lower values of the index, there is a higher probability of a crisis taking place in that high-value time period compared to other low-value periods. Note that we do not *know* the probability of a crisis coming nor are we even trying to estimate it with the index. We only know that it would be higher than it was in the past: the indices are not designed to give us a formal quantitative probability value or a time window of when a crisis could/would hit, but merely a relative financial-stability comparison to other past periods, as has already been stressed.

Finally, regarding the usefulness of the indices, we should remember that the failure of a single, or multiple, financial institutions, major or not, is not, strictly, the same as a financial crisis. A bank, or any financial institution, can go bankrupt without any significant changes or disruptions in the markets. Likewise, we can have instability in the market without any financial institutions going bankrupt. Therefore, a high value in a financial instability index does not necessarily mean that there are many bankruptcies at the same time. In other

[108] This example is inspired by M. Goldstein et al. (2000), especially page 16.

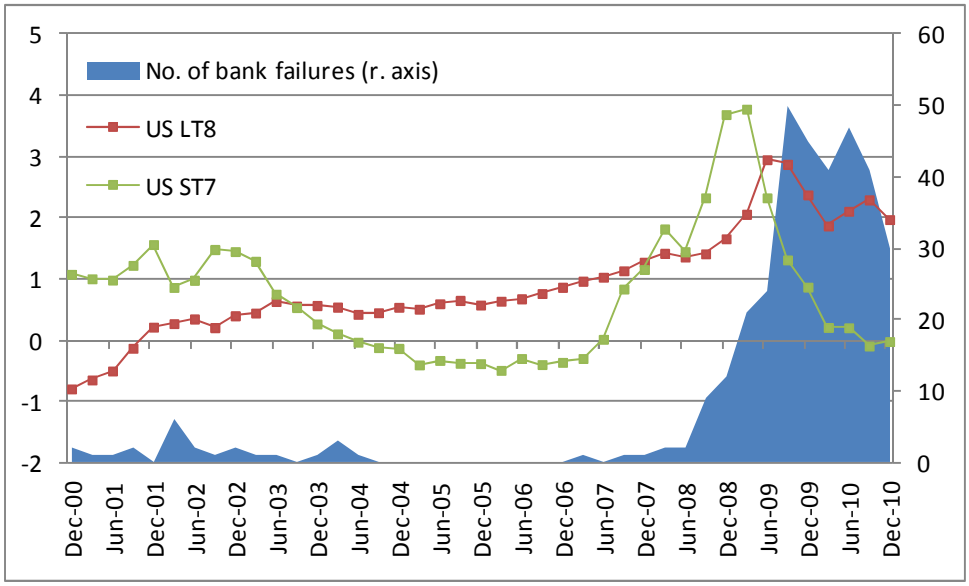
words, there does not need to be any close correlation at all between the two variables.

To underline this point we should first of all remember the words of Issing (2003, italics added), discussed in *3.1.1. Defining financial stability*:

> [F]inancial stability [is] the prevalence of a financial system, which is able to ensure in a lasting way, and without major disruptions, an efficient allocation of savings to investment opportunities... *Due to the focus on the resilience of the financial system [the definition] would not classify each individual bank failure or each large swing in an asset price as proof of financial instability*.

Figure 4.13 shows clearly how we can have a high value of financial instability, according to the indices, while bank failures are not of the same pedigree. Likewise, relative financial stability can be in place although bank failures are many, underlining Issing's words in italics. In other words, bank failures, handled in an organised way, need not be a financial crisis, nor do bank failures need to be many during what could be called a financial crisis.[109]

Figure 4.13 US bank failures and the financial instability indices



[109] The Federal Deposit Insurance Corporation (FDIC) in the US has the role of stepping in when commercial banks fail. The FDIC describes its purpose as following (Federal Deposit Insurance Corporation, 2014): "The Federal Deposit Insurance Corporation (FDIC) is an independent agency created by the Congress to maintain stability and public confidence in the nation's financial system by... managing receiverships." That is to say, the FDIC's purpose is to make sure that banks are liquidated in an orderly manner, and thereby "maintain stability and public confidence" in the financial system.

The indices give us an insight into the state of financial stability in comparison to the past, resting on Minsky's FIH. The short term index in particular gives us valuable information about the seriousness of recent (how recent rests mainly on the delay of necessary data) bursts and changes in financial instability that can, possibly, aid policy makers in reacting before the problem gets even worse. The comparison to the past is valuable in this perspective for policy makers can then better estimate how serious reaction is needed, and compare them to interventions in the past during then-current instability episodes. This can also help market participants in understanding the state of financial stability in the economy and compare it to past episodes. The long term index provides us with information that we can use to understand the sturdiness of financial structures in the economy, compared to how they have been in the past. By providing us with this information it, intuitively, gives us an informal guidance on how vary we should be when we evaluate the state of financial stability for the short term, hence the relationship between the level of long term financial instability and variations in the short term financial instability. This can complement formal EWIs if they are put to use in the first place, especially as they may grasp developments that EWIs do not – see previous discussion. Furthermore, the indices help us to evaluate the gradations in financial instability, as Chant (2003) described one of its characteristics, and can either complement or substitute EWIs on this front since, as previously discussed in this section, "either/or" EWIs do not grasp gradual changes in financial stability in the same way as the indices here developed.

4.1.6 The FDI data and the necessary changes to the indices

The data on Foreign Direct Investment comes from the Organisation of Economic Co-Development, OECD. The data is always represented as a share of Gross Domestic Product, never as an absolute amount. The FDI data (total FDI and financial FDI, stocks, flows, inward and outward) are on an annual basis and cover the time period 1987 – 2008 in the case of United Kingdom but 1985 – 2009 for the United States. [110]

[110] Note for figures 4.14-4.17. Abbreviations are as follows: OFF: Outward Financial Flow, IFF: Inward Financial Flow, OF: Total Outward Flow, IF: Total Inward Flow, OFS: Outward Financial stock, IFS: Inward Financial Stock, OF: Total Outward Stock, IF: Total Inward Stock.

Figure 4.14 UK Inward FDI Data (% of GDP)

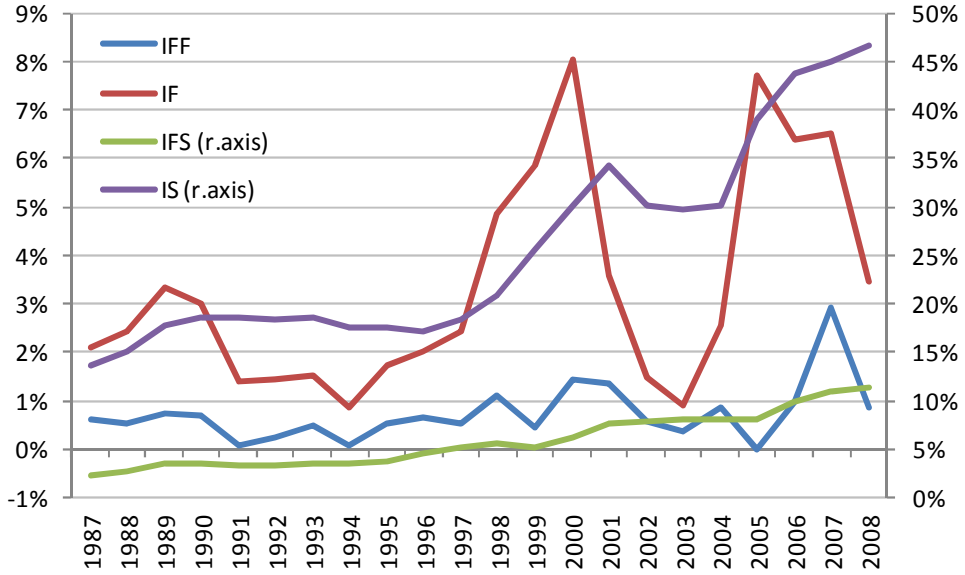


Figure 4.15 UK Outward FDI Data (% of GDP)

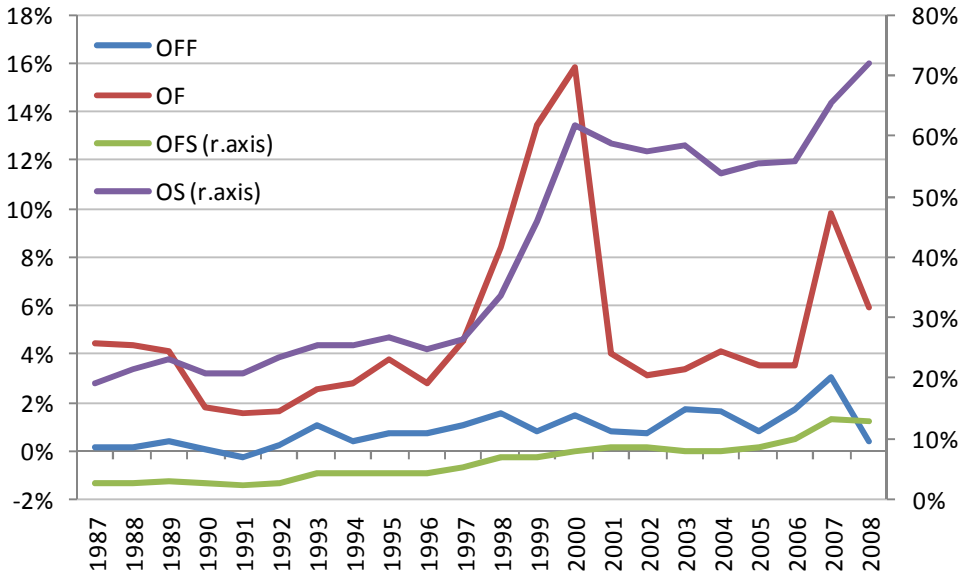


Figure 4.16 US Inward FDI Data (% of GDP)

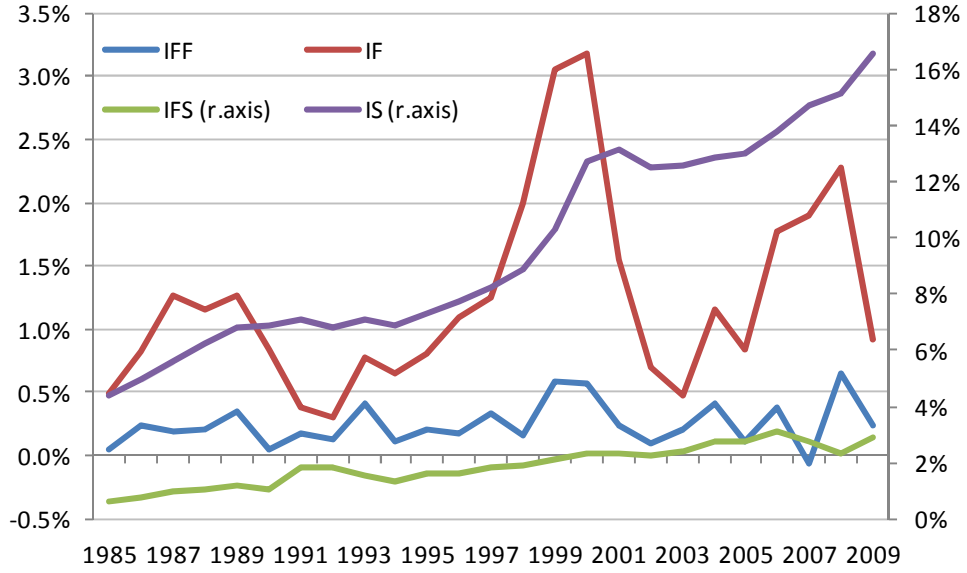
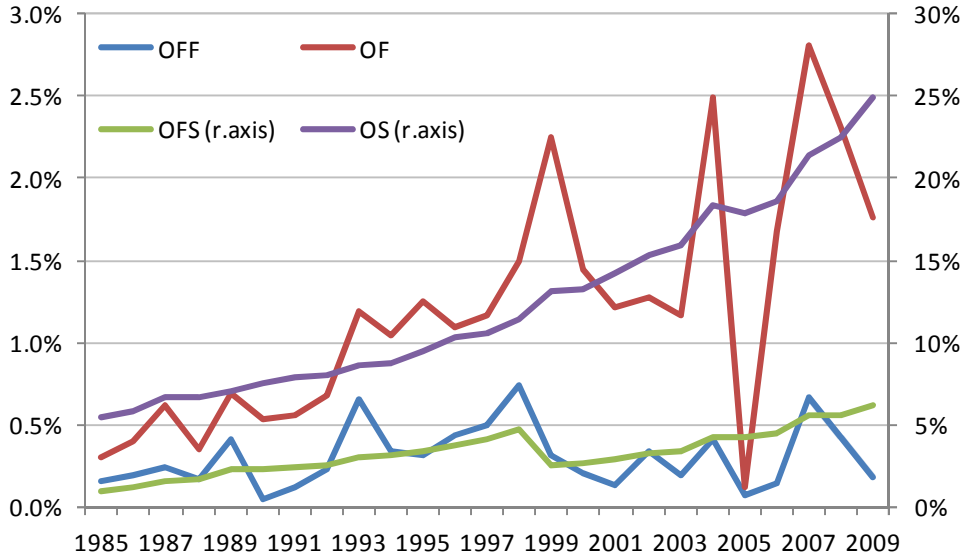


Figure 4.17 US Outward FDI Data (% of GDP)



Since the FDI data are on an annual basis, a data transformation was needed on the data on financial instability since they are on a quarterly basis. The transformation was simple: the annual data was compiled by averaging, over each year, the quarterly data for financial instability. This is similar to what Cardarelli, Elekdag, and Lall (2011) did, except they had monthly index-outputs which they averaged over quarters to facilitate comparisons with quarterly macro figures. In our case, we have quarterly-outputs which we average over years. That way, annual data for financial instability, covering the time period 1989 – 2009 (long term instability, United Kingdom), 1995 – 2009 (short term

instability, United Kingdom) and 1985 – 2010 (long term and short term instability, United States), were regressed against the annual data of FDI.

The regressions and the causation effects were estimated with Granger-causality, i.e. with Vector Autoregression, VAR, models of either one or two lags. The VAR model is a common-practice model to estimate causality, at least of statistical rather than purely actual nature, between economic factors. The usual warnings of "causality" in the Granger model should be remembered: although the word "causality" is used the Granger-causality test is more about forecasting variable Y with variable X. The direction of the 'causation' is also probed into in the model, i.e. do past values of X forecast current values of Y, the other way around, or even both (a feedback).

A general representation of a VAR(p) model is:

$$y_t = A_1 y_{t-1} + A_2 y_{t-2} + \cdots + A_p y_{t-p} + B x_t + \epsilon_t$$

where all "y" are a k x 1 vectors, all "A" and "B" are k x k vectors, "x" is a k x 1 vector of external variables – including the possibility of a time trend – and ϵ_ta k x 1 vector of white noise.

In order to get strong Granger-causality estimations, the VAR regressions must preferably be done on stationary samples, i.e. I(0) samples. The samples can also be I(1), i.e. non-stationary, and cointegrated . Tables 4.9 and 4.10 show P-values of Augmented Dickey Fuller tests, looking for stationarity in the variables. The null hypothesis is that the variable is non-stationary. So if the p-value is lower than 0.05 we can reject the null-hypothesis and conclude that the variable is stationary, i.e. an I(0) process.

Table 4.9 ADF tests for non-stationarity on the quarterly data

P-Values from Augmented Dickey Fuller Tests, quarterly data (1 lag)

Each ADF test is done with a constant. The lower p-value is with trend as well.

	United Kingdom	United States
Short term instability	0.113	0.172
	0.214	0.286
Long term instability	0.961	0.860
	0.228	0.790
1st diff. ST instability	0.000	0.000
	0.000	0.000
1st diff. LT instability	0.000	0.000
	0.000	0.000

Table 4.10 ADF tests on annual data (one lag)

	United Kingdom	United States
Short term instability	0.116	0.003
	0.607	0.004
Long term instability	0.873	0.945
	0.094	0.909
1st diff. ST instability	0.796	0.000
	0.948	0.010
1st diff. LT instability	0.100	0.041
	0.271	0.000
2nd diff. ST instability	0.252	
	0.350	
2nd diff. LT instability	0.002	
	0.008	
Outward Flow of Financial FDI	0.290	0.008
	0.000	0.051
Outward Flow of FDI	0.101	0.253
	0.241	0.002
Inward Flow of Financial FDI	0.063	0.032
	0.030	0.072
Inward Flow of FDI	0.059	0.031
	0.064	0.118
Outward Stock of Financial FDI	0.978	0.888
	0.158	0.708
Outward Stock of FDI	0.923	1.000
	0.176	1.000
Inward Stock of Financial FDI	0.995	0.640
	0.719	0.019
Inward Stock of FDI	0.959	0.978
	0.583	0.425
Outward Flow of Financial FDI, 1st diff	0.000	0.000
	0.000	0.000
Outward Flow of FDI, 1st diff	0.007	0.000
	0.047	0.000
Inward Flow of Financial FDI, 1 st diff	0.000	0.001
	0.000	0.007
Inward Flow of FDI, 1st diff	0.066	0.037
	0.267	0.167
Outward Stock of Financial FDI, 1st diff	0.031	0.009
	0.066	0.047
Outward Stock of FDI, 1st diff	0.101	0.219
	0.295	0.000
Inward Stock of Financial FDI, 1st diff	0.004	0.000
	0.000	0.001
Inward Stock of FDI, 1st diff	0.044	0.044
	0.050	0.121
Nominal GDP Growth	0.064	0.039
	0.036	0.011
Real GDP Growth	0.034	0.064
	0.153	0.123
Real GDP Growth, 1st diff.	0.000	0.001
	0.000	0.010

p-value in second line of each variable is ADF test with trend.

Tables 4.11 – 4.13 aggregate Engle-Granger tests on cointegration. The null hypothesis is that there is no cointegration. The p-values show there is no cointegration relationship in the quarterly data. Test was done with one lag. Only those variables that fail the ADF test are included as they are of course the only ones we can consider being I(1) variables. Very limited cointegration relationship is present in the data according to the Engle-Granger test.

Table 4.11 p-values from Engle-Granger tests on cointegration, quarterly data.

UK, quarterly data	ST instability	LT instability
ST instability	-	0.8843
LT instability		-

US, quarterly data	ST instability	LT instability
ST instability	-	0.7518
LT instability		-

Table 4.12 p-values from Engle-Granger tests on cointegration, annual data, UK.

UK, cointegration test. Annual data	ST instability	LT instability	1st diff. ST instability	1st diff. LT instability	Outward Flow of Financial FDI	Outward Flow of FDI	Inward Flow of Financial FDI	Inward Flow of FDI	Outward Stock of Financial FDI	Outward Stock of FDI	Inward Stock of Financial FDI	Inward Stock of FDI	Inward Flow of FDI, 1st diff.	Outward Stock of FDI, 1st diff.
ST instability	-	0.4209	0.3882	0.2530	0.6609	0.4485	0.3464	0.8457	0.2522	0.4870	0.2888	0.1876	0.2019	0.4101
LT instability		-	0.8419	0.9664	0.9645	0.9823	0.9534	0.9556	0.4320	0.5458	0.1902	0.1206	0.9260	0.9775
1st diff. ST instability			-	0.5082	0.9859	0.9795	0.9073	0.9740	0.7424	0.9357	0.8535	0.8374	0.9538	0.9620
1st diff. LT instability				-	0.2582	0.2408	0.2051	0.2365	**0.0250**	0.1088	**0.0281**	0.0916	0.5067	0.4508
Outward Flow of Financial FDI					-	0.2404	0.2564	0.0351	0.0007	0.0135	0.0114	0.0285	0.3360	0.3830
Outward Flow of FDI						-	0.0895	0.0560	0.1519	0.1903	0.1666	0.2127	0.1432	0.5966
Inward Flow of Financial FDI							-	0.0000	0.0088	0.0087	0.0157	0.0066	0.2907	0.0221
Inward Flow of FDI								-	0.0093	0.0134	0.0243	0.0893	0.0045	0.0194
Outward Stock of Financial FDI									-	0.1068	0.2998	0.2964	0.9906	0.9678
Outward Stock of FDI										-	0.1379	0.3833	0.9696	0.9601
Inward Stock of Financial FDI											-	0.0089	0.9955	0.9880
Inward Stock of FDI												-	0.9790	0.9825
Inward Flow of FDI, 1st diff.													-	0.2098
Outward Stock of FDI, 1st diff.														-

Table 4.13 p-values from Engle-Granger tests on cointegration using annual data on US.

US, cointegration test. Annual data.	LT instability	Outward Stock of Financial FDI	Outward Stock of FDI	Inward Stock of Financial FDI	Inward Stock of FDI	Real GDP Growth
LT instability	-	0.8685	0.6575	0.9094	0.7865	0.9542
Outward Stock of Financial FDI		-	0.3736	0.2942	0.3592	0.4950
Outward Stock of FDI			-	0.4035	0.4151	0.7916
Inward Stock of Financial FDI				-	0.0459	0.5664
Inward Stock of FDI					-	0.7542
Real GDP Growth						-

The null hypothesis in no cointegration. Test was done with one lag.

As the ADF tests show, there seems to be a structural deficiency in the UK short term data in the sense that the first difference of the series for short term instability in the UK seems not only to be non-stationary but even more strongly so than the original series themselves. This implies an I(2) structure, or above. In the meanwhile, both the original short term data and the first difference of the short term series in the case of US seem to be stationary.

This is at least partially dealt with by checking for autocorrelation (Ljung-Box autocorrelation test) and cointegration. The first difference of long term instability in the UK, which failed the ADF test (it is an I(1) process), does have a cointegration relationship with Outward Stock of Financial FDI and Inward Stock of Financial FDI, which are also unit-root I(1) processes. Regressions with those variables are therefore included and there is indeed positive and statistically significant Granger-causality from Outward Stock of Financial FDI on the first difference of long term financial instability, see table 4.14 below. However, other cointegration tests which include either long term or short term financial instability in the UK do not reject the null hypothesis of no cointegration. They are therefore not included.

In general, the data for US seem to be better constructed (e.g. fewer unit roots in the series). The reason is perhaps partly the fact that the annual series for UK ST stability only stretch over 15 years (1995 – 2009) while the availability is 26 years (1985 – 2010) in the case of US. In the case of FDI data, the data availability stretches from 1987 to 2008 in the case of UK but 1985 to 2010 for US.

The lack of data can therefore play an important part in making the UK figures not as trustworthy as the ones for the US. The results of regressions using the UK figures are nonetheless shown *with the warning that their quality is limited*. So if the results using the UK figures are different from those arising from the US data, the latter is judged to be more trustworthy.

4.2 Results

4.2.1 Annual data

Tables 4.14 and 4.15 show VAR regressions with F-test for Granger-causality where the p-value of at least one of the VAR(n) regressions is 10% or lower

(null hypothesis: no Granger-causality, β=0 => reject H_0: β=0 at 90% confidence level). Remember that the financial instability indices measure increased instability if the value of the indices goes up between time periods.

Only the most notable Granger-causalities, based on p-values, will be presented in the following tables to save space. For more details on regressions, see Appendix 3 where numerous tables and results can be found. The form of the data representation in tables 4.14 and 4.15 is from Xiaming Liu et al. (2001).[111] Their method of not giving the numerical value of the coefficients, or the sums, in the Granger-causality regressions, but merely the sign of the coefficient, or their sums, is adopted here. The significance level (90%, 95% or 99%) is given as well. Please see Appendix 3 for numerical values and other comment on the results.

[111] Only I(0)-I(0) and cointgrated relationships are shown in tables 4.14 and 4.15. This automatically excludes all instances with UK short term financial instability since the series fails the stationarity test. The stars (*, **, ***) signal significance levels: 90%, 95%, 99% levels respectively. How to read the tables: the x variable in each line Granger-causes the y variable in the same line. If there is no y variable in that line it is the same as is in the line above, e.g. Nom. GDP Growth (table 4.14, line 6) Granger-causes Δ^2LT in the UK, see table 4.14. In that particular case, the causality effects are positive (+, the coefficient, or their sum, is positive) and significant at 95% (**) when estimated with both VAR(1) and VAR(2) models.

Table 4.14 Overview of the results, UK

	Variables		Lags		
Line	**y**	**x**	**1**	**2**	**Notes**
1	ΔLT	Outward Stock of Fin. FDI	+**	+***	Cointr.
2	Δ^2LT	ΔOutward Fin. Flow	+	+***	
3		ΔOutward Flow	+***	+***	
4		ΔInward Fin. Flow	+	+*	
5		ΔOutward Fin. Stock	+	+**	
6		Nom. GDP Growth	+**	+**	
7		Real GDP Growth	+	+***	
8	Inward Fin. Stock	ΔLT	+***	+**	Cointr.
9					
10	Other notable relationships:				
11	Inward Fin. Flow	Real GDP Growth	+**	+**	Line 22
12		Real GDP Growth - w.trend	+*	+	Line 23
13	ΔOutward Fin. Flow	Nom GDP Growth	-	-**	
14		Real GDP Growth	-	-***	
15	Outward Fin Flow	Nom. GDP Growth	-**	-*	Line 19
16	ΔOutward Fin. Stock	Nom. GDP Growth	-	-*	
17	ΔInward Stock	Real GDP Growth	+***	+**	
18		Real GDP Growth - w.trend	+**	+	
19	Nom GDP Growth	Outward Fin. Flow	-	-**	Line 15
20		Inward Fin. Flow	-***	-***	
21		ΔInward Fin. Flow	-	-**	
22	Real GDP Growth	Inward Fin. Flow	-***	-**	Line 11
23		Inward Fin. Flow - w.trend	-***	-**	Line 12

If we focus first on the UK data (table 4.14) we can highlight the following.

First, various FDI activities do not seem to have positive effects on long term financial stability in the UK (table 4.14, lines 1-5). In fact, none of them has positive effects on long term financial stability according to those results – remember that an increased value of the index signals deterioration in the level of financial stability. Remember, however, that we are using the second difference of long term financial stability in those regressions to avoid problems due to non-stationarity. Also, those results do not include time trend. If time trend was included, the relationship between those variables disappeared (not reported in table 4.14). This signals that there might be an exogenous factor, not included in the dataset, which influences the development of financial stability and FDI. Furthermore, interpreting the relationship between the second difference (the acceleration) of long term financial stability and other variables is a slippery slope. Generally, therefore, especially due to the general lesser

quality of data in the case of UK, compared to the US, we should be careful not to draw too strong conclusions from the results in lines 1-8, table 4.14.

The data in the lower half of table 4.14 (lines 11-20) do not suffer from any serious data problems however. We can more aggressively draw conclusions from them. The most stand-out result is, first of all, the relationship between the change in inward stock of FDI into the UK and real GDP growth (lines 17-18). The positive effects of GDP growth on inward stock of FDI holds whether a trend is included or not. The relationship can be explained simply by arguing that foreign firms are willing to strengthen their position in the UK in the wake of strong economic growth. This can be done either by reinvesting their earnings in the economy or adding to the investment from the home country, i.e. a flow. Both of which would increase the stock of inward FDI in the UK. However, the flow explanation may be less powerful since there seems to be no Granger-causality between GDP growth and inward FDI flow into the UK. Revaluations of existing assets in the wake of strong GDP growth can also be an explanation for the apparent relationship. Notice that inward FDI – stock or flow – does not affect GDP growth: the causal relationship seems to be one-way only.

Another relationship worth highlighting is the one between inward financial-FDI flow and real GDP growth (lines 11-12, 22-23). We can see that increased economic growth draws in financial-FDI into the UK. However, that financial-FDI inflow has negative effects on real economic growth. The relationship is in place whether we include a trend or not, signalling that no serious exogenous factors have a role in the relationship. This is contrary to the expectations that more FDI increases growth (see chapter 1 for discussion on the matter).

Another notable result is that increased growth has adverse effects on outward flow and stock of financial-FDI (lines 13-16). This supports the view that financial institutions in the UK are home-biased: if economic growth is good at home and plenty of business opportunities in place, why risk expanding outside the home market, which is better known than many other markets that the financial institutions may operate in? See Chapter 2, especially section *2.3.4 Contagion risks from financial-FDI* and the references therein, for further discussion on the home-bias of financial institutions.

Table 4.15 Overview of the results, US

Line	Variables y	Variables x	Lags 1	Lags 2	Notes	
1	ΔLT	Inward Fin Flow	+**	+***	No trend	
2		Inward Flow	+**	+***	No trend	
3		ΔInward Stock	+**	+**	No trend	
4		ST	+	+***	No trend	
5		ΔST	+***	+***	No trend	Line 12
6	ΔLT	ST	+	+***	With trend	
7		ΔST	+***	+***	With trend	Line 17
8		Nom GDP Growth	+	+**	With trend	
9	ΔST	Inward Flow	+**	+**	No trend	
10		ΔInward Flow	+**	+**	No trend	
11		ΔInward Stock	+**	+	No trend	
12		ΔLT	-**	-	No trend	Line 5
13		Nom GDP growth	+***	+**	No trend	Line 50
14		Δreal GDP growth	+*	+	No trend	Line 62
15	ΔST	Nom. GDP Growth	+***	+**	With trend	Line 52
16		Δreal GDP Growth	+*	+	With trend	Line 70
17		ΔLT	-***	-	With trend	Line 7
18	ST	Inward Fin Flow	-	+**	No trend	
19		Inward Flow	+***	+***	No trend	Line 30, 33 (~)
20		Δinward Flow	+*	+*	No trend	Line 39 (~)
21		Δinward Stock	+***	+*	No trend	
22		Nom GDP Growth	+***	+***	No trend	Line 49
23	ST	Nom GDP Growth	+***	+***	With trend	Line 51
24						
25	**Other notable relationships**					
26	Outward Fin Flow	ST	-***	-***	No trend	
27	Outward Fin Flow	ST	-**	-**	With trend	
28	Inward Fin Flow	ΔST	+*	+	No trend	
29		ΔReal GDP Growth	+*	+	No trend	
30	Inward Flow	ST	-**	-	No trend	Line 19
31		Nom GDP Growth	+**	+	No	
32		Δreal GDP Growth	+**	+	No trend	
33	Inward Flow	ST	-**	-	With trend	Line 19 (~)
34		Nom GDD Growth	+**	+	With trend	
35		Δreal GDP Growth	+**	+	With trend	
36	ΔInward Fin Flow	Nom GDP Growth	-	-*	No trend	
37		Δreal GDP growth	+**	+*	No trend	
38	Δinward Fin Flow	Δreal GDP growth	+*	+*	With trend	
39	Δinward Flow	ST	-**	-**	With trend	Line 20 (~)
40		Real GDP Growth	+	+**	With trend	
41		Δreal GDP Growth	+**	+**	With trend	

Table 4.15 (cont.)

Line	Variables y	Variables x	Lags 1	Lags 2	Notes	
42	Δoutward Fin Flow	ΔST	-*	-	No trend	
43		Real GDP growth	-	-**	No trend	
44	Δoutward Flow	ST	-*	-	No trend	
45		ST	-*	-	With trend	
46	Δinward Stock	ΔST	+**	+***	No trend	
47	Δoutward Stock	ST	+	+**	With trend	
48		ΔST	+*	+*	With trend	
49	Nom GDP Growth	ST	-*	-***	No trend	Line 22
50		ΔST	-***	-***	No trend	Line 13
51		ST	-	-**	With trend	Line 23
52		ΔST	-***	-***	With trend	Line 15
53	Real GDP Growth	ST	-*	-**	No trend	
54		ΔST	-***	-***	No trend	
55		Inward Fin Flow	-	-*	No trend	
56		Inward Flow	-**	-**	No trend	
57		Δinward Fin Flow	-	-**	No trend	
58		Δinward Flow	-	-**	No trend	
59		Δinward Fin Stock	+**	+**	No trend	
60		Δinward Stock	-**	-*	No trend	
61	Δreal GDP Growth	ST	-	-***	No trend	
62		ΔST	-***	-***	No trend	Line 14
63		Inward Flow	-**	-*	No trend	
64		ΔOutward Flow	+	-*	No trend	
65		Δinward Fin Flow	-	-***	No trend	
66		Δinward Flow	-	-**	No trend	
67		Δinward Fin Stock	+**	+*	No trend	
68		Δinward Stock	-**	-**	No trend	
69	Δreal GDP Growth	ST	-	-***	With trend	
70		ΔST	-***	-***	With trend	Line 16

~ signals a feedback effect, however where one of the regression is made with a trend but not the other.

The data and the results from the US are much more robust than in the case of the UK. In the case of US, structural problems, such as non-stationarity, were not as serious. There are numerous points to be highlighted when it comes to those results.

If we focus explicitly on the causes of and the repercussions of financial stability in the US we can point out the following:

- Inward financial-FDI flows (line 1) and inward FDI flows (line 2) in general have a negative effect on long term financial stability. Notice, that if we include a (time) trend in the regression, the effects disappear. This can be interpreted as exogenous effects: there might be something else than

a possible causal relationship between FDI flows and financial stability that is driving the apparent statistical causal relationship between the variables. This might e.g. be increased financialisation, which has increased for the last decades and can have a negative impact on the real economy and financial stability (Hein & Truger, 2012; Orhangazi, 2008). Our dataset limits us from testing this hypothesis more formally.

- Short term financial instability Granger-causes long term instability to increase, both without (lines 4, 5) and with a trend (lines 6, 7). *The feedback is negative*: increased long term financial instability calms short term financial instability down (lines 12 (no time trend), 17 (with time trend)). This relationship reverberates the discussion in *3.4.4 The clash between long term and short term financial instability*. Drawing from that discussion, this relationship is easily explained. Markets are ruled by short-termism, i.e. markets think first and foremost about calmness in the short term. If e.g. a bailout or a quick-fix change in the financial system, which does nothing to improve the fragility of the underlying financial structures of the economy, i.e. increases the level of long term instability, is used to calm markets down from an episode of serious financial stress, the net effects will be calmness, even if underlying financial structures can be weaker than before. This reverberates Minsky's words as he explained the problems in the US financial system in 1966 (Minsky, 2008b, p. 101, emphasis added): "Because the difficulties were *papered over* with the *cosmetic changes* that allowed interest rate ceilings to vary with the size of the deposit, *the crunch was not interpreted as a signal that there were serious weaknesses in the financial structures*." Four years later, a liquidity squeeze took place: the "serious weaknesses in the financial structures" had not been fixed. The relationship between the long-term and short-term financial instability is also to be expected from the point of view of myopic loss aversion: humans have it ingrained in them to prefer a quick-fix to their problems even if it leaves them with another to solve later (see e.g. Thaler (1981), Tversky and Kahneman (1991), Frederick et al. (2002)). Professional traders in financial markets have even been shown to be more myopic loss averse than everyday students (Haigh & List, 2005). This relationship between long term and

short term financial instability is therefore not surprising, drawing from Minsky's work and the work of behaviourists.

- Economic growth seems to encourage economic units to build up leverage and generally accept more fragile financial structures than if growth was low: long term financial instability increases in the wake of strong growth (line 8). The effects are similar on short term financial instability (lines 15, 16, 23). This, again, follows from Minsky's FIH.

Drawing from this we can state the following. Inward FDI flows and stocks do not seem to have caused improvements in financial stability in the US. In fact inward financial-FDI flows, inward flow of FDI in general and inward stock of FDI in general seem to have had *negative* effects on the level of financial stability in the US. This depends, however, on whether we include a trend in our regressions or not which signals that there is possibly something else that is driving the statistical relationship between the variables. In any case, FDI certainly does not improve financial stability although its negative effects might be limited. These empirical conclusions are in accordance with the theoretical ones developed in chapters 1 and 2: the net effects of financial and non-financial FDI on financial stability are inconclusive and can land on either side of the "red line" so to speak. High economic growth is, however, a breeding ground for financial instability. Again, this is in full accordance with Minsky's FIH: high growth comes with greater optimism about the future which leads to over-leverage and increased financial fragility and instability.

Looking at other regressions (table 4.15, lines 26-70) we can highlight the following:

- Short term financial instability has negative effects on all sorts of FDI activities (note especially lines 27, 33, 39, 45 and 47-48).
- In case of outward financial-FDI flow (lines 26, 27) the impact is negative. This result is not obvious. On one hand, we could expect short term financial instability to push banks out of the economy, incentivise them to find more fertile markets abroad. On the other, short term financial instability at home can force managers to focus on the home market, which we can expect to be the best known market, and improve the company at home before expanding abroad. Unstable markets at home

can also put pressures on the parent to retreat in other markets (De Haas & Van Lelyveld, 2014). The result here is more according to that story and reconfirms the one where financial institutions focus on the home market and withdraw, at least partially, from abroad if faced with troubles, or a crisis, at home (Hryckiewicz & Kowalewski, 2011; Peek & Rosengren, 2000a). In other words, US financial institutions are home-biased.

- Financial instability also scares FDI away from the economy, i.e. increased short term financial instability has negative impact on inward flow of FDI in general (lines 33, 39). This is the opposite of the "fire sale FDI" argument (which was applied to emerging economies anyway and not the US): financial instability does not draw FDI in but scares it away.
- Short term financial instability has also negative impact on the activities of US companies abroad: outward flow and stock are negatively affected by short term financial instability (lines 45, 47-48). This is a sign that not only are US multinational financial companies home-biased (lines 26, 27) as already mentioned but so are US multinational companies in general.
- The effects of economic growth on FDI activities seem to be that economic growth draws FDI into the US (lines 34, 35, 38, 40, 41). Those results are similar to that of the UK (see table 4.14) where economic growth was drawing FDI into the economy. When it comes to the feedback – does inward FDI activities into the US cause economic growth? – the effects are much weaker, albeit generally negative (except the impact of the change in inward financial-FDI stock, line 59), and do not tolerate the addition of regressing with a time trend (lines 55-60, 63, 65-68). Therefore, we cannot say for sure that FDI into the US economy has any noticeable effects on economic growth but if the effects are there, they are generally negative. This is a slightly better result than in the UK case where inward financial-FDI flow had negative effects on real GDP growth, including when time trend was taken into the account (table 4.14, line 23). This result is in accordance with the pessimistic view of the effects of FDI on economic growth (see section *1.1 FDI and economic growth*). What is interesting is that in this case we are not talking about poor countries but rich ones. The impact of FDI is more likely to be negative the poorer the country is (Gallagher & Zarsky, 2006). Yet, here

we have two of the richest economies in the world and the impact is negative. The reason may be found in the fact that more FDI is not always better: after a certain threshold, the negative effects of FDI can begin to dominate the positive ones (Eller et al., 2006) in a quadratic-relationship fashion.

- As expected, short term financial instability has negative effects on GDP growth (lines 51, 52, 69, 70). Notice the previously discussed impact of GDP growth on financial instability: the effects are positive. Again, this is in full accordance with Minsky's FIH.

4.2.2 Quarterly data

We can investigate further the relationship between long term and short term financial instability using quarterly data. The first difference of the quarterly time series is stationary (see table 4.9) in both cases. We can use a VAR(n) lag selection test to determine the most appropriate model when it comes to lag selection. Tables 4.16 and 4.17 summarise AIC, BIC and HQC results that show us that a VAR(1) is the most appropriate model in the case of UK data while a VAR(2) or, possibly, a VAR(4) is best in the case of US.

Table 4.16 VAR(n) lag selection test, UK quarterly data

lags	loglik	p(LR)	AIC	BIC	HQC
1	-17.49716		0.886685*	1.109737*	0.972460*
2	-16.78117	0.83862	1.01061	1.382363	1.153568
3	-15.08879	0.49562	1.09769	1.618145	1.297832
4	-10.44477	0.05429	1.073387	1.742543	1.330712
5	-5.2464	0.03425	1.028166	1.846023	1.342675
6	-3.46052	0.46705	1.111718	2.078276	1.483409
7	-2.68973	0.81925	1.233575	2.348834	1.66245
8	3.79047	0.01147	1.139982	2.403943	1.626041

Table 4.17 VAR(n) lag selection test, US quarterly data

The asterisks below indicate the best (that is, minimized) values of the respective information criteria, AIC = Akaike criterion, BIC = Schwarz Bayesian criterion and HQC = Hannan-Quinn criterion.

lags	loglik	p(LR)	AIC	BIC	HQC
1	2.46581		0.073629	0.233901	0.138413
2	11.7489	0.00096	-0.036435	0.230684*	0.071539*
3	13.05447	0.62485	0.019699	0.393666	0.170862
4	20.31496	0.00581	-0.048228*	0.432587	0.146125
5	20.90403	0.88168	0.022833	0.610496	0.260376
6	23.50008	0.26815	0.052082	0.746593	0.332814
7	25.91365	0.3055	0.085132	0.886491	0.409055
8	27.2866	0.60121	0.139863	1.048069	0.506975

Note: The lag test is between Long Term Financial Instability and Short Term Financial Instability using quarterly data.

There is no need to summarise the results for the regressions here in the same way as in the case of annual results, for the vast output is not in place, but merely four tables similar in construction to those found in Appendix 3, detailing the annual data.

