Essays on pensions

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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.

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Abstract

This thesis consists of two self-contained empirical chapters on defined benefit pension plans (DB hereinafter) in the European Union (EU hereinafter) and the United States (U.S. hereinafter). These chapters examine earnings management incentives ahead of major corporate events, changes in pension accounting standards and unemployment risk's role on firm's pension decisions.

The first chapter provides a discussion on regulatory background and reviews the literature on pension actuarial assumptions in EU and the U.S. and pension investments. The second chapter studies the pension actuarial assumptions' role in EU firms' earnings management behaviour ahead of major corporate events such as mergers and acquisitions (M&As hereinafter), initial public offerings (IPOs hereinafter), and seasoned equity offerings (SEOs hereinafter). Prior literature has found that managers tend to manage earnings upward before such events in order to boost stock prices and maximise proceeds (Erickson & Wang, 1999). For example, a positive relationship has been documented between the expected rate of return (ERR hereinafter) and reported earnings (Asthana, 2008).

The second chapter also examines the impact of IAS 19 revised Employee Benefits (IAS 19R hereinafter) on EU firms' earnings management behaviour ahead of major corporate events such as M&As, IPOs, and SEOs. The recent introduction of IAS 19R marks a fundamental shift in pension accounting because it eliminates the use of the ERR on plan assets when computing pension expenses. It has been replaced by the discount rate, which was already being used under IAS 19 to compute the present value of pension obligations and interest costs. Given academic and anecdotal evidence that managers manage

the ERR (Bergstresser, Desai & Rauh 2006; Chuk, 2013; Picconi, 2006), this change will alter their ability to manage earnings.

To investigate the above, I study public firms in the EU involved in M&As, IPOs, and SEOs between 2005 and 2016. The results show that, before the adoption of IAS 19R, firms generally manage their expected rates of return upward before all types of major corporate events. However, the results provide evidence that firms manage the discount rate after the adoption of IAS 19R. I also explore two potential alternative tools for managing reported numbers both before and after the implementation of IAS 19R: discretionary accruals management and real earnings management. The results are consistent with the notion that firms use real earnings management to a greater extent after the adoption of IAS 19R.

The third chapter studies the effect of unemployment risks on pension investment and other pension-related decisions. Previous literature suggests that firms tend to take more risk with respect to their corporate financial policies after unemployment risk decreases (Agrawal & Matsa, 2013). Pension investment decisions are a major part of firms' overall financial policies.

I examine the changes in state unemployment insurance (UI hereinafter) laws as a source of exogenous variation in the costs borne by employees during unemployment. I use fixed effects and difference-in-differences (DiD hereinafter) methods for a matched sample of treatment and control firms. I find evidence that firms undertake higher pension investment risk by investing more heavily in equities after unemployment risk decreases.

According to Dou, Khan and Zou (2016), firm's earnings management behaviour can be reduced after unemployment risk decreases. In subsequent tests, I examine whether unemployment risk affects firm's earnings management behaviour using pension actuarial assumptions. The results show that firms manage pension actuarial assumptions such as the ERR to a lesser extent after unemployment benefits increase. Furthermore, I examine the impact of unemployment risk on firms' pension plan freeze decisions. When firms freeze their DB plans, they typically set up defined contribution plans (DC hereinafter). Employees bear higher risks under DC than DB plans. Thus, unemployment risk will increase if firms freeze their DB plans. I find that the probability of a pension DB plan freeze increases after unemployment benefits increase, which is consistent with expectations.

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Abbreviations

CEM	Coarsened Exact Matching
DB	Defined Benefit
DC	Defined Contribution
DiD	Difference-in-Difference
DOL	Department of Labour
EBM	Entropy Balance Matching
ERISA	Employee Retirement Income Security Act
ERR	Expected Rate of Return
EU	European Union
FUTA	The Federal Unemployment Tax Act
GAAP	Generally Accepted Accounting Principles
IAS 19R	IAS 19 Employee Benefits Revised
IFRS	International Financial Reporting Standards IFRS
IPOs	Initial Public Offerings
IRS	Internal Revenue Service
IS	Income Statement
M&As	Mergers and Acquisitions
OCI	Other Comprehensive Income
PBGC	Pension Benefit Guaranty Corporation
PBO	Projected Benefit Obligation
PPA	The Pension Protection Act
PSM	Propensity Score Matching
SEOs	Seasoned Equity Offering
UI	Unemployment Insurance
U.S.	United States

Chapter 1: Introduction

1.1 Background

Pensions have received a great deal of attention in accounting and finance literature over the past few decades. Pension accounting standards, which provide flexibility to managers when choosing actuarial assumptions and investment strategies have long been controversial among standard setters, academics, and practitioners. Pension accounting for defined benefit plans (DB hereinafter) involves complex actuarial estimations. Reported earnings and liabilities in financial statements are very sensitive to minor changes in actuarial assumptions. Pension investment decisions can also be an important component of the firm’s overall investment risk taking strategies and have a significant impact on a firm’s operating performance. Previous studies have significantly improved our understanding of pension actuarial assumptions determination and pension investment-risk taking decisions, but further research is needed to address other interesting research questions which build on prior research but have not been explored to date. For example, to what extent do managers exercise discretion in setting pension actuarial assumptions before major corporate events? And what factors could affect firm’s pension investment strategies other than anticipated pension plan performance, maturity of the pension plan and other factors examined in prior studies?

Hence, the goal of this thesis is to explore interesting and topical questions in the context of DB pension plans; in particular, the determination of actuarial assumptions and pension investment’s role in corporate decisions. First, I examine the role of pension actuarial assumptions on firms’ earnings management behaviour during the period that IAS 19 was effective, ahead of major corporate events such as mergers and acquisitions (M&As hereinafter), initial public offerings (IPOs hereinafter), and seasoned equity offerings (SEOs hereinafter). I also examine additional earnings management tools, including discretionary accruals and real earnings management under IAS 19. Next, I explore the impact of the revised pension accounting standard (IAS 19R hereinafter) on earnings management behaviour using the above tools. Further, this thesis examines the role of unemployment risk on pension investment decisions. In addition, it explores the role of unemployment risk on other pension-related issues, including pension actuarial assumptions determination and pension plan freeze decisions.

In the following sub-sections, I discuss the background, summarise the empirical studies and then discuss the contribution of this thesis to the prior literature.

1.2 Pension Actuarial Assumptions and Earnings Management Ahead of Major Corporate Events

Managers' incentives to exercise reporting discretion over earnings is attributable to various motives. Managers hold private information about a firm's actual performance and this gives them an information advantage over outside parties. Thus, it is difficult for legal authorities, or other users of financial reports, to constrain their earnings management behaviour. Anecdotal evidence suggests that, as long as they have some discretion, firms' reporting behaviour will always be affected by their differing incentives (apart from accurately reflecting firm performance) (Burgstahler, Hail, & Leuz, 2006). However, institutional factors and capital market forces can play an important role in shaping firms' incentives to manage reported earnings (Burgstahler et al., 2006). Public firms need external financing from public equity markets, which require high-quality accounting information that can be used by equity investors to evaluate and monitor firms.

Pension accounting standards for DB plans have been at the centre of debate for both academics and practitioners. Pension accounting standards can strongly influence sponsors' balance sheets and reported earnings (Glaum, 2009). Accounting for DB pension plan requires a number of actuarial assumptions to estimate projected benefit obligations (PBO hereinafter) and pension expenses, including mortality rates, discount rates, early retirement frequencies, future salaries, and expected returns on plan assets (Bauman & Shaw, 2014). Two key financial and actuarial assumptions under IAS 19 are the expected rate of return on plan assets (ERR hereinafter) to calculate expected pension investment returns and the discount rate to estimate pension interest costs and PBOs (Bartram, 2018).

When computing pension expenses, pension accounting standards generally require entities to report expected rather than actual returns for pension plan assets (IASB, 2009). The expected return on pension assets is estimated using the ERR, which is based on market expectations for returns over the entire life of the assets (IASB, 2009). It is the manager's responsibility to make the appropriate judgements based on anticipated investment performance to determine the ERR.

Note that the use of expected rather than actual returns has several critical consequences. On the one hand, it allows firms to recognise the benefit of risk-taking on net income when investing a higher percentage of pension assets in equity and other risky assets. On the other hand, it shields net income from the costs of an overly risky pension investment strategy, because the difference between expected and actual returns is accounted for in other comprehensive income (Anantharaman & Chuk, 2018).

The discount rate is used to compute the present value of pension obligations and to calculate pension interest costs. The discount rate is determined according to market yields on high-quality corporate bonds at the end of the reporting period. A higher discount rate has a downward impact on the value of reported pension obligations. The IASB (2009) states that raising the discount rate by 0.5% is expected to lower pension obligations by about 9.5%. Managers can exercise some discretion when determining the discount rate since the accounting standard does not specify which rate has to be used within high quality corporate bonds (Nobes & Stadler, 2017). There are also different methods to estimate yields under the yield curve for the same bonds and managers could use a rounded number of the yield as the discount rate rather than take it directly from the yield curve (Nobes & Stadler, 2017).

The discount rate can affect reported earnings through the pension expense components of interest costs and service costs. If all else remains equal, an increase in the discount rate may increase or decrease pension expenses. First, an increased discount rate raises the interest cost component of pension expenses. This impact decreases as pension plan maturity lengthens. Second, an increased discount rate lowers the service cost component of pension expenses, because current service cost is discounted at a higher rate. The overall impact on reported earnings is therefore ambiguous. Comprix and Muller (2011) assert that, if a firm's pension discount rate increases, reported pension expenses are reduced, and therefore reported earnings increase.