Tables 4.18-4.19 show us the results for UK quarterly data. Table 4.18 shows us that no Granger-causality is found from long term financial instability onto short term financial instability. This is the same result as in the case of annual data. However, *short term financial instability Granger-causes long term financial instability to increase*, relying on the VAR(1) model which is the most appropriate one (see table 4.19). In the case of the annual data, the data was non-stationary with no co-integration relationship in place. This regression was therefore not done. Notice that those results – UK short term financial instability Granger-causes UK long term financial instability to increase – is the same as in the case of US annual data, see table 4.15. Furthermore, US quarterly data show that short term financial instability Granger-causes long term financial instability to increase (table 4.21). All these results (UK quarterly, US quarterly & US annual) therefore depict that *market participants are affected by short-termism* (see discussion after table 4.15 and *3.4.4 The clash between long term and short term financial instability*).

Thinking about the effects of long term financial instability on short term financial instability we can see that tables 4.18 and 4.20 do not add much meat on the bones: long term financial instability does not Granger-cause short term

financial instability (p-values are statistically insignificant). Comparing this to the annual data makes us notice that the Granger-causality from long term financial instability onto short term financial instability seems to weaken: the effects are still the same but statistically insignificant. This signals that the relationship between these factors needs a longer time period than only one quarter to be realised.

Table 4.18 Does Long Term Instability Granger-cause Short Term Instability? UK

	ST 8, 1st diff	P-value, coeff.	P-value, F-test	Ljung-Box P value (4 lags)
LT 9 1st diff.	0.672	0.371	0.371	0.943
LT 9 1st diff. (2 lags)	0.597	0.384	0.675	0.981
	-0.265	0.594		
LT 9 1st diff. (4 lags)	0.618	0.263	0.763	0.999
	0.083	0.838		
	0.767	0.449		
	0.119	0.715		
Sum of coefficients (4 lags)	1.587			

Table 4.19 Does Short Term Instability Granger-cause Long Term Instability? UK

	LT 9, 1st diff.	P-value, coeff.	P-value, F-test	Ljung-Box P value (4 lags)
ST 8 1st diff	0.058	0.083	0.083	0.939
ST 8 1st diff	0.056	0.101	0.250	0.996
	0.010	0.846		
ST 8 1st diff	0.038	0.269	**0.030**	0.963
	0.013	0.825		
	-0.033	0.122		
	-0.067	0.062		
Sum of coefficients (4 lags)	-0.049			

Table 4.20 Does Long Term Instability Granger-cause Short Term Instability? US

	ST 8, 1st diff	P-value, coeff.	P-value, F-test	Ljung-Box P value (4 lags)
LT 9 1st diff.	-0.268	0.349	0.349	0.708
LT 9 1st diff. (2 lags)	-0.215	0.430	0.356	0.545
	-0.175	0.322		
LT 9 1st diff. (4 lags)	-0.341	0.233	0.301	0.997
	-0.447	0.101		
	-0.170	0.563		
	0.079	0.646		
Sum of coefficients (4 lags)	-0.879			

Table 4.21 Does Short Term Instability Granger-cause Long Term Instability? US

	LT 9, 1st diff.	P-value, coeff.	P-value, F-test	Ljung-Box P value (4 lags)
ST 8 1st diff (1 lag)	0.148	0.002	**0.002**	0.242
ST 8 1st diff (2 lags)	0.109	0.005	**0.000**	0.787
	0.173	0.007		
ST 8 1st diff (4 lags)	0.108	0.003	**0.000**	0.987
	0.172	0.004		
	0.080	0.110		
	-0.053	0.365		
Sum of coefficients (4 lags)	0.308			

A final comment is in order. Following post-Keynesian methodology, we should be careful in interpreting these econometric conclusions as non-changeable and applicable to all economies at all times. A very important note should be made, especially, on the fact that the focus is here on two economies that are both institutionally developed and modern. This institutional support facilitates and improves the effects of FDI onto the economy in question, as it does with general economic activities. Therefore, even if e.g. FDI activities are concluded here to have at best no effects on financial stability and at worst negative effects the result may not be as favourable in economies where the institutional framework is not as developed. Furthermore, it should be stressed here that the focus is first and foremost on FDI flows and stocks and not on other less sticky capital flows or capital flow "bonanzas" which are often disruptive (C. M. Reinhart & Reinhart, 2008).

4.3 Conclusion: where from here?

From the abovementioned regressions and tables, one can draw numerous conclusions. Bear in mind that the quality of data is better in the US case and so should the information be which we can yield of that dataset.

First, flows and stocks of FDI can and do have negative impact on financial stability, both for the short and the long term (remember that we are here talking explicitly about the US and UK economies). The effects are however weak, judging on the grounds of more sound US data. In any case, we cannot say that FDI activities strengthen financial stability. They do not even seem to strengthen economic growth, at least in the US. In short, the positive effects of FDI

activities do not seem to be strong enough to completely outweigh the negative effects (see chapters 1 and 2 for discussion on what those effects are).

A second clear result is that short term financial instability causes economic growth to decrease. This is entirely in accordance with Minsky's Financial Instability Hypothesis.[112] This strengthens the case for financial stability to be an unmistakable part of monetary and other policy objects, as Borio and Lowe (2002), Adrian and Shin (2008) and Eichengreen, Rajan & Prasad (2011) have spoken for. Indeed, Goodhart (1988) points out that financial stability was the original purpose of central banks. This original purpose should be remembered. Furthermore, short-termism seems to be a problem: long term financial stability is sacrificed for improvements in short term financial stability.

It should be noted that, following the VAR model here applied, long term financial instability does not seem to cause short term financial instability to take place, as could have been expected from the discussion in chapter 3. In other words, the statistical method here applied only manages to catch the short-run dynamics between short-term financial instability and long-term financial instability. Nevertheless, Figures 4.11 and 4.12 indicate that there is a complex non-linear relationship between the terms, supporting Minsky's description of the complex dynamics of the development of financial instability and how underlying financial structures (long term financial instability) will affect the immediate development (short term financial instability) of stability in the system. Therefore, although the VAR model does not catch those complex dynamics running from long term financial instability onto short term financial instability, Figures 4.11 and 4.12 hint that the relationship between them is as Minsky expected it to be.

Finally, we have, generally, not confirmed the view that FDI activities have a positive effect on GDP growth. In fact, we have shown that the Granger-causality from FDI on GDP growth is negative or neutral at best. This confirms the validity of prior studies, such as Mencinger (2003) – see also *1.1 FDI and economic growth*. In short, FDI should, with the story here told, not be relied on to boost economic growth – at least not in the current institutional framework.

[112] This is also in accordance with Werner's (2005) Quantity Theory of Credit. There, a crisis causes all credit creation to shrink – since banks flee to cover and decrease the supply of credit in general – and when that happens, economic growth contracts.

All in all, foreign direct investment does not seem to have positive effects on the economy according to this study. But some of the positive effects of foreign direct investments have certainly *not* been disproved. The point about foreign banks introducing better risk and operations management into the financial system is still very valid and should not be taken lightly. Nor should technical progresses and other positive spillover effects be forgotten. The positive effects of financial-FDI should, in short, not be altogether waved off in light of these results.

The challenge that now arises is to strengthen the potential benefits of FDI, both financial-FDI and FDI in general, while the possible drawbacks, such as excessive credit booms and establishments of economic links which financial instability can travel by, are mitigated or extinguished. In next chapter we bring forward the outlines of the fundamentals that we should look at when attempting to strengthen the positive sides of FDI while downplaying the drawbacks. Some improvements to a developed financial system are proposed with this purpose in mind.

Chapter 5 – A Suggestion, Part I: On Credit

> Now there is no part of our economic system which works so badly as our monetary and credit arrangements; none where the results of bad working are so disastrous socially; and none where it is easier to propose a scientific solution.
>
> John Maynard Keynes (1973b)

> The cause of the economic cycle is a rate of interest that is too high for a level of investment consistent with full employment, compounded by a monetary system that finances excessive investment for a prolonged period. Older terminology might be usefully resurrected: the economic cycle is caused by money which is *easy* – that is, readily available – but *dear*.
>
> Geoff Tily, (2010, p. 244)

We have seen from the previous chapters that FDI activities can be a double edged sword.

In chapter 1 we noted that FDI "should increase economic growth in the host economy... and even be more effective in boosting economic growth than domestic investment." But we also mentioned that "FDI does not always increase economic growth" and that absorptive capabilities should be in place in the host economy for positive spillovers of FDI to be realised. In chapter 2, we highlighted that "[t]he entry of a foreign bank into an economy can enhance the efficiency of the domestic financial sector." However, we also quoted Reinhardt and Dell'Erba (2013, p. ii): "...while FDI surges occur across all sectors, only surges in FDI in the financial sector are accompanied by a boom-bust cycle in GDP growth." Sure enough, in the case of our datasets, inward (financial) FDI flow had a negative Granger-causality on real GDP growth in the UK (table 4.14, line 23). General FDI inflows did not have any Granger-causality effects on GDP growth in the UK. In the case of the US, the results were more on the positive side albeit clearly not altogether supportive of neither non-financial or financial-FDI. In fact, if there were any effects at all, they were on the negative and not the positive side.

When we look at the link between financial stability and financial-FDI activities we saw in chapter 2 that foreign banks have, empirically, had unclear effects on credit availability and credit stability, making their impact on financial stability due to their effects on those factors rather hard to nail down. Furthermore, contagion risks between economies are introduced when the financial-FDI link is established. The Icelandic banks pre-2008 are an example of outward financial-FDI leading to contagion risks for the home economy. But, likewise, a well diversified international bank, with secure assets in many economies, can act as a buffer to local shocks instead of transferring them between countries. Banks' country- and industry-diversification is a double edged sword. Therefore, we cannot securely say whether the net effects of financial FDI on financial stability will be positive or negative.

Looking at FDI in general, the net effects of it onto financial stability are just as unclear. In chapter 1 we wrote that "the conventional view is that if a country wants to reduce the financial instability arising from capital flows reversals, FDI should be increased as a share of total capital inflows." But this does not seem to work all the time, especially since capital can flow into an economy under the disguise of FDI but out of it as a portfolio flow. Furthermore, as we wrote in chapter 1, "FDI can have a boosting impact on the rate of growth of credit in the economy." That can have serious implications for financial stability in the economy, following Minsky's FIH.

Empirically, we found in the case of the US that although the negative Granger-causality effects of FDI, both general FDI and financial-FDI, seemed to lessen significantly if we added a trend in our model, we cannot rule out the possibility that FDI had a negative impact on financial stability. The data certainly does not suggest that FDI activities have had a predominantly *positive* impact on financial stability in the US. The same applies for the UK, albeit the data is much more difficult to deal with in that case.

The empirical investigation introduces a certain dilemma. Arguments abound that FDI can have positive effects on economic growth, economic development and financial stability – see chapters 1 and 2. However, empirically, the track record of the impact of FDI seems to be a less glamorous image than the positive arguments paint. We saw that FDI, in particular inflows of it, can harm

financial stability and economic growth (see chapter 4). In short, the negative effects of FDI inflows onto the economy can overpower the positive ones. Therefore, we must ask us: can we dampen the negative economic effects of FDI activities while maintaining or even strengthening the positive ones?

This chapter is an attempt to answer this question. The chapter offers an insight into how the monetary system itself can be amended to moderate the adverse effects of FDI while, at least, maintaining its positives.

The chapter is constructed as follows. First, we will argue that the kernel of the negative effects of FDI activities is the risk of excessive credit expansion that can accompany and is encouraged by FDI inflow. This leads to financial instability, in accordance with Minsky's Financial Instability Hypothesis. We will then discuss two ways of controlling credit expansion. The Optimum Exchange Rate System, OERS, is introduced in the wake of that discussion. It is argued that the OERS can help maintaining financial stability while FDI activities are freely allowed to be carried out. Croatia is used as an empirical case of where the OERS would have been beneficial. We therefore conclude that adopting the OERS can support financial stability – dampening the negative economic effects of FDI – while allowing FDI activities to have an overall favourable impact on the economy.

5.1 FDI, credit expansion and financial stability

5.1.1 FDI and credit expansions

In chapter 1, we touched shortly on the relationship between FDI and credit expansion in the host economy. Specifically, we noted, quoting Bird and Rajan (2002, p. 200) that it is a "fact that FDI tends to be accompanied by an increase in bank loans." Before the late 1990s crisis in Malaysia, FDI inflows, albeit not as volatile as other capital flows, had been "procyclical in nature, amplifying business cycles" (Doraisami, 2007). And business cycles are driven by credit cycles, according to Minsky, signalling an amplification effect between FDI and credit in Malaysia. FDI, and other capital inflows, fed credit growth in Bulgaria between 1997 and 2008 (Hegerty, 2009). And in Iceland, especially during the early 2000s, there was a strong correlation between changes in the stock of inward FDI and credit expansion (see figure 5.1 and tables 5.1-5.2).

Figure 5.1 Year-over-Year growth of inward FDI stock and credit, Iceland, 1990-2011

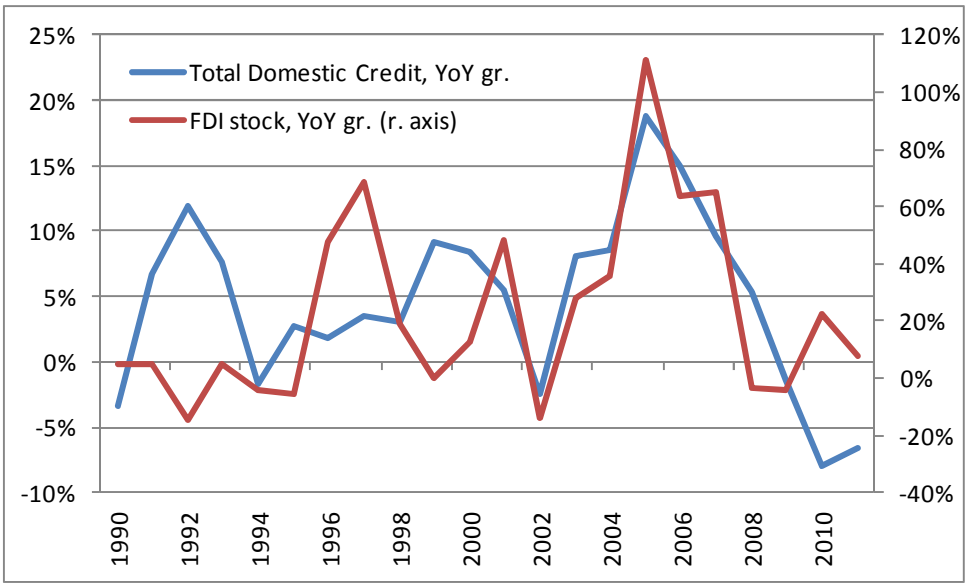


Table 5.1 OLS regression, Year-over-Year growth of inward FDI stock and credit, 1990-2011

Model 1: OLS, using observations 1990-2011 (T = 22)
Dependent variable: Total_cr_gr_GDP

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	0.0231271	0.0156582	1.4770	0.15525	
FDIst_gr_GDP	0.103097	0.0400784	2.5724	0.01818	**

Mean dependent var	0.046482	S.D. dependent var	0.067367
Sum squared resid	0.071611	S.E. of regression	0.059838
R-squared	0.248604	Adjusted R-squared	0.211034
F(1, 20)	6.617129	P-value(F)	0.018180
Log-likelihood	31.78641	Akaike criterion	-59.57282
Schwarz criterion	-57.39073	Hannan-Quinn	-59.05878
rho	0.495168	Durbin-Watson	0.953472

Table 5.2 Similar regression analysis as table 5.1, except over 2000-2011

Model 2: OLS, using observations 2000-2011 (T = 12)
Dependent variable: Total_cr_gr_GDP

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	-0.00261598	0.0220227	-0.1188	0.90780	
FDIst_gr_GDP	0.171716	0.0473588	3.6259	0.00464	***

Mean dependent var	0.050778	S.D. dependent var	0.082286
Sum squared resid	0.032178	S.E. of regression	0.056726
R-squared	0.567976	Adjusted R-squared	0.524773
F(1, 10)	13.14686	P-value(F)	0.004644
Log-likelihood	18.50104	Akaike criterion	-33.00207
Schwarz criterion	-32.03226	Hannan-Quinn	-33.36113
rho	0.274468	Durbin-Watson	1.231716

OLS regressions show how statistically robust the correlation has been since 1990 (see table 5.1) and even stronger since 2000 (see table 5.2): notice how the coefficient off the growth of FDI stock becomes not only higher (0.17 in table 5.2 compared to 0.10 in table 5.1) but statistically more significant as well (p-value 0.004 from 2000-2011 sample compared to 0.018 from 1990-2011 sample).[113]

Correlation does not necessarily mean causation. Arguably, the causation, if any direct one is in place, could go both ways. First, incoming FDI could have credit expansionary effects: investments increase, wages and income in the wake of that and credit, both for further gross capital investment and general consumption credit as well (higher income of workers would make them more secure borrowers, easing their credit constraints and expand the supply of available credit from banks). Second, the effects may go the other way around: a domestic credit expansion could expand the economy, increase the population's income and make general investments profitable – including foreign direct investments. Then, a feedback cycle may well be in place, making the causation two-ways. Also, there may be no causation at all and any measured correlation spurious, or it may be time- and/or country-specific.

The issue of the "hen and the egg" is therefore not a clear cut. Data analysis on the Icelandic case (see figure 5.1) reveals no Granger-causalities between

[113] Both inward stock of FDI and credit are divided by GDP at each year.

inward stock of FDI and domestic credit expansion, only that the correlation has been very strong between those factors. We should nevertheless note, as we did in chapter 1 (see *1.4 FDI and financial stability*), that FDI inflows have had a role in encouraging credit growth directly (Hegerty, 2009) and indirectly via e.g. investors' sentiment, which can spur credit growth and stock-market booms and busts. And "typically... the domestic investment undertaken by FDI establishments is heavily leveraged through the domestic credit market" (Razin, Sadka, & Yuen, 1999, p. 2) so credit expansion directly or indirectly due to inward FDI activity should be expected. Furthermore, as we noted in chapter 2, in the wake of inward financial-FDI, it is entirely to be expected that banks, foreign and domestic, will expand credit in the niche market as they fight for market share. This was, in fact, the case in some Eastern European countries between 2003 and 2007 where FDI in the non-tradable sector, of which financial-FDI was a large share, "fueled credit booms" (Kinoshita, 2011).

It may nevertheless not be certain that FDI will, definitely, cause or be positively correlated with credit expansion: it can depend on the phase of the business cycle. Following the phase of Minsky's FIH where the economy has recovered from past instability episode and investors have regained their confidence, investments, no matter whether they are domestic or foreign, and credit expansion have a positive feedback effects on each other. If the economy is in this up-beat stage we should expect there to be a positive correlation, and even a two-way causation, between FDI and credit expansion. However, during the downturn-phase of the FIH, we might get an inflow of "fire sale" FDI, as discussed in chapter 1. In this case the correlation between inflow of FDI and credit expansion should not be expected to be strong, and even negative, as domestic units are, during the downturn, reconstructing their balance sheets and deleveraging.

5.2 Credit expansion and some of its effects

If FDI inflows of any kind do *lead to* or *encourage* credit expansion in the host economy the repercussions for financial stability could be sizeable. Excessive credit expansion is, according to Minsky's FIH, the fuel of the incubation of unstable financial structures in the economy. And indeed, credit expansion has predated numerous episodes of financial instability. Werner (2005) blames the Japanese financial crisis in the late 1980s and early 1990s on credit expansion

the years before. Jordà, Schularick, and Taylor (2011, p. 340), looking at the experiences of 14 developed countries since 1870 until 2008, argue that (domestic) credit expansion is “the single best predictor of financial instability” over the period. They note that external imbalances, (they use current account deficits to measure external imbalances), have “an additional role” in crisis formation, especially in the post-World War II world. The main cause of financial instability is, ultimately, excessive domestic loan growth. Borio and Lowe (2002, p. 11) reach a similar conclusion: “One of the relatively few robust findings to emerge from the literature on leading indicators of banking crisis is that rapid domestic credit growth increases the likelihood of a problem.”

This should not surprise anyone who believes that Minsky was right when he developed his Financial Instability Hypothesis. Indeed, credit, its development and derived cash flows due to repayments of outstanding debts, such as interest costs, are important variables in our indices of financial instability, see chapter 4. And it should be added here that although external imbalances have had an “additional role” in the development of crises, it is in fact domestic credit creation that *drives* those imbalances as well. This includes current account deficits but also the depletion of foreign reserves and devaluations of the currency. The depletion of foreign reserves has been recorded to take place before a balance of payments crisis (Kaminsky & Reinhart, 1999) and the excessive depreciation of a currency introduces all sorts of problems to the local economy, including higher import prices and, consequently, inflation. Currency depreciation can in fact be so severe that it is a crisis – a currency crisis – on its own, and the extreme depreciation can aggravate any problems that are in place in the banking sector, especially if it owes foreign-currency-denominated debt (ibid).

5.2.1 Domestic credit expansion and current account deficits

We have previously established that money creation is endogenous to the creation of credit in the banking sector (chapter 2). This money creation is the creation of purchasing power. This purchasing power is spent on goods and services in the economy, including imported goods. Therefore, the creation of credit finances imports as the new purchasing power is spent: the creation of credit leads to worsening of the current account.

We can use simple accounting identities to explain this more rigorously. The following rests on IMF's balance of payments manual (International Monetary Fund, 2011) and Wray (2012). From the IMF we learn, through accounting identities and traditional meaning of symbols, that:

$$S - I = CAB \tag{1}$$

$$CAB = (S_p - I_p) + (S_g - I_g) \tag{2}$$

The IMF (2011, p. 224) points out that:

> [I]f government sector dissaving is not offset by net saving on the part of the private sector, the current account will be in deficit. More specifically, the identity shows that the budgetary balance of the government ($S_g - I_g$) may be an important factor influencing the current account balance.

Equally, the current account will be in deficit if private sector dissaving is not offset by net saving by the government sector.

"Dissaving" is the opposite of saving, i.e. when expenditures are higher than income. Dissaving can take place when existing stock of gross savings is liquidated, partly or wholly, and used to finance expenditures larger than income. Credit can also be created and the resulting purchasing power so created used to finance expenditures larger than income. Further, capital from abroad can be used to finance expenditures that are higher than income. This dissaving can be performed by either the domestic private sector or domestic government sector and this national (total) dissaving will constitute a saving for the foreign sector (Wray, 2012). Therefore, national dissaving and foreign saving adds up to zero according to accounting identities because domestic expenditures in excess of domestic incomes – financed with net creation of debt, capital inflows and/or net liquidation of savings – will constitute as savings for the foreign sector (ibid). We can therefore write:

$$CAB + B + L + K = 0 \tag{3}$$

Here, B is (net) credit creation by domestic parties (which, as we saw in chapter 2, are mainly banks), L is (net) liquidation of existing savings and K is (net)

capital flows from abroad. The sum of those three variables is equal to the national (dis)saving while the current account balance is the foreign balance.[114]

So national expenditures in excess of national income, i.e. a current account deficit, can be financed via those three channels: net credit creation (B), net liquidation of savings (L) and net capital flows (K) from abroad. IMF comments that causation should not be inferred from accounting identities, such as this one, and that (International Monetary Fund, 2011, p. 227) "[w]hether there is spontaneous financing of the current account deficit – that is, whether the gap between saving and investment is met from autonomous flows – depends on number of considerations." The institution, as an example, mentions a current account deficit that is financed with temporary liquidation of foreign reserves to smooth national dissavings due to a crop failure, which would be a shortfall of national income.

We are interested, specifically, in whether there actually *is* causation in place, running from credit expansion onto the current account. Ignoring L and K for a moment we can see that a domestic credit expansion, B, could cause the foreign balance to improve, i.e. the current account, CAB, to worsen. We saw in chapter 2 that banks are the main creators of credit in the domestic economy via their decisions to supply credit to borrowers. The hypothesis that we need to empirically test is then the following: *expansion of domestic bank credit causes the current account balance to worsen*.[115] The causality should not run the other way, i.e. worsening of the current account should not cause bank credit to expand.

Working from Keynes's realisation that investment can be financed with domestic credit expansion, without savings taking place before the investment to finance it (Tily, 2010), it is easy to see how the result of a domestic credit expansion can be a deficit on the current account, since CAB = S – I. If *I* increases, financed with a domestic credit expansion, then CAB worsens. Likewise, increased consumption, financed with new credit, would decrease savings, S, and worsen the current account balance. Empirically, evidences have been found for the validity of the hypothesis. Rapid loan growth

[114] This accounting identity can also be derived in a more rigorous way than here using purchasing powers, see Appendix 4.
[115] See Werner (2005) for similar tests on Japan.

“stimulated” current account problems in Croatia, according to data from 1995-2003 (Kraft & Jankov, 2005) and in Mexico, before 1994, the current account deficit was “to a large extent” the offspring of “a huge credit expansion” according to Gil-Diaz (1998).

This must be looked at in connection with the capital account. If a domestic credit creation takes place and the purchasing power so created is used to buy a foreign good, it will constitute a capital flow into the economy, because foreign ownership of domestic assets is increasing. At the same time, the current account will worsen. The relationship, or rather the timing, of capital account and current account book entries also depends on the international acceptability of the domestic currency.

Let’s look an example to explain this, following Wray (2012) and relying on figure 2.2.[116] A bank in the US creates a loan and a deposit for a US borrower. The borrower uses the deposit to buy a good from China. The commercial bank of the buyer asks the US Fed to transfer reserves from its account at the Fed to the account of the Chinese central bank at the Fed. The Chinese central bank then credits the account of the seller’s commercial bank and that bank credits the seller’s account in China. At the same time, the US bank debits the buyer’s account in the US. In this case, the credit expansion led to an income for the foreigner and the Chinese central bank now holds a financial liability of the Fed, i.e. the reserves – which it can use to buy US treasuries. Therefore, the capital accounts of the two economies must be amended as this constitutes a capital inflow into the US and a capital outflow from China: the net change in financial liabilities for the US is negative while it is positive for China. However, there was no actual “flow” of capital *from* China *to* the US: the creation of the credit took place in the US and a financial liability was, in the wake of that, simply transferred, within the US (between two accounts at the Fed), from an American owner to a Chinese one in exchange for an imported good. Therefore, the domestic credit expansion caused book entries on the capital account and the current account of the US (and China) *at the same time*. The reason why this is possible is that the foreigner, the Chinese central bank, is willing to hold a financial liability, Fed reserves, denominated in the domestic currency, US dollars in this case (Wray, 2012).

[116] See chapter 2, section *2.1.1 Banks and the payment system.*

But what happens if foreigners are not willing to hold financial liabilities denominated in the domestic currency, which is common in the case of developing nations (the so-called "Original Sin" (Eichengreen & Hausmann, 1999))? Wray (2012, loc. 2623) explains:

> If there is no foreign demand for IOUs (government currency or bonds, as well as private financial assets) issued in the currency of a developing nation, then its foreign trade becomes something close to barter: it can obtain foreign produce only to the extent that it can sell something abroad. This could include domestic real assets (real capital or real estate) or, more likely, produced goods and services (perhaps commodities, for example). It could either run a balanced current account (in which case revenues from its exports are available to finance its imports) or its current account deficit could be matched by foreign direct investment.
>
> Alternatively, it can issue foreign currency-denominated debt to finance a current account deficit.

Here, the acquisition of foreign funds, either via exports or capital flows in the form of FDI or the issuance of a foreign currency-denominated debt, will happen *before* the current account is affected: because the domestic currency unit is not accepted as a payment for the import, the developing nation must acquire foreign currency, accepted as a payment, *before* it can buy anything abroad, instead of issuing a domestic-currency denominated credit *at the same time* as the import of a foreign goods takes place. Notice that Wray specifically mentions "a developing nation." This seems indeed to be the case: capital inflows Granger-cause current account deficits, especially in emerging markets but much less so in developed economies (Ho-don & Yang, 2008). Mastroyiannis (2012), looking at Portugal between 1980 and 2009, held that the long-run causal relationship between the capital account and the current account was unidirectional from the former to the latter.[117]

[117] Is Portugal a developing nation? In this respect, yes: it does not issue a sovereign currency that is in demand by foreigners. The same applies to Iceland, which is considered a developed economy: although it is an issuer of a sovereign currency it is not sought out by foreigners (no nation has Icelandic krona in its foreign reserves, as an example).

Note that domestic credit creation can still cause current account deficits in the case of developing countries, even if the credit is in the form of the domestic currency, which we will assume is under the spell of "The Original Sin", i.e. not in demand amongst foreigners. In that case, domestic credit expansion would produce purchasing power that is spent on both domestic and foreign goods, i.e. imports. But rather than transferring a domestic financial liability (central bank reserves) to a foreigner, as in the previous case of the US dollar, the gross holdings of a nation of a foreign currency, such as central bank's foreign reserves or banks' holdings of foreign currency-denominated funds in corresponding banks, would be depleted instead (see figures 2.2 and 2.3 for details). We will investigate this in more depth later in this section (see *5.2.2 Domestic credit expansion and the depletion of foreign reserves)*.[118] For now we will focus on the hypothesis that credit expansion at home will cause the current account to worsen.

It is time to empirically test this hypothesis. We have already mentioned some research on this topic where it was found that domestic credit expansion did lead to worsening of the current account (Gil-Diaz, 1998; Kraft & Jankov, 2005; Werner, 2005). We will expand this literature by using data from Iceland.[119] We will also look into whether the capital account Granger-causes the current account in Iceland, as Wray (2012) expects is the case of "developing nations" and other researchers (Ho-don & Yang, 2008; Mastroyiannis, 2012) have found to be the case.

Table 5.3 describes the results from Granger-causality test on the relationship between domestic credit expansion in Iceland (change in outstanding stock of credit) and changes in the current account (annual figures).[120]

[118] See also Kouri and Porter (1974) and Werner (2005) in regards to the relation between credit expansion and the balance of payments.

[119] Data from Central Bank of Iceland, Statistics Iceland and author's calculations. Aggregate data is only available. It is therefore impossible to look at only GDP-related credit and/or non-GDP-related credit.

[120] Data was constructed from two different data sources, i.e. from Statistics Iceland's "Hagskinna" and the Central Bank of Iceland. The Hagskinna has data covering the current and capital accounts back to 1946 but meaningful data for outstanding credit only stretches back to 1971, coming from the Central Bank of Iceland (combining them with Hagskinna's data creates an illogical gap in the amount of outstanding credit and it is therefore not done). The reason why the sample is cut short in 2007 is that in 2008 the commercial banks were reconstructed with, practically, an unknown book-value discount compared to the face value of outstanding credit. The capital and current accounts are also under the influence of liquidation of the bankrupt estates of the old banks. Therefore, data from and including 2008

Table 5.3 Credit expansion and Current Account Balance, Iceland

VAR system, lag order 1
OLS estimates, observations 1972-2007 (T = 36)
Log-likelihood = -829.20959
Determinant of covariance matrix = 3.4816229e+017
AIC = 46.4005
BIC = 46.6645
HQC = 46.4926
Portmanteau test: LB(9) = 32.8238, df = 32 [0.4265]

Equation 1: CAB_90kr

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	-2914.07	3472.26	-0.8392	0.40737	
CAB_90kr_1	0.0150094	0.285747	0.0525	0.95843	
d_Credit_90kr_1	-0.275041	0.0826502	-3.3278	0.00216	***

Mean dependent var	-21588.07	S.D. dependent var	34428.40
Sum squared resid	1.02e+10	S.E. of regression	17577.39
R-squared	0.754235	Adjusted R-squared	0.739340
F(2, 33)	50.63719	P-value(F)	8.78e-11
Rho	0.071486	Durbin-Watson	1.803902

Tests for normality of residuals, autocorrelation and ARCH effects all come out favourably (at the 95% significance level). AIC, BIC and HQC all agree that VAR(1) is the most appropriate model.

What those results are telling us is that *credit expansion does indeed Granger-cause the current account to worsen in Iceland*. The causation does not run the other way, i.e. it is unidirectional from credit expansion onto the current account. And including the capital account in the regression does not change the result. In fact, as table 5.4 shows, in the case of Iceland a credit expansion drives both the current account and the capital account (broadly defined, i.e. including reserve transactions, KABRT).

is simply not of the same pedigree as pre-2008 data. The data is reflated with the CPI (source: Statistics Iceland), i.e. it is on fixed-price basis (base year 1990, the year data from Hagskinna stretches to).

Table 5.4 Credit expansion, capital account (KABRT) and current account (CAB)

VAR system, lag order 1
OLS estimates, observations 1972-2007 (T = 36)
Log-likelihood = -1220.502
Determinant of covariance matrix = 5.6260581e+025
AIC = 68.4723
BIC = 69.0002
HQC = 68.6566
Portmanteau test: LB(9) = 50.0231, df = 72 [0.9774]

Equation 1: CAB_90kr

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	-1241.91	4312.75	-0.2880	0.77523	
CAB_90kr_1	0.10849	0.320715	0.3383	0.73736	
KABRT_90kr_1	0.106944	0.160981	0.6643	0.51124	
d_Credit_90kr_1	-0.289363	0.0861015	-3.3607	0.00202	***

Mean dependent var	-21588.07	S.D. dependent var	34428.40
Sum squared resid	1.01e+10	S.E. of regression	17728.09
R-squared	0.757578	Adjusted R-squared	0.734851
F(3, 32)	33.33374	P-value(F)	5.77e-10
rho	0.016143	Durbin-Watson	1.925426

Equation 2: KABRT_90kr

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	-14718	5322.27	-2.7654	0.00936	***
CAB_90kr_1	0.568096	0.395788	1.4354	0.16089	
KABRT_90kr_1	-0.094715	0.198663	-0.4768	0.63677	
d_Credit_90kr_1	0.601026	0.106256	5.6564	<0.00001	***

Mean dependent var	13821.86	S.D. dependent var	49241.10
Sum squared resid	1.53e+10	S.E. of regression	21877.85
R-squared	0.819517	Adjusted R-squared	0.802597
F(3, 32)	48.43407	P-value(F)	5.33e-12
rho	-0.064273	Durbin-Watson	2.084192

All tests for normality come out normal. No autocorrelation problem is detected.

What we can see here is a reconfirmation of the results from table 5.3: it is credit expansion that Granger-causes the current account to worsen, even if we take the capital account into the regression as well.[121] Therefore we conclude that our hypothesis is correct: domestic credit expansion Granger-causes the

[121] This result is concurrent with the general-to-specific methodology (J. Campos, Ericsson, & Hendry, 2005): dropping the capital account (K) empirically simplifies the theoretical model in (3). Therefore, we conclude that the main driver of the current account in Iceland is not capital flows but the creation of credit by the banking system. It should be noted that data for net liquidation of existing savings (L) were not available.

current account to worsen – even if we look at the capital account at the same time as well.

5.2.2 Domestic credit expansion and the depletion of foreign reserves

In the wake of this finding it would be interesting to investigate whether the domestic credit creation causes foreign reserves to be depleted. Indeed, both empirical and theoretical approaches have highlighted this issue (Cottani, Cavallo, & Khan, 1990; Gil-Diaz, 1998; Johnson, 1972; Mwega & Ngola, 1988).

The IMF, in the 6th edition of its Balance of Payments Manual, (International Monetary Fund, 2011) notes that, according to an accounting identity, the following applies:

$$S - I = CAB = NKF + RT$$

Here, NKF is the (net) capital account transactions *excluding* reserves, while RT is "reserve transactions", i.e. change in the (net) holdings of foreign reserves. Thus a current account deficit caused by credit expansion at home, whether the channel be reduced savings (higher consumption) or increased investment, must result in either a capital inflow – when the home currency is accepted by foreigners – or a fall in reserves – such as when the home currency is not accepted by foreigners.[122]

The International Monetary Fund (2011, p. 229) notes the following regarding the impact of what exchange rate policy is in place:

> The previously described framework for analysis of the balance of payments is applicable, irrespective of the exchange rate regime adopted by an economy. For example, if the exchange rate is pegged, then transactions in reserve assets will be determined by the net demand or supply of foreign exchange at that exchange rate (i.e., RT = CAB–NKF). At the other extreme, if the exchange rate arrangement involves a pure float so that no exchange market intervention takes place, then CAB = NKF. In the intermediate case of a managed float, purchases and sales of reserve assets are typically

[122] See the US & China scenario, and immediate discussion after that, in *5.2.1 Domestic credit expansion and current account deficits* for examples.

undertaken to achieve a desired exchange rate path for the domestic currency in terms of one or more foreign currencies.

In the case of Iceland, the Icelandic krona was floated in (March) 2001. Running regressions regarding the impact of credit expansion on the level of foreign reserves would, following the remarks of IMF, not make sense over the whole period 1971-2007 for we should expect a break in the relationship in 2001 when the Icelandic krona is floated. Indeed, investigating the Granger-causality between credit expansion and FX changes in Iceland until and including 2007 yields no sensible relationship at all: FX reserves *go up* as credit at home expands (table 5.5).

Table 5.5 Credit expansion and FX changes, until 2007

VAR system, lag order 1
OLS estimates, observations 1972-2007 (T = 36)
Log-likelihood = -819.77513
Determinant of covariance matrix = 2.0613525e+017
AIC = 45.8764
BIC = 46.1403
HQC = 45.9685
Portmanteau test: LB(9) = 28.6736, df = 32 [0.6357]

Equation 1: FX_90kr

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	218.218	1637.5	0.1333	0.89479	
FX_90kr_1	-0.235481	0.1775	-1.3267	0.19373	
d_Credit_90kr_1	0.0533012	0.0156105	3.4144	0.00171	***

Mean dependent var	3056.729	S.D. dependent var	9418.100
Sum squared resid	2.27e+09	S.E. of regression	8300.569
R-squared	0.267622	Adjusted R-squared	0.223236
F(2, 33)	6.029363	P-value(F)	0.005863
rho	0.014297	Durbin-Watson	1.923911

However, regressing on a sample until and including 2000 yields a relationship between domestic credit expansion and FX reserves that makes theoretical sense: FX reserves are depleted in the wake of domestic credit expansion (table 5.6). AIC/BIC/HQC tests point to a VAR(2) model as being the most appropriate one. Notice that according to the p-value of F-tests of zero restrictions, the d_Credit_90kr variable, i.e. credit expansion, is only significant

at the 90% significance level (p-value 0.0670). Residuals are normally distributed and no problems of autocorrelation are detected.

Table 5.6 Credit expansion and FX changes, 1973-2000

VAR system, lag order 2
OLS estimates, observations 1973-2000 (T = 28)
Log-likelihood = -600.61053
Determinant of covariance matrix = 1.4676114e+016
AIC = 43.6150
BIC = 44.0908
HQC = 43.7605
Portmanteau test: LB(7) = 25.3293, df = 20 [0.1891]

Equation 1: FX_90kr

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	2984.57	1570.63	1.9002	0.07001	*
FX_90kr_1	0.216018	0.193634	1.1156	0.27612	
FX_90kr_2	-0.422322	0.203927	-2.0709	0.04977	**
d_Credit_90kr_1	0.037787	0.0335293	1.1270	0.27137	
d_Credit_90kr_2	-0.10021	0.0405983	-2.4683	0.02144	**

Mean dependent var	1070.285	S.D. dependent var	5384.052
Sum squared resid	5.85e+08	S.E. of regression	5045.101
R-squared	0.252028	Adjusted R-squared	0.121946
F(4, 23)	1.937457	P-value(F)	0.138216
rho	0.074812	Durbin-Watson	1.840904

F-tests of zero restrictions:
All lags of FX_90kr F(2, 23) = 2.3859 [0.1144]
All lags of d_Credit_90krF(2, 23) = 3.0465 [0.0670]
All vars, lag 2 F(2, 23) = 3.7391 [0.0393]

For the system as a whole
Null hypothesis: the longest lag is 1
Alternative hypothesis: the longest lag is 2
Likelihood ratio test: Chi-square(4) = 11.8976 [0.0181]

We therefore conclude that we have empirical signs in the case of Iceland, albeit perhaps weak (just below the 95% significance level), that *credit expansion leads to depletion of foreign reserves.*

It should be noted here that closely connected to this result is the result that credit expansion Granger-causes the capital account to move, see equation 2, table 5.4. In that regression we are using a broad definition of the capital account, i.e. we are including reserves (KABRT). In tables 5.5 and 5.6 we are specifically looking at the reserve account part of the overall capital account. And notice that in table 5.4 we are using the whole sample, i.e. up until and including the year 2007.

This is important as it demonstrates that although credit expansion caused the depletion of reserves up until and including 2000, when Iceland had still not fully floated the Icelandic krona (as expected by the IMF), the effects of the credit expansion can be seen on the overall capital account over the whole time period, i.e. domestic credit expansion Granger-causes the net foreign liabilities of Iceland to increase, no matter the exchange rate policy (float or pegged). This, of course, is expected following Wray (2012): the domestic balance (income minus expenditures) is negative due to the domestic credit expansion and through accounting identities the foreign balance must be positive by the same amount.

Net increment of foreign liabilities is, at least in the beginning, likely to be in the form of depletion of banks' liquid foreign assets, since, as depicted on figure 2.3, the payer's bank will lose part of its (foreign currency) deposit at its correspondent bank when the domestic bank deposit is used to pay for imports. Of course, the payer's bank might, in the wake of that, go searching for ways to replenish its stock of foreign-currency deposits in its correspondence bank, which could lead to changes in its portfolio of liquid and illiquid foreign assets and liabilities back to what they were before the import took place. The domestic bank might e.g. buy foreign currency for the domestic currency (reserves) or raise foreign currency through a (short term or long term) bank loan or other capital inflow.

We should expect this depletion of banks' foreign currency deposits, in the wake of expansion of domestic credit, to be more common in economies which are under the spell of The Original Sin as domestic-currency denominated financial liabilities are not (eagerly) sought out by foreigners. If, however, they

are, the payee's bank (the foreign bank) would be happy to receive reserves in the domestic central bank instead, following the argument of Wray (2012).

5.2.3 Domestic credit expansion and inflation

Since credit creation is the creation of money (see chapter 2) we should not be surprised if credit creation predates an increase in the general price level. The creation of money, in one form or another, has historically been closely correlated with a rise in the price level, going many centuries back in time (Martin, 2013). One of the fundamental theories in economics, the Quantity Theory of Money, makes a connection between the supply of money and the price level, taking the volume of transactions and the velocity of money into account at the same time: MV=PT.[123] And Friedman (1970, p. 11) famously concluded that "*inflation is always and everywhere a monetary phenomenon* in the sense that it is and can be produced only by a more rapid increase in the quantity of money than in output."

Regarding the causality between money and prices there are theoretical arguments for both ways. Monetarists argue that the causality runs from increased money supply to the price level: more money chasing the same amount of goods, leading to inflation. Structuralists argue that relative prices of goods change when the economy changes. However, some prices are downward inflexible. Therefore, due to this inflexibility of some prices, it is the flexible prices that change, driving changes in the price level which lead to passive responses in the money supply (Canavese, 1982). Post-Keynesians find the explanation for inflation in firms pricing their output according to cost pressures and mark-up on top of costs (Lee, 2004; Perry & Cline, 2013). If, e.g., the price of inputs increases firms will borrow from banks, thereby expanding the money supply, to finance the increased nominal cost of production (wages, commodity prices, cost of imported inputs, etc.) following Italian circuit theory (Realfonzo, 2006). Firms then pass the increased costs into the general price level, generally measured by the CPI.

Monetarists' explanations for inflation have been found to have explanation power in some studies (Masih & Masih, 1998; Tegene, 1989) but less so in

[123] Werner (2005) showed that it is appropriate to break the model down to GDP-related transactions and non-GDP-related transactions.

others (Saini, 1982). The empirical record of the Post-Keynesian theory of mark-up pricing is strong as well (Lee, 2004).

Again, we will rely on data from Iceland. Table 5.7 below shows the Granger-causality regression of log-difference of expansion of domestic credit in Iceland and the log-difference of the Consumer Price Index. The result is that Granger-causality runs only one way over the time period 1972-2007, i.e. *from credit expansion onto inflation*.[124] No autocorrelation is in place but, mainly due to the extreme inflation episodes in the 1970s and 1980s, normality tests for residuals fails.

Table 5.7 Credit expansion and the level of inflation

VAR system, lag order 1
OLS estimates, observations 1972-2007 (T = 36)
Log-likelihood = 90.406796
Determinant of covariance matrix = 2.258208e-005
AIC = -4.6893
BIC = -4.4253
HQC = -4.5972
Portmanteau test: LB(9) = 33.7641, df = 32 [0.3822]

Equation 1: ld_CPI

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	-0.0342783	0.0260996	-1.3134	0.19812	
ld_CPI_1	0.307946	0.187377	1.6435	0.10979	
ld_Credit_kr_1	0.602173	0.186377	3.2309	0.00279	***

Mean dependent var	0.175718	S.D. dependent var	0.162059
Sum squared resid	0.186292	S.E. of regression	0.075135
R-squared	0.797335	Adjusted R-squared	0.785052
F(2, 33)	64.91500	P-value(F)	3.65e-12
rho	-0.023518	Durbin-Watson	1.990867

5.2.4 Domestic credit expansion and devaluation of the currency

Finally, we will investigate whether the domestic credit expansion will lead to devaluations of the domestic currency. There are, again, previous arguments that this should be the case. Obstfeld (1982, p. 2) comments that "[d]omestic credit expansion... causes an incipient weakening of the exchange rate. Frankel

[124] Note that this result supports both the monetarist and the post Keynesian view: in both cases, the expansion of the money supply takes place *before* the increase in the general price level. The results do not ask *how* that happens so they do not answer which theory (monetarists/post Keynesian) is correct. For yet another approach, see Werner's (2005) Quantity Theory of Credit.

and Rose (1996) point out that currency crashes in emerging markets tend to occur when the growth of domestic credit has been high. And Cottani et al. (1990) show how credit expansion correlates inversely with the (real) exchange rate in less developed countries (LDCs), i.e. credit expansion leads to (real) exchange rate devaluations.

We will, again, use Icelandic data to add to this literature. Table 5.8 shows the results of the Granger-causality test between the log-difference expansion of domestic credit and the log-difference of the (nominal) exchange rate of the Icelandic krona versus the US dollar over the time period 1972-2007. The residuals are normally distributed. No problems of autocorrelation are detected.

Table 5.8 Credit expansion and the exchange rate

VAR system, lag order 1
OLS estimates, observations 1972-2007 (T = 36)
Log-likelihood = 65.269187
Determinant of covariance matrix = 9.1257983e-005
AIC = -3.2927
BIC = -3.0288
HQC = -3.2006
Portmanteau test: LB(9) = 30.871, df = 32 [0.5236]

Equation 1: ld_USD

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	-0.134164	0.0426507	-3.1456	0.00350	***
ld_USD_1	-0.0369181	0.169322	-0.2180	0.82874	
ld_Credit_kr_1	0.996275	0.200196	4.9765	0.00002	***

Mean dependent var	0.119082	S.D. dependent var	0.194406
Sum squared resid	0.465235	S.E. of regression	0.118735
R-squared	0.648291	Adjusted R-squared	0.626975
F(2, 33)	30.41380	P-value(F)	3.25e-08
rho	0.044205	Durbin-Watson	1.803818

We can see here that the reaction of the exchange rate of the Icelandic krona versus the US dollar is very closely correlated to the domestic credit expansion the year before. We therefore conclude that our hypothesis is correct: *domestic credit expansion does lead to devaluations of the currency*.

We have therefore established that not only is credit expansion closely correlated to foreign direct investment flows, although causality there between

may not be always so clear, and, as Jordà et al. (2011) put it, “the single best predictor of financial instability” but credit expansion also Granger-causes:

a) the current account deficit to worsen, increasing the net foreign liabilities of the economy,

b) the depletion of foreign reserves,

c) inflation to increase, and

d) the devaluation of the domestic currency.

It is therefore worth asking how credit expansion could be controlled in order to prevent these consequences, following Jorda et al and Minsky’s FIH.

5.3 Controlling credit

We learned in chapter 2 that banks are the main creators of credit in the economy. There are numerous ways to influence credit creation. Indeed, general bank regulation is one form of it. Via regulation governments restrict banks’ ability to extend credit to certain borrowers, such as those that cannot offer proper collateral (“Loan-to-Value” requirements) or those that otherwise would be “too big” borrowers for the bank (limits on single-borrower exposure). There are other requirements such as minimum capital requirements and liquidity requirements.

Those regulation requirements, and many more, restrict banks’ ability to create credit, at least to some extent. We will focus on two rather specific ways to control credit creation, which, of course, can be looked upon as two sub-groups of banking regulation but would perhaps be better thought of as parts of the underlying institutional structure of the monetary system itself.[125] Those are “credit controls” on one hand and a complete central bank take-over of the credit creation process.

[125] Two definitions of the word ‘regulation’ (The Free Dictionary, 2014d): 1) “A principle, rule, or law designed to control or govern conduct.” 2) “A governmental order having the force of law. Also called *executive order*.”

5.3.1 Central bank credit controls

Credit controls have many names. They have been called lending ceilings, a corset, credit quotas, credit framing (f. “encadrement”), credit caps (g. “Kredit-Plafondierung”), credit planning schemes, window guidance (j. “madoguchi shidoo”) and credit plans (Cull & Xu, 2003; Werner, 2002). We will mostly stick to “credit controls” here and onwards.

Credit controls can be either selective or general. The former type affects the price, and/or quantity, of specific types of credit (e.g. trade, real-estate, exports, imports, consumption, etc.) while the latter are designed to influence the total amount of credit (Schreft, 1990). Werner (2005, p. 215) makes a similar compartmentalisation of credit controls into “quantitative” (“whereby the central bank calculates by how much total credit creation should increase in the economy...”) and “qualitative” (ibid):

> [W]hereby it [the central bank] decides how the increase (or decrease) in credit creation will be allocated across different industries and sectors of the economy..., while purely unproductive credit (for consumptive or speculative purposes) is suppressed.

Export industries were e.g. favoured over consumption and services industries in Japan (Werner, 2002, 2005). The Reserve Bank of India prefers credit creation to the export industry rather than many other sectors (Reserve Bank of India, 2014).

The central bank can also, like it did in Japan, allocate how much credit each bank gets to create (Werner, 2002, 2005). The severity of the execution can be different as well, i.e. the central bank can directly require the banks to follow the *executive order* that the credit control is or the limits can be interpreted as *guidance* only – with or without any direct implications. Indeed, “window guidance” (the term used for credit controls in Japan and Korea (Werner, 2002)) is another term for “moral suasion” which is (Investopedia, 2014):

> A persuasion tactic used by an authority (i.e. Federal Reserve Board) to influence and pressure, but not force, banks into adhering to policy. Tactics used are closed-door meetings with bank directors, increased severity of inspections, appeals to community spirit, or vague threats.

It should be noted that banks that did not follow the “window guidance” in Japan, i.e. over- or undershot the amount of credit to be created within a time period, were “punished” such as, in the case of overshooting, with a lower credit quota in the next period (Werner, 2002, 2005).

Credit controls, in one form or another, have been used in many countries at some point in time: Japan, China, France, the UK, the US, Korea, Thailand, Germany, Austria, India, Indonesia, Malaysia, Taiwan to name a handful (Werner, 2005). Many central banks abandoned, at least officially, credit controls after the 1970s but at least some of them were nevertheless still applying the instrument, largely in secrecy, although it had been officially abandoned (Werner, 2002, 2005).

5.3.2 Credit controls’ pros and cons: selected issues

First of all, credit controls allow for a control of the money supply, because money is credit. Credit controls can thus be used to fight inflation, perhaps especially when the rate of interest is low which stimulates investment and aggregate demand. The adoption of credit controls in America in August 1941 was looked upon as a way of controlling inflation while the Federal Reserve was committed to keeping interest rates low (Schreft, 1990). Keynes had by that time showed how continuous and high level of employment could, and should, be reached through investment projects, public and private, the sustainability and stability of which depended on the level of long-term rate of interest: if long term interest rates were too high, real capital investment projects, which demanded labour, were unprofitable and investment depended too much on the volatile “animal spirits” of businessmen and their financiers (Tily, 2010). Keynes, in fact, considered it necessary to have and maintain a low enough rate of long-term interest to keep employment in place, via real capital investment, and stave off recessions: he blamed a high rate of interest for being the principal cause of economic downturns (ibid).

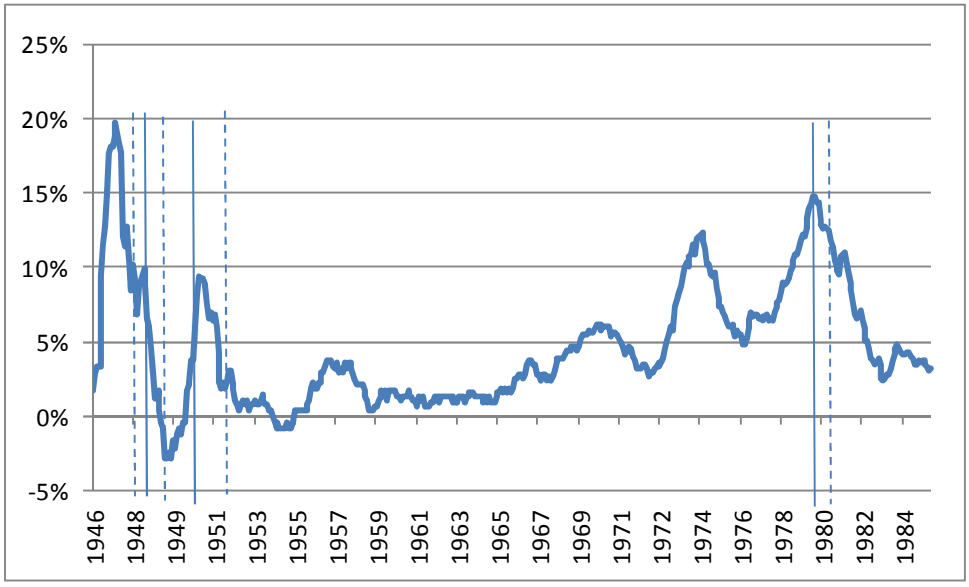
Credit controls are a way of keeping credit creation in the economy in check despite a low rate of interest and, consequently, a high demand from businesses for credit to finance profitable investment projects – profitable because interest rates are low. Through credit controls economic activity can be

kept at a level that is neither too high, leading to inflation and/or a credit boom, nor too low, leading to lack of real capital investment and unemployment.

Via credit controls, the allocation of credit can also be affected. This would be a “selective” or “qualitative” version of credit controls. Credit for speculative purposes (purchases and sales of existing assets, such as housing) can be limited while credit for real economic activity (such as investment projects) can be favoured. The argument for this preference of credit to real economic activity is based on the fact that increased speculative credit can push up asset prices while real economic output can stay the same (Werner, 2005). Credit that is allocated to real economic activity, however, induces economic development via investment and expansion of production capabilities. Research and development – and the general process of “creative destruction” (Schumpeter, 1934) – also needs credit. Therefore, from a social welfare point of view, credit to the real sector of the economy should be favoured over credit used for speculation purposes (Werner, 2005). Credit controls can assist in this allocation process.

On the topic of credit allocation for “real economic activity” rather than speculation purposes with existing assets, it must be noted, however, that credit allocated for consumption purposes, which certainly are “real economic activity”, can be inflationary (Werner, 2005). Indeed, credit controls in the US after the Second World War, which were especially aimed at controlling consumption credit (Schreft, 1990), seem to have been quite effective in controlling inflation (see figure 5.2 and table 5.9). The only instance when inflation did not move favourably with the instatement of consumer credit controls was in September 1948 when the economy was, arguably, still in post-war adjustment.

Figure 5.2 Inflation YoY and credit controls in the US



Source: Fred Economic Data and Schreft (1990). Dashed line: consumer credit controls off; whole line: consumer credit controls on. See also table 5.9.

Table 5.9 Consumer credit controls and changes in the rate of inflation

When	Off or On?	12m inflation at the time	Difference
Nov-47	Off	8.5%	
Sep-48	On	6.5%	-1.9%
Jun-49	Off	-0.8%	-7.4%
Sep-50	On	2.1%	2.9%
May-52	Off	1.9%	-0.2%
Mar-80	On	14.2%	12.3%
Jul-80	Off	13.1%	-1.0%

The case that credit controls can control inflation is therefore appealing, theoretically and empirically. The use of changing the rate of interest in fighting inflation and speculation should also be expected to be a slow and economically painful process, as Keynes pointed out (Tily, 2010): employment would be sacrificed as real capital investments, during a time of high interest rates, were considered unprofitable. Indeed, as the Fed turned to the interest rate weapon against inflation in the early 1980s, and long term rate interest rates (adjusted for inflation) on US corporate debt climbed to levels not seen in half a century (Tily, 2010), employment fell in tandem with inflation. The Joint Economic Committee had the following to say regarding the use of credit controls instead of interest rates, as quoted by Schreft (1990, p. 27).

> The use of general interest rate increases to fight inflation is not neutral in its effects on the economy. It tends to fall most heavily on

> small businessmen and on construction and other long-term investment and is not particularly effective in curbing speculative excesses.
>
> When businessmen begin to accumulate excess inventory because of anticipated price rises, or to overinvest in plant and equipment, their profit expectations are so high that only very large interest rate increases will deter them. In these sectors of the economy, interest rate increases may have an inflationary rather than a deflationary effect. On the other hand, residential construction, which we do not want to discourage, is hit much harder by higher rates.
>
> This committee believes that it would be preferable to concentrate on a prudent and limited restriction of consumer credit as an alternative to general credit restraint [i.e. higher interest rates]. Consumer credit, we know; is not dependent on interest costs because consumers think primarily in terms of the periodic payment they are required to make and, within broad limits, are not deterred or encouraged by interest rate changes.

Credit controls, can also be used to reach special goals for the government. The US used them during the Second World War to support the war effort (Schreft, 1990). The UK did the same (Tily, 2010). The government of China uses, via “credit plans”, the financial system to support the state sector (Brandt & Zhu, 2001) and the Reserve Bank of India uses credit controls to get banks, foreign banks included, to direct credit to sectors that are earmarked as “Priority Sectors” (including, as of 1 February, 2014: agriculture, micro and small enterprises, education, housing, and exports (Reserve Bank of India, 2014)).

However, despite the appealing case that credit controls are a prime way of managing the economy, they are not flawless.

First, most obvious and most important, is that the central bank, or whatever public body it is that decides their amount and/or allocation, can, bluntly put, mess them up. In Japan, where credit controls were used to reach “suitable” nominal economic growth targets (Werner, 2002, 2005), the central bank practically forced the banks to pump out the credit that created the bubble that

collapsed in the early 1990s. Werner (2002, p. 127), interviewing a bank officer of a commercial bank in Japan, writes (italic text in brackets added):

> In the bubble period, we wanted a certain amount [of loan increases], but the Bank of Japan wanted us to use more than that. After 1985, the Bank of Japan said, 'use more!'. Normally, we would not get as much as we want to use... Especially in 1986 and 1987, for about one year, the Bank of Japan said, 'please use more, because we have a recession' [*compared, presumably, to the "suitable" nominal growth rate that the BOJ wanted to reach: real economic growth in Japan was 6.3%; 2,8%; 4.1%; 7.1% in 1985-1988, according to OECD figures*]... Window guidance can be used not just to make borrowing smaller, but also to make it bigger. We [*at the bank*] actually thought, this is a little bit much.

And the results (Werner, 2002, pp. 143-144, italics added):

> Many commentators have blamed banks and their leading executives for the creation of the bubble of the 1980s (and thus also for Japan's deep recession of the 1990s). However, in this paper it has been established that *the true culprit were the extra-legal credit controls* (whose existence the Bank of Japan denies). The problem was not that bank lending was out of control. *To the contrary, it was controlled almost perfectly by the Bank of Japan's window guidance*. Instead, the problem was the policy taken by the Bank of Japan in setting those loan-growth quotas. Because the Bank of Japan chose far larger quotas than banks thought necessary, compliance with window guidance meant that banks were forced to peddle their loans to real estate speculators. The Bank of Japan was aware that its credit controls were sharply raising the allocation of new money to the real estate sector, thus pushing up real estate prices.
>
> Clearly, the window guidance loan quotas set by the Bank of Japan were inappropriate, if the policy was to avoid a major banking and economic crisis.

There are administrative costs of implementing credit controls as well. Werner describes, in the case of Japan (see Werner (2002, p. 114) and also Werner (2005, p. 269)): “Once the banks had submitted detailed lending plans, the Bank of Japan would analyse them according to the use of the loans, such as by sector of the economy or by size of company.” Surely, this process is not free-of-charge when it comes to manpower. This manpower could find more productive ways for its labour and is also likely to be excellently paid, since such lending-plans screening positions would not be for an uneducated individual. It is therefore not unreasonable to think that the overhead and administrative costs for the public body to maintain and execute so detailed credit controls can be noticeable.

Then there is the threat of too much connection between politicians and businessmen, something that was identified as one of the reasons for the financial crisis in Iceland in 2008 (Special Investigation Committee, 2010b). The threat is obvious: a politician or a bureaucrat that is connected to the decision about how much credit should be created and allocated is in a prime position to funnel it to his companions or related parties in the business world, giving them an unfair access to credit and thereby a favourable position to profit. The case of Iceland shows that this is not restricted to an institutional organisation where banks get orders from a public body about how much and where to they should allocate credit: banks in Iceland did not get any direct orders from a public body about the amount or the allocation of credit and yet the close connection between politicians and businessmen proved to be a problem. But introducing a direct chain of command – from a public body straight to the banks – where decisions regarding the amounts and the allocations of credit are conveyed from bureaucrats to bank officers certainly does not make things any better than they were, and perhaps still are, in Iceland. In this respect, it should be noted that one of the arguments against credit controls in the US in 1969 was that the legislation behind them “granted the President and the Board [of the Federal Reserve] almost dictatorial power over credit use” and that the outcome of the bill would be “a complete credit police state” (Schreft, 1990, pp. 27, 28).

5.3.3 Official take-over of credit creation (“debt-free money”)

The idea with debt free money is the following: “money does not need to be loaned into circulation, *but can equally be spent into circulation free of interest*

and redemption, i.e. debt free" (Huber, 2014, p. 41, emphasis added). [126, 127] Today, the creation of money is, mostly, via the creation of credit by banks (see chapter 2). Monetary reform initiatives, such as Positive Money in the UK, the American Monetary Institute, Monetary Modernisation in Switzerland and the Better Monetary System (i. Betra Peningakerfi) in Iceland would however like to separate the creation of money and credit creation in the economy (ibid):

> Banks should be free enterprises, but must not have the privilege to create themselves the money on which they operate. Control of the quantity of money is the responsibility of a state authority (e.g. central bank, treasury, currency commission).

The crux of idea is that the "central bank, treasury [or a] currency commission", following Huber, should be the only identity that creates credit, applicable as money, in the economy (and remember from chapter 2 that the state decides what money is by deciding what it accepts as a payment for taxes). This created credit is then made available to the state which then spends it, rather than lending it (like banks do today), into circulation via government expenditures of all sorts: wages, investment, consumption, defence, etc. However, contrary to the case when money is lent into circulation, there is no obligation for the state to repay this money to the central bank, or the institution that creates this credit. Therefore, the creation of new money, and the resulting state-expenditure of that money, is "debt-free" for the state, hence Huber's words: "money...free of interest and redemption, i.e. debt free".

How this would show up on the state's and the central bank's books can either be in the form of equity or as a perpetual loan, bearing no interest and no repayment obligation (see Jackson and Dyson (2012) and Jackson (2013)).

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[126] The work and the proposals of Positive Money will be extensively used and relied upon here as a representative of the debt-free money proposals. It is not the plan here to make an extensive literature review of every debt-free money proposal that has been put forward. It should be noted here, in the spirit of academic transparency, that the current author has, informally and without recompense, assisted and been in touch with Betra Peningakerfi in Iceland.

[127] "Credit" and "debt" are not the same. "Credit" is related to trust, a "reputation for solvency and integrity entitling a person to be trusted in buying or borrowing" (The Free Dictionary, 2014a). Credit is "a sum of money or equivalent purchasing power, as at a shop, available for a person's use" (ibid) and it is "the sum of money that a bank makes available to a client in excess of any deposit" (ibid). "Debt", however, is "something that is owed" (The Free Dictionary, 2014b), it is "an obligation or liability to pay or render something to someone else" (ibid).

Banks would, as Huber points out, still be around as “free enterprises”. They would have two main purposes.

The first one is that they would collect savings from the public and lend them back into circulation, mostly according to their own opinion regarding the creditworthiness of the prospective borrowers: the public body does not, in the spirit of banks being “free enterprises”, interfere with how banks allocate loans, financed with ex-ante savings only, to their borrowers.[128] Banks would cease being creators of credit – only the public body (the central bank) would have that role – and “they will have to find the money they need to make loans before they make them. Banks will thus become true intermediaries, merely transferring pre-existing purchasing power from savers to borrowers” (Jackson & Dyson, 2012, p. 265). Banks, operating in a competitive market, would use interest rates, and promises of lending the funds to certain sectors that individual savers might prefer over others, to attract savers in order to have funds to lend out to prospective borrowers: “[t]he price of money – the interest rate – will be set by the market” (ibid, p. 266). The central bank would stop using interest rates to influence the economy but instead make decisions on how much (debt-free) money should be created, giving the government the power to spend that money into circulation (Jackson & Dyson, 2012). The decisions regarding how much money should be created and how it should be allocated (spent) into circulation would be independent of each other: an independent monetary committee (the Money Creation Committee, MCC) would decide how much money should be created and simply allow the government, democratically elected or not, to spend that amount into the economy however it wanted to (ibid).

The second main purpose of banks in the reformed system would be to fulfil their current role as intermediaries in the payment system. In a reformed system, where banks do not create any credit at all, the public would make a choice between how much money it would have in accounts accessible at all times (called “Transaction Accounts” (Jackson & Dyson, 2012) or “sight deposit”

[128] However, the public, assumingly so, could (Jackson & Dyson, 2012, p. 262): “Individuals and organisations would have a choice over how the money that they save is to be used. For example, each bank would provide a range of Investment Accounts [from where funds for lending came from] with different interest rates and risks attached to them... As a result, the investment decisions of banks would start to reflect the investment priorities of society.”

accounts (Huber & Robertson, 2000)) and in another type of accounts meant for long-term saving ("Investment Accounts" (Jackson & Dyson, 2012) or "savings" accounts (Huber & Robertson, 2000)) where the money would *only* be accessible after an agreed-upon delay of the initial deposit, i.e. it would be illiquid. When making a payment, a transfer would be made from the payer's Transaction/sight deposit account to the payee's similar account. Banks would still be intermediaries of these payments. Importantly, *banks would not be able to use funds in Transaction/sight deposit accounts for lending* but only the money that had been deposited in Investment/savings accounts. Or as Huber and Robertson (2000, p. 38) explain (emphasis added):

> ...[debt-free money] reform will mean that money held by bank customers in their sight deposit accounts (i.e. as part of the pool of plain money consisting of sight deposits and cash) will clearly remain their money and not the banks'. The banks will hold it for them as their agents, for safekeeping and as a basis for providing them with cash and payment services. *But the banks will not be able to use it for their own business purposes, e.g. in order to lend it to someone else*, unless they have explicitly borrowed it from their customers. Borrowing it from their customers will involve transferring the plain money from customers' current accounts to the bank itself, in exchange for equivalent deposits in savings accounts or other similar accounts. Those deposits in savings accounts will not be money itself; they will represent claims on the part of customers to be repaid the money that the bank has borrowed from them.

Debt-free money issuance – in the sense that the state is not obliged to repay anything at all – has historical examples. Werner (2005, p. 166) quotes Marco Polo as he describes how Kublai Khan created his own debt-free money and spent it into circulation: "With this currency he [the Khan] orders all payments to be made throughout every province and kingdom and region of his empire... And all the Khan's armies are paid with this sort of money." The Treasury of the US issued its own US dollar notes under executive order No. 11,110, signed by Kennedy (Werner, 2005). The Chinese, long before Kublai Khan (b. 1215, d. 1294), and Kennedy, had applied the creation and the expenditure of money in a similar way. They researched monetary theory, in the fourth century BC, and reached the conclusion that money was a "tool" of the sovereign and that the

sovereign body should retain absolute and exclusive control over that tool (Martin, 2013) Their conclusion was (Martin, 2013, loc. 1243):

> If anyone else in the kingdom [than the sovereign] was able to issue money then they would arrogate to themselves control over the value of the [money] standard, and usurp part of the sovereign's power.

Of course, this is very similar to what Huber writes, previously quoted: "[The] [c]ontrol of the quantity of money is the responsibility of a state authority."

5.3.4 Debt-free money's pros and cons: selected issues

The most obvious positive of a debt-free money system is increased seigniorage. In fact, all new money created and spent into circulation would be seigniorage. This could greatly increase this source of income for the government and could lead to lower taxes and/or increased government expenditures in e.g. public investment projects, social security projects or whatever the government wanted to spend it on (Jackson & Dyson, 2012). Seigniorage would again become an important source of revenue for the government, similar to how seigniorage was an important source of revenue for sovereigns in the past (see Martin (2013) on that topic).

A second pro of debt-free money, according to its supporters, is lower debt-burden for the government, if the government chooses to use the newly created money to pay down the national debt (Jackson, 2013; Jackson & Dyson, 2012), and lower need for government borrowing (Jackson & Dyson, 2012; Huber & Robertson, 2000), which could even lead to no government debt at all (Huber & Robertson, 2000). If national debt is lower taxes can be lower. Net after-tax incomes for households and businesses will consequently improve. It should be noted, however, that in an economy that has its own sovereign currency as a legal tender, the government cannot default on nominal payments except by choice (Wray, 2012)[129] The sovereign power in such an economy can always "afford" to spend whatever amount of money it wishes to, although it is not necessarily economically wise to do so: inflation might go up, foreign reserves may be depleted and the exchange rate might fall or even crash (Wray, 2012).

[129] Jackson and Dyson (2012) recognise this, see Appendix II in their work.

Improved control over the total money supply in the economy is another feasible facet of debt-free money (Jackson & Dyson, 2012). If the central bank is the only body in the economy that decides how much money should be created the control of the money supply, which, today, consists mostly of credit created by banks, is greatly improved. This should assist the public body to better influence inflation and stave off credit-fuelled asset booms. This positive feature is shared with that of credit controls.

A problem of debt-free money, however, is the threat of lack of savings to be lent by banks into the economy. If savers do not want to put money into investment accounts at banks, for one reason or another (they do not trust them, the rate of interest is not high enough, etc.) there can be a lack of savings in the economy to finance planned investment projects. The accounting identity S=I will still be in effect but rather than investment leading and causing savings, like Keynes pointed out was the actual case in an economy where banks create credit applicable as money (Tily, 2010), it will be savings that lead investments: the prerequisite of banks being able to lend is that they manage to collect savings into their Investment accounts. If those (particular type of) savings are in short supply, “loanable funds” for investment will be low as well, leading to low investment in the economy and consequently lack of labour demand from real capital investors. Today, banks create the credit, and money, needed for the investor, without any ex ante savings (ibid, see also chapter 2).

This is a criticism that has been responded to by supporters of adopting debt-free money (see e.g. Jackson and Dyson (2012)). However, the solution to the problem that is proposed by supporters of debt-free money has nothing to with *debt-free* money, *spent* into circulation, but with *credit controls*, quantitative, qualitative, decided and forced by the MCC, where the money is *lent* into circulation (Jackson & Dyson, 2012, p. 214, emphasis added):

> After the reform the Money Creation Committee will also be tasked with ensuring that businesses in the real (non-financial) economy have an adequate access to credit... For example, the MCC may decide... to *lend* some newly created money to banks, *with the restriction that the banks can only lend this money to businesses that*

contribute to GDP (i.e. *it cannot be lent for financial speculation, consumer finance or mortgages*)...

Another problem with debt-free money is that it does not ensure that money is primarily allocated to real economic activity, *even* with credit controls similar to those proposed by Jackson and Dyson (2012). The reason is simple: credit controls are only to be imposed on funds that are lent to the commercial banks from the central bank, *not* on funds that banks manage to gather from savers in the economy.

It is easy to reason why banks would choose to finance loans meant for "financial speculation, consumer finance or mortgages" rather than real economic activity.

The first reason is that loans to finance "financial speculation, consumer finance or mortgages" could be less risky and/or more profitable than loans to the real economy. Mortgages have a high-grade collateral while a loan meant to finance entrepreneurial activity might not, which is exactly one of the reasons why it is hard for entrepreneurs with an idea but no or limited collateral to get credit to finance their idea in the first place: they are screened away from the pool of potential borrowers. Getting collateral is a part of banks' screening process of potential borrowers as it reduces the adverse selection problem faced by the banks (a borrower that provides high-grade collateral is less likely to run away from repayments than somebody that provides no collateral and only an idea). Short term lending to finance consumer expenditure can also be a very lucrative business, as profits from such loans can be high due to "stratospheric" interest rates: Wonga is a case in point (Barrow, 2013).

A second reason is that commercial banks would expect the central bank to step in and provide them with credit meant for real economic activity even if they were not lending to such activities from their own funds, borrowed via Investment accounts. Why would the central bank step in? Because there would be enormous political, statutory and professional pressure on the MCC members to create and supply the banks with credit meant for real economic activity (other than consumer finance, which, as we have already established, can be inflationary). Politicians in power would be looking at the real economy slowing down in front of their noses, and apply pressures on the MCC to do

something, i.e. lend the banks some credit so they can lend it out into the economy – or give politicians the money to spend it into the economy. From the professional and statutory points of view, who would like to be a member of an MCC that was responsible for a lack of credit in the economy when that same MCC, according to statute, "will also be tasked with ensuring that businesses in the real (non-financial) economy have an adequate access to credit" (Jackson & Dyson, p. 214)? That same person would not only be remembered as a professional failure, hence the professional pressure,[130] but from a statutory point of view this is comparable with the thought that a central bank, in today's monetary system, can decide to not supply a banking system in need of reserves with reserves. No central bank would ever do that for it is central banks' statutory obligation to maintain liquidity in the financial system, see *2.1.2 On money, credit and banks*. Therefore, it is highly unlikely that an MCC, "tasked with ensuring that businesses in the real... economy have an adequate access to credit" would not be under serious pressure to increase credit in the economy by creating and supplying it to the banks.

Certainly, the MCC members could point out that the banks were not lending to real economic activity from their own Investment-account borrowed funds in order to cast the spotlight on the banks rather than themselves or the government in power. But there is no definite certainty that this would discipline the banks to lend to real economic activities if other types of lending is less risky and/or more profitable and they know that if they hold out the MCC will cave in and lend them the credit: a 'game of chicken' could develop where the MCC could easily lose to the banks due to the pressures aforementioned.

Of course, banks would be more likely to lend to real economic activity if they were given an executive order by the MCC to do so. Threats and other "window guidance" (i.e. "moral suasion") could also be applied by the MCC. But that would be *credit controls*, qualitative or quantitative, imposed *on top of* a debt-free money system where money was spent and not lent into the economy. And

[130] Davíð Oddsson, the now-former governor of the Central Bank of Iceland during the financial crisis in 2008, who also served as the longest-serving prime minister of Iceland (from 1991 to 2004) and the foreign minister (from 2004 to 2005) before becoming the governor of the Central Bank, is still today, in 2014, remember as the man who stood watch when the crisis set in and, at least by some, blamed for it. One of the targets of the Central Bank of Iceland is to maintain financial stability.

according to the proposals, banks are meant to be “free enterprises” in the reformed system so this is not suggested in the first place.

There is, therefore, no guarantee, whatsoever, that banks, in a “laissez-faire” debt-free money system, would prefer to lend money gathered via their Investment accounts to real economic activities rather than “financial speculation, consumer finance or mortgages”. And even with credit controls imposed as Jackson and Dyson (2012) propose, this still might not be the case.

Closely connected to this issue is the potential problem regarding the rate of interest in a debt-free money system. The rate of interest in the economy is set by the public’s liquidity preference (Keynes, 1936). According to the theory, the rate of interest is determined by the demand and supply of money as a store of value. The liquidity preference depends to a large extent on the optimism of savers regarding the uncertain future that they face. If a saver is optimistic about the uncertain future he feels secure enough to demand a low amount of money, *the* liquid asset, as a store of value and he will instead invest his savings in an illiquid form: his liquidity preference is low. In a debt-free money system, this would mean, given a high-enough interest rate to compensate for departing with liquidity, that he would deposit a proportion of his savings in an illiquid Investment account of his choosing. This would mean savings available for lending. If, however, the saver is pessimistic or insecure about his future he will have the tendency to choose money, a highly liquid asset, as a store of value, and not an illiquid Investment account, in order to be able to meet unforeseen expenditures in the future. This translates into a high liquidity preference and, in a debt-free money system, a lower supply of available funds at the given interest rate than if the liquidity preference of the saver were low.

In order to attract funds the banks may offer a higher rate of interest since, as Keynes (1936) pointed out, the rate of interest is the price to depart with liquidity, which is “the instant command over sums of money” (Skidelsky, 2010, p. 92). And in the debt-free money system “[t]he price of money – the interest rate – *will be set by the market*” (Jackson & Dyson, 2012, p. 266, emphasis added). But a higher rate of interest will impair the level of investment and with it the level of employment. A lower level of employment will increase the

insecurity of workers which increases their liquidity preference making the problem worse still: a vicious cycle sets in.

In other words, the rate of interest and the level of investment may not be "self-adjusting" towards the "optimum" level as Keynes pointed out:[131] a sub-optimal equilibrium in the economy, where interest rates, due to a high liquidity preference of savers, are too high to maintain a stable and a high level of employment, can develop and *permanently* set in. Or in Tily's (2010, p. 147, underlining added) words:

> ...Keynes saw a free-market economy as a *multiple*-equilibrium system... [T]his meant that not only the short-run equilibrium but also the long-run equilibrium of an economy <u>could be at any level of employment</u>.

And (Tily, 2010, p. 149, underlining added):

> In logical terms, the saving–investment identity dismisses the classical theory of interest and, as Keynes put it in 1937, leaves the rate of interest 'in the air' (CW XIV, p. 212). An alternative theory of interest is, therefore, required. His [liquidity preference] theory put credit to one side and gave centre stage to phenomena arising from the use of money as a store of value. <u>Analysis of these phenomena led Keynes to his conclusion that there was no reason that the rate of interest prevailing in a free-market economy should be the rate appropriate for full employment</u>.

The logical conclusion of the General Theory was that the central bank should take control of the rate of interest, both the long-term and the short-term rate of interest (Tily, 2010). This is in stark contrast with the image that debt-free money supporters draw. Jackson and Dyson (2012, p. 251, italics added) write:

> In the reformed system *the interest rate will be determined by the market rather than being manipulated by the central bank* in an attempt to control the lending decisions by banks and therefore the

[131] Keynes, as quoted by Tily (2010, p. 136-137), wrote: "[T]he weight of my criticism is directed against the inadequacy of the *theoretical* foundations of the *laissez-faire* doctrine upon which I was brought up and which for many years I taught; – against the notion that the rate of interest and the volume of investment are self-adjusting at the optimum level...".

> business cycle. As a result the interest charged on loans will reflect *the real time preferences* of society as a whole: *if society wishes on aggregate to defer consumption to a future period (i.e. save), the rate of interest will be low* as individuals will place more of their money into Investment Accounts. Likewise, *production should increase as more business investment takes place*, ensuring that the economy as a whole can satisfy the demand for increased future consumption. Conversely, if individuals prefer to consume now, the rate of interest will be high, and consequently less investment will be undertaken. In such a system *the rate of interest* and the *quantity of funds* in Investment Accounts, *which is determined by individuals' preferences for present or future consumption* (spending vs. saving), *determines the amount of investment*, so matching future demand for goods to future levels of production.

This passage deserves some vitally important comments. We will highlight two.

First, Jackson and Dyson assume that deferred consumption, i.e. savings, will predominately or entirely end up in Investment accounts: "...the quantity of funds in Investment Accounts, *which is determined by individuals' preferences for present or future consumption* (spending vs. saving)..." Yet, as Keynes pointed out (Tily, 2010), the act of saving is a two-decision process: first, one decides how much one saves (or, equivalently, spends), i.e. how much of one's income one does not use for spending. Second, that deferred spending, i.e. savings, can either be saved in a liquid form *or* an illiquid form. Keynes's own words were without a doubt (Keynes, 1936, p. 108, italics added):

> It should be obvious that the rate of interest cannot be a return to saving or waiting as such. *For if a man hoards his savings in cash, he earns no interest though he saves just as much as before*. On the contrary, the mere definition of the rate of interest tells us in so many words that *the rate of interest is the reward for parting with liquidity for a specified period*...
>
> Thus the rate of interest at any time, being the reward for parting with liquidity, is a measure of the unwillingness of those who possess money to part with their liquid control over it. The rate of interest is

> *not* the 'price' which brings into equilibrium the demand for resources to invest with the readiness to abstain from present consumption. It is the 'price' which equilibrates the desire to hold wealth in the form of cash with the available quantity of cash...

This is why the demand and the supply of money, as a *liquid store of value*, are important according to the liquidity theory of interest. There is *nothing* that says that I, as a saver, will choose to store *all* my savings in an *illiquid* Investment Account as Jackson and Dyson seem to be assuming in the quoted passage. It would, in fact, be highly unlikely that I would choose to do so as I would demand liquidity (money) for four motives: transaction, precautionary, speculative (Keynes, 1936) and finance motives (see Wray (1992), also *2.1.2 On money, credit and banks*). If my liquidity preference is high I will demand a high rate of interest, according to Keynes's liquidity preference theory, to part with my ability to spend my savings whenever I want or may need to. Parting with this ability to spend my savings is exactly what I would do when I deposited my savings in an Investment account compared to depositing them in a Transaction account. Therefore, savings will *also* be deposited in Transaction accounts, depending on how liquid savers will want to be. But savings in Transaction accounts *will not* be available for lending according to the Positive Money proposal. It is therefore the liquidity preference of savers and not their "real time preference" that determines the supply of "loanable funds" in Investment accounts.