The complexity of pension accounting and the flexibility around the determination of some actuarial assumptions provide managers with discretion to set these with the view of meeting specific goals (Scholes, Wilson & Wolfson, 1992; Bergstresser, Desai & Rauh, 2006). The ERR can have a substantial impact on pension expenses and reported earnings (Winklevoss, 1993; Amir & Benartzi, 1998; Chuk, 2013; Bergstresser et al., 2006). Previous literature finds that using the ERR to manage earnings can be quite effective, because pension information tends to be extremely complicated and not fully disclosed to the market (Picconi, 2006; Franzoni & Marin, 2006). The important role of the ERR in manipulating earnings may, therefore, be attributable to its high degree of discretion (Bartram, 2018).

The ERR should reflect the long-term expected return of pension assets. However, Amir and Benartzi (1998) find that the correlation between the ERR and pension asset allocation is rather weak. The correlation between the ERR and the actual rate of return is also statistically insignificant. Jones and Walker (2003) find that some firms set unrealistically high ERRs, inconsistent with market performance. Picconi (2006) also finds that reported earnings do not fully reflect changes in pension discount rates or other pension information.

Previous literature has also found that firms use the pension discount rate to manage pension funding status and capital funding ratios (Feldstein & Morck, 1983; Godwin, 1999; Blankley & Swanson, 1995; Kwon, 1994). Comprix and Muller (2011) find that some firms manage the discount rate downward in order to increase reported PBO and justify pension plan freeze decisions. Stefanescu, Wang, Xie and Yang (2018) suggest that top executives may lower the discount rate to boost their pension payouts before retirement.

However, there is limited literature that focused on how the discount rate is used to manage reported earnings and the results of these studies are mixed. Blankley and Swanson (1995) find that firms do not always change their discount rates to reflect the rate on high-quality corporate bonds in order to manage earnings. While Godwin (1999) states that the firms choose discount rates following the guidance provided by the pension accounting standards. Godwin, Goldberg and Duchac (1996) find evidence suggesting that firms use changes in pension actuarial interest rate assumptions to manage earnings. However, they do not separate the impact of ERR or discount rate when examining changes in pension actuarial assumptions and also point out that the majority of the changes they examine in their sample are due to changes in ERR. Besides, the majority of the research on pension actuarial assumptions used in earnings management focuses mainly on the United States (U.S. hereinafter) (e.g., Amir & Benartzi, 1998; Chuk, 2013; Bergstresser et al., 2006; Godwin et al., 1996). Chapter 2 aims to address this gap by exploring whether firms in the European Union (EU hereinafter) use pension actuarial assumptions to manage earnings. In this context, it examines both the ERR and the discount rate during the period when IAS 19 was effective. Chapter 2 also examines other earnings management tools including discretionary accruals and real earnings management under IAS 19.

Research has shown that changes in accounting recognition can alter key firm decisions. For example, they can reduce the speculative use of derivative instruments (Zhang, 2009), reduce employee stock option management (Choudhary, Rajgopal & Venkatachalam, 2009), change corporate investment strategy (Bens & Monahan, 2008; Beatty, 1995), reduce retiree health care benefits (Mittelstaedt, Nichols & Regier, 1995), lead to a switch from capital leases to operating leases (Imhoff & Thomas, 1988), reduce R&D spending (Horwitz & Kolodny, 1980), and shift pension asset investment from equities to bonds (Amir, Guan & Oswald, 2010). Pension accounting requires detailed disclosures of information related to actuarial assumptions that can be used as a proxy for discretionary accounting choices (Asthana, 2008).

IAS 19R made an important amendment by eliminating the use of the ERR on pension assets when computing returns on plan assets and pension expenses. It instead requires companies to use the discount rate, which is also used when computing the present value of pension obligations and interest costs. Hence, after the adoption of IAS 19R, firms have to use the discount rate to compute both PBO/interest cost and return on plan assets. Given that companies will no longer be able to use the ERR following the effective date of IAS 19R, it's worth exploring the utilisation of the discount rate on earnings management behaviour after this change in the accounting standard. This is because the forthcoming change restricts firms' ability to use ERR to manage earnings. I also explore the role of other earnings management tools including discretionary accruals and real earnings management after the introduction of IAS 19R.

Chapter 2 uses an EU sample to examine firm's earnings management behaviour using pension actuarial assumptions, other discretionary accruals and real earnings management tools during the period that companies had to use IAS 19. As mentioned above, it also explores how pension standard IAS 19R's changes affect firms' earnings management behaviour by examining utilisation of the above earnings management tools under IAS 19R.

According to agency theory, the agent is expected to represent the best interests of the principal, and the principal uses signals to evaluate the agent

(Bens, Goodman & Neamtiu, 2012). If principals receive a bad signal, indicating the agent made decisions that are not in their best interest, it creates conflict, and principals may dismiss the agents. Along this line of reasoning, M&As, IPOs, and SEOs, as some of the most significant corporate events managers undertake, can be viewed as signals of the quality of managerial decisions. This perception of the quality of managers' decisions adds pressure on managers and further increases their incentives to manage reported earnings.

Previous research on firms' pension actuarial assumption manipulation incentives has focused on meeting/beating earnings targets (Picconi, 2006; Lee, Cox & Roden, 2007; Asthana, 2008), analyst forecasts (An, Lee & Zhang, 2014), and on managing pension obligations (Stefanescu et al., 2018; Sasaki, 2017; Hann, Lu & Subramanyam, 2007) or pension funding status (Godwin, 1999). Chapter 2 extends the existing literature by examining the role of pension actuarial assumptions on firms' earnings management behaviour leading up to major corporate events in the EU. It also sheds more light on how pension accounting standard changes affect firms' earnings management behaviour.

1.2.1 Mergers and acquisitions in the EU

M&As are one of the main modes of firm expansion (Singh & Montgomery, 1987). The EU and the U.S. are the two largest players in the M&A market. The harmonisation of the EU has created conditions for and encouraged the success of cross-border M&As (Coeurdacier, Santis & Aviat, 2009; Martynova & Renneboog, 2006). Thomson Financial shows that the EU accounted for 47% of cross-border M&A transactions from 2003 to 2005, as either the acquirer or the target (UNCTAD, 2006). EU is the region with the biggest increase accounted for 38% on average cross-border M&A deals in 2016 (OECD, 2017).

M&As usually take place when an acquirer firm begins a tender offer for a majority of the shares of a target firm (Magnuson, 2009). The goal of an M&A is to provide benefits, such as better allocation of resources, synergistic value, or better management, for both acquirer and target firms (Magnuson, 2009). However, hostile behaviour can reduce these benefits, or even cause damage to both parties. Takeover regulations were the result. They introduced certain requirements aimed at encouraging beneficial takeovers and minimising the misbehaviour of acquirer firms, target firms, and shareholders (Ferrarini & Miller, 2009; Magnuson, 2009). The EU and the U.S. feature different takeover regulations.

In the U.S., takeover law tends to be more management-centric, and both acquirer and target firms have substantial amounts of freedom. There is no prohibition against frustrating action (Ferrarini & Miller, 2009; Magnuson, 2009; Hopt, 2014). The courts in Delaware set the standards for takeover law, which mainly include disclosure obligations and procedural rules (Ferrarini & Miller, 2009; Magnuson, 2009; Hopt, 2014). In contrast, the EU follows the Takeover Bids Directive, adopted in 2004, which has significant restrictions on both acquirer and target firms. For example, acquirer firms must bid on all the outstanding shares in target firms.

Institutional factors and capital market forces can affect firms' incentives to manage earnings (Burgstahler et al., 2006). In Chapter 2, I investigate whether and how EU firms manage earnings ahead of M&A activity. This is an important issue, because, over the past decade, EU firms have become much more active in M&As transactions.

Previous literature has focused mainly on firms' earnings management behaviour from the standpoint of the acquiring firms (Erickson & Wang, 1999; Louis, 2004). Evidence of target firms' earnings management behaviour around M&A transactions is mixed. Erickson and Wang (1999), for example, find no significant evidence that target firms engage in earnings management leading up to M&As. They suggest this is because target firms are not usually the deal initiators, and they may lack the time and opportunity to engage in such behaviour. Anilowski, Macias and Sanchez (2009) find that target firms engage in upward accrual earnings management in order to "window dress," and thereby attract buyers.

In contrast, Anagnostopoulou and Tsekrekos (2013) find that firms manage earnings downward in order to be price-attractive. Target firm managers may thus have a greater incentive to use upward earnings management as a defense strategy. They may face welfare loss and lose control of the company if a takeover is successful (Easterwood, 1998). Also, target firm managers have an incentive to increase reported earnings to show shareholders that they are working efficiently (Easterwood, 1998).

Martynova and Renneboog (2011) state that target firms in the EU obtain much higher abnormal returns (9.13%) than acquirer firms (0.53%). This may indicate stronger incentives to manage earnings in order to obtain abnormal returns through a takeover. In this thesis, I explore the both the acquirer and target firms' earnings management behaviour in the EU.

1.2.2 Initial public offerings in the EU

IPO issuers are motivated to manage earnings pre-IPO in order to maximise proceeds. When a firm announces it is going public, there is usually only limited public information available about its operating performance. Potential investors must rely mainly on the accounting information provided by the issuers (Teoh, Welch & Wong, 1998a; DuCharme, Malatesta & Sefcik, 2004; Rao, 1991).

Analysts and underwriters play an important role in the IPO process, because analyst coverage provides crucial additional information for investors (beyond that in the written prospectus). In the U.S., analysts are prohibited from issuing reports or recommendations during the “quiet period,” the time between the issuing firm’s announcement and the forty calendar days after it goes public. This regulation protects issuing firms’ private information, and makes it harder, pre-IPO, to detect earnings management behaviour.