Second, according to Keynes, the level of investment was not just determined by the rate of interest, and available funding, but by the Marginal Efficiency of Capital (MEC), which "reflects businesses' expectations of the yield on investment in an uncertain future" (Tily, 2010, p. 150) as well. Simply put: if the MEC is considered, subject to e.g. businesses' "animal spirits", to be higher than the rate of interest, businesses would like to invest in real capital. But the MEC is greatly influenced by aggregate demand for it influences how businesses make cash-flow expectations about the uncertain future and therefore the yield of investment.

So when Jackson and Dyson write that (italics added) "if society wishes on aggregate to defer consumption to a future period (i.e. save), the rate of interest will be low... [l]ikewise, production should increase *as more business*

investment takes place" they are applying a *ceteris paribus* assumption by looking past the effects of deferred consumption – less cash-flows – on the MEC and consequently investment: deferred consumption constitutes lower cash flows for businesses which decreases the MEC which lowers the investment demand which lowers the demand for labour which decreases workers' wage incomes.

One solution proposed by debt-free money supporters to this potential vicious cycle of lack of loanable funds, low investment, low employment, high liquidity preference and a high rate of interest, has already been introduced: *credit controls* (Jackson & Dyson, 2012, p. 268, emphasis added):

> *If there were a shortage of funds across the entire banking system*, particularly for lending to businesses that contribute to GDP, the Bank of England would possibly opt to auction newly created money to the banks, *on the provision that they are on lent into the real economy* (i.e. to non-financial businesses...)

We have already discussed how banks would be able to effectively force the central bank to provide them with credit that is meant to be lent into the real economy by simply lending their own Investment-account borrowed funds to other activities and wait for the Bank to step in and provide credit. Again, there is no certainty that banks will prefer this type of lending to other types of lending that does not directly end in the real economy, i.e. "financial speculation, consumer finance or mortgages" (ibid, p. 214).

Another proposal, and following "Keynesian" arguments about the maintenance of aggregate demand in the economy, would be public deficit-spending. This would, in all likelihood, decrease the rate of interest somewhat since;

> a) demand for money as a store of value would decrease due to a higher employment level in the wake of debt-free deficit spending, decreasing uncertainties about a potential job loss in the future and thereby providing workers with more secure employment and income levels, lowering their liquidity preference; and

b) the supply of money – a liquid store of value – would increase as more money would be spent into the economy by the government.

Both a) and b) would, according to the liquidity preference theory of rate of interest, push the rate of interest downwards.

But debt-free public deficit spending is a prime chance for bankers and politicians to make a deal about how to share the rents of debt-free deficit spending: bankers could agree to channel credit to particular politically preferable borrowers or constituencies and the politicians would make sure that deficit expenditures, financed with debt-free money, would secure cash flows needed to pay for the credit, plus interests, from the banks. This deal-making between politicians and bankers has happened before and can happen under any political regime at all, democracy or autocracy, and have all sorts of questionable effects: it can constrain competition, lead to taxpayer-financed subsidies, higher leverage of banks, less access to credit – unless you know the right people – and higher interest rates on loans (Calomiris & Haber, 2014). If this is realised, the possible effects of a) and b) here above are counteracted.

Finally, it is possible that under a debt-free money system the rate of interest could fluctuate, even violently. Fluctuations in the interest rate make planning, including investment planning, about the uncertain future difficult as cash flows due to credit and interest rate costs become hard to estimate.

Why would the rate of interest fluctuate? Because it is "set by the market". Keynes pointed out that the rate of interest under a free market was bound to fluctuate, depending on the liquidity preference of the public and the supply of money as a store of value at each point in time (Tily, 2010). No system mechanism to meet any fluctuations in the liquidity preference of the public, such as Keynes's debt management program in the 1930s, is provided.[132] In fact, the supply of new liquidity (money) into the monetary system is, under the proposal of Positive Money, dependent on the current rate of inflation, and not

[132] For more on Keynes's debt management policy, see the work of Tily (2006).

unemployment or the liquidity preference of the public (Jackson & Dyson, 2012). [133]

We therefore conclude that debt-free money has some serious flaws, most notably the risk of high and fluctuating rate of interest, possible lack of private investment and high and/or fluctuating level of employment.

A Suggestion, Part II: The OERS monetary system

5.4 Introduction

So far, some of the issues we have inspected and/or established throughout this whole work are the following:

- FDI flows and stocks have grown significantly in the last decades. The effects of this development on the economy are disputed (Chapter 1). Nevertheless, FDI can potentially have – with some notable limitations – generally a positive impact on GDP growth (Chapter 1).
- FDI flows are preferable – albeit not perfect – over "hot money flows" to finance current account deficits. FDI can complement or substitute those flows (Chapter 1).
- Banking and financial services are the centre of the credit-driven economy as they act as intermediaries and creators of purchasing power. FDI in financial services can have several causes and effects, some welcome – such as distribution of risk, development of financial infrastructure and financial services and increased availability of credit – and some not – such as the risk of credit booms and the establishment of a link that financial instability can travel by internationally (Chapter 2).
- FDI can have implications for the level of financial stability in the economy (Chapters 1 and 2).
- Financial instability can be quantified using Minsky's Financial Instability Hypothesis. Maintaining financial stability is important to support the long-term growth prospects of the economy (Chapter 3).

[133] Inflation may not be the ultimate target (Jackson & Dyson, p. 204): "...in line with democratic principles, if Parliament deems targets other than price stability to be more desirable, it will have the ability to change the MCC's mandate." Of course, this opens the MCC up for many possible political pressures which will not be discussed further here.

- Some of the deciding factors about the level of financial stability in the economy are the level and expansion of debt, the rate of interest, the supply of liquidity in the economy, the external balance of the economy, the real exchange rate, profitability of companies, cash-flow coverage of debt burden and response of the government's expenditures to slack in the economy to sustain cash flows (Chapters 3 and 4).
- The empirical record shows that inward FDI flows can have a negative effect on financial stability (Chapter 4). Financial instability can also cause economic growth to suffer (Chapter 4).
- Credit expansion is not only, according to Minsky, a theoretical cause of but has also been, empirically, "the single best predictor of financial instability" (Jordà, Schularick, & Taylor, 2011, p. 340).[134] We have also seen that credit expansion can be highly correlated with, and even caused and/or supported by, FDI inflows (Chapter 5).

In the wake of this we discussed two ways of controlling credit expansion: credit controls and debt-free (sovereign) money. We, however, saw that those two ways of containing the credit expansion are somewhat lacking, at least certainly not flawless.

In the light of the previous work the current author would like to make the following suggestion regarding possible changes to the monetary system with the aim of maintaining financial stability while still allowing or even encouraging FDI and other long-term international capital flows. The kernel of the suggestion is to follow the empirically observed effects of credit expansion and design the system in such a way that an internal operatus will automatically respond to those observed effects of credit expansion. As such, it is a suggestion in the spirit of post-Keynesian economic theory: relevant and representing reality as observed (see Arestis (1996)).

Banks are still allowed to create credit. Debt-financed investment can therefore take place without ex-ante savings. However, certain credit controls, which are both quantitative and qualitative in nature, are applied and enforced to give the banks profit incentives to create and allocate credit to entrepreneurial and other

[134] To mention a specific case, Werner (2005, p. 232) finds the cause of the Japanese asset bubble in the 1990s being excessive credit creation within the banking system for non-GDP-related transactions (speculation),

real-economy purposes such that economic goals, decided by the government, are reached. The suggestion here assumes that *the economic goals are a stable, yet flexible, nominal exchange rate and a low level of the "misery index",*[135] *i.e. simultaneously low inflation and unemployment.*

As an additional incentive for the banks to efficiently create and allocate credit the government is *encouraged*, within limits, to deficit-spend money into circulation: if banks fail to reach the economic goals via their foreign exchange market and credit-creation activities the government, given a green light from an independent Monetary Creation Committee (a term coming from Jackson and Dyson (2012)), should be encouraged to create the credit needed itself and spend it into circulation with the aim of reaching the economic goals. The government, as the issuer of the legal tender and the political authority which decides the taxes that drive the currency's worth (see chapter 2), can pay whatever rate of interest it chooses for this type of credit creation – including 0%, which, after all, is the "natural" base rate of interest (Forstater & Mosler, 2005).

We will see later how exactly it will be a profit incentive for the banks to make sure this deficit-spending of the government does not happen but the crux of the reason is the following: deficit-spending by the government causes depletion of foreign reserves which is exactly the liquid asset that the banks' credit-creation capabilities hinge on.

Via the economic goals the banks will also have a profit incentive to adjust the exchange rate towards its "optimal level" so that the economy is close to being in balance on the current account while maintaining a low misery index at home. Foreign capital will be free to flow in and out of the economy but domestic banks, being important intermediaries between foreign and domestic parties (see Chapter 2), will have an incentive to primarily induce long-term foreign capital flows rather than short-term capital flows. In other words, long-term flows such as FDI and long-term portfolio flows will be preferred, due to banks' profit incentives, to short-term and more unstable foreign capital flows.

[135] Also known as the Economic Discomfort Index, coined by Arthur Okun (Welsch, 2007).

It is the hope of the author that the system in question can join the pros of credit controls with the pros of "debt-free" money while still accommodating for the positive potentials that capital flows, in particular long-term ones, can offer. The outcome, it is hoped, is a monetary system:

- where neither too much nor too little credit is created

- where created credit is allocated towards real economic development rather than speculation and/or Ponzi finances

- where the domestic economy is in or close to a balance with other foreign economies and where the nominal exchange is stable yet flexible

- where capital flows are possible but preferences are given to more stable and economically favourable long-term flows.

As such, the proposed system is a natural outcome from the research in the previous chapters: if focuses on maintaining financial stability while allowing for capital flows which can bring on added economic benefits for the world but can also exacerbate the boom-bust cycle in economic growth. This includes FDI in the financial sector. The approach here is post-Keynesian in nature: "the starting point of theory [is] the nature of the real world" (Dow, 2001, p. 12) since we begin by observing empirical facts regarding FDI, credit expansion and the construction of the banking system – see previous chapters – and set up our model with that in mind.

5.5 The basic functionality of the system: the OERS

OERS stands for Optimum Exchange Rate System. It is the brainchild of Leigh Harkness.[136] *The fundamental functionality of the OERS is credit controls where banks' credit creation (lending) is bounded by a certain changeable multiple, the value of which depends on how far the economy is from reaching the economic goals set by the policy maker.* This changeable multiple – here christened the

[136] Harkness came up with the OERS system in the wake of his work as an economist for the treasury of Tonga, a small (100,000 habitants) sovereign state in the Pacific Ocean. This monetary system, first developed in the 1990s, has not been published in any peer-reviewed academic journal, as far as I know, and should consequently be considered with warnings thereof. Harkness's work can be accessed on his website: www.buoyanteconomies.com. What follows is predominantly an original contribution of mine, drawing on insights made from earlier in this thesis, but the idea of the OERS is certainly in its entirety Harkness's. All faults and mistakes are mine.

“regulatory DFX ratio” – can be influenced by the banks as their credit creation and credit allocation processes influence the economy to or from the economic goals.

Box 2 – What is the DFX ratio?

The abbreviation “DFX” comes from the variables that are included in it: **D**omestic loans divided by **FX** reserves. Each banking institution has a balance sheet and this balance sheet has multiple assets, which can be divided into “domestic” and “foreign” assets. Each asset class (domestic/foreign) includes different assets, such as cash and cash-like assets (that includes reserves at central banks), bonds and equities, and loans.

The OERS proposal is, essentially, a balance-sheet constraint for banks. Balance-sheet constraints for banks are nothing new: the classical Reserve Requirement Ratio is one of them. However, the OERS focuses on the asset side of the banking system and not the liability side. As such, it is a variant of an asset-based reserve requirement for banking institutions and as such it follows the proposal of Palley (2004).

How to calculate the DFX ratio for a specific bank is very simple. It is simply the ratio of the (nominal) value of loans that the bank has granted to domestic borrowers compared to the bank’s assets in foreign reserves. Foreign reserves are defined as highly liquid net short term foreign-currency assets. At each time t, the value of the DFX ratio for bank A would then be DFX_{At}. This value is then compared to the concurrent regulatory DFX value which the Central Bank decides but, as is clear from the discussion to follow, can be influenced by the banks’ credit creation and allocation.

Each bank will have a certain value for its DFX ratio which is derived directly from its balance sheet at any time. Each bank’s DFX ratio is compared to and bounded by the regulatory DFX value, i.e. a bank’s DFX ratio ≤ regulatory DFX value. The regulatory DFX value is decided and enforced by the central bank. We stress that its value depends on how far the economy is from the economic goals: the closer the economy is to the predetermined national economic goals,

the higher the regulatory DFX value is. As such, the regulatory DFX value is a function of the status of the economy at each time (see also *5.5.4 A graphical representation of the regulatory DFX surface*).

If banks break the regulatory DFX value (i.e. a bank's DFX ratio ≥ regulatory DFX value) the central bank will have the power to respond. The central bank could e.g. issue an executive order, forcing the bank to decrease its lending until its DFX ratio has gone below the regulatory DFX value again. The central bank could also give the bank a "window guidance", as was the case in Japan (Werner, 2002, 2005), on what it should do.

The regulatory DFX value and the central bank's enforcement of it constitute *quantitative* credit controls where the central bank calculates the upper limit of the *amount* of credit created in the economy. The regulatory DFX value also limits the amount of credit *each individual bank* can create, as was the case in Japan (ibid). However, and contrary to the case of Japan, the individual bank can influence greatly the amount of credit it is allowed to create by influencing the economy towards a favoured state and by acquiring foreign reserves.

5.5.1 The banks' profit maximisation problem in the OERS

The regulatory DFX value, which all banks must obey, is a function of three variables, i.e. regulatory DFX_t value = $A_t = f(\mu_t, \pi_t, \Delta E_t)$ where the following applies:

$$1)\ \frac{df}{d\pi} < 0\ if\ \pi > \pi_0, \frac{df}{d\pi} > 0\ if\ \pi \leq \pi_0, \frac{df}{d\mu} < 0\ , \frac{df}{d\Delta E} \geq \frac{1}{1-\Delta E}$$

where π_0 is an inflation target set by the policy maker; μ: unemployment; E: nominal exchange rate (price of domestic currency in foreign currency) and Δ: percentage change in the nominal exchange rate. See also *5.5.4 A graphical representation of the regulatory DFX surface*.

Under the system, all banks will face the following profit (φ) function (ignoring management costs):

$$\varphi = r_L L + r_F F - r_D D$$

with the following balance sheet constraints (ignoring equity):

$$2)\ L + F = D$$

$$3)\ \ L = AF$$

with L: loans; D: deposits; F: foreign reserves. Expressing F in domestic currency becomes:

$$4)\ \ F = \frac{m}{E}$$

where m: units of foreign currency in reserves. The *static* profit function then becomes (at the constraints):

$$\varphi = r_L AF + r_F F - r_D(AF + F)$$

$$= F[A(r_L - r_D) + r_F - r_D]$$

$$5)\ \ = \frac{m[f(\pi,\mu,\Delta E)(r_L - r_D) + r_F - r_D]}{E}$$

Looking at 5) and 1) we see that each bank, no matter its size, has the profit incentive to:

a) have a level of inflation close to the inflation target.
b) have a low level of unemployment.
c) a weak exchange rate.

a) – c) deserve a further comment. We will begin with c).

5.5.2 Banks and the exchange rate in the OERS

Looking at the static profit function of banks (5)), we see that they will have the incentive to have a weak currency, E, as it boosts their profits. They will also want to increase their holdings of foreign reserves, m. This implies, in the static version, that banks will continuously devalue the domestic currency to boost their profits.

This will not happen in dynamic reality. First, the direct influences of devaluing the exchange rate are dealt with with the regulatory DFX value itself since:

$$\frac{df}{d\Delta E} \geq \frac{1}{1 - \Delta E}$$

Remember that ΔE stands for the percentage change in the nominal exchange rate. Why is this derivative as such? Because the DFX ratio is calculated as the ratio between domestic loans and foreign reserves and if E is devalued by ΔE

the bank's DFX ratio falls by 1/(1-ΔE).[137] This, therefore, takes away the ability of banks to boost their credit creation capabilities by devaluing the exchange rate alone (and if the ">" sign applies, this actually *decreases* their credit creation capabilities as the exchange rate depreciates).

We have then to deal with the indirect influences. For that, we must look at the economy as a whole and then identify the banks' role in it.

First, following textbook macroeconomics (Blanchard, Amighini, & Giavazzi, 2010), we express net exports NX as:

$$NX = X(Y^*,e) – IM(Y,e)/e$$

Where X: exports; Y*: foreign income; Y: domestic income; IM: imports; e: real exchange rate (the price of domestic goods in terms of foreign goods). The following applies:

$$\frac{dX}{dY^*} > 0\ , \frac{dX}{de} < 0, \frac{dIM}{dY} > 0, \frac{dIM}{de} > 0$$

We now express Y_a as actual output and Y_p as potential output. We adopt Werner's (2005, p. 208) definition of potential output as "a function of the quantity of factor inputs (QFI) [such as labour and machinery] and the quality of their use (total factor productivity, TFP)." Y_p "can also be considered akin to the aggregate supply of the economy" (ibid). Indeed, Dutt (2010, p. 222, original emphasis) adopts a similar definition of aggregate supply: "...the *maximum* real output that can be produced by the economy given determinants of factor supplies... technological parameters... and a vector of all other possible determinants of [aggregate supply]...". So, by definition, $Y_a \leq Y_p$ (for how can something be larger than its potential, i.e. maximum). We have:

$$Y_a = GDP = C + I + G + X(Y^*,e) – IM(Y,e)/e$$

An exchange rate devaluation boosts foreign demand for domestic goods, leading to increased domestic production and employment of resources,

[137] A simple example for explanation purposes only: Regulatory DFX ratio = bank's DFX ratio = 50 = domestic loans/foreign reserves = 100 billion / 2 billion at exchange rate E. 10% currency devaluation takes place. Then, bank's DFX ratio is 100 / 2.2 = 45.45 = 50/1.1. Therefore, the regulatory DFX ratio should be lowered by a factor of at least 1.1 (1/(1-(-10%)) to stop the bank from being able to create more credit due to exchange rate devaluation alone.

including labour. It also decreases the domestic demand for imports. This moves the economy towards the economic goal of low unemployment as demand shifts towards domestic goods. The regulatory DFX value goes up accordingly. The banks can create more credit given the same amount of foreign reserves. The increase in net exports also improves the economy's source of foreign reserves.

But Y_a cannot be higher than Y_p – by definition – so a devaluation only gets the economy so far. And if Y_a is pushed towards Y_p, inflation pressures build up.[138] This will apply unless Y_a *and* Y_p are expanded at the same time, such as via real capital investment in production facilities (increased/improved machinery), education (improved efficiency of labour) or entrepreneurial activity that "reconfigures" the available inputs into a more valuable output, given costs, than before: Schumpeter's creative destruction. Furthermore, banks' credit expansion in the wake of increased exports and lower unemployment leads to current account deficits (see *5.2.1 Domestic credit expansion and current account deficits*) as domestic purchasing power is used to buy goods, including imported goods. The banks' foreign reserves are depleted in the wake of the credit expansion (see *5.2.2 Domestic credit expansion and the depletion of foreign* reserves). Also, devaluation in the exchange rate can lead to inflation via higher import-prices (exchange-rate pass-through effects). This is complemented by the inflationary effects of the credit expansion itself (see *5.2.3 Domestic credit expansion and inflation*). Higher inflation decreases the regulatory DFX value.

Employment is decided by the intersection of aggregate supply and aggregate demand, i.e. by effective demand (Setterfield, 2012; Stockhammer, 2012). If employment is low, banks will want to boost effective demand, thereby increasing employment and increase the regulatory DFX value, allowing them to create more credit. Here, banks can boost effective demand in three ways.

First, they can buy foreign currencies for domestic, and create a devaluation in the exchange rate. This boosts effective demand. Employment is created and

[138] This is, of course, closely related to the idea of a non-accelerating inflation rate of unemployment (NAIRU). From the post-Keynesian view, the NAIRU is unstable and will move as a consequence of changes in effective demand. This is different from the Neoclassical version of NAIRU for in that case, NAIRU is exogenously determined by supply-side factors arising from the labour market institutional framework (Stockhammer, 2012).

deflationary pressures disappear as actual output (Y_a) approaches potential output (Y_p).

Second, banks can also create credit to boost effective demand. This pushes Y_a up towards Y_p. The creation of credit depletes banks' foreign reserves (or slows down their accumulation) and so raises their DFX ratios via changes in both the nominator (domestic loans) and the denominator (FX reserves). Banks can respond by buying foreign currencies. However, if the banks had already pushed Y_a up to Y_p with credit creation, the consequential devaluation of the exchange rate causes further inflationary pressures: the regulatory DFX value goes down as inflation goes up. In other words, the inflation-governor in the regulatory DFX value now stops banks from being able to expand their loan portfolios, removing the inflationary pressures again.

Finally, banks can reallocate credit without expanding its total supply. In this case, banks can channel credit away from non-productive speculative means with existing assets and inflationary consumer finance towards projects such as capital investment projects. Capital investment projects demand labour and so the employment level rises. Capital investment also expands potential output, Y_p, and, accordingly, decreases or keeps inflation pressures at bay. Note that if the investment project is in exports, this reallocation of credit in the economy can actually *increase* the net receipts of foreign currency despite possible increases in imports in the wake of a higher employment levels and growth of wage income. And, just as in the case of a credit expansion, what banks do on the foreign exchange market (buy or sell the domestic currency) must take the allocation, and quantity, of credit into the account. Too weak exchange rate will create inflationary pressures, which will feed through the inflation governor, and too strong exchange rate will lead to current account deficits and the depletion of foreign exchange (unless met with capital inflows). Allocating credit towards non-productive means, such as speculation, should also have more impact on banks' foreign reserves since no additional production capabilities are created. Banks have therefore the incentive to favour borrowers that plan to invest in real capital rather than speculate with existing assets.

The argument is therefore simple. In the OERS, banks will have the profit incentive to have the exchange rate neither too strong nor too weak. If the

exchange rate is too strong, they will bleed foreign reserves through imports and their profit capabilities are cut. If the exchange rate is too weak, inflationary pressures are formed and the regulatory DFX value is consequently lowered by the inflation-governor and their profit capabilities are cut again. At the same time, credit quantity and allocation must be taken into the account.

5.5.3 Banks, the inflation and the unemployment

Now, if we accept that increased aggregated credit in the economy can be inflationary, then we have no problem accepting that if inflation goes up the regulatory DFX value will be lowered. This forces banks to slow down their credit creation and/or allocating it to projects that expand the production capabilities of the economy, both of which counter the inflation pressure. Inflation will subsequently fall. Banks can also strengthen the domestic currency to respond to inflation but then they risk not only unemployment (because of a fall in effective demand) but also depleting their own stock of foreign reserves as imports pick up. At the same time, they will not favour too weak exchange rate since the inflation governor will be activated in the wake of imports-inflation. This applies to all banks: the inflation governor in the regulatory DFX surface is effective, no matter the banks' size.

The reader may, however, consider it a potential problem that the individual bank may not have the adequate incentive to *allocate* credit towards labour intensive projects if the bank thinks that due to its (small) size, the impact of such allocation (on the rate of unemployment and therefore the regulatory DFX surface) will be remote and not worth the effort. Therefore, full employment may not be reached because banks, individually, do not think they can affect the rate of unemployment enough with their *lending* decisions.

This is unlikely to be a problem for four reasons. First, banks may, formally or informally, decide to act as a collective entity when it comes to their lending decisions. A formal collective action by banks with the purpose of lowering unemployment would be a cartel-like entity. And cartels can be positive for economic growth (Werner, 2005) so this form of collective action by the banks should not be discouraged by the government. An informal collective action by banks would be voting-like behaviour. And although in some cases the chance

of casting the decisive vote is one-in-millions,[139] people still vote – The Paradox of Voting (Downs (1957) is perhaps the most widely-read text on the subject). So banks, even without any formal cartel-like agreement, can act in an informal voter-like way and still decide to allocate credit such that they increase employment.

Second, the fact is that most economies are not characterised by thousands of small banks that have, individually, slim to no effects on the economy when they allocate credit. In a study covering 95 countries Nicoló, Bartholomew, Zaman, and Zephirin (2004) found that in the year 2000 the average ratio of total banking assets in the ownership of the five largest banks in each country was 60% - and the trend was upwards. Surely then, most economies are characterised by banks that are big enough to care about their credit allocation under a well designed regulatory DFX surface.

Third, even if banks are small and they do not act in neither formal nor informal collective action, the central bank can use "sticks and carrots" to get the preferred results. As a carrot, it can increase the unemployment incentive in the regulatory DFX surface. As a stick, it can apply "window guidance" on the banks – and if that information is made public the banks' managers may be swayed, in a "responsible voter" fashion, to amend their ways later.

Fourth, and finally, let's assume that none of the previous points applies, i.e. the economy is characterised with several, small banks that individually have no effect on the employment situation in the economy with their lending decisions, the banks do not act in a formal or an informal collective way as an entity and the central bank does not use sticks and carrots to drive the credit allocation of the numerous small banks in the economy.

Then, banks still have an incentive to lower unemployment. But rather than allocating credit to reach that goal – we are now assuming that they cannot – they can buy foreign currencies for the local one. All banks, no matter their size, will always need net foreign reserves in order to back up their loan portfolios, following the regulatory DFX value. If unemployment is high banks can buy foreign currencies. This lowers their own DFX ratio and, as the local currency

[139] In the American 2008 presidential elections, the average voter had a 1/60,000,000 chance of casting the decisive vote (Gelman, Silver, & Edlin, 2012).

falls in value, increases effective demand which creates employment. At the same time, the inflation governor in the regulatory DFX surface stops banks from devaluing the exchange rate too much. This becomes especially relevant when employment is already high (see also *5.10.1 Simultaneously low unemployment and low inflation*).

Therefore, banks can lower unemployment with their *foreign exchange* decisions even if they are so small that they consider it not worthwhile aiming for that target with their *lending* decisions: the unemployment governor in the regulatory DFX surface is effective, no matter the banks' size.

Therefore, even if the economy is characterised by small banks (which is, empirically, usually not the case anyway so from a post-Keynesian perspective the potential small-banks problem should not worry us much),[140] we rule that the regulatory DFX surface can be used to effectively incentivise the banks to reach the economic goals of low inflation and low unemployment.

5.5.4 A graphical representation of the regulatory DFX surface

The regulatory DFX ratio is a function of three economic goals: low unemployment, low inflation target and a stable nominal exchange rate which, as we have just seen, the banks have a profit incentive to steer towards the "optimum" level, taking credit creation into the account, such that $Y_a = Y_p$.

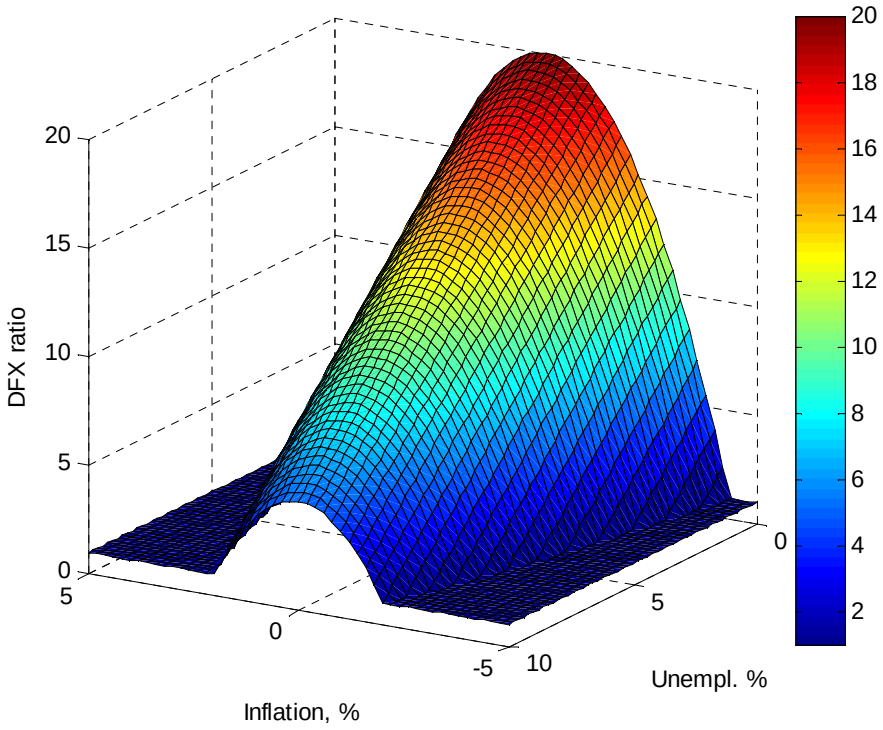
As such, the regulatory DFX ratio is a three-dimensional surface in a four-dimensional space. Such surfaces are not easily drawn on a two-dimensional paper. Therefore, we must settle for figure 5.3 for graphical explanation of how the regulatory DFX ratio works. On figure 5.3 the regulatory DFX surface is maximised at 0% unemployment and 0% inflation but the values and the shape of the regulatory DFX surface should be understood as for presentation purposes only. It is, again, the policy maker who defines the DFX surface.

Recapitulating what has been said before and expanding the discussion even slightly before we present figure 5.3 is in order. The regulatory DFX value is the maximum value that the ratio between banks' domestic loans and their foreign reserves can be. Foreign reserves are very liquid and as such they are a financial asset that yields a low rate of interest. Holding foreign reserves is

[140] See Arestis (1996).

therefore not very profitable. Domestic loans are, however, very profitable since they are more illiquid than the deposits they create. This creates a profit incentive for banks via the net interest differential between domestic loans and domestic deposits. Banks would, from a profit incentive point of view, like to maximise their loans. For that, however, in the OERS they need foreign reserves and/or an economy with a low unemployment and a low inflation. Banks influence the economy with their credit creation and allocation decisions. Operating under the regulatory DFX surface creates, depending on its shape, a profit incentive for the banks to allocate their credit creation in such a way that the economy reaches the economic goals. The closer the economy is to the economic goals, the higher the regulatory DFX value is. Banks can then increase their domestic loans given foreign reserves. Therefore, banks have a profit incentive, due to the credit controls incorporated in the regulatory DFX value, to *allocate* their credit creation towards economic activity that a) demands labour and b) keeps inflation down. Examples would be real capital investment and entrepreneurial activities. Credit creation meant for financial speculation, mortgages or consumer finances would not be incentivised by the regulatory DFX surface since those can be inflationary and do not demand particular labour activity. This constitutes *qualitative* credit controls where the *allocation* of credit is influenced by the central bank.

Figure 5.3 A possible regulatory DFX surface, two social welfare goals.



Formula of the DFX surface shown: max(1, – π^2 – 1.5*μ + 20). *The surface is for presentation purposes only* to explain the functionality of the OERS.

5.6 Why those foundations?

The OERS is a monetary system where banks' lending is tied to banks' foreign reserves. This needs further explanations. Furthermore, the social welfare goals of the system are low unemployment, low inflation and a stable nominal exchange rate.[141] The reasoning for those economic goals needs to be made clear as well.

5.6.1 The foreign reserves base

We saw in *5.2 Credit expansion and some of its effects* that credit expansion in the domestic economy precedes four developments: the current account to worsen, the depletion of foreign reserves, higher inflation and the devaluation of the domestic currency against foreign currencies.

Connecting the credit creation of banks to the foreign reserves has the purpose of making an explicit link there between. If the banking system increases credit in circulation it should expect the overall DFX ratio (sum of all banks'

[141] Harkness's original idea was to rely on only two economic goals: low unemployment and low inflation. He proposed using certain accounting rules to stop banks from devaluing the domestic currency. Here, the nominal exchange rate is incorporated directly into the regulatory DFX surface.

outstanding loans / sum of all banks' foreign reserves) to increase due to two reasons. First of all, the nominator in the DFX ratio (domestic loans/FX reserves) increases. Second, as the credit expansion leads to an incipient depletion of foreign reserves the denominator goes down as well, increasing the DFX ratio even further. This is therefore *a governor*[142] that regulates the supply of new credit being created (see also *5.8 On the governors of the system*).

5.6.2 Inflation, employment and the exchange rate

The purpose of using inflation as a governor is similar to that of using foreign reserves. As credit creation speeds up, inflation can be caused, leading to the regulatory DFX value to fall in value, forcing the banks to slow down their credit creation and/or improve its allocation towards expanding Y_p. Again, this is a governor that reacts automatically to the development of the economy which is under the influence of banks' credit creation and allocation.

Focusing on inflation, employment and the exchange rate has the purpose of incentivising banks to allocate credit to productive purposes, rather than speculation with existing assets or consumer finance. This allocation incentive can not only allow banks to create credit without creating inflation but it can create economic growth as a consequence as well. The banks have also an incentive to balance the economy, taking credit creation and allocation into the account, via the exchange rate, which also acts as a governor. Following in the footsteps of Werner (2005) we can make the following arguments (we will continue calling actual output Y_a while potential output is Y_p).

1) First, if $Y_a < Y_p$ then, for a given productivity level, credit creation may not raise prices. If the credit creation leads to improvement in the utilisation of resources, such as labour (lower unemployment), then production will increase at constant prices. Consumptive lending may in this case improve the utilisation of resources as workers are needed to produce the consumption goods. An exchange rate devaluation, such as when banks buy foreign currencies for the domestic, can cause the same effects: Y_a goes up towards Y_p. However, if the credit creation or the exchange rate devaluation does not manage to improve

[142] Governor in the following meaning (The Free Dictionary, 2014c): "A feedback device on a machine or engine that is used to provide automatic control, as of speed, pressure, or temperature." The opening of Maxwell's famous "On Governors" paper is worth quoting as well (Maxwell, 1867, p. 1): "A governor is a part of a machine by means of which the velocity of the machine is kept nearly uniform, notwithstanding variations in the driving-power or the resistance."

the utilisation of resources, e.g. if no new workers are employed because of it (no, or very few, new workers would be employed because of a credit-fuelled speculation on the housing market), then we will have more money chasing the same amount of goods and the risk of inflation increases. Excessive nominal exchange rate devaluation would have similar effects, especially as it would also affect the cost of imported inputs of production, putting supply-shock pressures on prices. Banks keenness to primarily finance asset purchases is held back by a low regulatory DFX value due to unemployment. Banks can and have a profit incentive to finance economic processes (investment, consumption) that create employment.

2) Second, let us assume here that credit creation, credit allocation and the exchange rate level have been perfected to such a utopian level that $Y_a = Y_p$. Here, factor inputs (labour and real capital) are fully utilised at their maximum efficiency. Then, for a given productivity, credit creation for consumption and/or an exchange rate devaluation are going to raise prices for this is where "more money is chasing the same amount of goods" and the economy simply *cannot* supply more of them as it already is at its maximum potential output level. Ergo, we are likely to have inflation.

3) Third, we will keep the assumption that $Y_a = Y_p$. Here, if banks allocate credit to investment projects (entrepreneurial activity, real capital investments, education projects, etc.) *that expand* Y_p, rather than to finance consumption, then we will go back to the first case where $Y_a < Y_p$ because the production capabilities of the economy are expanded.[143] This will, as was seen in that case, allow banks to create more credit, expanding their stock of domestic loans.

Increasing Y_p, so that $Y_a < Y_p$, can be in the form of increased ability to export (e.g. better machinery or improved quality (education) of labour in an export industry). If demand for exports is in place, exports will increase as the capability to supply them increases. Increased exports show up as a positive entry on the current account, meeting the negative impact credit expansion can

[143] This might happen with a delay, as Schumpeter (1934) argued and Werner (2005) points out: banks' initial credit creation for entrepreneurial activity happens at full capacity utilisation, creating inflation. However, as entrepreneurs create high-value goods, the full value of goods in the economy goes up and the inflation pressure is reversed, partially, entirely or even more.

have on it (see*5.2 Credit expansion and some of its effects*) and improving the development of net foreign assets of the economy. Increased exports are also a source of foreign reserves for the banks, slowing down the incipient depletion of foreign reserves in the wake of credit expansion. Banks have therefore a double profit incentive to lend to investment activities that expand the potential export output of the economy. It expands their domestic loans and provides them with foreign reserves.

Finally, banks' credit creation does not only lead to the incipient depletion of foreign reserves (increasing their DFX ratio) and inflation (decreasing the regulatory DFX ratio) and little effects on employment if allocation is not for productive purposes, but devaluation of the currency as well (decreasing the regulatory DFX ratio). Currency devaluation can also lead to import-price inflation via the exchange-rate pass-through. But nominal exchange rate changes are incorporated in the regulatory DFX value to stop banks from having a profit incentive in continuously devaluing the exchange rate. And if banks were to try to allow the exchange rate to strengthen, thereby increasing the regulatory DFX ratio, imported goods would become cheaper in comparison to domestic goods, leading to current account deficits and depletion of foreign reserves, which increases their DFX ratio. They therefore gain nothing from either too weak or too strong exchange rate.

The system as a whole therefore works as a collection of governors on banks, automatically directing them to create and allocate credit and buy and sell the domestic currency such that the social welfare goals are all reached simultaneously.

5.7 Fiscal activity

We have so far focused on the banking system in the OERS. It is now time to focus on the public finances in the system.

5.7.1 Deficit-spending by the government: how it incentivises the banks

In the OERS it is the banks, via their credit creation and credit allocation, which are made, effectively, responsible for reaching the economic goals – given a well-designed regulatory DFX surface. However, if the banks do not reach the economic goals via their credit creation and allocation the central bank, and the

government, can create the credit themselves and deficit-spend it into the economy with the purpose of reaching those goals. After all, the government, as the issuer of a national currency, creates credit, i.e. money, every day as it pays for goods and services (Forstater & Mosler, 2005, see also next section) and this can be used to reach a lower unemployment level in case the banks do not do it themselves. One possibility would be an Employer of Last Resort (ELR) program (see Tcherneva (2012) for a concise intro to the subject).[144]

This would have important consequences. First of all, the government's expenditures would become "a failsafe" in case the governors in the OERS would not work as expected or if a dominant part of the banks would, e.g. due to external and random shocks, or temporary incompetence, end up with DFX ratios above the regulatory DFX value, hindering their ability to create and lend credit into the economy. This could also be an available option if banks were saddled with bad debts, hindering them from supplying credit into the economy – similar to what Werner (2005) suggested for Japan.[145] While banks were working on reorganising their loan books, so that they would again comply with the regulatory DFX value, the government could sustain employment and cash flows in the economy by spending money into the economy and thereby maintaining aggregate demand. In case of bad debts in the banking system, the government could use bank-credit to do this, i.e. borrow from the banks, to improve their balance sheets as there is no safer borrower than the state (Werner, 2005). This would improve the ratio of good debts vs. bad debts on their balance sheets.[146]

Second, government deficit-spending becomes an incentive for the banks to fulfil the economic goals at all times because the money created by government's deficit-spending can be used, just as other bank-credit created money, as a means of payment in the economy. As such it can be spent on whatever goods and services there are in the economy. Part of this purchasing

[144] If an ELR program would be introduced the regulatory DFX surface could use the ratio of the workforce employed via such program as the relevant unemployment statistics.

[145] Werner (2005, p. 262): "With the ability of banks to create credit severely impaired by bad debts, an economic recovery could be created by a policy of aggressive expansion of both central bank and bank credit."

[146] In serious cases, the establishment of a publicly funded "Bad Bank" could be juxtaposed with other interventions. The Bad Bank would then take over the bad debts of the banking system, effectively bailing out the banks. The Bad Bank can be financed with credit creation from the treasury, similar to when the treasury creates credit every day when it pays for goods and services.

power will lead to imports, leading to incipient depletion of banks' foreign reserves. The government deficit-spending, used to e.g. finance an ELR, therefore decreases the banks' ability to create credit.

Consequently, banks are likely to vehemently oppose such government expenditures. But exactly because the government now directly influences the banks' ability to create credit via its own credit creation via deficit-spending, it can demand of banks that they reach and sustain the economic goals. If they do not, the government will, indirectly, decrease their profit capabilities by creating and allocating the credit that the economy needs itself to reach a level of low unemployment.

Explicitly incorporating the possibility of government expenditures to reach the economic goals in case the banks do not do it therefore creates not only a failsafe in case of a genuine external shock that the banks can do nothing about. It also acts as an incentive for the banks to actually reach the goals. Government expenditures, e.g. in the form of an ELR program, therefore act as a stick and a failsafe at the same time. Whether the government can or will misuse this stick is discussed in *5.11 Responsibly sharing the power to create money*.

5.7.2 Public debt, its management and the rate of interest

When the government spends it credits the reserve accounts of banks at the central bank. When the government taxes, it debits the reserve accounts of banks at the central bank. Net deficit spending by the government therefore leads to a net increase in the reserves of banks at the central bank (Forstater & Mosler, 2005). The government can choose to pay whatever rate of interest it wants on those reserves, including 0% (ibid). A negative rate of interest on reserves is also possible, as current, at the time of this writing, deposit rates for bank reserves at the ECB show us and at Danmarks Nationalbank before that (see e.g. Bomsdorf (2014)).

The purpose, then, of issuing government bonds is not to "borrow" funds for the government which it can then spend – for the government, being the issuer of the currency, credits bank accounts when it spends and therefore does not need to borrow anything in order to be able to spend (Forstater & Mosler, 2005) – but "to manage aggregate bank reserves and control short-term interest rates

(overnight interbank lending rate)" (ibid, p. 538). This can also be looked at as the act of soaking up past monetary expansions due to net-deficit spending by the government.

Another purpose of issuing government bonds is to make sure that (domestic) financial assets are available for savings purposes in case the private sector decides to rein in spending such that the private sector balance (S-I) is positive. In that case, the only way the domestic private sector can find domestic financial assets to use as saving instruments is in the form of government liabilities, following the accounting identity S – I = (G – T) + (X – M): private sector domestic savings are only possible if the government runs a deficit at the same time (Wray, 2012). Therefore, the government *must* issue bonds in order to allow the private sector to save domestically.

Similar to the interest rate on reserves, authorities can pay "whatever they like" (Tily (2010) quoting Keynes (CW Vol. XXVII, p. 391-3)) on government bonds of whatever maturity. Those rates, being considered the risk-free rate of interest, would then become the base of all other rates in the economy. The only prerequisite for this to be valid is that the government must "allow[...] the public to be as liquid as they want" (ibid), i.e. the government must be indifferent about the amount of outstanding government bonds of all maturities. Since the government is the issuer of the currency and as such cannot default on domestic-currency bonds, except by choice, (Forstater & Mosler, 2005; Wray, 2012), the government should be indifferent about the maturity profile of its domestic-currency debt.

The management of public debt should be carried out with this in mind. Its aim should be to influence the rate of interest, i.e. the whole yield curve, towards what Keynes described as the "optimum" rate, where full employment would be reached, and is, according to him, different amongst societies (Keynes, 1936).[147]

It is proposed here that the debt management of public debt would follow that applied in the UK during the 1930s and early 1940s. The theoretical foundations were Keynes's liquidity theory of the rate of interest (Tily, 2006, 2010, 2012).

[147] For a comment on whether it is possible to lower the domestic rate of interest below the world rate of interest without the use of capital controls, see *5.10.3 Will banks stop lending at home?*

While the debt management was following Keynes's advice (1931-1946) both real and nominal long-term interest rates in the UK fell and the economy greatly improved (Tily, 2010).

5.8 On the governors of the system

The OERS is a self-controlled system and fits well within control theory. Its fundamental assumption is that banks want to maximise their profits.[148] It is a dynamic system where oscillations are dealt with automatically within the system itself, resulting in a (financial) system that constantly strays to keep the economy near the nation's economic goals. It should be noted that the system does not need to have any stable "equilibrium". As such, the OERS falls well within the boundaries of post-Keynesian economics, which are "Economics without Equilibrium" (Arestis (1996), referencing Kaldor (1985)).

The problem in control theory is to affect a process that is at time t_0 in initial state $\mathbf{x}^0$ towards the desired state $\mathbf{x}^1$. This process is dynamic and can be expressed with an ordinary differential equation (Aström & Murray, 2008; Benner, 2007):

$$\dot{\boldsymbol{x}}(t) = \boldsymbol{f}\big(t, \boldsymbol{x}(t), \boldsymbol{u}(t)\big), \boldsymbol{x}(t_0) = \boldsymbol{x}^0$$

To reach the desired state $\mathbf{x}^1$, we apply a control function **u**(t) which is an input. The aim is that by applying **u**(t) we will reach $\mathbf{x}^1$ at $t_1 \geq t_0$.

In the case of the OERS, the desired state $\mathbf{x}^1$ is the economic goals. The economy begins at stage $\mathbf{x}^0$. To reach the desired state $\mathbf{x}^1$ we apply the control function "regulatory DFX surface". This underlines the importance of the shape of the regulatory DFX surface. The output is the banks' credit creation and allocation and activity on the FX market which will affect the state of the economy towards the economic goals $\mathbf{x}^1$.

If we use $\mathbf{x}_t$ to signify the state of the economy at time t, $\mathbf{u}_t$ to signify the regulatory DFX value at time t and $\mathbf{y}_t$ to signify the banks' credit-creation activities, including allocation, and foreign exchange activities the chain of events can be described as follows:

[148] Banks may have a social goal, like the local employment of their region (this was commonly the original purpose of savings banks in Iceland). If they do, they nevertheless would fit within the system here proposed.

$$\ldots \mathbf{x}_t \text{ -> } \mathbf{u}_t \text{ -> } \mathbf{y}_t \text{ -> } \mathbf{x}_{t+1} \text{ -> } \mathbf{u}_{t+1} \text{ -> } \mathbf{y}_{t+1} \text{ -> } \ldots \text{ -> } \mathbf{x}^1$$

The governors of the system therefore guide the economy constantly towards the economic goals. A failsafe is incorporated into the system with the possible deficit-spending of the government in case the economic goals are not reached via the control function alone: the banks may not have been following it properly, they may have experienced an external shock which they could do nothing about or the DFX surface was badly designed.

5.9 A note on capital flows in the proposed system

We now turn our attention towards international capital flows in the proposed system. We saw in chapter 2 that banks are intermediaries between the domestic and the foreign economies. They act as such via their role in the payment system where an international payment to/from the domestic economy goes either directly through the nation's central bank or via commercial banks' correspondent banks (see *2.1.1 Banks and the payment system*). Banks also act as intermediaries of foreign funds between domestic borrowers and foreign lenders.

5.9.1 Capital flows and banks' profit incentive

The standard view of short term capital flows is that they respond to arbitrage opportunities (Montiel & Reinhart, 1999). Those arbitrage opportunities can e.g. be high interest rates in the capital-importing economy (ibid) or exchange rate opportunities such as triangular arbitrage. Carry-trade with currencies is one form of this arbitrage opportunity: borrow in a low-interest rate currency and invest the funds in a high-interest rate currency. Liquidity transformation is another way of profiting: borrow short term abroad at a low rate of interest and lend it long term at a higher rate of interest, continuously rolling over the debts as they mature.

A sizeable portion of international wholesale funding, a large part of it short term, goes through the banking system (Brunnermeier et al., 2012). Domestic banks, especially too-big-to-fail banks and under the spell of moral hazard, can profit from liquidity transforming foreign funds. In fact, too-big-to-fail banks always have an incentive to borrow abroad and relend the money to domestic parties, especially under de facto or de jure fixed exchange rates (Eichengreen, 2004; Kraft & Jankov, 2005). This can have serious consequences for the

financial stability of the economy as short-term foreign debt, public or private, can force balance of payments problems onto the economy when capital flows are subject to sudden stops and reversals (Rodrik & Velasco, 1999).

The same authors also note that the ratio between foreign reserves and short-term foreign debt is an indicator of a looming crisis. Indeed, the Guidotti-Greenspan rule is that (emerging) economies should keep foreign reserves such that “usable foreign exchange reserves should exceed scheduled amortizations of foreign currency debts (assuming no rollovers) during the following year” (Greenspan, 1999). Calafell and Del Bosque (2003) showed that the ratio is a useful indicator of an oncoming currency crisis. In the case of Iceland, the ratio was only 8% (instead of the Guidotti-Greenspan recommended 100%) around the time of the collapse in 2008 (Benediktsdottir, Danielsson, & Zoega, 2011).

Parallels can be drawn between the Guidotti-Greenspan rule and the system here proposed. The system is built on foreign reserves, this time of banks instead of the central bank, defined as net short term foreign-currency assets. Banks therefore cannot boost their foreign reserves, and thereby their credit creation capabilities, with short-term foreign borrowing since short-term foreign borrowing does nothing in boosting their net foreign reserves. Banks, if they wish to have an outstanding domestic loan portfiolio, will always have positive net short term foreign assets on their books and since a large part of the international short-term wholesale funding goes through the banking system, as Brunnermeier et al. told us, this will likely have the effect that the economy is very close to fulfilling the Guidotti-Greenspan rule at all times.

Other capital flows, such as into domestic equity and bond markets, are also possible in the OERS. Domestic banks are likely to act as intermediaries in such flows via their brokerage services and participation in the international payment system (see *2.1 What do banks do?*). This includes but is not limited to FDI flows. Such flows are still open for possible sudden-stops and reversals and banks will not, under the OERS, build up any particular system-imposed buffers against possible reversals of these flows. The banks may want to do so nevertheless as a part of their risk management operations or because they would like to prevent the currency from deviating too much from a value that

they expect would balance Y_a and Y_p, given credit creation and credit allocation. The central bank could also choose, independently, to amass foreign reserves in the case of such inflows of short-term capital.

However, the risk to financial stability due to those flows is lower than that due to (short-term) bank flows. Brunnermeier et al. (2012, p. 8) explain:

> In principle, equity-type [rather than debt-type] liabilities should be helpful in a crisis, since foreign investors take an automatic hit if the market value of liabilities declines. The typical equity investor (corporation, pension fund or mutual fund) is not leveraged, so foreign direct investment (FDI) and portfolio equity flows are less likely to reverse abruptly. Even when they do, the impact may be less damaging than a "sudden stop" associated with bank flows. In the case of portfolio equity flows, for example, foreign sellers of stocks in a crisis face the double penalty of lower local currency prices when they sell, as well as a sharply depreciated exchange rate when they exit...
>
> However, debt-type inflows intermediated by banks can generate adverse dynamics, especially in an environment in which GDP is shrinking, price deflation is occurring, and default risk is rising. Although bank-related flows are just one component of overall capital flows, they are an especially procyclical and volatile one that is important for transmitting financial conditions.

To summarise: banks will not be able to expand their domestic credit creation by borrowing foreign currencies for the short-term. They can, of course, still borrow foreign currencies for the short term, it just does not expand their credit creation capabilities. This creates a particularly strong defence against credit expansion during the euphoric phase of Minsky's FIH when concerns about liquidity are suppressed by false overconfidence, because the foreign short-term borrowing by banks, which is procyclical and volatile, is made unprofitable.

Instead, banks can borrow foreign currency *long-term* in order to expand their domestic loan portfolio: that way, the foreign-currency liability is long-term but the asset (raised funds) is short term, thereby boosting their short term foreign

reserves and lowering their DFX ratio at that time (they will then have to deal with it when the long-term liability turns short term, with the passing of time, and their DFX ratio will consequently increase). But such foreign borrowing is much safer than liquidity transforming foreign funds, where the foreign-currency liability is short term. Banks can also make increased use of equity and FDI flows into the economy to boost their foreign reserves and therefore credit-creation capacity at a given state of the economic goals. But those are more stable flows than short-term bank-debt flows and do not pose the same risk to financial stability to the local community as Brunnermeier et al (2012) point out.

5.9.2 The behaviour of capital flows in the system as proposed

So capital flows due to banks' hunt for profits via liquidity transformation of foreign funds – borrow abroad short term and lend long term – are discouraged in the system and long-term bank flows are instead encouraged. But other capital flows, which are short term in nature and can be destabilising, are discouraged as well. We can identify two reasons why.

First, banks, being both managers of money and creators of it (see chapter 2), have less profit incentive than before to speculate with the exchange rate. For even if the money-manager part of the bank wishes to speculate with the exchange rate and asset prices in the hunt for short-term profits made from capital gains on its asset portfolio, creating capital flow as a consequence of that hunt, the money-creating part of the bank does not profit from such activity if it displaces the economy from a path which leads it to reaching the economic goals of the nation where the regulatory DFX value, and the bank's credit creation capabilities, are maximised.

The second reason is that the credit creation of banks is not controlled with a price instrument (policy rate changes by the central bank) but a quantity instrument, i.e. the regulatory DFX value. Short term interest rates, i.e. policy rates, will not change frequently, if ever, in the OERS. Money market interest rates will therefore be very stable. Public debt management is also carried out with the aim and purpose of reaching and sustaining a low rate of interest on government bonds over the whole yield curve. And similar to the management of banks' credit creation, the management of public debt is performed using quantities (outstanding amount of government bonds) and not prices (interest

rates): the price of government bonds is fixed, but the quantity is not while the traditional way is to fix the quantity and let the price fluctuate.

This way of carrying out the management of public debt, along with very infrequent, if any, changes on policy rates, takes away the profit incentive that is created by price speculation: capital gains, or losses, on government bonds due to changes in prices (interest rates) of those bonds become much less frequent. Money managers, including banks, insurance companies, hedge, pension and mutual funds, are, to a significant extent, driven by those gains rather than the income flow (such as interests and dividends) of their asset portfolio (Wray, 2009). Money managers, as they move wealth between economies, creating capital flows as a consequence, therefore lose the main incentive behind their portfolio choices: price speculation.[149]

Capital flows that arise from money managers' hunt for short term capital gains are therefore of a lesser degree than if the price of government bonds would be allowed to fluctuate. Also, due to those mitigating effects of fixed price of government bonds on capital flows, the chances to speculate with the exchange rate will also be of a lesser degree than before. Money managers therefore lose a large part of both the capital-gains incentives that arise from changes in the price of the asset (government bonds) *and* the currency. The time horizon of international capital flows is consequently likely to become longer compared to what it is today since the prospects of immediate capital gains and losses – i.e. asset price and exchange rate movements – are diminished.

In short, the system, as proposed, discourages capital flows driven by "money manager capitalism", a term coming from Minsky to describe capitalism of the sort where managers of money are the "leading players in financial markets and in determining the course of economies" (Minsky, 1988, p. 4). As such, the system works against the intensifying effects that money manager capitalism has on financial instability, described by Nersisyan (2012). We should remember that money manager capitalism has had the effects of shortening the holding period of financial instruments considerably, making them being traded

[149] At least on government bonds and, to a large extent, on money-market securities since policy rates will be stable. Private bonds and equities will still fluctuate in price and be open to speculation. But the vexation arising from capital flows of this type, especially of the equity type, should not be severe, see previous section.

mainly due to the prospects of capital gains (price movements) rather than income flows (dividends).[150]

How, then, would capital flows in the OERS behave if money-manager driven capital flows are discouraged? It is well possible that they will behave more in the Kouri and Porter (1974, p. 447) fashion where "changes in real variables and changes in the domestic component of the monetary base cause portfolio substitutions which lead... to capital flows".

There are, however, a number of points to be made about that possibility. First, the exchange rate is floating in the OERS and not fixed, as in the K&P model. Expectations will still play a part in the formation of the exchange rate, even if the expectations of some short-term capital gain will not be as influential as before. This makes the K&P model inappropriate for the OERS framework for the model neglects the effects of expectations of the exchange rate changes on capital flows. K&P themselves recognise this problem (p. 452).

Second, in the K&P model (ibid, p. 447) "monetary factors are assumed not to influence real variables in the current period." This assumption is rejected. Monetary factors do influence real variables in the real world, and the OERS, and that is the post-Keynesian way of looking at money: it is not neutral, the reason being that the future is uncertain (Arestis, 1996).

Third, the K&P model endogenises the domestic rate of interest. But the (risk-free) interest rate *is* exogenous in the proposed system: the domestic authorities can have the domestic risk-free rate of interest "whatever they like" and fix it there as long as they are willing to buy and sell bonds at the predetermined price (see *5.7.2 Public debt, its management and the rate of interest*).

Fourth, the empirical explanation power of the model can be questioned (see Werner (1994, 2005)).

[150] According to Farrow (2012) the average holding period of a stock in the US is only 22 seconds. The problem is similar when it comes to government bonds: back in 1988, it was already only 20 days on US treasuries with maturities longer than 10 years (Klarman, 1991). And the reason: "Professional traders and so-called investors prize thirty-year Treasury bonds for their liquidity *and use them to speculate on short-term interest rate movements*, while never contemplating the prospect of actually holding them to maturity" (ibid, p. 7, emphasis added).

Rather, it would be more realistic to model capital flows in the system a la Werner (2005). There, total financial wealth (W) of the domestic economy is in foreign (F) and domestic (D) assets such that W = F + D. The causes of capital flows are stock adjustments (where W is unchanged but the ratio between F and D changes) and flow adjustments (where W changes but the ratio between F and D is unchanged). Capital flows therefore take place because existing stock of financial wealth is rebalanced one way or the other and because new financial wealth (credit) is created and added onto the existing wealth.

It is easy to argue that the stock adjustment effects are not going to be prominent in the proposed system. The reason is simple: money manager capitalism is attenuated, as already discussed, and therefore the management of existing stock of financial wealth is not going to be prominent. The main influencer of capital flows is therefore likely to be the flow adjustment. Werner (2005) finds that the flow adjustment alone has considerable explanation power in the case of Japan. It is reasonable, because money manager capitalism is attenuated, to believe that the flow adjustment would even have more explanation power in the proposed system than it had in the case of Japan (of course, this cannot be empirically tested until the system has been adopted). But that means that "net capital outflows are directly proportional to excess credit creation entering the financial circulation [since e]xcess credit creation in the financial circulation expands the total national financial portfolio" (Werner, 2005, p. 241).[151]

Now we must be careful and distinguish between two cases: when the domestic sovereign currency is accepted as a means of payment abroad and when it is not. If it is accepted abroad, the local financial system can create credit (purchasing power) that can be used to "go shopping", as Werner (2005, p. 243) colloquially puts it in the case of Japan, abroad. Capital outflows *can* then be financed with domestic credit creation that enters the financial circulation without the exchange rate to be affected – at least at that moment – because the foreigner accepts that domestic-currency denominated payment at par value, just like any other domestic party does.

[151] Werner (2005) distinguishes between credit used for GDP-based transactions, which he calls C_R, and credit used in financial circulation, which he calls C_F. The latter is closely connected to speculative purposes.

But if the domestic currency is not accepted abroad, this is impossible. Then, credit that enters the financial circulation, which leads to capital outflows via the flow adjustment, will necessarily be exchanged into another currency that is accepted as a means of payment abroad. But, contrary to the case where the domestic currency is accepted abroad, that will lead to exchange rate depreciation and/or depletion of foreign reserves. In the system proposed, that will lead to a decrease of the regulatory DFX value, and even imports-inflation, and/or an increase in banks' DFX ratios, consequently stopping the continuation of the credit creation. Capital flows due to the creation of credit entering financial circulation will slow down.

This shows how reactive the system is to credit creation and how flexible it is in keeping credit creation not only at the appropriate level but also in the real economy rather than for financial activity and speculative purposes. This applies especially for an economy without an internationally accepted sovereign currency. No matter whether the newly created credit is going to enter the financial circulation or the real-economy circulation of the economy, the external balance of the economy is at the forefront, since otherwise banks' foreign reserves will either build up or be depleted. And even if the share of domestic financial assets increases in the total domestic financial wealth a reflex in the regulatory DFX value stops the credit creation from continuing.[152] Credit-driven booms are therefore unlikely to go out of hand. Furthermore, because the banks have the unemployment incentive incorporated in the regulatory DFX value, it gives them the incentive to direct credit to real economic activity, which creates employment, rather than financial and speculative activity, especially since money manager capitalism is attenuated.

5.10 Selected issues and problems

5.10.1 Simultaneously low unemployment and low inflation

Judging from the discussion so far, the reader may get the impression that zero unemployment and zero rate of inflation are the explicit *targets* of monetary policy. The reader can then doubt the empirical possibility of the system, given

[152] In that case, i.e. when there is a stock adjustment towards more domestic financial assets, the nominator in the DFX ratio of banks goes up and sooner or later it will hit the regulatory DFX value. If the credit creation leads to capital outflow (i.e. when the share of domestic assets does not increase, i.e. no stock adjustment) the denominator goes down as well, speeding up the increment in the banks' DFX ratio towards the regulatory DFX value at that time.

that low unemployment and low rate of inflation may be hard to achieve and maintain.

The OERS is constructed on the post-Keynesian approach to monetary policy, i.e. that monetary policy affects *both* output and prices – and not only prices as neoclassical theory maintains (Howells, 2012). The system adopts at least three of the four characteristics of post-Keynesian monetary policy (as listed by Howells (2012)): aggregate demand determines the level of economic activity; full employment is not necessarily reached through free-market forces; and the money supply is endogenous.[153]

In the system an *incentive* is given to banks to construct their credit creation, credit allocation and activities on the foreign exchange market such that unemployment and inflation will be kept permanently low. Theoretically, the optimal scenario is *no inflation* environment with *full employment* of all inputs, real capital and labour, such that actual output is equal to potential output, i.e. $Y_a = Y_p$ and inflation and unemployment will both be equal to zero, simultaneously. Whether this utopian optimality will actually be attained and maintained is a different matter. In fact this would be a very unlikely situation. But even if those utopian targets are not reached, at any particular time, "lower" unemployment and inflation towards the inflation target π_0 in the regulatory DFX surface are still the incentives constantly given to the banking system.

A note on unemployment and inflation and their relationship is in order here. Low unemployment, or "full employment", has no universally agreed-upon definition in economics. To Keynes, full employment was when involuntary unemployment was nonexistent at the market-determined money-wage (Mitchell & Watts, 2012). Later, after the Phillips curve was born (A. W. Phillips, 1958), full employment became a political concept: the rate of unemployment that was acceptable given the rate of inflation (Mitchell & Watts, 2012). The next step in the evolutionary process was the NAIRU: "full employment" was redefined into being equal to the "Non-Accelerating-Inflation-Rate of Unemployment" (ibid). But that said nothing about whether there existed

[153] The fourth characteristic (a preference for more equal distribution of income and wealth) is not directly addressed. Yet, via full employment, this may well be realised if the system works as planned.

involuntary unemployed or under-employed persons or not. Keynes's definition had been abandoned.

The NAIRU is rejected in the post-Keynesian approach to economics. The NAIRU is considered unstable and not unique but will change between time periods as a consequence of changes in the effective demand (Stockhammer, 2012) and the hysteresis effects (Mitchell & Watts, 2012).[154] It is effective demand, and not supply-side or microeconomic problems related to the labour market, that determines whether an economy will be able to *attain* full employment or not. Structural changes, such as technological progresses, depletion of natural resources and changes in consumers' tastes, can then recreate unemployment, i.e. *maintaining* full employment levels can be challenging due to endogenous or exogenous developments (Forstater, 2012).

Inflation, on the other hand, is "a complex social process" (Smithin, 2012, p. 292), caused by a plethora of effects (cost-push, demand-pull, workers-vs.-capitalists bargaining power, tax changes, etc.). Building a universal model of inflation, that fits all times and places, may well be impossible (ibid), although some brush strokes can be made, such as in this work when it comes to the relationship between credit and inflation. The post-Keynesian approach of observing empirical facts should be followed, not forgetting that characteristics and institutional factors of economies can change and invalidate or at least affect the processes that drove the original inflation dynamics.

The relationship between unemployment and inflation – the Phillips curve – is, following post-Keynesian thinking, not to be expected to be stable, just like the NAIRU. Keynes himself did not put forward some sort of a "Phillips curve argument" when it came to the empirical relationship between inflation and unemployment and he would not have argued that there ever was or would be a stable such relationship (Lodewijks, 2012). Keynes argued that the economy was a system that could settle in at multiple equilibria and not a single one. Unemployment could be at any level, both in the short and the long run, and no

[154] Hysteresis has been investigated in many economies. Bolat, Tiwari, and Erdayi (2014) found the effects in Netherlands, Slovakia, Italy, Portugal and Cyprus but not in other Eurozone economies. Australian unemployment exhibits hysteresis (Tiwari, 2014) and the effect has been argued to exist in the US economy as well (Plotnikov, 2014). The fact that hysteresis is not always confirmed to exist signals the importance of the post-Keynesian institutional approach: different economies can have different institutional frameworks that will affect economic outcomes – such as the level of hysteresis.

market-based process would guarantee full employment at all times (Tily, 2010). Inflation could at the same time be at whatever level. Chick discusses price changes without even mentioning the Phillips curve. The reason: "Fundamentally I do not think it was designed for the job [to explain price changes]" (Chick, 1983, p. 282).

The orthodox long run Phillips curve is vertical. Boosting aggregate demand does nothing in the long run but to create inflation in this framework and employment will always settle in at its NAIRU level, which, according to this theory, can only be lowered with microeconomic reforms, such as deregulation, privatisation and the minimal size of the welfare state (Mitchell & Watts, 2012). But post-Keynesians reject the vertical long run Phillips curve (Kriesler & Lavoie, 2004). The rejection is based on the fact that the future is fundamentally uncertain so an expectations-augmented vertical long-run Phillips curve would simply be coincidental (so its slope can be of whatever degree and sign, positive or negative).[155] Instead, as already mentioned, unemployment is caused by lack of effective demand and can exhibit hysteresis effects. Furthermore, inflation is "a complex social process" and its effects are far from being demand-related alone.

The post-Keynesian view is, therefore, that there is no *steady* relationship between unemployment and inflation, neither in the short nor the long run. If there is a Phillips curve in place it can be of any shape and shift without much warning. Also, as Chick (1983) points out, the traditional Phillips curve, as simple and attractive as it is, is victim to exactly its own simplicity. The process of price changes is more complex than including only money-wages. Therefore, the Phillips curve, describing price changes only in relation to the labour market development, is simply inadequate as an explanation for inflation.[156]

The OERS, which adopts post-Keynesian monetary theory characteristics, should be looked at within this post-Keynesian framework of the relationship

[155] As an example, Kriesler and Lavoie (2004) present a Phillips curve that is horizontal over a large range of capacity utilisation in the economy.

[156] That does not mean that some sort of a Phillips-curve relationship cannot be shown to exist between unemployment and inflation in the post-Keynesian framework. An increase in effective demand that increases employment and output can lead to demand-pull inflation (Smithin, 2012), more notably so if capacity utilisation is high (Kriesler & Lavoie, 2004). This would show up as a downward sloping short term Phillips curve. But, as has been emphasised, post-Keynesians are careful not to consider this apparent relationship between unemployment and inflation as lasting or the only important one.

between inflation and unemployment. In the OERS, monetary policy is used to motivate banks to simultaneously reach full employment and low inflation via maintaining adequate demand and prefer lending to real economic activity rather than asset price speculation or inflationary consumer finance. A similarity can be drawn between the new-Keynesian approach and the OERS approach. In the new-Keynesian approach, the central bank faces a loss function (e.g. based on a Phillips curve) in reaching a higher level of employment. The losses are in the form of higher inflation. In the OERS, the "loss function" for the banks, as the conductors of monetary policy (creators and allocators of credit), is the (potential) trade-off between the effects of a change in the level of employment, inflation and the exchange rate on the regulatory DFX value as credit creation and credit allocation take place. We can express this with the following (simplified) relationship in mind:[157]

$$\frac{df}{dc} = \frac{df}{d\mu} \cdot \frac{d\mu}{dc} + \frac{df}{d\pi} \cdot \frac{d\pi}{dc} + \frac{df}{d\Delta E} \cdot \frac{d\Delta E}{dc}$$

This means that the effects on the regulatory DFX value due to credit creation are going to be through the effects that said credit creation has on unemployment, inflation and the nominal exchange rate. Those factors will then affect the regulatory DFX value.

Remember that it is the central bank that decides the shape of the regulatory DFX surface and as such the central bank defines, directly, the "loss function" for the banks. But the trade-off between employment, inflation and nominal exchange rate changes due to credit creation is affected by the *allocation* of credit:[158] the effects of creating credit for consumer finance on the regulatory DFX value is not going to be the same as creating credit for expanding production capabilities in an export industry. The loss function which is derived from the regulatory DFX surface is therefore only a *potential-loss* function where the loss can be minimised by proper credit allocation. The potential-loss function, so defined by the regulatory DFX surface, also influences the rate at

[157] This follows the expressions on p. 254, i.e. regulatory DFX value = f(μ, π, ΔE). This simplification excludes time and also the endogenous effects of changes in between the variables themselves e.g. the effects of a change in the nominal exchange rate on the level of unemployment (which will affect the regulatory DFX value).

[158] Credit allocation is something new-Keynesian models do not commonly address but is an unquestionable part of the incentives in the OERS.

which banks would be willing to allow the currency to fall in value in an attempt to reach a higher level of employment as such currency devaluation can lead to temporary import-price inflation.

The structure of the OERS moves in the direction of letting the private sector, with incentives from the policy maker, solve the problem of *attaining* full employment: the *effective demand problem* (see Forstater (2012)) is, at least partially, solved by the private sector itself due to the unemployment-incentive given by the regulatory DFX surface to banks. The regulatory DFX surface also incentivises the banks to *maintain* full employment, thereby providing a private-sector solution, at least partially, to the *structural change problem* (ibid) of employment.[159] At the same time, low inflation will be strived for by the banking system, no matter the level of employment, via the regulatory DFX surface. On top of this comes the ELR program which provides a public solution to both the effective demand and the structural change problems (Forstater, 2012) and helps stabilising wages and prices (Tcherneva, 2012).

It should be noted that although employment is kept up by aggregate demand it does not mean that more aggregate demand is always better. The reason is simply that although growth theory models have traditionally looked at aggregate demand and aggregate supply independently of each other when postulating about the reasons for economic growth (and employment) in the short and the long run (Dutt, 2010) that approach is likely to be inappropriate (ibid). As an example, theoretically, economic growth could be demand-led in the short run but supply-led in the long run (Lavoie, 2010). If so, more demand does nothing for growth in the long run and its main long-run effects are a higher price level. But other theoretical growth models have adopted the view that *both* aggregate demand and aggregate supply are influential in the long run (Dutt, 2010). Yet, still, more demand will still lead to inflation if the expansion of aggregate supply does not keep up with the expansion of aggregate demand. There is therefore a limit to what aggregate demand can yield in the long run in the forms of economic growth and employment considering the cost paid in the

[159] The effective demand problem is self-explanatory. The structural change problem is when changes in the economy itself cause unemployment, e.g. depletion of natural resources or the invention of a new technology that decreases the demand for labour. Banks will have the incentive, via the regulatory DFX value, to fight against this type of unemployment by allocating credit to new or other industries so that they will have the credit to develop and expand further, reemploying the unemployed as that development and expansion take place.

form of inflation: more aggregate demand is not always better for aggregate supply must follow suit. If it does not, we may have full employment but we are also likely to have high inflation (given a fixed liquidity preference).[160]

5.10.2 Can banks spend other banks' foreign reserves?

When a bank extends credit to a borrower within the OERS it will lead to increased imports as the increased credit in the economy is purchasing power which in the end is spent on all sorts of goods, including imports. But if Bank A extends credit to a borrower, and imports pick up, there is nothing that says that Bank A will see its foreign reserves being depleted. It may just as well be the foreign reserves of Bank B that are used to finance the imports. This seems then to be a problem: banks can extend credit knowing that they may not be the (only) ones which will lose foreign reserves in the wake of it.

Harkness suggests improving the interbank market such that when banks extend liquidity (central bank reserves) to each other they can demand being paid back in a foreign currency. If e.g. Bank A extends credit into the economy it will need to find liquidity (i.e. reserves) in the domestic currency to facilitate that credit extension for "[i]n the real world, banks extend credit, creating deposits in the process, and look for the reserves [in the domestic currency] later" (Holmes, 1969, p. 73). Ways of finding those reserves include (in increasing-cost order) cash from depositors, the interbank market and the central bank (Wray, 2012).

Harkness's suggestion, in short, is that a bank which lends liquidity, in the domestic currency, to another bank on the interbank market may demand to be repaid in the foreign currency (at an agreed exchange rate) if it so chooses: all interbank lending will basically be accompanied with a currency option contract, executable at the will of the interbank-market lender. The same functionality can be in contracts between the central bank and the commercial banks.

[160] Introducing new money into the economy in an attempt to boost aggregate demand, effective demand, output and employment is not a straightforward matter (Keynes, 1936, p. 187-188, emphasis added) "[f]or the schedule of liquidity-preference itself depends on how much of the new money is absorbed into the income and industrial circulations, which depends in turn on how much effective demand increases and *how much the increase is divided between the rise in prices, the rise in wages, and the volume of output and employment*." The OERS assists, via the regulatory DFX surface, in diverting the increase in money supply such that the volume of output and the level of employment grow rather than causing a rise in consumption and asset prices or idle money balances (due to a high liquidity preference of the owner).

This means that when Bank A extends credit and later looks for liquidity in the interbank market, it will lose foreign reserves as it repays that interbank loan, if the lender so chooses. No individual bank would be able to extend credit *and* sit on their foreign reserves like Fáfnir sat on his gold.[161] A positive development of this procedure is that a forward and/or options market would necessarily develop in the domestic currency, a feature that is missing or scarcely developed for many small currencies.[162]

5.10.3 Will banks stop lending at home?

Keynes wrote (quoted by Tily (2010, pp. 78-79), shortened and underlining added):

> Freedom of capital movements is an essential part of the old *laissez-faire* system and assumes that it is right and desirable to have an equalisation of interest rates in all parts of the world... *In my view the whole management of the domestic economy depends upon being free to have the appropriate rate of interest without reference to the rates prevailing elsewhere in the world*. <u>Capital control is a corollary to this</u>.

This seems to be a potential problem within the OERS. Harkness (1995) notes that domestic rates are likely to be insignificantly different from the world interest rates. But we have already seen how, potentially, a public debt management can be used to influence the domestic rate of interest downwards, see *5.7.2 Public debt, its management and the rate of interest*. This would be done to gain a full employment level via investment activity.

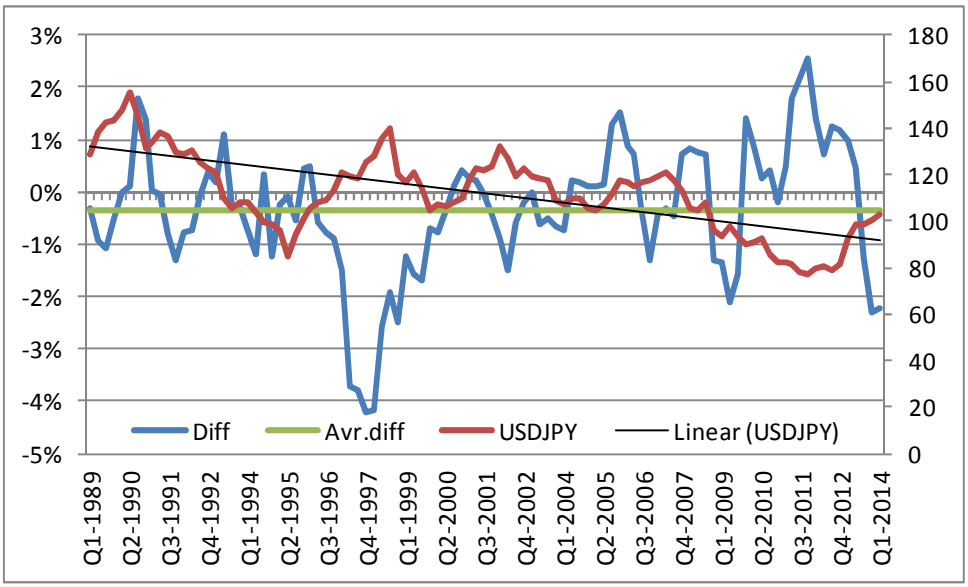
If it so happens that the domestic rate of interest to reach a full level of employment is lower than the world rate of interest, will the domestic public choose to invest all their savings abroad, due to the higher rate of interest? And would banks choose to invest their foreign reserves abroad instead of basing their credit creation at home on it? Will the end result then be a lack of credit due to a too-low rate of interest at home compared to the world rate of interest?

[161] In Nordic mythology, Fáfnir was a dragon who had in his nest a vast amount of gold. He was greedy and poisoned the land around his nest so that nobody could ever approach it and the gold.

[162] For a quick look at the FX forward market and how thinly, or not at all, traded it is with some currencies compared to others, see e.g. CME Group (2014). See also Bank of International Settlements (2013), especially table 5.

This is an unlikely situation to materialise. But before we continue explaining why, it should be noted that interest rate differentials between economies have, empirically, been in place even if the flow of capital is free. Amongst the OECD countries the difference between (nominal) long-term interest rates has ranged between 7 and 21 per cent since 2000.[163] Of course, some of this difference is due to "different estimations of risk", including inflation risk. But even the real interest rate parity hypothesis has, empirically, shown itself to be difficult to prove (J.-L. Wu & Chen, 1998). Furthermore, even if real interest rate parity would hold the balancing item may not be the rate of nominal interest or inflation but the exchange rate: low domestic real interest rates, pushed down by the management of public debt, compared to the "world" real interest rate could be corrected for by a (long term) *strengthening* of the nominal exchange rate instead of changes in the inflation or the interest rate: the chain of events in the interest rate parity hypothesis is unclear. As an example, real interest rates (CPI debased nominal rates, ex post) have been, on average, lower in Japan than in the US since 1989: the difference has been -0.34 per cent (green line, figure 5.6). At the same time, the Japanese yen has strengthened versus the US dollar (figure 5.6, quarterly data from the OECD).

Figure 5.6 Long term real rates differential and the USDJPY exchange rate



Now, let us discuss the problem at hand. First, regarding the banks, it is unlikely that they, operating under a well-designed regulatory DFX surface, will

[163] Data from the OECD.

predominantly choose to invest their foreign liquid assets abroad instead of using them to base their domestic credit creation on.

The reason is the following. Imagine that the rate $r_h = r_d + \delta_d$ is the home rate of interest for private borrowers from banks. r_d is the "risk free" rate at home; the rate on fully liquid government bonds, externally decided by the central bank and maintained via the management of public debt, see *5.7.2 Public debt, its management and the rate of interest*. δ_d is the risk premium private borrowers pay on top of the risk free rate. At the same time, the "world rate of interest" is $r_w = r_f + \delta_f$ where r_f is the risk free rate abroad and δ_f the risk premium foreign firms pay on top of that. The problem is that if $r_h < r_w$ is needed to sustain full employment, will banks invest their foreign reserves abroad instead of creating credit at home?

Let us look at the choice of the individual bank. Let us imagine that the individual bank within the OERS has acquired NX new foreign reserves. Since there are no capital controls in the OERS, the bank can freely choose to invest the NX either abroad or at home. What will the bank do?

The bank may choose to use the NX foreign reserves to create and extend credit in the home economy even if the rate of interest is lower than abroad. If the bank is going to create credit at home then the interest income of the domestic loan would be (in the domestic currency):

$$DFX * NX * (r_d + \delta_d)$$

At the same time, the interest income of the foreign loan is (in the foreign currency):

$$NX * (r_w + \delta_f)$$

Assuming no changes in the exchange rate, the profit incentive for the bank to lend at home rather than abroad is the following:

$$DFX \cdot NX \cdot (r_d + \delta_d) > NX \cdot (r_f + \delta_f)$$

$$DFX > \frac{r_f + \delta_f}{r_d + \delta_d}$$

So as long as the regulative DFX value is high enough, the bank will have the profit incentive to use its foreign reserves to create credit for domestic borrowers rather than investing abroad. Notice also that if banks borrow long term overseas at $r_f + \delta_f$ the individual bank can still have the profit incentive to borrow abroad and use the foreign currency it gets to expand its creation of credit at home. That would in fact draw foreign funds into the economy despite $r_h < r_w$.

But what about everybody else? Even if banks will be willing to use their foreign reserves to base their domestic credit on rather than using them to buy foreign assets, will the general public not still want to buy foreign high-interest rate financial assets, keeping its savings abroad rather than at home at a lower rate of interest?

First, in regards to this question, remember that we have already argued that stock adjustments of financial wealth between foreign (F) and domestic (D) assets are not going to be prominent in the proposed system. Rather, capital flows are mainly going to be driven by flow adjustments and those adjustments will be driven by credit creation which will again be kept in check via the regulatory DFX surface.

The case of “everybody else” preferring to keep their savings in a foreign form would be a stock adjustment towards foreign financial assets, the extreme of which would be domestic wealth stored in its entirety in foreign assets. From a portfolio theory point of view, that would be equivalent to placing all the eggs in the same basket. The holders of financial wealth in the economy are unlikely to make that choice. Furthermore, domestic parties ultimately need purchasing power in the domestic currency and not a foreign one. This creates a demand for financial wealth (store of value) in the domestic currency. So “everybody else” is not going to move all their wealth into foreign assets, creating acute and everlasting shortage of foreign reserves. Yes, financial wealth may be shifted between domestic and foreign financial wealth in the beginning, after the adoption of the system. But that stock adjustment would be temporary and so would its effects on capital flows be.