Some literature finds that IPO firms in the U.S. manage earnings upward before an IPO announcement (Teoh et al., 1998a; DuCharme et al., 2001; Rao, 1991). And issuing firms are willing to pay high fees to underwriters with top-ranked analysts in order to garner favourable post-IPO analyst coverage (Ritter, 1987; James, 1992; Beatty & Welch, 1996; Torstila, 2001).

However, the EU does not mandate quiet period restrictions for analysts; they are free to issue research reports or recommendations at any time during the IPO process. Issuing firms’ earnings management behaviour can, therefore, be detected and reported by analysts before they go public. This may reduce EU firms’ pre-IPO earnings management incentives. Moreover, Torstila (2001) finds that EU firms usually pay much lower underwriting fees than U.S. firms. This lends further support to the idea that EU firms are less willing to manage earnings before going public.

IPO activity in the EU has been declining over the last decade, likely due to the 2008 global financial crisis and the 2011 Eurozone debt crisis (Ritter, Signori

& Vismara, 2013). Ritter et al. (2013) state that the percentage of IPOs by small firms has decreased from 38.2% in the 1990s to 25.4% in the 2000s. The drop in IPO numbers indicates an increase in competition in the IPO market (Abrahamson, Jenkinson & Jones, 2011). As a result, firms may manage earnings not only to maximise proceeds, but also to attract more investors (Ritter, 2003).

I posit that the differences in the regulatory and market environments in the EU may lead to differences in earnings management incentives. Chapter 2 investigates EU IPO firms' earnings management behaviour. This is especially informative after the adoption of IAS 19R, because it altered the flexibility of firms reporting under International Financial Reporting Standards (IFRS hereinafter) to manage the ERR.[1]

1.2.3 Seasoned equity offerings in the EU

When a firm issues an SEO to raise capital, it provides current shareholders with the opportunity to transfer wealth from prospective shareholders. Firms that issue SEOs have incentives to use accounting discretion to manage earnings upward in order to increase their offer price and maximise the capital raised (Kim & Park, 2005; Iqbal, Espenlaub & Strong, 2009; Teoh, Welch & Wong, 1998b; Rangan, 1998). Firms that manage earnings during the pre-SEO period may experience a reverse impact on the subsequent post-SEO period, such as poor stock returns (Teoh et al., 1998b; Iqbal et al., 2009). False earnings signals may

[1] Firms reporting under U.S. GAAP, still use ERR to estimate reported expected returns in the income statement. The changes made by IAS 19R provides a unique opportunity to examine the role of pension actuarial assumptions in earnings management in the EU since the U.S. pension standards retained the flexibility offered by ERR.

give firms a poor reputation, and negatively affect their ability to raise additional capital.

There is very little research to date on firms' earnings management behaviour leading up to SEOs in the EU. Krakstad (2013) finds that the direct cost of issuing a SEO is 1.7% higher in the U.S. than in EU. This could lead to mixed findings on firms' earnings management incentives. On the one hand, it is easier to issue shares at a low cost, which may reduce the incentive to manage earnings. On the other hand, low issue costs are more likely to increase competition in the SEO market, which may increase the incentive to manage earnings to attract investors. Chapter 2 examines EU firms' earnings management behaviour before SEO issuance. In particular, it examines firm's earnings management behaviour using pension actuarial assumptions and the impact of the pension accounting standard change. In addition, it examines other earnings management tools including discretionary accruals and real earnings management under IAS 19 and whether IAS 19R adoption affects firm's use of these tools.

1.2.4 Summary, main findings and contributions

To summarise, I first examine whether firms engage in earnings management leading up to major corporate events under IAS 19 and what tools they used. I examine alternative earnings management tools such as the ERR, the discount rate, other discretionary accruals, and real earnings management, using data for EU companies from 2005 to 2016.

I use the entropy matching method (EBM hereinafter) in order to match treatment firms, which are firms involved in major corporate events in a given year, with control firm which are firms that were not involved in such events. The results suggest that EU firms manage the ERR ahead of major corporate events, including M&As, IPOs and SEOs. The results also show that EU firms use other discretionary accruals to manage earnings upward before engaging in these major corporate events. Furthermore, the results suggest that target, IPO and SEO firms use real earnings management to manage earnings upward. I find no significant evidence that EU firms use the pension discount rate to manage earnings ahead of major corporate events under IAS 19.

Chapter 2 also explores the impact of IAS 19R adoption on EU firms' overall earnings management behaviour ahead of major corporate events. The results suggest that, after the adoption of IAS 19R and the replacement of the ERR with the discount rate, EU firms manage the discount rate ahead of M&As and IPOs whereas SEO firms do not manage the discount rate ahead of SEOs even after the adoption of IAS 19R. Moreover, I find significant evidence that EU firms use more real earnings management activity to manage earnings upward after the change in the pension accounting standard. Further, I examine pension actuarial assumption management's impact on M&As completion probability and find that pension actuarial assumptions management does not have any impact on M&As completion.

This chapter makes several contributions to the existing literature. The majority of the earnings management and major corporate events literature focuses on the U.S. (Healy & Wahlen, 1999; Bergstresser et al., 2006; Erickson & Wang, 1999; Cohen & Zarowin, 2010; Kothari, Mizik & Roychowdhury, 2016). Public firms in the EU also engage in these events, but under different market conditions and accounting standards than in the U.S. Botsari and Meeks (2008) find positive evidence that U.K. acquirer firms manage earnings before M&As

similar to the U.S. To the best of my knowledge, limited studies have investigated firms' earnings management incentives ahead of major corporate events in the EU, especially in the context of using pension actuarial assumptions. This chapter fills that gap.

Chapter 2 also serves to complement Bergstresser et al. (2006) by examining ERR manipulation in an EU context. Following this line of research, it provides new evidence of managerial incentives to inflate earnings before major corporate events, including M&As from an acquirer and also target firm perspective, IPOs, and SEOs within a DB pension plan setting. Furthermore, I expand existing earnings management literature by examining several earnings management tools in an EU context, including discount rate management, discretionary accruals management, and real earnings management in addition to the ERR. Chapter 2 is thus the first to examine the role of the pension discount rate on firms' earnings management strategies ahead of major corporate events. This examination is important because the focus on this chapter is on how the pension discount rate affects reported earnings. Previous literature focuses primarily on how it influenced pension obligations on the balance sheet. In addition, examining the discount rate is interesting and topical in light of the change in the accounting standard.

Moreover, M&As have generally been studied only from the acquirer's perspective (e.g., Erickson & Wang, 1999). Literature on target firms' earnings management behaviour is quite limited (Raman, Shivakumar & Tamayo, 2013). I contribute to that literature by examining firms' earnings management behaviour during the pre-M&A period from both an acquirer and a target firm perspective. This also contributes to an understanding of how actuarial assumptions, discretionary accruals and real activities are managed beforehand for both acquirer and target firms in the EU.

Chapter 2 also investigates the impact of IAS 19R's elimination of the ERR on firms' earnings management behaviour ahead of major corporate events. While prior studies have explored the impact of the pension standard change on investment decisions (Anantharaman & Chuk, 2018; Picconi, 2006; Barthelme, Kiosse & Sellhorn, 2019), to the best of my knowledge, no previous studies have examined the potential impact on earnings management behaviour. My findings provide important insights into how IAS 19R has impacted managerial flexibility by showing that firms switched from accruals to real earnings management. Chapter 2 documents that pension actuarial assumptions can be an important method to manage earnings. Changes in standard-setting can possibly alter firms' real transaction decisions and have future economic consequences. This chapter may also be of interest to standard setters, auditors, and potential investors as it may aid a better understanding of firms' earnings management behaviour leading up to M&As, IPOs, and SEOs. In addition, it may help to better understand how adoption of IAS 19R affects such earnings management and the role of the changes made in IAS 19R related to pension actuarial assumptions on earnings management.

1.3 Labour Unemployment Risk and Pensions

Unemployment risk relates to the considerable welfare losses employees experience during unemployment, and after reemployment in the form of wage reductions (Low, Meghir & Pistaferri, 2010; Jacobson, LaLonde & Sullivan, 1993). Employees can also suffer from reductions in consumption due to the pressure of unemployment risk, as well as a myriad of psychological and social costs during unemployment (Gruber, 1997a; Liem & Liem, 1988; Kalil & Ziol-Guest, 2008). Previous literature has suggested that workers require "compensating wage differentials" to make up for unemployment risk (Burdett & Mortensen, 1998; Cotton, 1988; Agrawal & Matsa, 2013).

This "wage differential" can be reduced by greater job security (Pinheiro & Visschers, 2015). When firms are financially constrained or have high bankruptcy risk, employees are exposed to greater unemployment risk (although not all bankruptcies lead to total liquidations or cessation of operations). For large corporations, bankruptcies can often lead to reorganisation. However, that process involves substantial disruption, and employee benefits may be changed or reduced (Titman, 1984; Graham, Kim, Li & Qiu, 2019).

Previous literature shows that firms tend to choose conservative financial policies (Agrawal & Matsa, 2013), manage earnings upward (Dou, Khan, & Zou, 2016), increase positive disclosures (Ji & Tan, 2016), or increase cash holdings (Devos & Rahman, 2018) to provide employees with better job security and decrease unemployment risk. One important part of employee compensation is future pension benefits. Employees' perceptions of unemployment risk may be affected by their perceptions of pension risk (Chuk, 2013).

1.3.1 Defined benefit plans

DB plans provide employee pension benefits and these are determined by factors such as age, length of service, and compensation. In the U.S, both employers and employees could make contributions in order to meet the estimated pension obligations. However, employers that sponsor DB plans or trustees are responsible for deciding the pension investment strategy, and employers bear all the investment risk (Kiosse & Peasnell, 2009; Bergstresser et al., 2006). The Pension Protection Act of 2006 (PPA hereinafter) requires DB pension plan sponsors to make contributions that cover the accrued benefits. If the pension plan becomes severely underfunded for any reason, The Employee Retirement Income Security Act of 1974 (ERISA hereinafter) has mandated accelerated funding requirements (PBGC, 2017).