Second, and generally about the possibility overall of having a rate of interest that is lower than the world rate of interest, this is basically an argument stating

that countries (central banks) are not tied to a global interest rate because they can exploit the uncovered interest parity condition, UIP, as long as they manage to create expectations about a stronger exchange rate in the future.[164]

Lavoie (2000) discusses exactly this. He points out that one interpretation of the UIP is that it means that domestic interest rates cannot be lower than world rates – unless exchange rate expectations are manufactured by the policy maker. The real interest rate parity (RIP) is practically the same, taking inflation into the account. But Lavoie also points out that empirical studies have failed to prove that the UIP applies, just as is the case when it comes to the RIP. He also points out (relying on Coulbois and Prissert (1974) and Prissert (1972)) that the forward exchange rate is set administratively by foreign exchange dealers by reversing the covered interest rate parity, CIP. [165] In other words, the forward exchange rate is not a market-driven approximation of $E(S_{t+1})$ but simply calculated, by foreign exchange dealers, using the other known variables in the equation, i.e. $F_t = S_t * (1+i_f) / (1+i_d)$. Therefore, the domestic monetary power can do whatever it likes to domestic interest rates – they are exogenously determined by it as long as it is willing to supply liquidity as the market wants (see *5.7.2 Public debt, its management and the rate of interest*) [166] – and the forward exchange rate will simply follow: lower the domestic rate of interest and the forward exchange rate will appreciate.

That, however, is not enough since the forward exchange rate is a bad predictor of the future spot exchange rate (Lavoie, 2000). As Lavoie points out, J. T. Harvey (1993, p. 517) is of the opinion that "...*actual* changes in the exchange rate are a function of how dealers *expect* the rate to change over the short and medium term." Those expectations are subject to uncertainty, herd-behaviour and other traits focused on by the post-Keynesian literature. "News" is one variable that Harvey finds influential in moving the exchange rate and breaks it down to news of a) monetary policy moves, especially regarding actual or

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[164] For ease of reference, the UIP is: $\frac{1+i_f}{1+i_d} = \frac{E(S_{t+1})}{S_t}$.

[165] Again, for ease of reference, the CIP is: $\frac{1+i_f}{1+i_d} = \frac{F_t}{S_t}$ where F_t is the forward exchange rate at time t.

[166] Footnote 9 in Lavoie (2000) is also interesting in this perspective where he refers the work of Dow (1999) who is of the opinion, according to Lavoie, that, fundamentally, it is the *offered* liquidity in the currency that affects the rate of interest of assets denominated in that currency. This only strengthens this author's opinion that Keynes's public-debt management would be effective in influencing the rate of interest to whatever level the monetary power would see fit to reach full employment in the economy, see section *5.7.2 Public debt, its management and the rate of interest* and the references therein.

hinted interest rate movements, b) balance on the current account, c) economic indicators (excluding the current account), d) central bank intervention in the foreign exchange market and e) other news. Harvey finds that a), b), c) and e) are the most influential news that drives the exchange rate.

Now think about a), b) and c) in the OERS as proposed.[167] Factor a) is pretty much non-existent since the monetary policy is not driven by interest rate changes anymore but rests on quantitative and qualitative credit controls. Factor b) is still in effect but its prominence is likely to be limited since banks will not be able to create credit, which drives the current account down, to a larger extent than the DFX surface allows them. They are also unlikely to allow the current account to be in a large surplus as it would constitute a build-up of foreign reserves in the economy, which can be used to create more credit. Factor c) will be just as important as before and since the economic indicators in the OERS are, if the system works, generally positive, since the system drives the banks to reach the economic goals, c) is likely to have, generally, strengthening effects on the exchange rate in the long run. Lavoie points exactly this out when he highlights that a low rate of interest can actually draw in foreign capital, especially of the long term type, since the low interest rates spur economic growth. And, as we saw in chapter 4, economic growth actually drags FDI into the economy.

To summarise the argument: domestic interest rates that are lower than the world interest rate are possible in the OERS because the forward exchange rate market follows the interest rate changes of the domestic monetary power (CIP holds by definition) and positive economic development in the wake of a low domestic rate of interest will spur speculators and investors to strengthen the exchange rate over the long term. In short, as Lavoie (2000, p. 176) notes:

> The empirical failure of uncovered interest parity, combined with the cambist causal explanation of the covered interest parity relation and the Post Keynesian view of the foreign exchange market, sustains the notion that central banks are able to set real rates of interest that

[167] "Other news" (factor e)) were news that were impossible to rank with a)-d). Harvey mentions a military confrontation (US vs. Libya in early January 1989, supposedly the Gulf of Sidra incident) and these news must be evaluated one by one. Other "other news" could then be e.g. politics or the weather.

> are lower (or higher) than those ruling on average in the rest of the world.

5.11 Responsibly sharing the power to create money

John Locke (1821, p. 116) wrote:

> The great question which in all ages has disturbed mankind, and brought on them the greatest part of those mischiefs which have ruined cities, depopulated countries, and disordered the peace of the world, has been, not whether there be power in the world, nor whence it came, but who should have it.

Martin (2013) describes how the power of creating money has been "perennially" fought over by the sovereign and private parties. Today, the situation is that most money is created by the banking system (see e.g. figure 2.6). However, that has not always been the case as Martin (2013) points out. The power of money creation was considered the *right* of the sovereign by the Chinese. Creating money – the seigniorage – was in some cases the main source of income for the government (ibid). Supporters of taking the money-creation capabilities away from banks want, basically, to move the money-creation power back in its entirety to the state, showing, indeed, how perennial this battle is.

But the sovereign power has repeatedly misused this power (ibid). Exactly because seigniorage can be such an important source of revenue it is easy for the government to be tempted to issue "just a bit more". This causes inflation and devalues the purchasing power of existing stock of money, changing the monetary standard in comparison to the amount of goods it can buy. This inflationary episode can, in some cases, be democratically favoured as it recalibrates the monetary standard, when it becomes "unfair", towards increased fairness (ibid). An example could be when financial assets are mainly distributed towards a plutocratic elite and the plebs want economic justice and equity, and demand them via their political right to cast a ballot – and if they do not have that right the plutocratic elite risks a plebeian revolution (Acemoglu & Robinson, 2013).

But history shows that the sovereign cannot be entirely trusted to handle the power to create money in an economically responsible way – and democracy is open to the flaws of populism: will the common populace most definitely reach the economically soundest conclusion via the ballot? Every so often, the sovereign misuses the power of creating money at the cost of the private sector (Martin, 2013), whether populism is a problem or not.

Minsky famously pointed out that “everyone can create money; the problem is to get it accepted” (Minsky, 2008, p. 255). The private sector does this everyday as private parties enter into promises to pay, i.e. create an IOU, and most of today’s money creation takes place in banks (see Chapter 2). But contrary to the sovereign no private party has political authority. And as Martin (2013) points out, private money only works in good times when it is trusted. When confidence vaporises it is the sovereign that must step in and provide liquidity, even equity, to the banking system. And sovereign money (today, central bank reserves) is at the top of the liability pyramid: it is the ultimate payment of taxes and private liabilities make use of the currency, the money, that the government issues and demands payments of taxes in (Wray, 2012). For a long time, the sovereign has been recognised as having the responsibility – and the capability – of stopping a liquidity crisis in the banking system (Martin, 2013) exactly because the sovereign controls the only institution that has the capability of creating vast amount of liquidity of sovereign money almost instantaneously: the central bank. The problem is however still in place but turned on its head: the cost of the private sector’s misuse of the power to create money is now borne by the sovereign. The money that is created by the central bank to finance a bailout for the private banking system could be used for something else, such as providing a free-for-all road or free-for-all education.

The problem is therefore essentially the same if the power to create money, de jure or de facto, is mainly in the hands of either the private sector or the public sector: those who benefit from creating the money do not bear the full cost of their actions in case they create too much or too little of it. When the sovereign creates all the money, and creates an economic mess (such as inflation), it is the private sector that foots the bill. When the private sectors creates the money, and creates an economic mess (such as debt-induced crises), it is the

public power that foots the bill. Money creators, in brush strokes, do not equally face both the potential upsides and downsides of their money-creation actions.

The system here proposed solves this accountability problem. The solution is in the form of deficit-spending by the government that is aimed at reaching the economic goals of the nation in case the banks do not reach them. As previously explained, deficit-spending by the government leads to depletion of banks' net foreign reserves. They will therefore vehemently oppose such spending. But if the government is going to hold back on its deficit spending, it will demand that of banks that they reach and sustain the economic goals: *quid pro quo*.

Friedman (1978) believed "that the problem in this world is to avoid the concentration of power."[168] On a similar note, Acemoglu and Robinson (2013, p. 364) note that "[r]ich nations are rich largely because they managed to develop inclusive institutions at some point during the past three hundred years" and that (ibid):

> Under inclusive economic institutions, wealth is not concentrated in the hands of a small group that could then use its economic might to increase its political power disproportionally. Furthermore, under inclusive economic institutions there are limited gains from holding political power, thus weaker incentives for every group and every ambitious, upstart individual to try to take control of the state.

Werner (2005, p. 214-215, emphasis added) also writes:

> Since the credit market is supply-determined and the decision about whether and how much to lend and who to lend to is entirely made by the banks, *a crucial public goods function that affects the entire economy is performed by them...* [But t]here is no guarantee [in a laissez-faire system] that the choice made by individual banks is consistent with the [credit] allocation that would maximize social welfare. Given the pervasiveness of imperfect information, it would be a mere coincidence if the banks' decisions were welfare optimal.

[168] Relying on small and decentralised banking systems to counter the concentration of power within the financial system has been proposed (Werner, 2013).

> Indeed, *the incentive structure of loan officers may produce behaviour that is oriented towards other goals than what would be in the interest of the overall population* (for instance, they may favour large-scale firms in established industries, as this may minimize risk to their own job security, or real estate speculators, expecting high profits).
>
> Thus there is a case for government intervention at various levels: firstly, the government can intervene to implement *an institutional design* for the banking system, which will give loan officers *incentives* that will align their individual behaviour more with the social welfare goal. Secondly, the government or other delegated authority (such as the central bank) may enhance welfare by intervening in the decision-making process concerning the decision of *how much to lend in aggregate* (that is, how much total credit should be created) and *who to lend to* (which industrial sector, and so on).

In the system here proposed, and contrary to the ideas of "debt-free" money supporters, banks will still, as they do today, take the first step in the money creation process. They will still be able to allocate *and* create – and not merely, as in the "debt-free" money proposals, allocate – credit and money, i.e. the medium of exchange. After all "that is what they are for" and "[t]hat is the banking business, just in the same way a steel plant makes steel" according to a former governor of Bank of Canada (Towers, 1945). But banks' economic power, their "economic might", will be limited compared to what it is today, the reason being that not only are their credit (money) creation capabilities quantitatively limited by the central bank's regulatory DFX value but they have a strong incentive to adhere to the wishes of society of economic welfare. If the banks, via their credit creation and allocation, fail to reach the economic goals and their private-money creation leads to divergence from these goals, the government will step in and create the money itself. The government will get its seigniorage, as is one of the goals of debt-free money supporters, but *only* if banks have failed to reach the economic goals. This is a clear institutional incentive structure for banks, which, albeit not being directed directly to loan officers, is along the lines of Werner's recommendations. His recommendations of some sort of quantitative and qualitative credit controls are also heeded.

But a vital question still stands unanswered: will the government, like the sovereigns of old, not misuse its power to deficit spend?

5.11.1 Will the government misuse its power to deficit-spend?

This is an institutional question. As such, we seek insights from Acemoglu and Robinson (2013). The question is then: how do we set up an institutional design such that the government will not, or, preferably, cannot, misuse its power to deficit-spend?

Wray (2012) notes that there are no operational constraints on the ability of the government to spend money. The constraints are self-imposed and political in the form of inflationary and exchange rate pressures. In the framework set up here, another political pressure will be coming from the banks since government spending will lead to depletion of banks' foreign reserves. That, on top of political pressures on the government in the form of democratic voting, should tip the scale such that there are "limited gains from holding political power" when it comes to the government's power to create money by spending. This institutional design is that of inclusive economic and political institutions.

If this is not a strong enough institutional design around the system, it can be strengthened further to limit the government from spending "just a bit more" and misuse its power to deficit-spend money into existence. One way of doing that would be to set up a "Money Creation Committee", MCC, a term coming from "debt-free" money supporters. The MCC would have the (constitutional) mandate to stop the government from expanding the money supply via deficit-spending if inflation goes above a pre-determined value, which could even be decided by the MCC itself. The MCC would therefore act as the "traffic-light" of government deficit-spending, stopping the government from misusing its power to create money if inflation is too high.

At the same time, the MCC can also be the institutional venue for different opinions of interested parties to be publicly and democratically discussed. It will not be discussed in detail here how this institutional venue could be organised but following Acemoglu and Robinson (2013) work on inclusive institutions and their favourable economic consequences, some simple principles should be kept in mind.

First, political and economic accountability should be in place. Political and economic powers should be limited, such as with a cap on how long and how often an individual can sit on the MCC. Second, all interested parties should be represented and their voices equally heard: pluralism should be favoured.[169] Third, an institutional design that caters for quick execution of decisions is favourable as, in times of crisis, time can be severely limited and actions must take place swiftly. The possibility of temporarily ignoring the MCC's constitutional mandate for low inflation should e.g. be considered in case of war or other crisis. For excellent examples of crises where time was short, see Bruner and Carr (2007) and Sorkin (2010).

5.11.2 The deal

The system here proposed is a *deal* between the banks and the sovereign power: the government allows the banks to create and allocate credit, functioning as money, into the economy. Instead, it demands a well-functioning economy at all times: *quid pro quo*. Deals between those parties are common and, indeed, those two parties *need* each other: banks need e.g. clear property rights and a well-functioning legal system, which the government provides, to be able to operate safely, while the government needs a well-functioning payment system and an economy-wide supply of credit, which the banking system provides, to have a flourishing economy (Calomiris & Haber, 2014).

In the end, it is beneficial for both the banks and the government that everybody plays by the rules and that the economic goals of low unemployment, low inflation and a stable exchange rate are reached. And it is in nobody's interest to cheat: if banks do, the government will stop them, via the regulatory DFX surface, and even outright take over the money creation process. If the government cheats, and inflation goes out of bounds, the MCC can stop it in its tracks. It will also face political pressures, especially from banks. *Quid pro quo* goes both ways.

[169] An example of a five-member MCC could be the following: a central bank representative, a bank representative, a government representative, a labour union representative, and an independent academic (with a background in monetary economics). The meetings of the MCC should be open to the public and/or the media for transparency reasons. Records of MCC meetings should be public.

5.12 An empirical case: Croatia

Croatia[170] is a small European economy with its own currency, the kuna (HRK). The currency regime is classified by the IMF as a "crawl-like arrangement" versus the euro (International Monetary Fund, 2013a), but Croatia, which joined the EU in 2013, expects to, eventually, join the euro zone (Thomson, 2013). Geršl and Jašová (2014, p. 13) describe the arrangement as follows:

> The National Bank of Croatia *de jure* employs an exchange rate regime of managed floating... [But] *de facto* operates under a quasi-currency board that allows for exchange rate volatility to discourage one-way gambles and speculation and encourage FX hedging.

We can use statistics from the Croatian National Bank (CNB), the World Bank and the Croatian Bureau of Statistics to discuss what the implications for the Croatian economy would be if the OERS system had been adopted.

A credit expansion took place in the Croatian economy, both immediately after the war of independence (which ended in 1995) until 1998 and again after 2000 until 2008 (Geršl & Jašová, 2014; Kraft & Jankov, 2005). This credit expansion, also visible on figure 5.7 (data from CNB Bulletin, Table D1), had the effects of stimulating current account and foreign debt problems along with generally increasing the threat of a banking crisis (Kraft & Jankov, 2005). To hold back the credit expansion, regulations regarding banks' reserve requirements were applied (2004-2006), capital buffers changed and credit ceilings adopted (from January 2003 to December 2003 and November 2007 until 2009: the limit was 16% annual growth of banks' outstanding credit but circumvented via banks' foreign offices, see Dell'Ariccia, Igan, Laeven, and Tong (2013)) amongst other measures (Geršl & Jašová, 2014).[171] Some of those measures worked, to some limited extent (ibid), but the overall stock of outstanding credit expanded nevertheless noticeably as figure 5.6 shows (data from CNB).[172]

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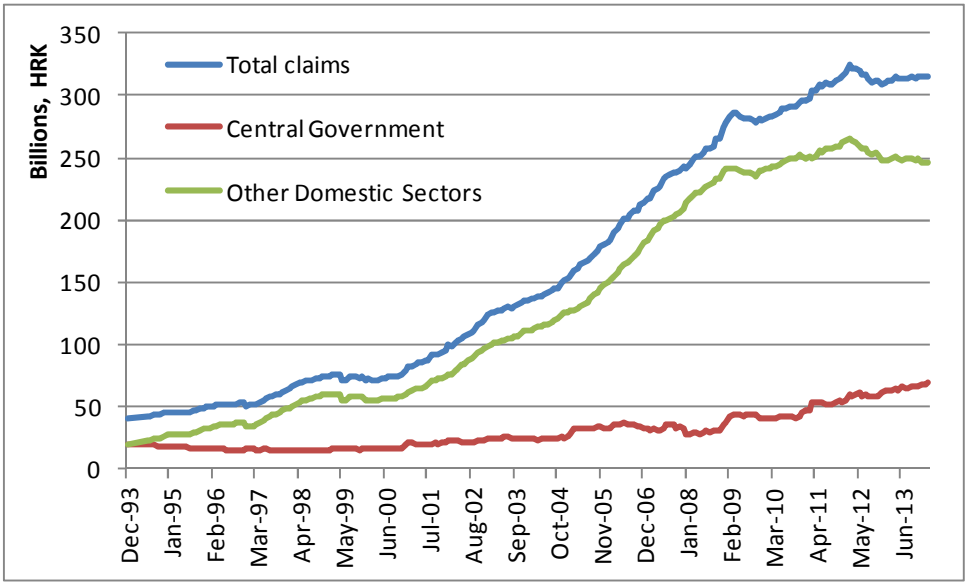
[170] Special thanks to Ines Merkl at the Publishing Department of the Croatian National Bank for assistance in finding data for this section. All faults are mine.

[171] As expected, according to endogenous money creation theory (see chapter 2 for an introduction), the changes in the reserve requirements were ineffective in holding back the expansion of credit: "...the boom did not stop in 2006, rendering the overall effectiveness of such measures questionable" (Geršl & Jašová, 2014, p. 17)

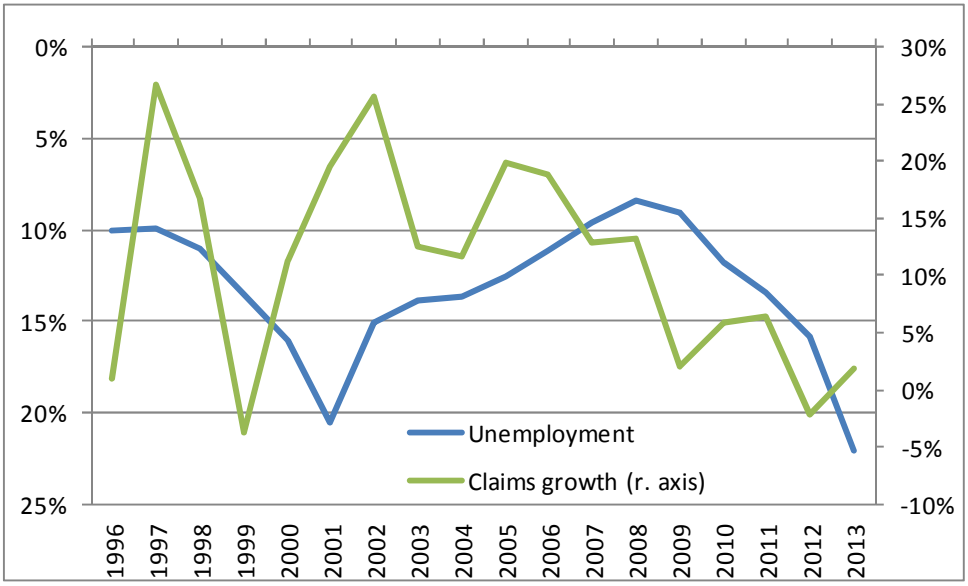
[172] "Credit institutions" includes banks and non-bank financial institutions. The power to create credit (money) does not reside with the non-bank private sector but only banks (Werner, 2005). It is hoped that

Figure 5.6 Croatia: Credit institutions' claims (all currencies) on domestic sectors



This credit expansion was accompanied with a fall in the unemployment rate and strong economic growth, especially immediately after the end of the war of independence. However, when the credit expansion slowed down, unemployment rose and GDP growth fell. Inflation, after an initial short term burst, fell as well and is now, in May 2014, below 0%, i.e. deflation (figures 5.7-5.9).

Figure 5.7 Croatia: Unemployment and growth of total claims of credit institutions



the assumption that "credit institutions" mainly includes banks, in the case of Croatia, is not a heroic one and does therefore not excessively eschew the following discussion.

Figure 5.8 Croatia: GDP growth and growth of total claims of credit institutions

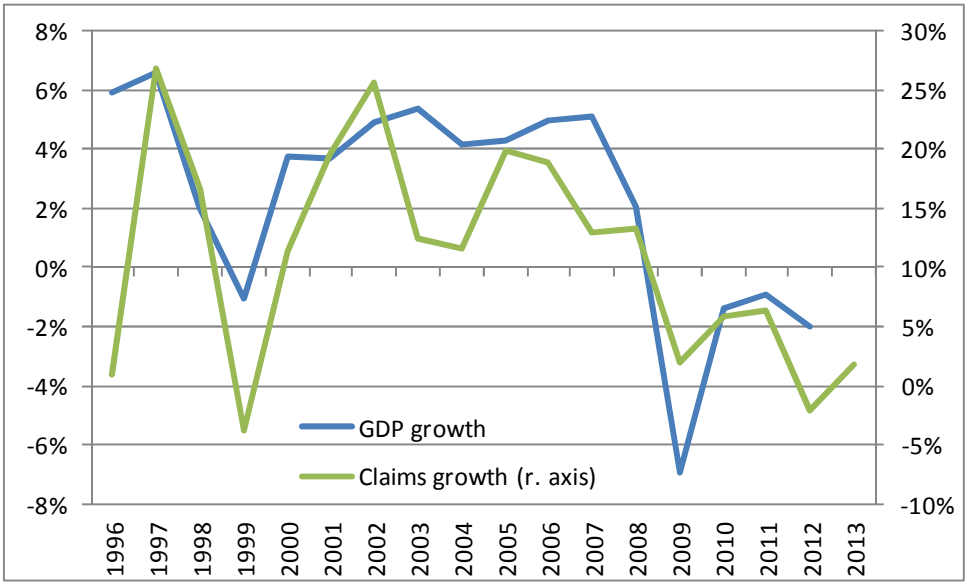
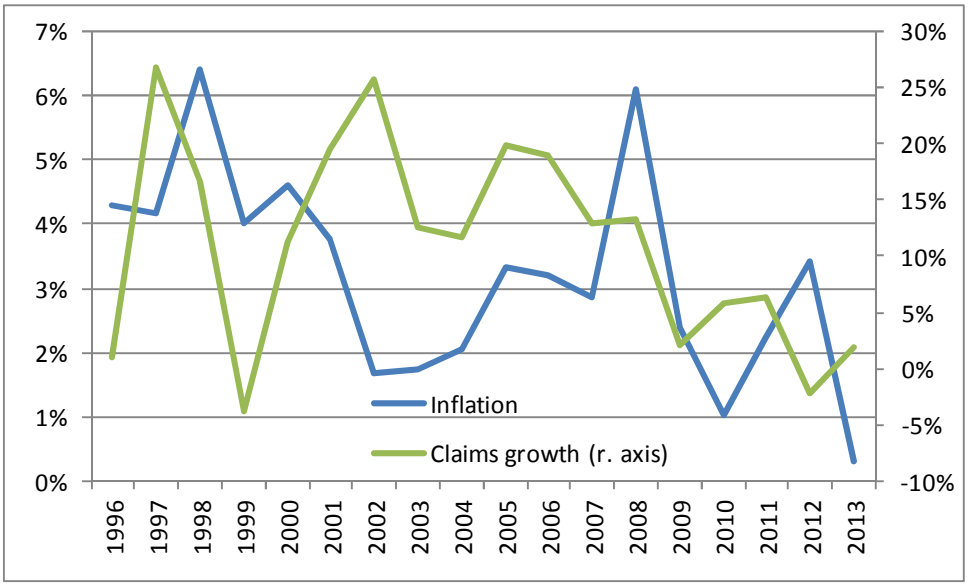


Figure 5.9 Croatia: Inflation and growth of total claims of credit institutions



We can see what happened to the DFX value of the banking system (aggregate figures). Figures 5.10 and 5.11 below show how the ratio grew steadfastly along with the expansion of credit and began to fall again as the credit expansion slowed down. Notice that most of the credit expansion was to the domestic sector (also pointed out by Kraft and Jankov (2005) who disaggregate the figures more than is done here).

A note on the calculation of the DFX ratio is in order: “foreign reserves” of banks are calculated as “Foreign currencies” (CNB Bulletin data, Table D2: Foreign assets) + “Demand deposits” (ibid, Table D2: Foreign assets) – “Demand

liabilities" (ibid, Table D10: Foreign liabilities). *This is an estimate of "foreign reserves"*, as previously defined, of banks operating in Croatia as the CNB does not disaggregate "Loans and advances" (ibid, Table D10: Foreign liabilities) or any other line in its data tables into "short term" and "long term" sections.

Figure 5.10 Croatia: DFX ratio of credit institutions

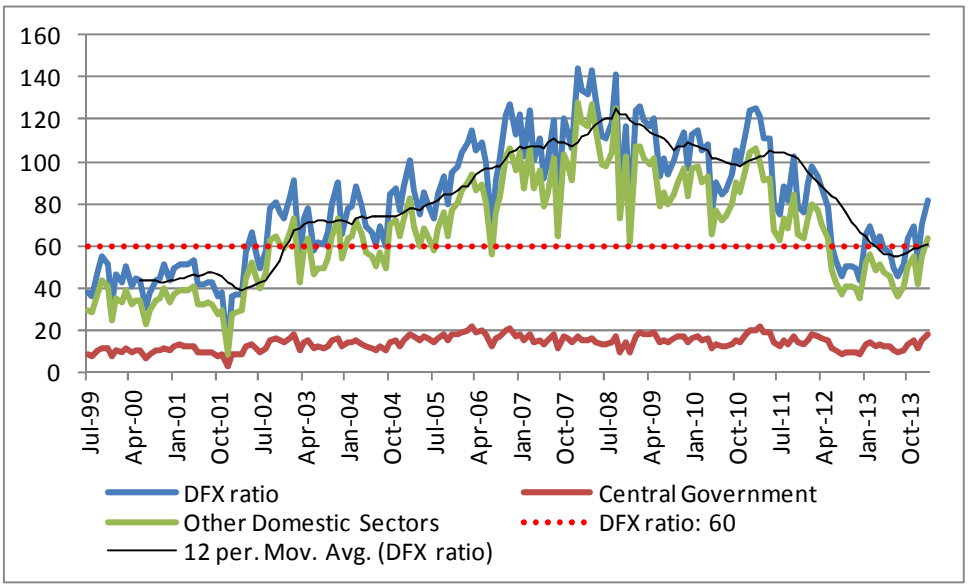
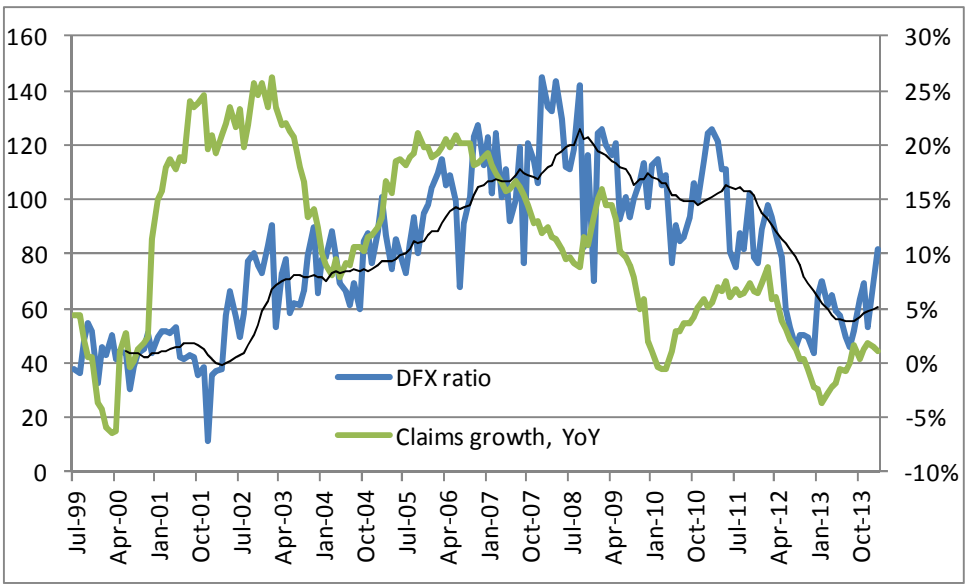


Figure 5.11 Croatia: DFX ratio and growth of total claims of credit institutions



Croatian policy makers began applying reserve requirements in 2003 in an attempt to hold the credit expansion back. This did not work and credit continued to expand. Had they, however, limited the DFX value of banks to, say, 60 they would have stopped the banks' ability to expand credit as quickly as they did post-2002, when that value would have become restrictive (see red

dashed line, figure 5.10). This would have decreased the current account problem, which was the main reason for the central bank's credit interventions (Kraft & Jankov, 2005), by decreasing the growth of imports, which is linked to the growth of credit (see *5.2.1 Domestic credit expansion and current account deficits*, also Kraft and Jankov (2005)). Limiting the credit expansion also would have limited the downgrade in lending standards that took place (ibid) and limited the pressure on the exchange rate, which, had it set off, would have caused realisation of credit risk in the banking system (many domestic loans are linked to the exchange rate or in foreign currencies while borrowers' income is in the domestic currency) and stirred memories of previous uncontrolled inflation and exchange rate depreciations (ibid). Instead, the policies applied were at best only partially successful in holding back the credit expansion (ibid).

The economy would not have suffered due to the credit limitation imposed by a regulatory DFX value of 60. First, banks would have responded by raising long-term foreign funding, via their foreign parent companies or not, thereby boosting their foreign reserves and credit-creation capabilities. This also would have diminished the international-crisis-induced problem of capital flows reversal, as banks' funding would have been for the long term.

Second, banks would have had the explicit institutional incentive to lend to real economic activity, especially export industries. This would have improved the current account and improved employment and kept inflation low as production would have expanded parallel to increased credit in the economy. This incentive would also be particularly strong today in the current state of very low inflation (deflation) and high unemployment.

Third, the level of private credit in the economy would have been more manageable, which, according to Minsky's FIH, would have strengthened the financial stability of the economy. Credit, due to the incentives in the institutional design of the system, would have come from banks first and foremost to finance investment and real economic activities, which generate cash flows from production instead of speculation with existing assets. Such cash flows serve contractual debt obligations as they mature. Consequently, aggregate private debt-to-income levels would have been contained and banks' non-performing loans ratio been lower than it is today. Instead, domestic credit to the private

sector, provided by banks, grew from 36% of GDP in 2001, which is the last year that a regulatory DFX value of 60 would have been non-restrictive (see figure 5.10), before topping in 71% of GDP in 2011 (World Bank data) and banks' non-performing loans are currently 15.4% of their total gross loans (year end 2013 figures), up from 4.8% in 2007 (ibid).

Finally, had banks not adequately performed their task of creating and allocating credit efficiently, the Croatian government would have stepped in and done it itself. Public investment in export industries, education, health and infrastructure would have been welcome, especially in a country that had rather recently been torn by war and its destruction. This would have expanded the production capabilities of the Croatian economy while providing employment and sustaining cash flows to firms and workers. Such government spending would, today, still have positive effects as it would improve banks' balance sheets by lowering their non-performing loans ratio. Unemployment levels would drop. The Croatian state could even, as an additional measure, borrow from the banks to improve their balance sheets, as suggested by Werner (2005) in the case of Japan: a safer borrower than the state hardly exists in any economy. This government spending, via the banking system or not, could come instead of the measures now adopted by the CNB to stimulate credit growth in an attempt to revive the economy (see e.g. Vidakovic and Zbašnik (2014) for discussion on the measures adopted: they include the lowering of the reserve requirement).

We therefore conclude that had Croatia adopted the OERS the credit expansion of post-2000 had been largely contained. The allocation of credit created would have improved as well. Today's possibilities of maintaining employment and low inflation at the same time would have been expanded compared to what they actually are.

Conclusion to chapter 5

In the beginning of this chapter, we stated that this "chapter offers an insight into how the monetary system itself can be amended to moderate the adverse effects of FDI while, at least, maintaining the positives."

Hopefully, the chapter has done so. The OERS encourages banks to look for long term financing at all times, including when FDI inflows into the economy

take place and, as we saw in chapter 1 and earlier in this chapter with the case of Iceland, credit expansion can, consequently and parallel to the FDI activity, take place. This way, the positive spillovers that, potentially, can take place with the FDI activity will have their chance of affecting the host economy while credit expansion is kept in check and, following the empirical record and Minsky's FIH, financial stability is maintained.

In the OERS the economy is never in a slump for the state can intervene with government spending even if the banks fail to maintain employment and low inflation. Depending on how well the system works an economy with a record of high level of financial stability may even attract further FDI, boosting yet further the potential positive spillovers of such international economic activity. Credit, i.e. money, is cheap in the OERS but not readily available for any financing at all. The economic cycle is thus discouraged to take place and the economy will be more stable in the state of a "quasi-boom." The OERS follows, in other words, what Keynes had envisaged in order to get rid of the economic cycle (Keynes, as quoted by Tily (2010, p. 244)):

> [T]he remedy for the boom is not a higher rate of interest but a lower rate of interest! For that may enable the so-called boom to last. The right remedy for the trade cycle is not to be found in abolishing booms and thus keeping us permanently in a semi-slump; but in abolishing slumps and thus keeping us permanently in a quasi-boom.

The OERS recognises the need to keep the credit expansion in check. FDI inflows will have mainly isolated effects on the industry in question instead of leading to excessive credit booms over the economy as a whole. FDI outflows are neither encouraged nor discouraged and such projects will, as today, be judged on their expected profitability. Other destabilising capital flows, such as short-term bank financing, are discouraged as banks cannot expand their credit creation capabilities by raising such finance.

Conclusion

> Theories should be relevant in that they should represent reality as accurately as possible and should strive to explain the real world as observed empirically.
>
> Philip Arestis (1996, p. 261)

We have travelled afar from the introduction to this work. We set out on this journey by quoting Arestis (1996, p. 112): "The main aim of post-Keynesian economics is to provide a clear understanding of how the economy works, by relating economic analysis to real economic problems." We adopted the post-Keynesian approach to economics "which begins with observation and proceeds to build upon 'realistic abstractions' rather than 'imaginary models'."

Since then, we have provided a brush-stroke image of some of the literature behind foreign direct investments, both in general and in the financial sector. We have described Minsky's Financial Instability Hypothesis, FIH, and argued how it can be used to develop measures of financial instability. Using those measures, we investigated the connections between financial instability, foreign direct investment, and economic growth (see section *4.2 Results* for details). Then, using observation and realistic abstractions, we developed a monetary system – the OERS, supported by public debt management a la Keynes – which we argued would solve the "policy problem" as Minsky (2008, p. 328) described it: "...to devise institutional structures and measures that attenuate the thrust to inflation, unemployment, and slower improvements in the standard of living without increasing the likelihood of a deep depression."

The conclusion, in as concise form as possible, is that foreign direct investment is a double-edged sword. Although theoretical arguments can be made for its case the empirical record as observed here points in the direction of financial stability being impaired, rather than not, parallel to FDI activities. In short, the pessimistic view of FDI and its effects on the economy seem to be empirically more accurate than the optimistic view when it comes to financial stability. However, whether that is unavoidably the case is not certain and should be judged on a case-by-case basis. Adopting the OERS, along with public debt management a la Keynes, would certainly improve the ability of FDI to have

positive effects on the economy, rather than negative, especially as financial stability would be supported by a strong policy framework. Those are the core empirical and theoretical contributions of this work.

6.1 Policy implications of this work

On 24th of November, 2005, Halldór Ásgrímsson, then the prime minister of Iceland, established a committee. The committee had the purpose of discussing the possibilities of building Iceland up as an international financial centre. The committee was headed by Sigurdur Einarsson, then the chairman of the board of directors of Kaupthing Bank, Iceland's largest bank, but later found guilty of market manipulation, receiving a prison sentence of five years (Ríkisútvarpið, 2013). The committee's report was published in October 2006 (Forsætisráðuneyti, 2006). It recommended some reforms that were to move Iceland closer to becoming an international financial centre.

Two years later, the economy crashed and the financial system was wiped out. It was rebuilt only on the grounds of an exigency legislation (laws no. 125/2008, normally referenced to as "The Emergency Act") that allowed, amongst other things, the Icelandic Financial Supervisory Authority to force banks into liquidation and the government to establish new banks on the ashes of the old, bankrupt ones. The Central Bank raised capital controls and took over the intermediation of international payments to and from Iceland.

Less than six years after the collapse of the Icelandic banking system, in June 2014, Aldo Musacchio, Associate Professor of Business Administration at Harvard Business School, argued that Iceland (Jónsson, 2014)

> ...should try to follow into the footsteps of states such as Hong Kong and Singapore. It would be a good idea to make use of the experience and the knowledge which [Icelanders] have gained in the field of finance after the collapse of the banks in the fall of 2008 to open up the economy for foreign investors and turn it into an international financial centre.

One of the centrepieces of Minsky's Financial Instability Hypothesis is that market participants, people, forget. Or as he put it: "...over time the memory of the past disaster is eroded" (see *3.3.1 Minsky's Financial Instability*

Hypothesis). It is tempting to argue that in the case of any ideas regarding turning Iceland into an international financial centre, memories of the past disaster have eroded particularly fast.

As noted in the introduction to this work, Iceland has been an inspiration to me. One reason might be that Icelanders were, before 2008, stricken exceptionally blind by euphoria that nothing could cast a shadow on. Words of warnings were ridiculed. Infamous are the examples of Þorgerður Katrín Gunnarsdóttir and Árni Mathiesen before the crash in 2008. In 2006, when the Icelandic banks faced criticism regarding their business model from international finance professionals, including Richard Thomas of Merrill Lynch, Gunnarsdóttir asked, as the minister of education and a member of the Icelandic parliament, if Thomas "did not need a refresher course [in economics]" (Vísir, 2008c). Mathiesen, as the minister of finance and a member of parliament, asked, in March 2007, the opposition, who tried to echo the words of warning from abroad: "Boys, can't you see the party?" (Alþingi, 2007). A year and a half later, the party was over.

Steingrímur Hermannsson, then the minister of foreign affairs and a member of the Icelandic parliament, commented back in 1987 that "in this small economic society of ours [Iceland], which is far from being in equilibrium, those holy laws of economics do not apply" (KB, 1987). Those words have been repeatedly ridiculed since then. They have been interpreted such that Iceland is conceived as being "special" and so unique that the "holy laws of economics do not apply." But of course the laws of economics must apply in Iceland, like any other economy. Otherwise, they are not laws in the first place. And Iceland is just an economy, like any other. Hermannsson's words are an oxymoron at best and nationalistic at worst.

But Hermannsson must be given credit. He was referring to the laws of laissez-faire economics: "[m]onetary policy based on laissez-faire economics will take everything here to Hell if it is not stopped" (ibid). Twenty-one year later, the economy, under the helmsmanship of liberal economic theories, arrived to Hell.

To Minsky, like post-Keynesians, the laws of laissez-faire economics were not laws in the first place. The economy was not destined to tend to a stable equilibrium but to unstable disequilibria. With the passing of time, a "stable"

economy would endogenously develop trends towards ever increasingly fragile financial structures. The time would come that the system would, endogenously, break under the build-up of leverage and debt and a financial panic would be the result. Contrary to laissez-faire economics, “stability is destabilising” and the government had a role: to stabilise markets and solve “the policy problem”.

Minsky built his theory of endogenous financial instability on a diverse set of economists that preceded him. Schumpeter was his doctoral supervisor and he understood, like post-Keynesians, how money is endogenously created by the banking system and how endogenous money finances economic activity without any ex-ante savings. Fisher’s debt deflation theory explained how too much debt can force a deflation in prices to take place, which will have a feedback back onto the overburden of debt so that a vicious cycle sets in. Kalecki’s principle of increasing risk helped understanding how an interest rate increase can develop, endogenously, in the financial system as the leverage builds up. The increase in interest rates can then act as the snowball that turns into the avalanche of debt deflation.

But it was Keynes who provided the shoulders of a giant that the FIH stands on. It was Keynes’s approach to economics, relying on uncertainty, money, and human behaviour, that provided the most influential theories behind Minsky’s formulation of the FIH. Keynes was so influential to Minsky that he saw it worthwhile to write a book, named after Keynes himself, about his theories and how they had been misunderstood by the mainstream.

Admittedly, because Minsky’s theories are constructed on Keynes’s, it can be hard to see where the line between them is to be drawn. This work, which to a large extent rests on Minsky’s theories, can consequently be interpreted as being an offspring of Keynes’s theories rather than his intellectual son. As an example, the last chapter of this work builds a monetary system which, it is argued, helps solving the “policy problem”, as Minsky described it. But it can just as well be interpreted as a continuation of Keynes’s ideas for Keynes “regard[ed] monetary policy as an important policy to *prevent* recession and public works as most relevant to the *cure* of recession” (Chick & Tily, 2014, p. 2). That is exactly what the OERS, along with Keynes’s public debt management, does. It uses monetary policy (quantitative and qualitative credit

controls) to *prevent* recessions and keep the economy permanently in a "quasi-boom". Public works, such as an Employer of Last Resort program, act as a failsafe – the *cure* to recessions – in case the monetary policy fails, for one reason or the other, to prevent them.

Reorganising the way monetary policy is done may seem radical to some. But the dominant monetary-policy regime of the day, i.e. inflation targeting, has been tested. And it failed the test.

Today, it is generally accepted that keeping inflation down is not enough to secure financial stability (Bank of International Settlements, 2014). Central banks have therefore had to improvise and the idea of "Inflation Targeting Plus" has, essentially, resurfaced.[173] According to these ideas, inflation targeting must be accompanied with something else, such as direct interventions on the exchange rate market or more proactive government finances. Changing interest rates to suffocate inflation and let the market do the rest is not enough.

But the problem goes deeper than that. Monetary policy based on an inflation target and conducted by changing interest rates seemed to have defeated high inflation when it was gradually adopted in the late 1980s and 1990s. But that success can be ascribed to nothing else than luck: it was the lack of economic shocks that created the Great Moderation and not inflation targeting (Beckworth, 2014; Cecchetti & Ehrmann, 1999). And one cannot ignore the fact that the Great Moderation preceded the Great Recession without monetary policy based on inflation targeting having much to say about it: monetary policy based on inflation targeting did not *prevent* the Great Recession, thereby failing to fulfil the purpose of monetary policy as Keynes saw it.

[173] The term has also been called "Augmented Inflation Targeting" and "Inflation Targeting 2.0" (Baldwin & Gros, 2013). No exact definition of the term seems to exist but Baldwin and Gros highlight that it "involves financial stability considerations – even when that means coordinating with other domestic institutions, regulators, and so on". This, of course, breaks the "linchpin" of the trust that the inflation target itself rests on: central-bank independence. There is therefore a certain internal conflict in "Inflation Targeting Plus". A mention of the exact term, considerably before the Great Recession, is in Holub (2004). But the idea is older. As an example, Bofinger and Wollmershäuser (2003) discuss the role, or the lack thereof, of exchange rate interventions in a macro model where the monetary policy is based on inflation targeting. They then introduce exchange rate interventions as complementary to inflation targeting via policy rate changes and note that despite central banks declaring their target being inflation and their policy tool being interest rate changes, they frequently intervene in the exchange rate market. Goldstein (2002, p. 1) discusses ""managed floating plus," where the "plus" is shorthand for a framework that includes inflation targeting and aggressive measures to reduce currency mismatching." But the policy tool is still interest rate changes.

So just as interest rate changes superseded the idea of conducting monetary policy on the basis of growth of the money supply, the “experiment” that inflation targeting is may have reached its end (Beckworth, 2014). Something else must come instead. “Inflation Targeting Plus” is one suggestion. Another suggestion is the OERS, supported by the tested, and successful, method of managing the public debt a la Keynes.

The switchover from the Great Moderation to the Great Recession would have been impossible within the OERS. First, credit controls would have stopped the debt build-up. Credit fuelled asset bubbles would have been few and small. Second, interest rates would have been more stable, supporting the financial structure of the economy instead of being the source of instability via changes in the interest burden. Third, money manager capitalism would have been attenuated and its destabilising effects, at least the part arising from international capital flows, euthanised within the OERS. Fourth, deficit spending, in case of monetary policy being incapable of preventing the recession from beginning, would have been targeted directly towards public works and full-employment schemes. Consequently, unemployment would have been kept at bay. So even if the recession would have taken place it would have been immediately stopped in its tracks: if the prevention would have failed, the cure would have followed.

The policy implications of this work are not to shut down or fight international economic activity, even if foreign direct investment, like other international capital flows, can have a negative impact on financial stability. Far from it! The policy implications are that the institutional structure of the monetary system should be restructured, yet without shutting down globalisation. International economic activities such as foreign direct investment programs can yield positive results. Nevertheless, they should not be carried out in the blind faith of free markets and wishful thinking regarding ergodic trends in the economy towards stable equilibrium. Rather, the economy should be recognised for what it is: a chaotic non-equilibrium system with endogenous processes that tend to unstable equilibria, as Minsky and post-Keynesians have argued. As such, the policy implications of this work are to reorganise the institutional framework of the monetary system such that the possible positive effects of international economic activities, such as foreign direct investment, can be enjoyed to the

fullest without putting financial stability at risk. The OERS is a theoretical contribution in that direction, based on observations of how the world works.

6.2 Where from here: the next steps in research

There are still aspects of financial instability to be understood. The approach here has been from the macroeconomic side. But the organisational setup of the financial system matters as well. For banks have two roles in the economy. The first is the lending function: to screen potential borrowers and create credit. The second is the payment function: to intermediate payments and thereby grease the process of commerce. But the first function – the lending function – can make banks fail while the second function – the payment function – relies on them not failing. Therefore, banks' roles in the economy are inherently misaligned (R. J. Phillips, 2014).

Studying financial stability and its maintenance must also be done from the organisational point of view of the payment system. This is not done in this work and could be a welcomed expansion of it. Again, Iceland's experience in 2008 is inspirational. Iceland's payment system was and is channelled through the central bank which operates as the system's settlement institution. This is the reason why Icelandic debit and credit cards continued to function normally despite the banks going bankrupt in 2008: the payments are settled in central bank money. In contrast, payments with debit and credit cards are settled with commercial bank money in the United Kingdom (Dent & Dison, 2012). That organisation would have been catastrophic had it been the implemented one in Iceland in 2008: commercial bank money became worthless and illegible as a means of payment as the banks went bankrupt. The problem of banking institutions being too-big-to-fail is closely connected to this organisational structure of the payment system. To end too-big-to-fail, banks *cannot* be allowed to be an indispensible part of the ultimate settlement process of the payment system.

Setting the OERS up in a stock-flow consistent framework and rigorously testing it to various types of endogenous and external shocks (a build-up in leverage, a credit-supply shock, a fall in productivity, changes in consumer preferences, changes in foreign interest rates, etc., etc.) would be very informative and speed the development of the system.

Finally, the OERS is likely to receive criticism. That natural criticism must, of course, pass the tests of being relevant and “strive to explain the real world as observed empirically”. It should not be built on “imaginary models” and be irrelevant to real-world economic analysis. Judging on the severity of that criticism the system may have to be amended and developed further. That work, as this has hopefully been, must always be carried out with the aim of post-Keynesian economics in mind:

> ...to provide a clear understanding of how the economy works, by relating economic analysis to real economic problems.

Appendix 1

During the Icelandic "Golden Age", domestic firms expanded rapidly abroad. Examples include the banks, Actavis, Bakkavor and other Icelandic manufacturers. Somehow, all this FDI activity had to be financed. But contrary to Japan during the 1980s, Iceland was, as Mexico before the Tequila crisis, running a large current account deficit. Therefore, not only did the Icelandic nation have to finance a current account deficit that peaked at more than 24% of GDP but it had to finance a net FDI flow abroad that amounted to similar figures. On top of that came a net accumulation of Other Investment, i.e. other than portfolio investments.[174]

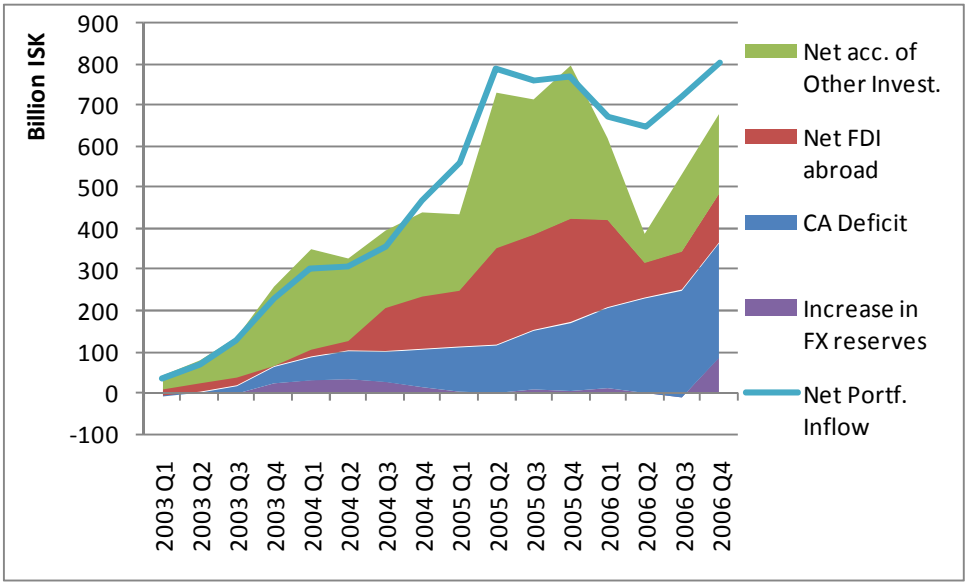
The most spectacular period and the one we will focus on is 2004 – 2006. During that time, Iceland ran an accumulated current account deficit of ISK 1,800 billion; the accumulated net FDI abroad was ISK 1,650 billion; and the accumulated net other investments were ISK 2,700 billion. Altogether, this amounted to nearly 200% of GDP over the same time period.

The way all this foreign-asset accumulation and spending on imports was financed was, largely, via portfolio investments.[175] Figure A1.1 shows how the flows developed during 2003 – 2006.

[174] The Central Bank of Iceland (Central Bank of Iceland, 2013), where the accompanying data comes from, has this to say on Other Investment: "Other investments than [direct investment, portfolio investment and financial derivatives] or reserve assets consist of trade credits and loans classified into short-term (with an original maturity of one year or less) or long-term. Currency and deposits are included in this category, along with other movements in assets and liabilities such as financial leases." Interest-rate and currency swaps linked to foreign borrowing by residents is also included in Other Investment.

[175] Central Bank of Iceland's definition of Portfolio Investments in its International Investment Position data (Central Bank of Iceland, 2013): "Portfolio investment shows residents' holdings of foreign securities (assets) and non-residents' holdings of Icelandic securities (liabilities). Definition of foreign and Icelandic securities is based on the residence of the issuer of the security. Portfolio investment covers equities, shareholdings of less than 10% in companies and units in mutual funds, and debt instruments, bonds and notes (original maturity over one year) and money-market instruments (such as commercial paper). Securities need not be listed on a stock exchange but are classified according to their format."

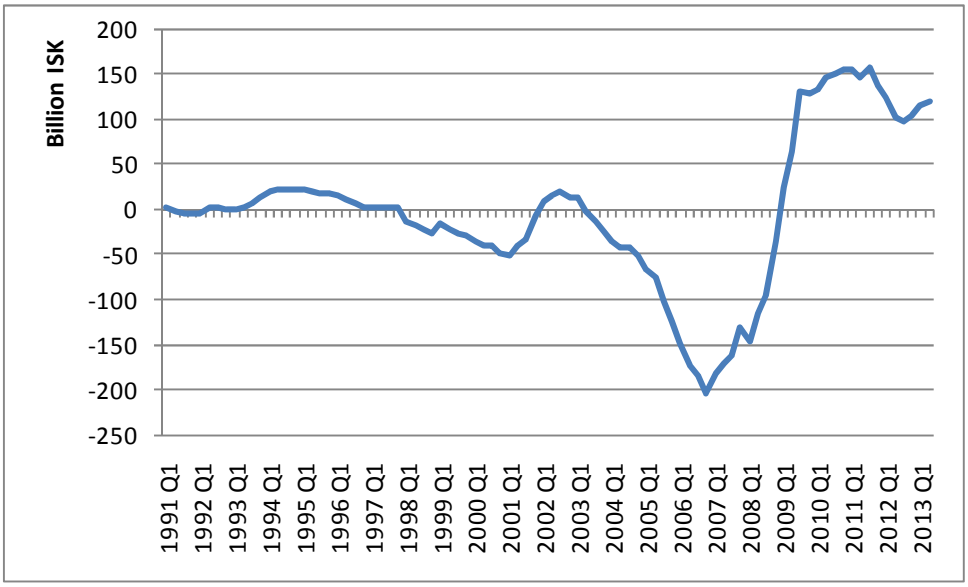
Figure A1.1 – International capital flows in Iceland, 1Q2003 – 4Q2006



The stacked shadowed areas show "expenditures" of foreign currencies while the line is "collected" foreign currencies. The gap in the figures during 2006 comprises of mainly the balancing item, which's importance grows considerably after 2005. The data is graphed on four quarter moving average for smoothing purposes.

When it comes to the current account deficit in particular, figure A1.2 shows the balance on trade with goods and services.

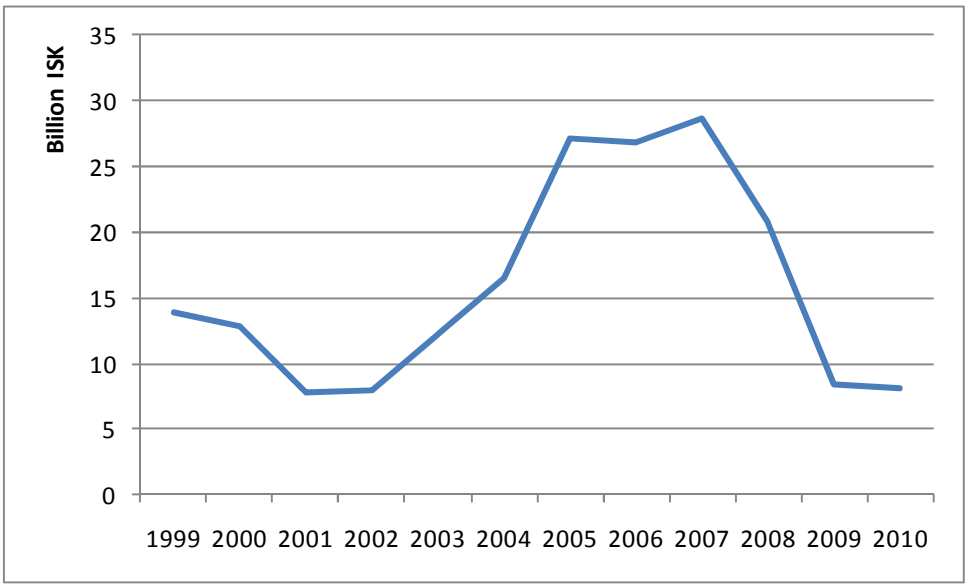
Figure A1.2 – Balance on trade with goods and services (4Q mov.avr)



Breaking down the data on imports can give us an idea what sort of goods were being imported. We will, as a proxy for "luxury goods", look in particular at cars

(data from Statistics Iceland).[176] We see from figures A1.2 and A1.3 that not only did the trade deficit build up to unprecedented heights before the Crash in 2008 but it seems that the growth in luxury imports was noteworthy as well. This chimes with the development of Mexico before the Tequila crash.

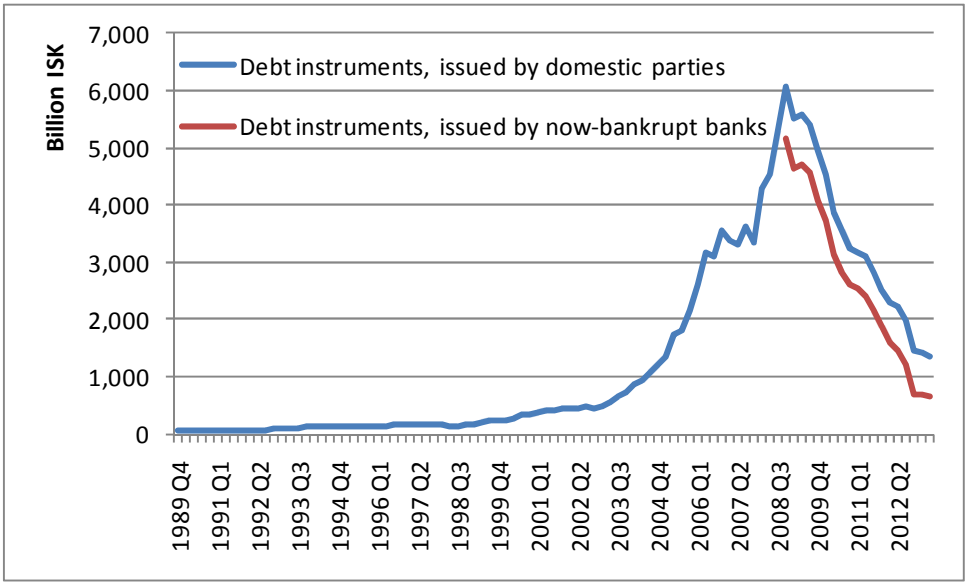
Figure A1.3 – Annual importation of cars into Iceland



Now, it is impossible to make a distinction between banks and non-banks in the public CBI's data on portfolio investments: who were the institutions raising the funds for all this foreign-asset accumulation and current account deficit? However, after the Crash in 2008, the CBI started explicitly reporting the share of now-bankrupt banks in the IIP of Iceland. Relying on that data, we can see that the bankrupt estates of the banks are the main issuers of outstanding external debt instruments issued by Icelandic parties. Arguably then, it is not heroic to assume that it was mainly the banks that raised the foreign funds and channelled them to into the Icelandic economy.

[176] Infamous is the story that during the height of the Icelandic bubble there were more Range Rovers imported into Iceland than in Sweden and Denmark combined, (population ratio ca. 1/50) (Valdimarsson, 2013). In Iceland, after 2008, the luxury car goes by the name "Game Over".

Figure A1.4 – Outstanding IIP, portfolio debt instruments



Now, an interesting issue must be highlighted here. In the case of Japan, Werner (2005) explains how Japanese banks' (speculative) credit creation Granger-caused capital outflows from Japan to the rest of the world. "Japan in effect created much money that was not backed by real economic activity and used it to 'go shopping' in the world" (Werner, 2005, p. 243). The exchange market did not price this credit creation properly, i.e. the yen was overpriced. Despite all the yen-credit creation, foreigners bought into it: "[i]t seems that nobody called Japan's bluff during the 1980s" (ibid, p. 245). Werner notes that, seemingly so, the world suffered from a "yen illusion".

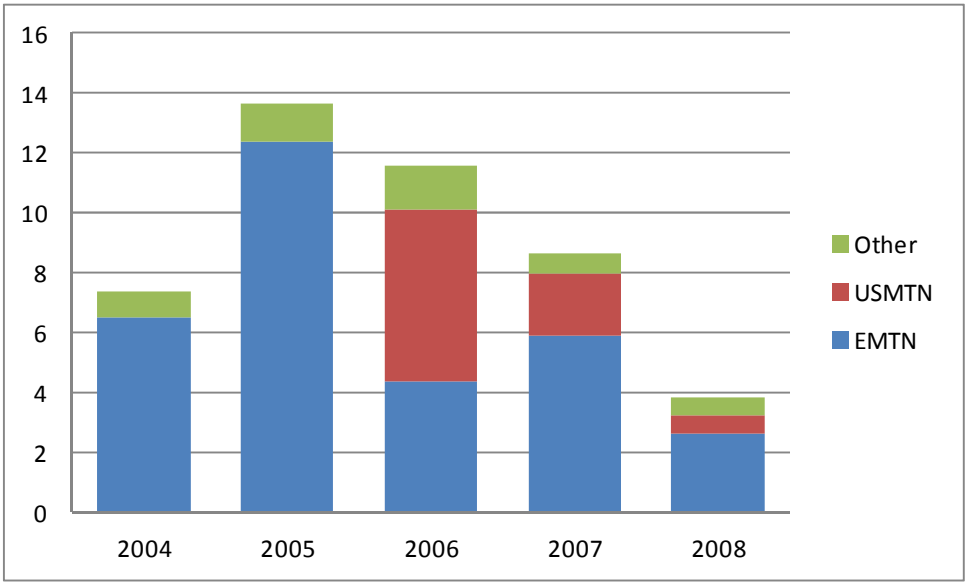
Following his model, we could discuss whether Icelandic banks' speculative credit creation was, at least partially, responsible for the capital outflows from Iceland to the rest of the world. Indeed, foreign financial firms began, in August 2005, to issue "Glacier bonds" which were bonds denominated in Icelandic krona. Issuers included KFW, Rabobank, Rentenbank and Deutsche Bank. Those bonds were sold to foreigners seeking a higher yield than they could normally get in other currencies (ask yields for AAA-rated bonds were, by February 2007, generally between 8-14% depending on maturity, see Ásbjörnsson (2007)) but they would have to accept a currency risk instead: if the Icelandic krona would fall in value, the worth of the principal of the bond, in other currencies, would fall. The Icelandic banks were involved in those deals not only to supply the kronas to the buyer of the Glacier bond – the foreign financial institution issuing the bonds gets paid for it in ISK, which the buyer of

the bond finds in the foreign exchange market, where the the Icelandic banks operate – but also to meet demand for exchange-rate hedges from the issuers, which were provided in the form of currency swaps (for a more in-depth discussion about how the issuance of Glacier bonds and the exchange-rate hedges worked, see Ólafsson (2005)).

This way, the Icelandic banks expanded their balance sheets with domestic credit to foreign parties, seemingly similar to what the Japanese banks did in the 1980s. And the amounts were considerable. In August 2007, outstanding Glacier bonds topped, amounting to ISK 450 billion (Datamarket, 2014), or roughly a third of GDP. In 2011, there were still ISK 200 billion of those foreign-owned funds on the balance sheets of the Icelandic banks (Viðskiptablaðið, 2011). And as in the case of Japan in 1980s, foreigners bought into this credit creation, at least for a while: the exchange rate of the Icelandic krona did not begin to drop until late 2007 and then sank by 50% in 2008. Until then, we may perhaps say that the world was suffering from a “krona illusion”.

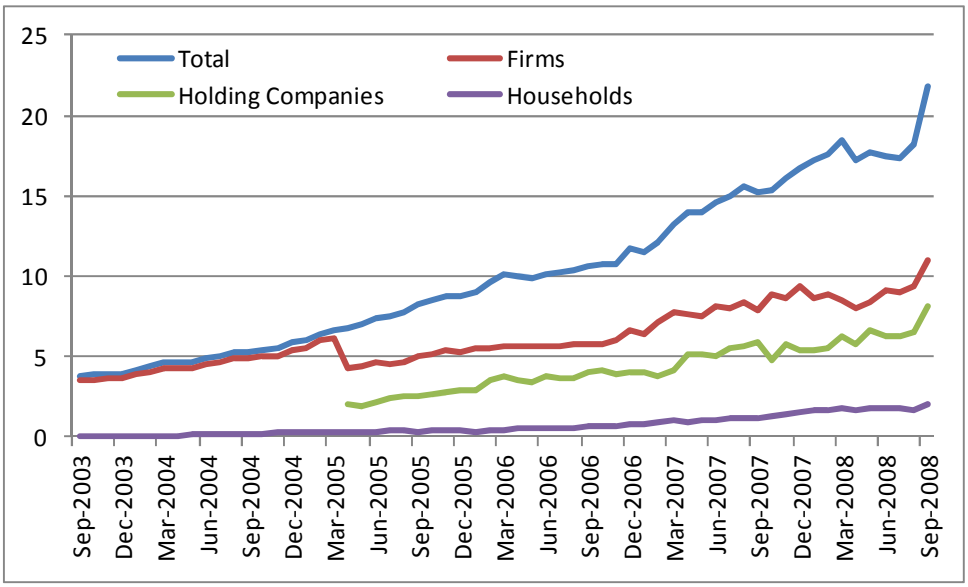
But the Icelandic banks, especially the “Big Three” (Kaupthing, Glitnir, Landsbanki) also raised funds via foreign bond markets, especially in Europe (EMTN: Euro Medium Term Note) and, later, in the US (USMTN: US Medium Term Note), see figure A1.5. Those funds were then re-lent to domestic parties, having the effect that outstanding foreign-currency loans to Icelandic corporations, and households, increased (see figure A1.6). The Icelandic banks were, as Mexican banks before the Tequila crisis, intermediating funds from abroad as well.

Figure A1.5 Bonds issuances by the "Big-Three" Icelandic banks, billion EUR



Source: The Special Investigation Commission (Special Investigation Committee, 2010b)

Figure A1.6 Outstanding foreign-currency loans in Iceland, EUR billion[177]



Source: Central Bank of Iceland, author's calculations

We conclude that Icelandic banks raised funds abroad and used those funds to finance their own FDI and other Icelandic firms' FDI abroad during the Icelandic "Golden Age". The Icelandic banks also raised funds to finance the spectacular

[177] Footnote no. 33 is reproduced here, see *2.1.2 Banks as intermediaries*: "A considerable portion of "foreign currency" loans in Iceland were in fact not in foreign currency but loans in Icelandic krona but linked to the exchange rate. The Central Bank of Iceland nevertheless counted them as "foreign currency loans", making it impossible for us to know exactly how much of the total credit to corporations, and households ("foreign-currency" mortgages and car loans became increasingly popular after 2006), was in fact in foreign currencies. The "foreign currency loans", i.e. ISK credit with the principal linked to the exchange rate, were, generally, deemed illegal with a series of court rulings starting from 2009, resting on laws from 2001 (no. 38/2001) amongst others. Complications apply that will not be discussed here."

current account deficit and imports of luxury goods, just as the Mexican banks had done in the early 1990s. They also, as the Japanese banks in the 1980s, issued domestic credit that was used to “go shopping” in the rest of the world, assisted by the world’s “krona illusion”. This is similar to what the Japanese banks did according to Werner (2005). The Icelandic banks were therefore “Japanese” in this sense, and “Mexican” also as they acted as intermediaries as well. The Icelandic nation then used the money raised and created by the Icelandic banks to go on a consumption binge (negative current account), buy and build foreign production facilities abroad (FDI) and buy other assets as well.

Appendix 2 – Reasoning for the selection of indicators

This appendix explains the reasons for selecting the indicators that are used to construct the financial instability indices, see tables 4.1 and 4.2. We will begin with the short term index and move to the long term index later. Do note that the indicators may not be exactly the same as were in fact used, the most common reason being lack of data. Furthermore, the indicators highlighted here are in some cases only some of the many similar indicators that can be used to estimate the same effects.

A2.1 Indicators in the short term index

The indicators that would be valuable to include in the short term index, following Minsky's FIH, can be categorised into two categories. The categorisation depends on whether they are connected to income flows or portfolio flows covering balance sheet flows (see chapter 3, equation 1).

A2.1.1 Income-flow covered balance sheet flow

Economic units' cash flows profile should be as close to that of a Minsky hedge unit as possible for them to be secure. Net income flows should cover, as much as possible, net negative balance sheet flows due to financial positions, creating no or limited need for net negative portfolio flows such as additional borrowing or emergency sales of capital and financial assets. Income-flow-covered balance sheet flow is the characteristic of hedge financing.

Economic units which do not have adequate income flows to cover balance sheet flows are taking speculation or even Ponzi positions, trusting that they can find refinancing whenever there is shortage of operational income to cover balance sheet flows. Their net income flows do not cover their net negative balance sheet flows, creating need for net negative portfolio flows such as increased borrowing or sales of any financial or capital assets they may have positions in. Such borrowing needs and sales of assets can bring price instability to asset markets, even leading to fire-sales spiralling out of control.

An important input in estimating whether the economy is financially robust or not is therefore the ratio of net income flows to balance sheet flows. Sectoral look is appropriate, as Minsky did (Minsky, 2008b). Those ratios can include but are not limited to:

(Households' income - net interest expenses of long term debt - households' current liabilities) / households' income

(Firms' cash flow from sales and operations [EBIT] - net interest expenses of long term debt - firm's current liabilities) / Firms' cash flows from sales

(Government primary balance - net interest expenses of long term debt - government current liabilities) / government primary balance

(Banks' net interest income - banks' current liabilities) / banks' net interest income

(*[net] exports - [net] interest expenses of external debt - short term external debt) / [net] exports*

Minsky emphasised that financial crises are due to optimistic expectations of cash flows failing to come true, leading to selloff pressures on external funded assets, which in the end leads to a drop in asset prices, lack of investment and general instability until expectations of cash flows are revised downwards and actually realised. With this in mind, the following indicator, or something similar, could be valuable:

The size of government expenditure (of GDP)

In an economy with Big Government (public expenditures are high compared to GDP), the state makes sure that fluctuations of cash flows are not as excessive as they would otherwise be in an economy with Small Government (Minsky, 2008b). The size of the government expenditure is therefore assumed to be a proxy of how easily the state can sustain cash flows within the economy and how easily automatic stabilisers, such as unemployment benefits and social security payments, kick in once the private cash flows within the economy fail to realise investors' expectations and the economy slows down.

This cash-flow-supporting mechanism therefore supports the financial system, at least for the short term although the long term effects may be negative: too much "guarantee" of cash flows can increase moral hazard and leverage amongst private economic units as they trust that the government will step in in case of lack of cash flows.

A2.1.2 Portfolio-flow covered balance sheet flow

Portfolio flow can supply economic units with cash in two different ways: refinancing of the maturing debt position or by selling assets. If balance sheet flows are prominently covered by portfolio flows it can lead to (exponential) expansion of loans in the economy and/or short drop of asset prices. Remember that credit demand is always in place and the credit market is rationed by the supply of credit (see section *2.1 What do banks do?*). Once the financial system stops being able, or does not want, to supply credit to the economy the demanders of credit must find other ways of financing their financial positions and meet their contractual cash outflows.

With this in mind, the following variables and ratios should be considered when estimating the cash-need of investors within the economy and the ability of the financial system to supply that cash. The list is not meant to be exhaustive.

Indicators of credit expansion

Minsky emphasised that credit expansion was an unmistakable part of the boom that later would turn into a bust. Keen argues the same (Keen, 1997, 2009b, 2011a). Empirically, credit expansion has been shown to be an indicator of upcoming financial stress (Babecký et al., 2013; M. Goldstein et al., 2000). This makes it a prime candidate in measuring financial instability.

(Short term debt + interest expenses – net income) / outstanding debt

This would give an estimate of how much of the outstanding debt must be refinanced in the near future, taking into the account the coverage that the net income flow provides and the impact of interest expenses on long term and short term debt. This should be done for all the economy's major pillars. This is, in short, a crude measure of liquidity needs.

New issued debt / (matured debt + interest expenses – income)

This would estimate the credit creation of the financial system that is used to meet the maturity of older debt contracts which are not covered by income flow. If this ratio is high it could signal either an impending credit bubble or excessive reliance on credit creation (portfolio flow) to cover balance sheet flows.

The amount of protected assets / short term debt of financial institutions

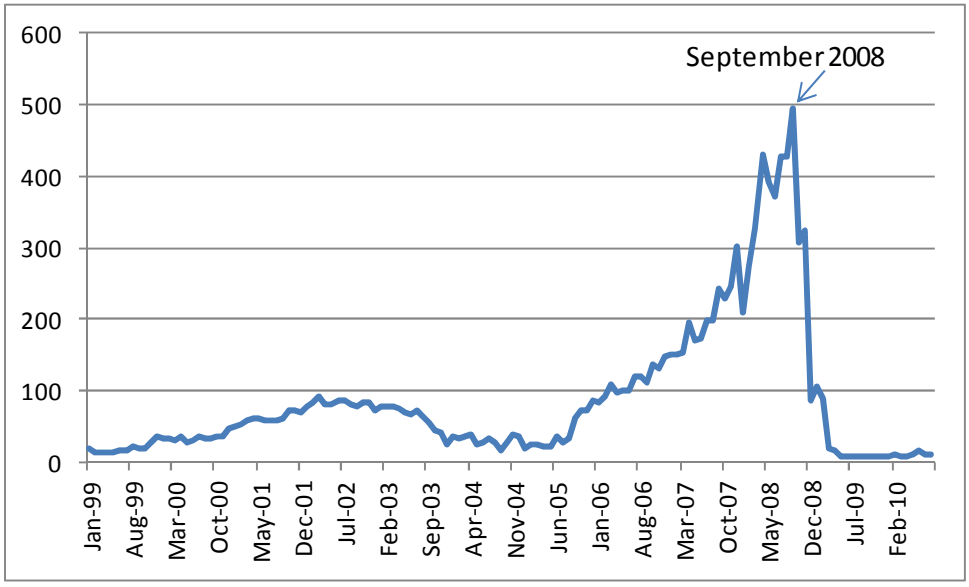
This ratio gives an estimate of how easily financial institutions can find REPO applicable assets in the market when seeking liquidity from the central bank, without the central bank having to accept unfavourably high credit risk by making corporate bonds REPO applicable. During liquidity stress, high quality and protected assets (treasury bonds and notes) give a “convenience yield” due to their high market liquidity (see e.g. Longstaff (2002), Vayanos (2004) and Krishnamurthy and Vissing-Jorgensen (2007)). Minsky (2008b) underlines this, noting that the time of relative financial tranquillity after the second World War, up to 1966, was to a large extent traceable to the high amount of war bonds in the financial system, representing and constructing a save base of highly liquid assets. Furthermore, one of the reason why the 1966 liquidity squeeze in USA was smothered in the beginning was the prominence of this safe asset base compared to short term debt and other non-protected assets (Minsky, 2008b).

Finally, Margeirsson (2009) pointed out that during the October 2008 banking crisis in Iceland, the banks had run out of treasury bonds while trying to get liquidity assistance from various central banks, The European Central Bank and Central Bank of Iceland in particular. This prompted the Central Bank of Iceland to expand its base of repo-applicable assets to include the bonds and bills of financial institutions, assets later nicknamed “love letters” (i. ástarbréf).

The amount of repo agreements from the central bank

As the amount of repo agreements of the central bank mounts, the higher the imminent liquidity demand of the financial system. This variable is a sign of a more imminent threat to financial stability in the short term than the others that have been listed since it signals that banking institutions have stretched themselves as far as possible in utilising other cheaper refinancing possibilities (such as interbank borrowing, deposit hoarding etc.) than repo agreements. This is a clear sign of imminent stress. A clear example of this is the development of repo agreements between the Central Bank of Iceland and the Icelandic banks before the banking system finally collapsed in October 2008 (figure A2.1).

Figure A2.1 Outstanding REPOs (ISK billions) with banks, Central Bank of Iceland



Source: Central Bank of Iceland

A2.1.3 Behavioural factors

Behavioural factors must be considered as well. Asymmetric information can influence market participants' behaviour, leading to increased financial instability (Hakkio & Keeton, 2009). Behavioural factors can also add to uncertainty about the future, which will influence liquidity preferences amongst people in the economy (Keynes, 1936).

Hakkio and Keeton (2009) pointed out five characteristics of investors' behaviour when financial stress increased and they had to rely on portfolio flows in the form of asset sales to raise cash. Those characteristics are:

Increased uncertainty about the fundamental value of assets: investors become doubtful about the (discounted) value of future cash flows that assets were previously expected to yield.

Increased asymmetry of information: buyers and sellers of assets have no longer the same level of information about what influences the price of the asset. This can e.g. be investor A's inside information about the upcoming financial trouble of investor B who is holding the same asset as A. A will then have the incentive to use this information to sell the asset to C before B will have to sell it, which would lead to a drop in the asset value. It can also happen that buyers and sellers of an asset class start to emphasise the fact they do not have the same information, i.e. the asymmetry of information was always there

but it was largely ignored during the good times. When it is finally emphasised, the market experiences instability. Moral hazard and adverse selection increase, increasing the cost of borrowing and lowering the price of assets.

Elevated uncertainty about other investors' behaviour: investors can, and do, profit from "jumping on the bandwagon" whenever they can guess which band wagon to jump on; asset prices rise because of investors' confidence of being able to find the "greater fool" once they want to sell out their position in the relevant asset class. When financial stress hits, investors do not "read" other investors' as easily as they were able to, therefore finding it tougher to find the correct bandwagon to jump on. This is Keynes's "beauty contest" argument.

Flight to liquidity: investors prefer assets that are easier to sell than others (closer to being cash-equivalent) since that eases their worries about holding assets (cash, bank deposits) that are acceptable when meeting contractual payment obligations. This applies especially in times of great uncertainty about the future and investors seek asset classes that are more liquid than others, protecting the nominal value of their asset.

Flight to quality: Those assets that have clear, transparent and safe cash flows are preferred over those where there are doubts about what they will yield in the future.

Variables that can grasp those behavioural factors are e.g. the following (see Hakkio and Keeton (2009) and Illing and Liu (2003)):

The spread between LIBOR and T-bill yields

Interest rate swap yield spread

Yield spread between off-the-run and on-the-run treasury bonds

The yield spread between highly rated corporate bonds and treasury bonds

The yield spread between highly rated corporate bonds and low rated corporate bonds

The yield spread between "junk bonds" and low rated corporate bonds

The yield spread between consumer asset backed securities (CABS) and treasury bonds

The correlation between stock returns and treasury bonds returns

Volatility of stock prices

Individualistic volatility of bank equity prices

Dispersion of returns on bank stocks

(Stock) trading volume and margin calls

(Real) exchange rate volatility

A2.2 Indicators in the long term index

The major deciding factor of long term financial stability *is the sustainability of the financial structure of the economic units within the economy*. This is not the same as the "panic phase" of Minsky's FIH, which is more the focus of the short term index: the long term index should focus on how sustainable and robust the current underlying financial structures of economic units truly are.[178] Following Minsky's FIH we can say that this largely depends on the size of (net) income flows compared to balance sheet flows and the prospect of how those flows will develop for the long term: hedge financing should dominate the financial structures of economic units. If, as time passes, there are risks that future balance sheet flows must be serviced with portfolio flows, long term financial stability is threatened as such financial structures can lead to pressures on asset prices and uncertainty, having the effects of increases in short term instability.

Current balance sheet flows are inheritance of financial contracts made in the past that are maturing and coming into effect today (Minsky, 1984). This means that they are a flow variable that is a function of a stock variable. Interest cost is e.g. a flow variable that hinges on the stock of outstanding debt. Measuring the sustainability of the financial structure of the economic units within the economy will therefore to a large extent be a comparison of not only flow variables to

[178] See *3.4 Applying Minsky's FIH to measure financial stability* for further discussion on "short term" and "long term" financial instability.

other flow variables (such as current account balance/GDP) but also stock variables relative to flow variables (such as debt/GDP).

The following variables and indicators would be valuable in estimating the fragility of the underlying financial structure of the economy. This list is not meant to be exhaustive.

Debt (public and private) / GDP

Income-debt ratios yield valuable information about whether the balance sheet flows of maturing debt can be met with income flows or not. High debt burden can also have negative effects on financial stability if interest rates rise: smaller rise in the rate of interest is needed to cause cash-flow mismatches if the stock of debt is large.

In the macroeconomic context, the value of gross domestic production is a proxy for income of the nation. The ratio of debt, private and public, to GDP is therefore informative on its own. A sectoral focus – i.e. focusing on the debt of households, firms and government in comparison to the income of those groups – would be valuable as well. Minsky himself used sectoral focus in his analysis (Minsky, 2008b). He also noted that “in a heavily indebted economy” (Minsky, 1995, p. 198) the stability of the economy is more fragile and lesser change in flow variables, such as interests and wages, is needed to cause cash-flow mismatches and instability

Long term interest rates compared to GDP growth

Interest rates compared to income growth [sectoral]

When estimating whether financial structures are sustainable or not we can look at the rate of change of income in comparison to the rate of interest. The argument is obvious: credit is used to invest and those investments create capital goods that are used for production that yields income which is used to repay the initial debt plus accrued interests. If the rate of interest is higher than the rate of increase in income there will be a shortfall in inflow of cash compared to total outflows of cash. This shortfall can be temporarily covered with new credit. But in the long run, such financial structure cannot be sustained: debt-to-income ratios would grow exponentially.

A sectoral focus would be valuable as well, where the interest cost of households, firms and even the government would be compared to the rate of growth of income. Tily (2010, p. xii) nicely sums up the reason why a high rate of interest can have a negative impact on the stability of the economy, especially when focusing on the sectoral levels:

> High interest rates are problematic because it is difficult for businesses to earn sufficient profit to cover future repayments. (Households have difficulty when interest payments become too large as a share of income, especially following redundancy.)

Foreign or external debt (compared to e.g. GDP, [net] exports or foreign assets)

There are numerous examples of economies being hit hard by distress because of troubles paying for external debt and some of those episodes are amongst the most famous financial crises in the history: Mexico 1994, Asia 1997, Russia & Brazil 1998, Argentina 2001, Iceland 2008 to name but a few. During such episodes, the exchange rate of the currency can take a hit as external liabilities mature and the capital leaves the economy. The Icelandic currency e.g. lost 50% of its value versus the USD in 2008 (according to data from the Central Bank of Iceland).

External debt, [179] especially for countries that are subject to the "Original Sin", is often denominated in foreign currency.[180] Foreign currency is needed to service such debt, just as certain assets (cash or bank deposits) are needed to meet contractual payments in domestic currency. The main source of foreign currency that does not create liabilities in the future, like foreign borrowing does, is exports.