If firms are unable to fund their pension plans, or if they, for example declare bankruptcy, the Pension Benefit Guarantee Corporation (PBGC hereinafter) will take over the plan. The PBGC can pay out the employee benefits up to the limits set by law. According to the PBGC, the beneficiaries in the 26,000 DB plans they sponsor account for over 40 million employees. The maximum benefit payment is less than the average retirement income, which means employees will lose part of their pension benefits in the event of firm default.

1.3.2 Pension investment strategy

If a firm declares bankruptcy or defaults on its pension plan, it increases employees' unemployment risk. In order to reduce wage costs, firms should aim to reduce that risk. According to previous literature, firms tend to use conservative financial policy as a means of increasing employees' job security.

DB pension plans are economically significant. Pension accounting is an important component of firms' capital structure, and leverage ratios are about 35% higher when pension assets and liabilities are incorporated (Shivdasani & Stefanescu, 2010).

Chuk (2013) states that 26% of U.S. firms on Compustat had DB plans in the fiscal year 2013. Those firms capture 62% of the market capitalisation of all firms on Compustat. The total dollar amount of pension assets on Compustat is $2.1 trillion. Pension investment is an integral part of firms' overall financial policy because they are liable for any volatility associated with the investments (Bartram, 2018). To ensure security, and to be consistent with overall financial policy, firms should ideally opt for the safest pension investment strategy which generates sufficient returns to meet pension obligations depending on the maturity of the pension plan. If a firm allocates more assets to safe securities, such as bonds, both pension plan default risk and investment risk will be reduced. This will foster employees’ job security, and reduce the “wage differential.”

1.3.3 Unemployment insurance system

Prior research finds that unemployment insurance (UI hereinafter) is one way for firms to reduce both unemployment risk and the compensating wage differentials (Topel & Welch, 1980; Topel, 1984). Ellul, Pagano and Schivardi (2018) also suggest that government and firm provided employee benefits can substitute for each other. When the government provided benefit increases, it reduces the pressure on firms to provide employee benefits.

Each state in the U.S. runs an independent UI program to provide temporary financial assistance to eligible workers. The amount of the benefit is determined by state law, and the maximum weekly benefit can change from year to year. UI benefits can mitigate unemployment risk by reducing the costs borne by workers. Thus, changes in the liberality of UI benefits provide a meaningful shock to unemployment-related costs.

The variation in UI laws provides a clean setting in which to explore the impact of unemployment risk on firms’ decision- making (Agrawal & Matsa, 2013). In Chapter 3, I use changes in UI benefits to examine whether firms take unemployment risk into account when setting pension investment strategies.

1.3.4 Summary, main findings and contributions

In Chapter 3, I use change in the generosity of state UI benefits as a proxy for unemployment risk in order to examine their role in the determination of pension investment strategies. State-level UI data are hand-collected from the U.S. Department of Labour.

My analysis uses both a fixed effect model and a difference-in-differences model (DiD hereinafter), following Dou et al. (2016). The DiD model is designed to capture changes after an exogenous increase in the UI benefit. The treatment group consists of firms that operate in states with a large increase (>10%) in maximum UI benefits. The control group consists of firms that operate in neighbouring states that did not experience large increases in the same year.

Further, I match firms from the treatment group with those from the control group, using three different techniques: EBM, coarsened exact (CEM hereinafter), and propensity score matching (PSM hereinafter). Using the matched sample can minimise any spurious effects of factors that drove the change in pension investment strategies and can increase the power of the test. I add state-level controls to address the unobservable macroeconomic impact and other omitted variable effects. The findings show that firms take greater pension investment risks after experiencing a large increase in UI benefits.

Chapter 3 further analyses the impact of UI benefits increase on firms' other pension-related decisions. First, it tests the impact on the probability of a DB plan sponsor freezing its pension plan. The number of DB plans has declined steadily since the early 1980s. This is mainly because firms now prefer to provide defined contribution plans (DC hereinafter), where employees take on the bulk of the risk.

Also, many financially constrained sponsors have terminated their plans (Kruse, 1995; Ippolito & Thompson, 2000).

During the early 2000s, a growing number of firms, including large and otherwise healthy firms chose to convert their DB plans to DC plans (Munnell, Golub-Sass, Soto & Vitagliano, 2007). The PBGC allows this through either termination or a freeze of the current plan. Note that only fully funded pension plans are allowed to enter a standard termination, which involves disbanding completely and a payout of all current accrued benefits.

Freezing a pension plan means that it stops accruing benefits for some or all of the plan participants. Firms can freeze their pension plans after giving notice to participants or other people who may be affected by the pension freeze (Levine & Golumbic, 2006). Pension termination involves high costs and legal restrictions, while pension freezes offer flexibility. Thus, many firms opt for a freeze as a way of converting their DB plans into DC plans (Vafeas & Vlittis, 2018).

There are three types of pension freezes. Because of data availability, Chapter 3 focuses on hard freezes. Pension plan freezes can release firms from the increasing costs of pension contributions and the investment return volatility of DB plans (Munnell et al., 2007). From an employee's perspective, however, a hard freeze indicates a reduction in anticipated future pension benefits (VanDerhei, 2006). The result of the analysis examine pension plan freeze shows that the probability of a pension plan freeze increases after an increase in unemployment benefits insurance.

Chapter 3 also tests whether firms change their earnings management behaviour by using pension actuarial assumptions after an increase in UI benefits. Dou et al. (2016) find that firms have a tendency to reduce upward earnings management after a UI increase. The results suggest that firms use pension actuarial assumptions to unwind prior earnings management. Prior literature has also found that firms increase the investment risk of their pension portfolios to justify reporting high ERR (Chuk, 2013; Bergstresser et al., 2006). Since I find that pension actuarial assumptions are managed downward, this further supports the notion that the increase in pension investment risk reported in my main findings is due to changes in unemployment risk.

Chapter 3 makes several key contributions to the existing literature. First, it provides new evidence that firms consider employees' perceived unemployment risk when determining their pension investment strategies, deciding whether to freeze their pension plans, and in the context of pension earnings management. These findings contribute to the existing pension accounting literature by providing another factor that could affect pension accounting decisions.

Pension investment decisions can be affected by various factors such as financial performance, pension plan contribution and changes in accounting standards, and Rauh (2009) suggests there is still a large part of these factors that are not identified in the existing literature. I build on Rauh (2009) and contribute to prior literature by providing supporting evidence that unemployment risk is one of the factors managers consider when making pension asset allocation decisions. This chapter also adds to the labour economics literature by showing that unemployment risk is related not only to employees' spending behaviour, but also to firms' pension accounting decisions. These findings may also have implications for practitioners including investors, auditors and regulators. In particular, they could help practitioners to better understand firm's pension related decisions and discover how firms use pension decisions to manage employee's perceived unemployment risk and reduce wage costs.

1.4 Outline of the Thesis

The findings of this thesis provide important contributions to the literature, because they enrich our understanding of pension accounting's impact on firms' reported numbers. The flexibility inherent in pension accounting especially in relation to the choice of actuarial and financial assumptions suggests that firms can use discretion when setting assumptions. I find that this discretion can be used to manage earnings.

The remainder of this thesis is structured as follows. Chapters 2 and 3 each present a major empirical study, as introduced in the two sections above. Each chapter discusses the motivation underlying the research question examined, followed by a literature review and hypotheses development, description of the research design, sample and data, empirical results, and concluding remarks. Chapter 4 concludes and discusses the limitations of the research and future research opportunities.

Chapter 2: IAS 19/IAS 19R and earnings management activities around major corporate events

2.1 Introduction

In recent years, European countries have begun to participate more actively in financial markets and in major corporate events such as mergers and acquisitions (M&As hereinafter), initial public offerings (IPOs hereinafter), and seasoned equity offerings (SEOs hereinafter) (Martynova & Renneboog, 2006; Mariana, 2013). Previous literature suggests that firms are more likely to engage in earnings management ahead of such events in order to boost stock price, facilitate the transaction, reduce transaction costs or increase deal premium (Erickson & Wang, 1999; Cohen & Zarowin, 2010; Kothari, Mizik & Roychowdhury, 2016; Cumming, Ji, Johan & Tarsalewska, 2018).

There are numerous tools of managing earnings. For example, one line of research focuses on how firms attempt to boost earnings by engaging in accruals and/or real earnings management (e.g., Erickson & Wang, 1999; Cohen & Zarowin, 2010; Roychowdhury, 2006). Pension accounting provides another possible way to manage earnings because it is premised upon complex actuarial assumptions, which give managers flexibility and discretion (Glaum, 2009). Hence, another line of research offers many examples of how firms can use actuarial assumptions to manage earnings (e.g., Comprix & Muller, 2006; Bergstresser, Desai & Rauh, 2006; Picconi, 2006).

In the United States (U.S. hereinafter) setting, Bergstresser et al. (2006) find that firms use the expected rate of return (ERR hereinafter) on pension plan assets to manipulate earnings ahead of an M&A or SEO transaction. Erickson and Wang (1999) find that firms manage earnings upward through manipulating discretionary accruals leading up to a target firm's acquisition, while Teoh, Welch and Wong (1998a) find positive evidence that firms manage discretionary accruals ahead of IPOs. In addition, Kothari et al. (2016) find that managers engage in both real and accruals earnings management ahead of SEOs.