External debt has shown itself to influence the probability of a crisis: the higher the debt, the higher is the risk of distress (Kraay & Nehru, 2006). Sectoral

[179] Foreign debt is all debt of domestic units in foreign legal tenders, no matter who owns that debt. External debt is all debt of domestic units that is owned by foreigners, no matter the currency the debt is denominated in.

[180] The Original Sin refers to (Eichengreen & Hausmann, 1999, p. 3) "a situation in which the domestic currency cannot be used to borrow abroad or to borrow long term, even domestically. In the presence of this incompleteness, financial fragility is unavoidable because all domestic investments will have either a currency mismatch (projects that generate pesos will be financed with dollars) or a maturity mismatch (long-term projects will be financed with short-term loans)."

indicators, such as banks' foreign liabilities as a share of foreign assets, can also be valuable when estimating the underlying fragility of the economy (M. Goldstein et al., 2000). Looking at the situation of other sectors (households' foreign debts, firms' foreign debts) could bring value as looking at the banking sector would.

Interest rate on foreign debt compared to growth of exports

The argument for the use of this indicator is the same as looking at interest rates (on domestic liabilities) compared to the growth of income – see previous discussion.

Terms of trade (exports/imports)

This signals the competitiveness of the economy in comparison with other economies. The terms of trade variable has been shown to accurately (92% of crises accurately called) signal an oncoming banking crisis (M. Goldstein et al., 2000).

To some extent, using the terms of trade to estimate whether the income flow from exports is on a fast-growing path or not, relative to other economies, is an application of Thirlwall's law (Thirlwall, 1979). Given that economic growth is balance-of-payments constrained, the long run economic growth of an economy is the growth of exports relative to income elasticity of demand. If Thirlwall's law is true (which some research does support see e.g. Bairam (1988), Atesoglu (1993) and Britto & McCombie (2009)), the terms of trade gives a valuable estimate of the path of exports-income for the long run.

The real exchange rate

The volatility of the real exchange rate is an important input in measuring financial stability for the short term as it can be a part of the panic-phase of Minsky's FIH. The real exchange rate can also be informative when looking at the underlying financial structure of the economy and how sustainable it is as it can be used to see if currencies are overvalued or not, like Burkart and Coudert (2002) did. This is not the same as the terms-of-trade variable as it focuses more on the exchange rate rather than the relative value of exports to imports, which can e.g. change due to commodity price changes without any changes in

the real exchange rate. Too strong exchange rate can lead to current account deficits and shortage of foreign currency income. M. Goldstein et al. (2000) highlight the real exchange rate as an indicator that is one of the first ones to signal an oncoming currency crisis.

The current account balance

Current account deficits are common in the early-warning literature on financial crises and crashes. M. Goldstein et al. (2000) find that its accuracy in predicting a currency crisis is good but (Kaminsky et al., 1998) find the indicator "insignificant" in most studies. However, later research has argued that the indicator is valuable in both predicting a crisis (Frankel & Saravelos, 2012) and in relation to the severity of the crisis (Babecký et al., 2013). From a Minskyian point of view, the variable signals the accumulation of external debt, which, in the end, creates contractual cash flows. Therefore, the current account deficit should be considered when estimating the sustainability of the underlying financial structures of the economy.

Indicators of profitability and productivity of non-financial and financial corporations

Low profitability of corporations impairs their ability to repay debt. This, effectively, is the other side of the argument why a high rate of interest is detrimental to financial sustainability. Profits from operations are cash flows that are, amongst other things, used to meet financial obligations according to the underlying debt contracts (Minsky, 2008a). Low profits of non-financial and financial corporations could therefore signal upcoming stress in the financial structures of the economy. Likewise, low productivity of firms can impair profits since more costly inputs are needed to produce the same output if productivity is low.

Equity indicators of non-financial and financial corporations

Usage of external funds in investment projects

An unmistakable part of Minsky's FIH is that leverage builds up as bankers and investors become confident about the future. However, high level of leverage makes the operations of firms vulnerable to unforeseen cash flow mismatches.

High leverage, i.e. low equity ratio, is therefore an important indicator of the strength of the underlying financial structures of the economy.

Minsky also noted that during the phases of high hopes of the future, high leverage would be applied in investment projects in an attempt to increase the return on equity in the relevant projects. Borrowed external funds are needed for this increase of leverage. Low margin of safety of investment projects is associated with high level of reliance on external funds. High ratio of borrowed external funds in investment projects therefore signal a risk of lack of resilience in the underlying financial structures of the economy.

The structure of the yield curve

A flattening or even downward sloping yield curve is also a sign of the liquidity squeeze development in Minsky's Financial Instability Hypothesis. A certain turning point in the development of the financial system and its stability, according to the FIH, is when the build-up of leverage and ignorance of liquidity needs has pushed interest rates on liquid financial assets upwards; their prices have fallen.

A flat or even a downward sloping yield curve is therefore a sign of the turning point in Minsky's FIH. Once this turning point is reached, the interest rate costs of economic units that finance themselves especially on the short end – such as banks and units that trust being able to find available refinancing when needed – but hold assets with longer maturity will push them into losing money. Short term instability is by then not far away.

A downward sloping yield curve should therefore have negative impacts on financial stability and overall economic performance. This is confirmed, on average, by e.g. Bordo and Haubrich (2008), Campbell (1995) and Ang, Piazzesi and Wei (2006). In light of this, the structure of the yield curve could be a valuable indicator in the long term financial instability index.

Debt-financed aggregate demand

Keen (2009b) defined aggregate demand as the sum of gross domestic product and the change in debt. He also noted that as the change in debt represents a larger share of the aggregate demand, the financial structure of the economy is

more unstable, making recessions that come after periods of high debt-financed growth in aggregate demand more severe than others. The correlation between debt contribution to demand and unemployment is especially high; shortly after debt-financed aggregate demand diminishes, unemployment increases and more so where demand was increasingly debt-financed.

The intuition is simple. Define net savings as:

Income – Expenditures = Net Savings

Or:

Expenditures = Income + Net Increase in Debt

From a macroeconomic point of view this can also be put forward in the sense of aggregate demand:

Aggregate demand = Gross Domestic Production + Net Increase of Debt

Taking the first differential, one can see that:

Change in Aggregate Demand = GDP growth + Change in Net Increase of Debt

Or:

$$\Delta AD = \Delta GDP + \Delta\Delta Debt$$

By measuring how much share of aggregate demand is represented by gross domestic product, one can see the contribution made by change of debt (which can be negative). Therefore, based on Keen, we can argue that an important input variable in estimating the long-term sustainability of the economy's financial structure is to monitor how large share of the aggregate demand is debt financed, or, equivalently, how much the share of GDP is of aggregate demand in the sum here above. The higher the share of GDP is then the nature of the economy's financial structure is less fragile.

The responsiveness of the government safety net

Minsky (2008b) argued that a Big Government – i.e. a government big enough to have considerable effects on the cash flows of the economy – "stabilizes not

only employment and income but also business cash flows (profits) and as a result asset value". And how big should Big Government be? "Big Government must be big enough to ensure that swings in private investment lead to sufficient swings in the government's deficit so that profits are stabilized. This means that government must be of the same order of magnitude or larger than investment" (Minsky, 2008b).

However, there is a limit to the size of Big Government. Not only can Big Government be inflationary (Minsky, 2008b) but government expenditures must be responsive enough: when private investment expands government expenditures should contract to decrease the threat that too strong cash flows of private corporations create an exuberant environment, which pushes for an increased use of leverage instead of equity in financing a business's operations and investments.

Figure A2.2 Investment, budget balance (BB) and government expenditures in Iceland

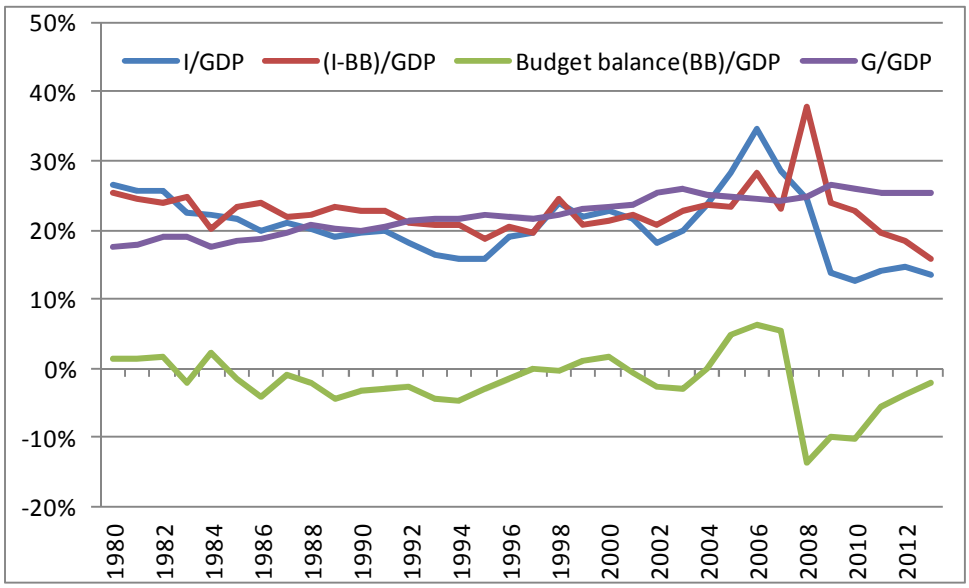


Figure A2.2 is a case in point. It shows how government expenditures in Iceland did not react (contract) quickly enough in the run up of the crisis in 2008. According to Minsky, the budget balance should have been more positive still to dampen the expansionary effects of increased credit expansion and private investment. This did not happen to a high enough degree: the red line creeps up. This added fuel to the fire, making the bubble even worse. The same problem but the opposite side of it emerges after the crash in 2008. Then the

government expenditures are expanded but not sustained as private investment collapses: the red line drops below unprecedented levels. Both the expansion and the contraction are therefore made worse by the lack of responsiveness in the government expenditures in Iceland.

Appendix 3 – Data Appendix

The following tables detail the regressions summed up in tables 4.14-4.15 further. Many regressions in those tables are not to be found in tables 4.14-4.15. The reason why is e.g. non-stationarity problems (as in the case of short term financial instability in the UK) or statistical non-significance.

A3.1 UK tables

Table A3.1 What causes Long Term Instability in the United Kingdom?

	LT, 1st diff. [I(1)]	Coeff. P-value	P-value, F test	Ljung-Box P-value
Outward Flow of Financial FDI [I(0)]	19.760	0.000	**0.000**	0.701
Outward Flow of Financial FDI [I(0)]	15.646	0.002	**0.000**	0.465
	15.655	0.106		
Outward Stock of Financial FDI [coint.]	4.049	0.037	**0.037**	0.201
Outward Stock of Financial FDI [coint.]	8.841	0.025	**0.002**	0.664
	-3.918	0.388		
Inward Flow of Financial FDI [I(0)]	11.465	0.117	0.117	0.407
Inward Flow of Financial FDI [I(0)]	18.164	0.000	**0.000**	0.956
	14.196	0.139		
Outward Flow of Fin. FDI, 1st diff [I(0)]	11.696	0.174	0.174	0.962
Outward Flow of Fin. FDI, 1st diff [I(0)]	14.003	0.032	**0.023**	0.753
	17.659	0.023		
Outward Flow of FDI, 1st diff [I(0)]	3.660	0.019	**0.019**	0.566
Outward Flow of FDI, 1st diff [I(0)]	3.396	0.044	0.120	0.839
	0.731	0.501		
Outward Stock of Fin. FDI, 1st diff [I(0)]	11.017	0.031	**0.031**	0.606
Outward Stock of Fin. FDI, 1st diff [I(0)]	8.496	0.101	0.103	0.508
	7.943	0.129		
Inward Stock of Fin. FDI, 1st diff [I(0)]	-1.800	0.835	0.835	0.551
Inward Stock of Fin. FDI, 1st diff [I(0)]	5.827	0.470	0.059	0.674
	21.119	0.022		
Nom. GDP gr [I(0)]	2.473	0.675	0.675	0.952
Nom. GDP gr [I(0)]	12.440	0.027	0.071	0.958
	2.879	0.346		
GDP real growth [I(0)]	6.879	0.000	**0.000**	0.505
GDP real growth [I(0)]	6.858	0.001	**0.001**	0.245
	1.778	0.631		

Table A3.2 What causes accelerations of Long Term Financial Instability in the UK?

	LT, 2nd diff. [I(0)]	Coeff. P-value	P-value, F test	Ljung-Box P-value
Outward Flow of Fin. FDI, 1st diff [I(0)]	12.964	0.146	0.146	0.795
Outward Flow of Fin. FDI, 1st diff [I(0)]	14.983	0.062	**0.002**	0.418
	18.370	0.015		
Outward Flow of FDI, 1st diff [I(0)]	3.643	0.005	**0.005**	0.817
Outward Flow of FDI, 1st diff [I(0)]	4.355	0.000	**0.000**	0.718
	2.555	0.015		
Inward Flow of Fin. FDI, 1st diff [I(0)]	6.825	0.431	0.431	0.688
Inward Flow of Fin. FDI, 1st diff [I(0)]	9.983	0.047	0.082	0.740
	8.843	0.388		
Outward Stock of Fin. FDI, 1st diff [I(0)]	8.328	0.143	0.143	0.657
Outward Stock of Fin. FDI, 1st diff [I(0)]	8.606	0.066	**0.023**	0.821
	5.243	0.547		
Inward Stock of FDI, 1st diff. [I(0)]	-2.586	0.098	0.098	0.690
Inward Stock of FDI, 1st diff. [I(0)]	-0.644	0.775	0.952	0.791
	-0.057	0.975		
Nom. GDP gr [I(0)]	14.883	0.038	**0.038**	0.916
Nom. GDP gr [I(0)]	18.245	0.012	**0.028**	0.828
	1.380	0.856		
GDP real growth [I(0)]	5.008	0.175	0.175	0.529
GDP real growth [I(0)]	14.177	0.000	**0.000**	0.167
	-7.353	0.007		
Real GDP growth, 1st diff. [I(0)]	7.233	0.025	**0.025**	0.743
Real GDP growth, 1st diff. [I(0)]	10.438	0.001	**0.001**	0.795
	4.628	0.180		

Table A3.3 What causes Short Term Financial Instability in the UK?

	ST, 1st diff. [I(1)]	Coeff. P-value	P-value, F test	Ljung-Box P-value
Outward Flow of Financial FDI [I(0)]	56.407	0.088	0.088	0.151
Outward Flow of Financial FDI [I(0)]	42.133	0.040	**0.024**	0.232
	81.265	0.034		
Inward Flow of Financial FDI [I(0)]	78.187	0.036	**0.036**	0.552
Inward Flow of Financial FDI [I(0)]	89.681	0.072	0.172	0.789
	40.740	0.402		
Inward Flow of Fin FDI, 1 st diff [I(0)]	37.963	0.152	0.152	0.099
Inward Flow of Fin FDI, 1 st diff [I(0)]	49.245	0.023	**0.026**	0.798
	65.548	0.028		
Outward Stock of Fin FDI, 1st diff [I(0)]	59.886	0.018	**0.018**	0.243
Outward Stock of Fin FDI, 1st diff [I(0)]	58.028	0.035	0.073	0.670
	21.888	0.438		

Table A3.4 What Granger-causes Outward Financial FDI Flow from the United Kingdom?

	Outward Financial FDI Flow [I(0)]	P-value	P-value, F test	Ljung-Box P-value
Nom. GDP gr [I(0)]	-0.133	0.020	**0.020**	0.555
Nom. GDP gr [I(0)]	0.122	0.271	0.059	0.991
	-0.296	0.069		

Table A3.5 What Granger-causes Inward Financial FDI Flow into the United Kingdom?

	Inward Financial FDI Flow [I(0)]	P-value	P-value, F test	Ljung-Box P-value
LT, 1st diff. [I(1)]	0.012	0.001	**0.001**	0.765
LT, 1st diff. [I(1)]	0.003	0.651	0.102	0.939
	0.016	0.172		
GDP real growth [I(0)]	0.101	0.018	**0.018**	0.876
GDP real growth [I(0)]	0.127	0.022	**0.034**	0.677
	-0.020	0.792		
GDP real growth [I(0)] - w.trend	0.079	0.094	0.094	1.000
GDP real growth [I(0)] - w.trend	0.058	0.503	0.680	0.921
	0.000	1.000		

Table A3.6 What Granger-causes Inward FDI Flow into the United Kingdom?

	Inward FDI Flow [I(1)]	P-value	P-value, F test	Ljung-Box P-value
ST [I(1)]	-0.070	0.003	**0.003**	0.312
ST [I(1)]	-0.067	0.022	**0.025**	0.655
	0.022	0.524		
ST, 1st diff. [I(1)]	-0.066	0.007	**0.007**	0.808
ST, 1st diff. [I(1)]	-0.057	0.076	0.164	0.932
	-0.022	0.575		
GDP real growth [I(0)]	0.312	0.019	**0.019**	0.431
GDP real growth [I(0)]	0.222	0.275	0.131	0.401
	0.152	0.486		

Table A3.7 What Granger-causes changes in the Outward Financial FDI Flow out of the United Kingdom?

	Outward Financial Flow, 1st diff. [I(0)]	P-value	P-value, F test	Ljung-Box P-value
ST [I(1)]	-0.008	0.589	0.589	0.161
ST [I(1)]	-0.021	0.050	0.063	0.849
	0.018	0.032		
Nom. GDP gr [I(0)]	-0.040	0.500	0.500	0.093
Nom. GDP gr [I(0)]	0.222	0.201	**0.030**	0.791
	-0.248	0.034		
GDP real growth [I(0)]	-0.049	0.564	0.564	0.099
GDP real growth [I(0)]	0.138	0.076	**0.007**	0.193
	-0.201	0.002		
Real GDP growth, 1st diff. [I(0)]	0.125	0.058	0.058	0.124
Real GDP growth, 1st diff. [I(0)]	0.183	0.009	**0.025**	0.253
	-0.046	0.5357		

Table A3.8 What Granger-causes changes in the Inward FDI Flow into the United Kingdom?

	Inward FDI Flow, 1st diff. [I(1)]	P-value	P-value, F test	Ljung-Box P-value
ST [I(1)]	-0.042	0.269	0.269	0.363
ST [I(1)]	-0.097	0.031	**0.003**	0.816
	0.070	0.002		
ST, 1st diff. [I(1)]	-0.079	0.002	**0.002**	0.594
ST, 1st diff. [I(1)]	-0.083	0.007	**0.020**	0.769
	-0.026	0.479		

Table A3.9 What Granger-causes changes in the Outward Stock of Financial FDI from the United Kingdom?

	Outward Stock of Fin FDI, 1st diff. [I(0)]	P-value	P-value, F test	Ljung-Box P-value
ST [I(1)]	-0.031	0.015	**0.015**	0.344
ST [I(1)]	-0.013	0.276	0.059	0.599
	-0.034	0.162		
Nom. GDP gr [I(0)]	-0.108	0.262	0.262	0.906
Nom. GDP gr [I(0)]	0.028	0.933	0.067	0.965
	-0.217	0.439		

Table A3.10 What Granger-causes Inward Stock of Financial FDI into the United Kingdom?

	Inward Stock of Financial FDI [I(1)]	P-value	P-value, F test	Ljung-Box P-value
LT, 1st diff. [I(1), cointgr.]	0.012	0.009	**0.009**	0.827
LT, 1st diff. [I(1), cointgr.]	0.008	0.245	**0.031**	0.695
	0.007	0.478		

Table A3.11 What Granger-causes changes in the Inward Stock of Financial FDI in the United Kingdom?

	Inward Stock of Fin FDI, 1st diff [I(0)]	P-value	P-value, F test	Ljung-Box P-value
LT, 1st diff. [I(1)]	0.012	0.010	**0.010**	0.775
LT, 1st diff. [I(1)]	0.005	0.387	**0.010**	0.860
	0.011	0.128		
ST [I(1)]	-0.010	0.225	0.225	0.610
ST [I(1)]	0.007	0.346	**0.041**	0.498
	-0.020	0.018		
ST, 1st diff. [I(1)]	0.005	0.586	0.586	0.835
ST, 1st diff. [I(1)]	0.012	0.198	0.085	0.316
	-0.010	0.407		

Table A3.12 What Granger-causes changes in Inward Stock of FDI in the United Kingdom?

	Inward Stock of FDI, 1st diff [I(0)]	P-value	P-value, F test	Ljung-Box P-value
GDP real growth [I(0)]	0.425	0.001	**0.001**	0.827
GDP real growth [I(0)]	0.284	0.149	**0.022**	0.612
	0.208	0.590		
GDP real growth [I(0)] - w.trend	0.366	0.022	**0.022**	0.829
GDP real growth [I(0)] - w.trend	0.039	0.901	0.551	0.349
	0.253	0.507		

Table A3.13 What Granger-causes Nominal GDP Growth in the United Kingdom?

	Nominal GDP Growth [I(0)]	P-value	P-value, F test	Ljung-Box P-value
ST [I(1)]	-0.026	0.000	**0.000**	0.202
ST [I(1)]	-0.031	0.026	**0.003**	0.834
	0.026	0.060		
ST, 1st diff. [I(1)]	-0.032	0.000	**0.000**	0.782
ST, 1st diff. [I(1)]	-0.028	0.002	**0.005**	0.505
	-0.012	0.347		

Table A3.14 What Granger-causes Real GDP Growth in the United Kingdom?

	GDP real growth [I(0)]	P-value	P-value, F test	Ljung-Box P-value
ST [I(1)]	-0.021	0.001	**0.001**	0.682
ST [I(1)]	-0.028	0.009	**0.020**	0.669
	0.037	0.196		
ST, 1st diff. [I(1)]	-0.029	0.006	**0.006**	0.900
ST, 1st diff. [I(1)]	-0.023	0.008	**0.022**	0.426
	-0.011	0.417		
Inward Flow of Financial FDI [I(0)]	-1.309	0.009	**0.009**	0.704
Inward Flow of Financial FDI [I(0)]	-1.363	0.014	**0.035**	0.674
	-0.381	0.599		
Inw. Flow of Fin. FDI [I(0)] - w.trend	-1.641	0.009	**0.009**	0.900
Inw. Flow of Fin. FDI [I(0)] - w.trend	-1.564	0.015	**0.040**	0.801
	-0.555	0.425		

A3.2 US tables

Table A3.15 What Granger-causes changes in Long Term Financial Instability in the United States? No time trend

	1st Diff LT 8	P-value	P-value, F test	Ljung-Box P-value
Inward Flow of Financial FDI	96.634	0.028	**0.028**	0.817
Inward Flow of Financial FDI	110.674	0.014	**0.002**	0.832
	35.151	0.367		
Inward Flow of FDI	20.741	0.028	**0.028**	0.949
Inward Flow of FDI	11.267	0.368	**0.006**	0.981
	14.796	0.147		
Inward Stock of FDI, 1st diff	16.890	0.016	**0.016**	0.987
Inward Stock of FDI, 1st diff	10.180	0.131	**0.016**	0.752
	16.209	0.074		
ST	0.201	0.151	0.151	0.435
ST	0.540	0.000	**0.000**	0.083
	-0.439	0.002		
ST, 1st diff.	0.487	0.000	**0.000**	0.058
ST, 1st diff.	0.577	0.000	**0.000**	0.911
	-0.386	0.002		

Table A3.16 What Granger-causes Long Term Financial Instability in the US? With time trend.

	1st Diff LT 8	P-value	P-value, F test	Ljung-Box P-value
ST	0.153	0.189	0.189	0.719
ST	0.460	0.000	**0.000**	0.264
	-0.363	0.003		
ST, 1st diff.	0.453	0.000	**0.000**	0.395
ST, 1st diff.	0.479	0.000	**0.000**	0.474
	-0.214	0.142		
Nominal GDP growth	0.000	0.358	0.358	0.984
Nominal GDP growth	0.000	0.010	**0.018**	0.830
	0.000	0.006		

Table A3.17 What Granger-causes Short Term Financial Instability in the United States? No time trend.

	ST 8 1st diff	P-value	P-value, F test	Ljung-Box P-value
Inward Flow of FDI	35.233	0.010	**0.010**	0.621
Inward Flow of FDI	43.273	0.003	**0.010**	0.502
	-0.169	0.991		
Inward Flow of FDI, 1st diff	26.745	0.033	**0.033**	0.807
Inward Flow of FDI, 1st diff	14.978	0.339	**0.034**	0.628
	39.033	0.080		
Inward Stock of FDI, 1st diff	39.844	0.048	**0.048**	0.618
Inward Stock of FDI, 1st diff	42.112	0.054	0.142	0.476
	8.706	0.478		
LT, 1st diff.	-1.010	0.015	**0.015**	0.323
LT, 1st diff.	-0.295	0.535	0.806	0.826
	0.133	0.766		
GDP nom. growth	22.142	0.000	**0.000**	0.634
GDP nom. growth	16.415	0.012	**0.036**	0.658
	1.927	0.817		
GDP real growth, 1st diff	19.290	0.086	0.086	0.403
GDP real growth, 1st diff	9.393	0.225	0.426	0.699
	1.938	0.827		

Table A3.18 What Granger-causes Short Term Financial Instability in the United States? With time trend.

	ST 8 1st diff	P-value	P-value, F test	Ljung-Box P-value
GDP nom. Growth	25.452	0.005	**0.005**	0.799
GDP nom. Growth	20.751	0.017	**0.021**	0.657
	7.861	0.407		
GDP real growth, 1st diff.	19.239	0.078	0.078	0.401
GDP real growth, 1st diff.	9.604	0.224	0.428	0.707
	1.986	0.825		
LT, 1st diff.	-1.344	0.006	**0.006**	0.794
LT, 1st diff.	-0.609	0.284	0.516	0.781
	-0.066	0.871		

Table A3.19 What Granger-causes changes in the Outward Financial FDI Flow from United States? No time trend.

	Outward Financial FDI Flow	P-value	P-value, F test	Ljung-Box P-value
ST	-0.001	0.015	**0.015**	0.818
ST	0.000	0.877	**0.047**	0.616
	-0.001	0.247		
GDP real growth, 1st diff	0.049	0.053	0.053	0.969
GDP real growth, 1st diff	0.048	0.057	0.147	0.994
	0.004	0.895		

Table A3.20 What Granger-causes Outward Financial FDI Flow from United States? With a time trend.

	Outward Financial FDI Flow	P-value	P-value, F test	Ljung-Box P-value
ST	-0.001	0.013	**0.013**	0.751
ST	0.000	0.827	**0.016**	0.376
	-0.002	0.188		
GDP real growth, 1st diff	0.001	0.062	0.062	0.976
GDP real growth, 1st diff	0.001	0.078	0.186	0.948
	0.000	0.845		

Table A3.21 What Granger-causes Inward Financial FDI Flow into the United States? No time trend.

	Inward Financial FDI Flow	P-value	P-value, F test	Ljung-Box P-value
ST, 1st diff.	0.001	0.063	0.063	0.924
ST, 1st diff.	0.001	0.327	0.151	0.853
	0.001	0.681		
GDP real growth, 1st diff	0.035	0.051	0.051	0.946
GDP real growth, 1st diff	0.037	0.081	0.206	0.943
	0.003	0.908		

Table A3.22 What Granger-causes Inward FDI Flow into the United States? No time trend.

	Inward FDI Flow	P-value	P-value, F test	Ljung-Box P-value
ST 8	-0.003	0.024	**0.024**	0.302
ST 8	-0.001	0.723	0.536	0.897
	-0.001	0.843		
GDP nom growth	0.143	0.049	**0.049**	0.237
GDP nom growth	0.106	0.306	0.564	
	-0.035	0.663		
GDP real growth, 1st diff	0.165	0.023	**0.023**	0.633
GDP real growth, 1st diff	0.140	0.093	0.230	0.794
	0.074	0.469		

Table A3.23 What Granger-causes Inward FDI Flow into the United States? With a time trend.

	Inward FDI Flow	P-value	P-value, F test	Ljung-Box P-value
ST	-0.003	0.016	**0.016**	0.334
ST	-0.002	0.644	0.353	0.729
	-0.001	0.843		
GDP nom growth	0.209	0.011	**0.011**	0.356
GDP nom growth	0.148	0.181	0.357	0.786
	0.025	0.767		
GDP real growth, 1st diff	0.166	0.028	**0.028**	0.668
GDP real growth, 1st diff	0.143	0.109	0.262	0.659
	0.077	0.447		

Table A3.24 What Granger-causes changes in the Inward Financial FDI Flow into the United States? No time trend.

	Inward Financial FDI Flow, 1st diff.	P-value	P-value, F test	Ljung-Box P-value
GDP nom growth	-0.011	0.750	0.750	0.734
GDP nom growth	0.019	0.689	0.072	0.920
	-0.078	0.035		
GDP real growth, 1st diff	0.052	0.049	**0.049**	0.553
GDP real growth, 1st diff	0.064	0.057	0.087	0.684
	0.002	0.933		

Table A3.25 What Granger-causes changes in the Inward Financial FDI Flow into the United States? With a time trend.

	Inward Financial FDI Flow, 1st diff.	P-value	P-value, F test	Ljung-Box P-value
GDP real growth, 1st diff	0.053	0.050	**0.050**	0.537
GDP real growth, 1st diff	0.067	0.053	0.091	0.681
	0.003	0.917		

Table A3.26 What Granger-causes changes in the Inward FDI flow into the United States? No time trend.

	Inward FDI Flow, 1st diff.	P-value	P-value, F test	Ljung-Box P-value
ST	-0.004	0.011	**0.011**	0.903
ST	-0.004	0.088	**0.018**	0.765
	0.001	0.834		
GDP real growth	0.176	0.186	0.186	0.632
GDP real growth	0.234	0.056	**0.027**	0.640
	-0.130	0.266		
GDP real growth, 1st diff	0.192	0.019	**0.019**	0.581
GDP real growth, 1st diff	0.225	0.013	**0.039**	0.818
	0.122	0.218		

Table A3.27 What Granger-causes changes in the Outward Financial Flow from the United States? No time trend.

	Outward Financial Flow, 1st diff.	P-value	P-value, F test	Ljung-Box P-value
ST 8 1st difference	-0.001	0.067	0.067	0.563
ST 8 1st difference	-0.001	0.408	0.404	0.474
	-0.001	0.631		
Real GDP growth	-0.008	0.845	0.845	0.516
Real GDP growth	0.029	0.413	**0.047**	0.180
	-0.109	0.015		

Table A3.28 What Granger-causes changes in the Outward FDI Flow from the United States? No time trend.

	Outward Flow, 1st difference	P-value	P-value, F test	Ljung-Box P-value
ST 8	-0.002	0.072	0.072	0.250
ST 8	0.000	0.986	0.480	0.308
	-0.002	0.663		

Table A3.29 What Granger-causes changes in the Outward FDI Flow from the United States? With a time trend.

	Outward Flow, 1st difference	P-value	P-value, F test	Ljung-Box P-value
ST 8	-0.002	0.085	0.085	0.219
ST 8	-0.001	0.817	0.173	0.257
	-0.002	0.750		

Table A3.30 What Granger-causes changes in the Inward FDI Stock in the United States? No time trend.

	Inward Stock of FDI, 1st diff	P-value	P-value, F test	Ljung-Box P-value
ST 8	0.000	0.790	0.790	0.570
ST 8	0.006	0.000	**0.001**	0.572
	-0.006	0.002		
ST 8 1st difference	0.004	0.015	**0.015**	0.607
ST 8 1st difference	0.005	0.059	**0.001**	0.653
	0.003	0.576		

Table A3.31 What Granger-causes Changes in Outward Stock of FDI from United States? With a time trend.

	Outward Stock of FDI, 1st difference	P-value	P-value, F test	Ljung-Box P-value
ST 8	0.002	0.186	0.186	0.474
ST 8	0.009	0.009	**0.027**	0.973
	-0.006	0.066		
ST 8 1st difference	0.006	0.053	0.053	0.202
ST 8 1st difference	0.007	0.115	0.056	0.999
	0.001	0.832		

Table A3.32 Does financial instability Granger-cause Nominal GDP growth in United States? No time trend

	GDP nom growth	P-value	P-value, F test	Ljung-Box P-value
ST	-0.999	0.096	0.096	0.247
ST	-2.800	0.001	**0.002**	0.061
	2.566	0.003		
ST, 1st diff.	-2.615	0.001	**0.001**	0.126
ST, 1st diff.	-3.273	0.000	**0.000**	0.924
	1.838	0.007		

Table A3.33 Does financial instability Granger-cause Nominal GDP growth in United States? With a time trend.

	GDP nom growth	P-value	P-value, F test	Ljung-Box P-value
ST	-0.831	0.146	0.146	0.304
ST	-2.469	0.003	**0.010**	0.112
	2.374	0.006		
ST, 1st diff.	-2.457	0.001	**0.001**	0.106
ST, 1st diff.	-3.127	0.000	**0.000**	0.884
	1.717	0.028		

Table A3.34 Does financial instability Granger-cause changes in the real GDP Growth in the United States? No time trend

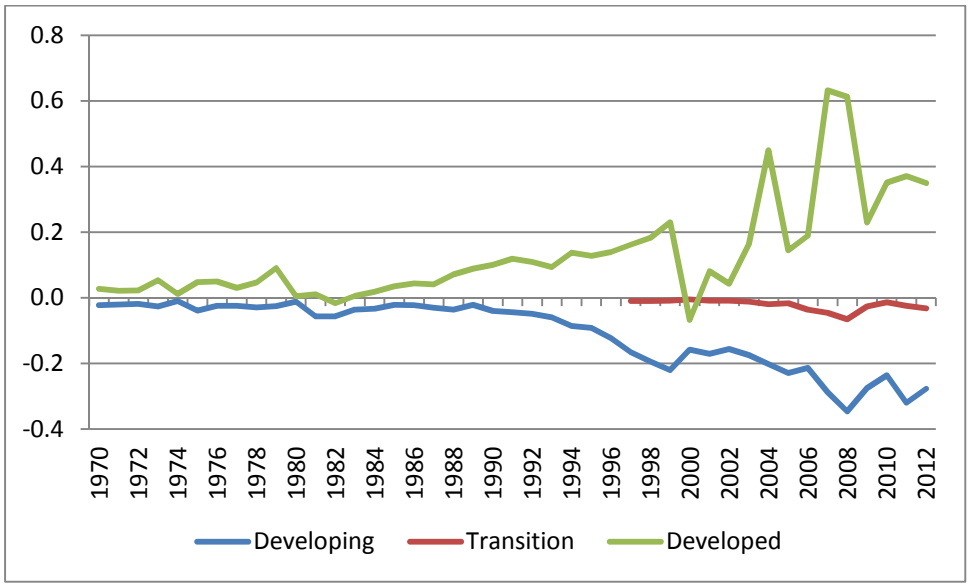
	GDP real growth 1st diff.	P-value	P-value, F test	Ljung-Box P-value
ST	-0.192	0.771	0.771	0.748
ST	-2.497	0.000	**0.002**	0.152
	2.493	0.004		
ST, 1st diff.	-2.441	0.001	**0.001**	0.166
ST, 1st diff.	-2.988	0.000	**0.000**	0.413
	2.358	0.001		

Table A3.35 Does financial instability Granger-cause changes in the real GDP Growth in the United States? With a time trend.

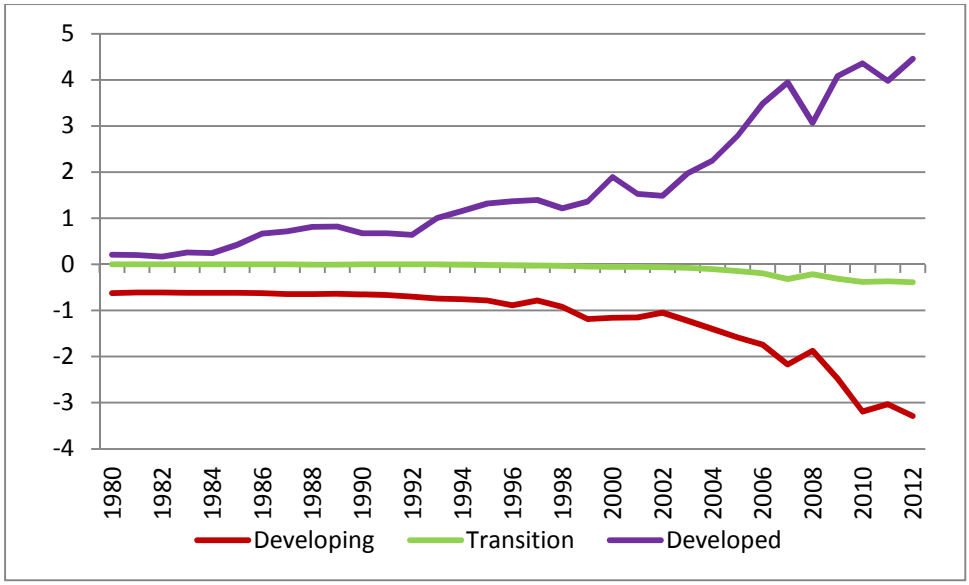
	GDP real growth 1st diff.	P-value	P-value, F test	Ljung-Box P-value
ST	-0.216	0.708	0.708	0.761
ST	-2.716	0.002	**0.007**	0.160
	2.530	0.006		
ST, 1st diff.	-2.521	0.004	**0.004**	0.140
ST, 1st diff.	-3.006	0.000	**0.000**	0.418
	2.342	0.001		

A3.3 Net FDI data

Graph A3.1 Net Outward FDI Flows



Graph A3.2 Net Outward FDI Stock



The graphs above show that main stock and flows of FDI have their source in rich and developed countries while the receivers of that FDI are developing countries.

Appendix 4

The following rests, to a large extent, on the analysis of Harkness (2014). The reader will see that the argumentation is quite similar to that of IMF and Wray.

A certain amount of money has a certain purchasing power in the economy. The creation of bank credit and the endogenous creation of money is therefore the creation of purchasing power. Schumpeter pointed this out when he called banks “manufacturers” of purchasing power (Schumpeter, 1934).

We will use B_A to signify the purchasing power created from gross domestic credit creation. Gross purchasing power also comes from gross national income ($N_A = C + I + G + X + PI + SI$) and from gross capital inflows from abroad, K_A. Here, PI and SI represent gross primary income from abroad and gross secondary income from abroad. Finally, current gross purchasing power can be attained via a *transfer* of purchasing power. This transfer will either be between *time periods* or to *another domestic party* within the same time period. Transferring domestic purchasing power between two different domestic units does nothing to the gross available national purchasing power within that time period. We can therefore ignore that factor. But accumulated stock of savings is purchasing power that has been *transferred* from the past to the now. Liquidating those savings, partially or fully, gives the owner a spendable amount, i.e. purchasing power. This gross liquidation of existing savings will be signified with L_A. We can now express available gross national purchasing power, P_A, as:

$$P_A = N_A + B_A + L_A + K_A$$

Purchasing power can be spent or stored, i.e. saved, for a rainy day. Expenditures of purchasing power can be recorded as a domestic income, N, or foreign income. Foreign income is domestic expenditures on imports (M) and primary and secondary income from abroad, which for the domestic economy are expenditures. We signify those variables with PE and SE respectively. The domestic economy can also spend its domestic purchasing power by acquisition of foreign assets or by repaying outstanding foreign debt, i.e. gross capital outflows. We will signify this variable with K_E. Purchasing power will also be used to repay outstanding bank debt, B_E. Spent purchasing power is therefore

going to be used in one of the three: $N_E = C + I + G + M + PE + SE$, B_E or K_E. Finally, if purchasing power is not spent, it is stored, i.e. saved. This is addition to existing savings and represents the act of transferring purchasing power from now to the future. We will signify this gross *transfer* of available purchasing power to the future with L_E. Therefore, we can write that the purchasing power spent and stored, P_S, is:

$$P_S = N_E + B_E + L_E + K_E$$

Available purchasing power *must* be either spent or stored between periods, it is logically impossible to not have it so: if you hold a dollar bill in your hand, which you acquired one way or the other, you must spend it or not spend it. Therefore, $P_A = P_S$ by definition, i.e.:

$$P_A = N_A + B_A + L_A + K_A = N_E + B_E + L_E + K_E = P_S$$

And therefore:

$$X + PI + SI + B_A + L_A + K_A = M + PE + SE + B_E + K_E + L_E$$

$$X – M + PI – PE + SI – SE + B_A – B_E + L_A – L_E + K_A – K_E = 0$$

PI – PE is BPI, i.e. balance on primary income from abroad. Likewise, SI – SE is BSI, i.e. balance on secondary income from abroad. $K_A – K_E$ is net capital flows from abroad, K. And $B_A – B_E$ is net domestic credit expansion, B. And $L_A – L_E$ is net liquidation of existing savings, L. Remember (International Monetary Fund, 2011) that X – M + BPI + BSI = CAB where CAB is current account balance. Therefore, we get:

$$X – M + BPI + BSI + B + L + K = 0$$

$$CAB + B + L + K = 0$$

Which is the same as (3), see section *5.2.1 Domestic credit expansion and current account deficits*.

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