However, this evidence is mainly U.S. based (Bergstresser et al., 2006; Erickson & Wang, 1999; Kothari et al., 2016). In this study, I investigate European Union (EU hereinafter) firms' earnings management behaviour before they engage in major corporate events. This is an important distinction, because the EU setting provides a unique opportunity to examine this issue.

There are major institutional differences between EU and the U.S. EU have used the International Financial Reporting Standards (IFRS hereinafter) since 2005, while the U.S. uses Generally Accepted Accounting Principles (U.S. GAAP hereinafter). The different accounting standards may influence managers' abilities to engage in earnings management behaviour. For example, pension standard IAS 19 Employee Benefits governs pension accounting in the EU, while U.S. firms are required to use SFAS 87 and SFAS 158 after 2006 under U.S. GAAP. Both standards require firms to use the ERR to estimate returns on pension plan assets. Research has shown that managers use discretion in choosing ERR assumptions to manage earnings (Bergstresser et al., 2006).

However, the revised pension accounting standard under IFRS (IAS 19R hereinafter), which was implemented in January 2013, eliminates the use of the ERR on pension assets and replaces it with the discount rate. The updated U.S. GAAP pension accounting standards 158 did not change this actuarial assumption. Firms that report under U.S. GAAP can therefore still use ERR when reporting expected returns on plan assets.

Given prior academic and anecdotal evidence that firms manage reported numbers using the ERR assumption, the adoption of IAS 19R provides a unique opportunity to examine the impact on firms' earnings management behaviour. Previous research has focused primarily on changes in earnings management behaviour ahead of major corporate events, mostly in a U.S. context (e.g., Kothari et al., 2016; Zang, 2012; Cohen, Dey & Lys, 2008). There has been limited research thus far on corporate events in an EU context, although some findings suggest that EU firms are likely to shift from accrual to real earnings management when managerial discretion decreases (Botsari & Meeks 2008; Ipino & Parbonetti, 2017). This chapter focuses on the EU setting and uses EU data to provide new evidence on how pension accounting standards may affect earnings management.

I examine firms' earnings management behaviour ahead of major corporate events. In this context, I use a difference-in-differences (DiD hereinafter) model, and first examine whether firms engage in earnings management before such events under IAS 19 and what tools they use. In particular, I examine the following tools: ERR, the discount rate, other discretionary accruals and real earnings management. Pension actuarial assumptions may also be affected by a change in interest rates, because managers may need to adjust their ERR and discount rates (An, Lee, & Zhang, 2014). These factors are controlled by the DiD design, since both the target and the control groups face the same external environment. I also examine whether pension actuarial assumptions management has any impact on M&As completion probability. Furthermore, I explore how IAS 19R adoption impacts firms' incentives and ability to use various earnings management tools.

I focus on three primary types of corporate events: M&As, IPOs, and SEOs. I find positive evidence that firms manage ERR ahead of all types of corporate events under IAS 19. However, I find no evidence that firms manage the discount rate ahead of major corporate events under IAS 19. I also find that, under IAS 19, acquirer firms manage discretionary accruals, while target, IPO, and SEO firms use both discretionary accruals and real earnings management. Consistent with previous literature, I find that EU public firms use discretionary accruals to manage earnings after the adoption of IFRS standards (Callao & Jarne, 2010).

The results show that acquirer, target, and IPO firms generally manage the discount rate after the adoption of IAS 19R. During the pre-event period (i.e., the year leading up to the major corporate event), they manage the discount rate in order to boost earnings after the elimination of ERR. Acquirer and IPO firms also use more real earnings management after the adoption of IAS 19R. This is consistent with prior literature, which predicts that when accruals earnings management options become more limited under IAS 19R, firms will engage in real earnings management to a greater extent (Brown & Pinello, 2007; Chen, Lee & Li, 2008; Zhang, 2012). However, I find no evidence that IAS 19R has any impact on SEO firms' earnings management behaviour. The findings also suggest that IPO firms manage discretionary accruals to a lesser extent following the adoption of IAS 19R.

This chapter makes several contributions to the existing literature. First, it complements Bergstresser et al. (2006) by examining ERR manipulation in an EU context. Following this line of research, it provides new evidence of managerial incentives to inflate earnings before major corporate events, including M&As from an acquirer and target firm perspective, IPOs, and SEOs within a defined benefit pension plan (DB hereinafter) setting. It also examines another actuarial pension assumption, i.e. the discount rate, in this context. This is important especially as IAS 19R replaces the ERR with the discount rate and it is interesting to examine the utilisation of the discount rate before and after this significant change in pension accounting introduced by IAS 19R. Previous literature has focused on discount rate's impact on pension obligation or funding status (Stefanescu, Wang, Xie, & Yang, 2018; Sasaki, 2017; Hann, Lu, & Subramanyam, 2007), I examine the role of discount rate in firm's earnings management behaviour. To the best of my knowledge, this is the first study to examine firms' earnings management behaviour ahead of major corporate events (M&As, IPOs, & SEOs) in an EU context using pension actuarial assumptions and also examine the impact of IAS 19R. This chapter thus fills that gap in the existing literature by exploring the manager's behaviour under IFRS leading up to major corporate events.

I also examine two alternative earnings management tools: discretionary accruals management and real earnings management. The majority of the earnings management and major corporate events literature focuses on U.S. companies, and explores only one corporate event (Healy & Wahlen, 1999; Erickson & Wang, 1999; Cohen & Zarowin, 2010; Kothari et al., 2016). For example, the literature on target firms' earnings management behaviour concentrates on discretionary accruals management (Raman, Shivakumar, & Tamayo, 2013; Anagnostopoulou & Tsekrekos, 2013). This chapter contributes to the literature on these earnings management tools ahead of all three major corporate events in an EU context: M&As, IPOs, and SEOs. Firms have similar incentives to manage earnings before these events, so this chapter can help stakeholders (such as potential investors, auditors, and standard setters) better understand firms’ earnings management behaviour.

Finally, this chapter contributes to the literature by investigating how IAS 19R’s elimination of the ERR impacts firms’ earnings management behaviour ahead of major corporate events. While prior studies have explored its impact on investment decisions (Anantharaman & Chuk, 2018; Picconi, 2006; Barthelme, Kiosse & Sellhorn, 2019), to the best of my knowledge, this is the first study to examine its impact on earnings management behaviour. My findings provide important insights into how IAS 19R has impacted managerial flexibility by demonstrating that firms switched from accruals to real earnings management. The results suggest that pension actuarial assumptions can be an important method to manage earnings. Changes in standard-setting can alter firms’ real decisions and have future economic consequences.

The remainder of this chapter is organised as follows. Section 2.2 briefly discusses relevant background information on IAS 19, as well as changes implemented under IAS 19R. Section 2.3 provides a literature review, and develops the hypotheses to be tested. Section 2.4 describes the research methods and Section 2.5 presents the empirical results. Sections 2.6 and 2.7 present some further tests and explain the robustness tests. Section 2.8 concludes.

2.2 Background

The EU adopted IFRS in 2005 as a major initiative to unify financial reporting standards across Europe. IAS 19 Employee Benefits under IFRS articulates the accounting and disclosure requirements for employee benefits. It was amended in 2011 by introducing changes to the pension actuarial assumptions among others. The revised accounting standard IAS 19R was effective from 1 January 2013.

There are two main types of pension plans: DB, and defined contribution (DC hereinafter). Under DB plans, employers bear all the associated risks, such as investment risk, inflation risk, and longevity risk (Kiosse & Peasnell, 2009). The benefits payable are determined by factors such as age, length of service, and compensation (Glaum, 2009). In contrast, under DC plans, employees bear the investment risk. Companies pay a fixed contribution to a separate fund, and have no legal obligation to make any further contributions. Moreover, employers have no actuarial or investment risks under a DC plan (Picconi, 2006; Comprix & Muller, 2011).

The focus of this chapter is on DB plans, given that pension actuarial assumptions are only used when accounting for those plans.[2] I first provide a general overview of IAS 19, followed by an outline of the major changes introduced by IAS 19R relevant to this chapter.[3]

According to IAS 19, an entity must recognise a liability when an employee has provided service, and recognise an expense when the entity consumes the economic benefit arising from the service in exchange for employee benefits (e.g., short- and long-term employee benefits, post-employment benefits, and termination benefits) (IASB, 2009).

IAS 19 regulates the reporting of pension costs, assets, and liabilities in financial statements. When a firm sponsors a DB pension plan, the plan is liable

[2] Accounting treatment for a DC plan is relatively simple. Employers and/or employees make regular contributions to employees' retirement accounts based on a pre-determined fraction of salary. The contribution is recognised as a pension expense, and is tax-deductible (IAS 19, paragraphs 43-47).
[3] Appendix A provides a detailed comparison between IAS 19 and IAS 19R.

for all future payments that will be due to employees. Those future pension payments represent an obligation of the sponsoring firm. The difference between the pension obligation and the plan assets is the funding status. The plan is overfunded if the plan assets exceed the pension obligation; it is underfunded if the plan obligation exceeds the plan assets. The amounts of the defined benefit obligation and the fair value of plan assets are recorded on the balance sheet (IASB, 2009, para. 54). All the pension costs of sponsoring the plan must be included on the firm's income statement.

Pension accounting is considered complex, mainly because of the assumptions needed to measure pension obligations and expenses (Asthana, 2008). The present value of the pension obligation is determined using the discount rate. According to IAS 19 (IASB, 2009, para. 83), the discount rate is "determined according to market yields on high-quality corporate bonds at the end of the reporting period." This provides an opportunity for plan sponsors to improve their funding status. Billings, O'Brien, Woods and Vencappa (2017) find that firms exercise their discretion when selecting the discount rate, especially when a plan is underfunded.

Pension expenses include current service costs, interest costs, the expected return on any plan assets, actuarial gains and losses to the extent recognised, past service costs, and the effects of any curtailments or settlements (IASB, 2009). Service costs and interest costs are calculated using the same discount rate, which can be affected by the sponsor's discretion (Comprix & Muller, 2011). The return on pension plan assets is positive income that offsets other pension expenses.

IAS 19 requires firms to report expected rather than actual returns for pension plan assets when computing pension expenses. The expected return on pension assets is estimated using the ERR, which is based on market expectations for returns over the entire life of the assets (IASB, 2009). It is management's responsibility to make the appropriate assumptions to determine the ERR (Bergstresser et al., 2006; Picconi, 2006; Li & Klumpes, 2013). Thus, managers have some discretion in the decision-making process, especially as the ERR reflects expected long-term returns on the pension portfolio (Bergstresser et al., 2006; Picconi, 2006; Li & Klumpes, 2013).

Recognition of actuarial gains and losses is another important component of pension accounting that offers plan sponsors flexibility. The difference between actuarial assumptions and actual experience gives rise to actuarial gains and losses, as does the difference between actual and expected returns on pension assets and changes in the discount rate. According to IAS 19, these may result from an increase or decrease in either the present value of a defined benefit obligation, or the fair value of any related plan assets (IASB, 2009, para. 94). IAS 19 provides three options to recognise actuarial gains and losses on the balance sheet: 1) recognise them in full in other comprehensive income (the OCI method hereinafter), 2) recognise them on the income statement (the IS method hereinafter), or 3) use the "corridor method" to recognise only a portion of actuarial gains and losses and keep the bulk off balance sheet (IASB, 2009, paras. 92-93).[4]

[4] A company should recognise a portion of its actuarial gains and losses as income or expenses if the net cumulative unrecognised actuarial gains and losses at the end of the previous reporting period exceed the greater of: 1) 10% of the present value of the defined benefit obligation at that date (before deducting plan assets); or 2) 10% of the fair value of the plan assets at that date.

The options provided under IAS 19 have been criticised for lack of transparency and comparability, because firms were able to choose freely among the three recognition methods and were not required to justify their choice in their financial statements (Fasshauer, Glaum & Street, 2008). The corridor approach has come under particular criticism because companies can use it to report smoothed actuarial gains and losses (Carmona & Trombetta, 2008). For example, if a firm selects a higher ERR to increase the expected return on pension assets and reported earnings in one period, the difference between expected and actual returns at the end of the period will be recorded in the actuarial gains and losses. If a firm chooses the corridor approach, the cumulative actuarial gains and losses will be kept off the balance sheet as long as it is less than the 10% corridor. And, even if it exceeds the 10% corridor, only a portion must be amortised and recorded as an expense. If a firm chooses the OCI or IS method, the difference will be recognised in OCI or P&L respectively at the end of the period. Thus, the corridor method and the OCI method help keep actuarial gains and losses off the balance sheet and P&L.

IAS 19R made several changes to actuarial assumption requirements. It eliminated the use of the ERR on pension assets and it instead requires companies to use the discount rate. The determination of the discount rate does not change under IAS 19R, and it is based on high-quality corporate bond returns (IASB, 2011).

IAS 19R also changed the actuarial gains and losses recognition method by eliminating the use of the corridor approach. Hence, it requires all actuarial gains and losses to be recognised immediately in OCI in the reporting period in which they occur. Although this change enhances comparability and eliminates expense smoothing, both IAS 19 and IAS 19R allow any difference arising from pension plan asset returns to be shielded from net income.

After the adoption of IAS 19R, the scope of the discount rate limited managers' abilities to exercise discretion compared to ERR since the discount rate has to reflect yields on high quality corporate bonds rather than anticipated investment return. But the difference between reported and actual returns is still shielded from reported earnings (in OCI). This implies that, under both IAS 19 and IAS 19R, firms can manage reported pension returns without incurring a large future reverse impact on reported earnings.

Based on the above discussion, it is important to examine how firms choose ERR as well as discount rates under IAS 19 as well as how they choose the discount rate after the adoption of IAS 19R. The impact of the discount rate on earnings is certainly smaller compared to ERR. Prior literature on earnings management has focused on discretionary accruals and real earnings management and documents positive evidence on firm's switching from discretionary accruals management to real earnings management following a change in the accounting standards. In addition to examining pension actuarial assumptions which constitute a form of accruals management, this chapter examines how IAS 19R has impacted firms' earnings management behaviour by exploring tools such as discretionary accruals and real earnings management as well.

2.3 Related Literature and Research Hypotheses

This section first focuses on discussing motivations for earnings management, and then discusses prior literature related to earnings management around major corporate events. It then identifies alternative earnings management tools and develops the hypotheses to be tested in this chapter.

2.3.1 Motivations for earnings management

The accounting literature defines earnings management as distorting the application of accounting standards (Levitt, 1998). Healy & Wahlen (1999, p. 368) note that ‘‘Earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting practices.’’

Firms have an incentive to manage earnings to meet targets related to debt covenants, management compensation, and other market pressures (Fields, Lys & Vincent, 2001). When companies’ actual earnings are lower than their targets, managers will also be motivated to manage earnings to achieve their goals. Theoretically, a company’s stock price represents the present value of its future earnings. Thus, increased earnings represent an increase in company value (Lev, 1989). Managers may be motivated to manage earnings when they want to influence stock prices (Erickson & Wang, 1999).

Prior studies have shown that earnings management behaviour can be influenced by institutional factors at the country level, such as the adoption of IFRS, legal investor protection, and national culture (Leuz, Nanda & Wysocki, 2003; Barth, Landsman & Lang, 2008). Earnings management may, therefore, vary across countries. Han, Kang, Salter and Yoo (2010) find that uncertainty avoidance and individual dimensions of national culture are associated with different managerial behaviour and earnings management approaches across countries.

The aim of IFRS is to provide principles-based standards, with limited alternative accounting treatments, to assist managers in exercising their best judgment and accurately reporting their underlying economic situations (Soderstrom & Sun, 2007; Carmona & Trombetta, 2008). Thus, the adoption of IFRS could limit earnings management opportunities (Callao & Jarne, 2010; Marra, Mazzola & Prencipe, 2011). Nevertheless, managers still need to use their professional judgment to make some estimates, which suggests that earnings management may be possible. For example, managers can, e.g., intentionally choose the accounting option that will best help them meet their targets. Some research has found that the adoption of IFRS actually does not constrain earnings management behaviour in the EU (Bradshaw & Miller, 2008; Sunder, 2009; Gray, Kang, Lin & Tang, 2015). Managers are also inclined to manipulate financial information to portray firm performance in a more positive light, especially given pressure to meet/beat earnings thresholds, or ahead of major corporate events such as M&As, IPOs, and SEOs (Kothari et al., 2016).

2.3.1.1 Mergers and acquisitions

According to, e.g., Erickson and Wang (1999), Healy and Wahlen (1999), and Louis (2004), acquirer firms are likely to increase their stock prices before acquisition in order to reduce the cost of the activity. Firms may attempt to manipulate earnings to increase their share prices before engaging in stock-for-stock acquisitions (Erickson & Wang, 1999; Gong, Louis & Sun, 2008; Martin, 1996). Martynova and Renneboog (2006) find that a large proportion of EU M&As are stock acquisitions, and thus firms may prefer to manage earnings to increase stock prices. The acquirer usually experiences substantial share price declines, low announcement effects, and low share price reactions. Furthermore, cash offers tend to trigger significantly higher abnormal returns than all-equity offers (Martynova & Renneboog, 2006).

These phenomena may motivate acquirers to manipulate earnings to increase share prices not only for cost reduction purposes, but also to offset any negative impact after the acquisitions. According to Bergstresser et al. (2006), higher reported earnings can increase firms' share prices to benefit their equity bids, but they can also be used to obtain higher bargaining power in the bidding process for cash offers.

The extant literature also suggests that target companies may have incentives to manipulate earnings ahead of an M&A transaction in order to increase the deal premium (Moeller, Schlingemann & Stulz, 2004; Antoniou, Arbour & Zhao, 2008; Anagnostopoulou & Tsekrekos, 2015; Marquardt & Zur, 2015), or in response to acquirer firms' earnings management (Easterwood, 1998; Erickson & Wang, 1999). According to Erickson and Wang (1999), both M&A acquirers and targets would rationally anticipate that the other party will manage earnings before the merger, and may adjust their transaction prices accordingly. Therefore, if the target does not engage in pre-merger earnings management, they may risk undervaluation.

However, in most cases, the targets are not the initiators of M&A transactions. Hence, they cannot necessarily anticipate an acquisition proposal, and they may not have sufficient time to manage earnings during the pre-M&A period (Anagnostopoulou & Tsekrekos, 2015). Target firms' earnings management behaviour may be related to the method of sale.

For example, in the case of an auction, target firms are attracted to positively manipulate earnings because they have both the time and the opportunity to exercise discretion (Anilowski, Macias & Sanchez, 2009). The risk of earnings management detection is also lower under auction acquisitions than under negotiated acquisitions. The target may be able to massage the information provided to potential buyers and influence bidders' information analysis (Hansen, 2001; Kummer & Sliskovic, 2007). Thus, the M&A target would have the incentive to engage in earnings management.

As the literature notes, target firms' earnings management behaviour can affect bidders' takeover decisions (Raman et al., 2013; McNichols & Stubben, 2015; Skaife & Wangerin, 2013; Anilowski et al., 2009). Target firms that engage in earnings management may extend the M&A deals process, which may even lead to deal terminations (Skaife & Wangerin, 2013). Vasilescu and Millo (2016) suggest that, in the U.K., target firms' earnings management can be reduced by industrial diversification.

2.3.1.2 Initial public offerings

Turning to IPOs, I find there is only limited public information about how firms prepare during the pre-IPO process. Investors seem to rely heavily on the accounting information in the prospectus provided by the issuers (Teoh et al., 1998a; Chen, Shi & Xu, 2013). Thus, information asymmetry is high between investors and issuers, which could encourage earnings management (Teoh et al., 1998a; DuCharme, Malatesta & Sefcik, 2001; Rao, 1991).

High levels of information asymmetry are related to high levels of earnings management (Warfield, Wild & Wild, 1995). IPO issuers are motivated to manage earnings pre-IPO in order to maximise proceeds (Darrough & Rangan, 2005;

Wongsunwai, 2013; Teoh et al., 1998a; DuCharme et al., 2001; Rao, 1991; Alhadab & Clacher, 2018). However, post-IPO performance may suffer from overly aggressive earnings management behaviour (Teoh et al., 1998a).

Besides maximising proceeds, other factors may affect IPO firms' incentives to manage earnings, such as 1) the type and reputation of the financial intermediary involved in the IPO process (Cho & Lee, 2012; Chahine, Arthurs, Filatotchev & Hoskisson, 2012; Lee & Masulis, 2011; Wongsunwai, 2013), 2) the IPO firm's credit rating (Gounopoulos & Pham, 2017), 3) its audit quality (Alhadab & Clacher, 2018), and 4) its underwriter quality (Carter & Manaster, 1990).

Institutional factors and country-specific characteristics may also have an impact. For example, in Malaysia, where firms have high ownership concentration, owners are willing to forgo earnings management and accept lower proceeds in order to avoid worse post-IPO performance (Ahmad-Zaluki, Campbell & Goodacre, 2011). And Roosenboom, van der Goot and Mertens (2003) find that IPO firms in the Netherlands only manage earnings in the first year as a public company, not during the pre-IPO period.

Certain legal requirements may also pressure and motivate managers to conduct earnings management to ensure they are qualified to issue IPOs by meeting the positive earnings threshold (Kao, Wu, & Yang, 2009). According to previous literature, IFRS try to mitigate information asymmetry problems and improve accounting quality to some extent (Daske, Hail, Leuz & Verdi, 2008; Muller, Riedl & Sellhorn, 2011; Barth et al., 2008; Hong, Hung & Lobo, 2014). Alhadab, Clacher and Keasey (2016) find that the regulatory environment can affect IPO firms' earnings management behaviour in the U.K.

2.3.1.3 Seasoned equity offerings

Managers may aim to maintain high stock prices in order to maximise shareholder benefits. Certain firm-specific events, such as SEOs can offer greater incentives to manage earnings in order to boost stock prices (Kothari et al., 2016; Bar-Gill & Bebchuk, 2002; Iqbal, Espenlaub & Strong, 2009; Teoh, Welch and Wong, 1998b). When a firm issues an SEO to raise capital, it provides current shareholders with an opportunity to transfer wealth from prospective shareholders. SEOs also generally feature high information asymmetry between managers and potential investors, and this provides an incentive for firms to manage earnings (Dye, 1988; Trueman & Titman, 1988; Richardson, 2000; Warfield et al., 1995; Teoh et al., 1998b).

In contrast, as mentioned earlier, firms that manage earnings during the pre-SEO period may experience a reverse impact in the subsequent period, such as poor stock returns (Teoh et al., 1998b; Iqbal et al., 2009). False earnings signals may give firms a poor reputation, and negatively affect their ability to raise additional capital. Prior research has also shown that, if firms manage earnings before an SEO, their litigation risk is likely to increase dramatically afterwards (DuCharme, Malatesta & Sefcik, 2004; Cohen & Zarowin, 2010). However, several studies have also shown that firms' earnings management behaviour usually cannot be detected by investors during new share issues (Loughran & Ritter, 1997; Rangan, 1998; Teoh et al., 1998b).

Firms that issue SEOs have an incentive to use accounting discretion to manage earnings upward in order to increase their offer price and maximise the capital raised (Kim & Park, 2005; Iqbal et al., 2009; Teoh et al., 1998b). SEO firms' earnings management behaviour could be constrained by factors such as extensive disclosure requirements (Jo & Kim, 2007), firm diversification (Lim, Thong & Ding (2008), audit quality (Zhou & Elder, 2004), media attention (Comiran, Fedyk & Ha, 2018), or underwriter quality (Jo, Kim & Park, 2007).

All of the factors above may decrease firms' incentives to manage earnings in the pre-SEO period. However, these factors can differ across countries. Ching, Firth and Rui (2006) find evidence that discretionary accruals earnings management in the pre-SEO period does not affect future stock returns in Hong Kong. Indeed, China mandates that listed companies must achieve a minimum return on equity of 10% in each of the prior three years before they may apply for permission to issue additional shares. This regulation gives managers extra incentives to manage earnings in order to be qualified to issue SEOs. Chen and Yuan (2004) find this leads to increased scrutiny by Chinese regulators, although empirical analysis suggests that firms still use earnings management to raise capital. Fauver, Loureiro and Taboada (2017) and Harakeh, Lee and Walker (2019) find that EU firms engage in earnings management before SEO issuance. And Iqbal et al. (2009) find positive evidence that U.K. firms also manage earnings ahead of SEOs.

Based on the extensive evidence of earnings management incentives discussed above, this chapter examines EU firms' earnings management behaviour ahead of three major corporate events: M&As from both the acquirer and target perspective, IPOs, and SEOs. Furthermore, I explore the impact of changes in IFRS on EU firms' earnings management behaviour using alternative tools.

2.3.2 Earnings management tools and hypotheses development

The extant literature notes two primary tools of earnings management: accruals earnings management or real earnings management (Kothari et al., 2016; Cohen et al., 2008). In the accruals-based method, managers exercise discretion and judgment regarding accounting choices in order to manipulate reported financial figures (Cohen et al., 2008). In contrast, in the real earnings management method, managers use investment and operating decisions, such as marketing strategies, tactics, and budgets, to alter reported earnings (Roychowdhury, 2006).

2.3.2.1 Expected rate of return (ERR)

Pension accounting involves a myriad of assumptions that provide managers with the opportunity to manage reported earnings, with no future reverse impact and a low likelihood of discovery by stakeholders or regulators (Dechow & Skinner, 2000). Coronado and Sharpe (2003) and Franzoni and Marin (2006) find that investors are not generally knowledgeable about pension accounting, and Picconi (2006) suggests that even analysts can misinterpret firms' pension earnings and funding status.

As Lode and Napier (2014) note, the adoption of IFRS has increased firms' opportunities to manage earnings using pension accounting. They find that U.K. listed firms prefer to use pension "corridor" methods when recognising actuarial gains and losses in order to smooth earnings.

As I discussed earlier in Section 2.2, managers can use the ERR to calculate expected returns on pension assets under IAS 19. Academic and anecdotal evidence, however, suggests that some firms use this actuarial assumption opportunistically (Bergstresser et al., 2006; Asthana, 2008; Ali & Kumar, 1993;

Blankley, 1993; Jones & Walker, 2003). According to IAS 19, the ERR is determined by market expectations regarding anticipated returns long-term pension asset investments. Pension assets can be invested in various categories, such as equity, bonds, or property among others. Because equity investment (and other risky asset type categories) usually involves greater risk, it usually generates higher returns than bonds. Therefore, a positive correlation is expected between the ERR and the percentage invested in equities. However, Amir and Benartzi (1998) find only a weak correlation. This suggests that the ERR used by firms does not precisely reflect the return on pension plan assets (Amir & Benartzi, 1998; Jones & Walker, 2003; Chuk, 2013).

Pension expenses recorded on the income statement are determined by the expected return on pension assets: Higher expected returns will result in lower pension expenses, ceteris paribus. For example, consider a firm with £100 of operating assets, a 5% return on these assets, and £20 of pension assets. If this firm changes its ERR from 10% to 11%, it can immediately increase net income by 4%. Therefore, managers can significantly influence reported earnings by setting the ERR on pension assets, especially when firms have a larger pension than operating assets (Winklevoss, 1993; Bergstresser et al., 2006; Zion & Carache, 2002). IBM provides another example. It reported pension plan assets in 2000 of about $50 billion. In their case, a relatively small 10-basis point increase in ERR would raise expected pension income by $500 million, a 4% increase in pre-tax earnings (Bergstresser et al., 2006).

Academic evidence has confirmed that firms with DB pension plans can manage earnings by manipulating the ERR on pension plan assets. An et al. (2014) find that firms manage ERR upward in order to ensure their earnings beat analyst forecasts. Adams, Frank and Perry (2011) find that firms choose a higher ERR in order to reduce overall pension expenses and inflate earnings. Ramaswamy (2012) also finds that firms were reporting higher median ERRs, although the yield on Treasury securities was declining. Finally, Li and Klumpes (2013) find that U.K. managers manipulate their reported ERRs on pension assets to meet earnings targets.

However, using the ERR to manage earnings can have a downside, because it is typically determined by managers at the beginning of the year (Picconi, 2006; Li & Klumpes, 2013). Other managerial choices, such as accruals or sales, can be made throughout the year or at the end of the year. Managers may not be aware at the beginning of the year in which events they will be participating in, especially managers of M&A target firms. However, M&As, IPOs, and SEOs normally involve long-term preparation, so, overall, we can probably assume managers are aware of those corporate events in advance.[5]

Picconi (2006, p. 929) also argues that changes in ERR will be immediately reflected in earnings, because the expected return on plan assets can be approximated as “the prior year’s reported plan assets times the current year’s ERR.” This gives managers the opportunity to exercise discretion when determining the ERR at the beginning of the period.

Previous literature has found mixed results for acquirer firms’ earnings management behaviour using the ERR leading up to M&As. Bergstresser et al. (2006) find that acquirer firms manage ERR upward in the year prior to an M&A. However, Doyle (2016) finds no such evidence, and argues that the majority of

[5] There is a possibility that firms are unaware of the major corporate events at the beginning of the year, in which case they may not be able to use ERR to manage earnings before major corporate events.

firms can justify their reported ERR by having large pension plans and allocating more assets to equity investment. Both studies focus on the U.S.; as noted earlier, no previous literature has examined this issue in a EU context and I extend Bergstresser et al.'s (2006) research by examining EU public firms' behaviour when determining the ERR ahead of M&As. I contribute to the gap in the existing literature and shed more light on whether firms use the ERR to manage earnings in this context.

As discussed in Section 2.2, managers have an opportunity to exercise discretion on ERR without a reverse future impact. This can be appealing when managers have incentives to manage earnings. And previous literature suggests that the IFRS provides a more flexible environment than U.S. GAAP (Barth, Landsman, Lang & Williams, 2012). Acquirer firms' ERR management results in the U.S. are mixed ahead of M&As (Doyle, 2016; Bergstresser et al., 2006). I examine whether EU acquirer firms manage ERR ahead of M&As. This leads to Hypothesis 2.1.1, expressed in the null form:

Hypothesis 2.1.1: Acquirer firms do not engage in expected rate of return management ahead of M&As under IAS 19.

Much of the research on firms' ERR manipulation incentives has focused on how to meet or beat earnings targets (Picconi, 2006; Lee, Cox & Roden, 2007; Asthana, 2008) or analyst forecasts (An et al., 2014). And Bergstresser et al. (2006) find positive but insignificant results for ERR manipulation before firms issue SEOs. In this chapter, I extend Bergstresser et al. (2006) by examining whether the ERR is used to manage earnings before major corporate events such as M&As (for the acquirer and the target as well), IPOs, and SEOs in the EU. Previous literature suggests that pension actuarial assumptions are significantly related to stock prices (Barth, Beaver & Landsman, 1992; Hann, Heflin & Subramanyam, 2007), and firms have an incentive to increase their stock prices ahead of these events. I therefore test the following hypotheses, expressed in the null form:

Hypothesis 2.1.2: Target firms do not engage in expected rate of return management ahead of M&As under IAS 19.

Hypothesis 2.1.3: IPO firms do not engage in expected rate of return management ahead of IPOs under IAS 19.

Hypothesis 2.1.4: SEO firms do not engage in expected rate of return management ahead of SEOs under IAS 19.

2.3.2.2 Discount rate

As discussed in Section 2.2, the discount rate is determined by market yields on high-quality corporate bonds at the end of the reporting period (IASB, 2009). Managers have an opportunity to exercise discretion when choosing the discount rate, because the determination of the discount rate lacks specific guidance or benchmark index for high-quality corporate bonds that matches the duration of pension liabilities (Sasaki, 2017; Nobes & Stadler, 2017). There are a variety of corporate bonds that qualify as high-quality corporate bonds and there are several interest rates provided for each of these bonds. Nobes and Stadler (2017) point out that managers can choose freely among the high-quality corporate bonds and the interest rate since IFRS does not specify which bonds or interest rates have to be used. The discount rate can also be determined using different methods to estimate market yields on the same bonds and managers can use the rounded number instead (Nobes & Stadler, 2017). Under IAS 19, the discount rate is used to calculate pension interest costs, and to estimate the present value of pension benefit obligations. Research finds that the choice of the discount rate is used primarily for managing reported DB pension obligations (Stefanescu et al., 2018; Sasaki, 2017; Hann et al., 2007), improving pension funding status (Godwin, 1999; Kwon, 1994), and avoiding debt covenants (Godwin, Goldberg & Duchac, 1996). Stefanescu et al. (2018) find that firms are likely to lower the discount rate to increase pension obligations in order to boost pension payouts before an executive retires or to justify plan freeze decisions.

The discount rate can also be used for earnings management (Kwon, 1994; Godwin et al., 1996; Blankley & Swanson, 1995; Bauman & Shaw, 2014; Comprix & Muller, 2011; Sasaki, 2017). It affects both the service and interest cost components of pension expenses. First, a higher discount rate lowers service costs, as well as the present value of projected benefit obligations (PBO hereinafter). Second, it increases the interest rate used to calculate pension interest costs. The interest cost component can thus be increased or decreased depending on the size of the pension obligation or the duration of the pension plan. Although previous literature suggests that the effect of the discount rate on computing pension obligations dominates the effect of the discount rate on interest costs, it still largely depends on plan maturity (Comprix & Muller, 2011). For example, it can be increased (decreased) if the pension obligation is relatively large (small) and has a short (long) duration (Comprix & Muller, 2011). An increase in the discount rate can either increase or decrease the reported pension expense. And the impact of an increased discount rate on reported earnings is ambiguous. According to Comprix and Muller (2011), in real-world situations, it usually reduces pension expenses and increases reported earnings.

Although Comprix and Muller (2011) pointed out that the discount rate can affect reported earnings, to the best of my knowledge, no previous literature has examined the use of the discount rate to manage earnings especially ahead of major corporate events. In addition, the studies cited above are focused mainly on a U.S. context and no previous literature has focused on the EU, a setting which presents unique features under IFRS. As Nobes and Stadler (2017) state, the quality of pension discount rate disclosure varies between countries under IFRS. In this chapter, I fill the gap by examining whether EU firms manage the discount rate to boost earnings ahead of major corporate events, and shed more light on how it impacts reported earnings. This leads to the following hypotheses, expressed in the null form:

Hypothesis 2.2.1a: Acquirer firms do not engage in discount rate management ahead of M&As under IAS 19.

Hypothesis 2.2.2a: Target firms do not engage in discount rate management ahead of M&As under IAS 19.

Hypothesis 2.2.3a: IPO firms do not engage in discount rate management ahead of IPOs under IAS 19.

Hypothesis 2.2.4a: SEO firms do not engage in discount rate management ahead of SEOs under IAS 19.

By mandating the use of the discount rate to measure pension plan returns, IAS 19R fundamentally changed the actuarial assumptions used for recognising pension expenses. The determination of the discount rate limits the range of rates managers can use to establish expected returns. The change was expected to decrease the reported expected return on pension assets, and to increase pension expenses on the income statement. The discount rate on plan assets is usually lower than the ERR, especially if firms invest pension assets in risky asset classes. Therefore, firms can no longer determine their expected returns on pension assets based on the riskiness of their investment portfolios.

Moreover, based on the above discussion, the discount rate can also affect the other two components of pension expense. After the adoption of IAS 19R, it can affect all three components: expected return, the service cost, and the interest cost. Based on previous literature, a higher discount rate will decrease pension obligations and reduce pension expense (Comprix & Muller, 2011). But if pension maturity is relatively short then the effect of the discount rate on pension obligation can no longer dominate the effect on interest cost, in which case the impact of an increase in the discount rate on interest cost could counteract the effect of using it to increase earnings (i.e. via its impact on return on plan assets) (Comprix & Muller, 2011).

Recent research has focused on evaluating and understanding the economic consequences of IAS 19R. For example, Anantharaman and Chuk (2018) using a sample of Canadian firms find that, after the introduction of IAS 19R, firms began shifting investments from equities to bonds, because they can no longer report a high rate of return on their equity investments. Barthelme, Kiosse and Sellhorn (2019) document shifts from equity to bonds due to the elimination of the ‘corridor method’ under IAS 19R in Germany. Previous literature also states that accounting standard changes can lead to firms altering transactions (Mittelstaedt, Nichols & Regier, 1995; Graham, Harvey & Rajgopal, 2005; Bens & Monahan, 2008; Choudhary, Rajgopal & Venkatachalam, 2009; Zhang, 2009; Amir, Guan, & Oswald, 2010; Chuk, 2013). The replacement of the ERR with the discount rate could therefore potentially provide incentives for firms to manage the discount rate instead.

In most cases, the effect of a higher discount rate on pension obligation dominates, and it will ultimately decrease the total pension expense. Since it leads to an increased expected return, a decreased interest cost due to lower PBO, and reduced service costs (Comprix & Muller, 2011). However, the range of the discount rate is much smaller than that of the ERR, and the interest cost could counteract the effect when pension maturity is short. So even if firms manage the discount rate, it is not expected to be as effective as the ERR. In this chapter, I examine whether firms' discount rate management behaviour changes after the adoption of IAS 19R ahead of major corporate events. This leads to the following hypotheses, expressed in the null form:

Hypothesis 2.2.1b: The adoption of IAS 19R has no impact on acquirer firms' discount rate management behaviour.

Hypothesis 2.2.2b: The adoption of IAS 19R has no impact on target firms' discount rate management behaviour.

Hypothesis 2.2.3b: The adoption of IAS 19R has no impact on IPO firms' discount rate management behaviour.

Hypothesis 2.2.4b: The adoption of IAS 19R has no impact on SEO firms' discount rate management behaviour.

2.3.2.3 Other discretionary accruals

As I mentioned earlier, manipulating pension actuarial assumptions is only one of many forms of accruals management. Accruals are a favoured instrument for manipulating reported earnings, particularly when the goal is to manage earnings temporarily ahead of an acquisition (Erickson & Wang, 1999). Accruals management features relatively low costs, is easy to operate, and relatively difficult to discern (Young, 1999). It misrepresents a firm's underlying operating performance, but does not alter operations (Kothari et al., 2016). Furthermore, as per Barth et al. (2012) and Lang, Lins and Miller (2003), firms that report under IFRS prefer to use accruals management over real earnings management.

Discretionary accruals earnings management has been used to achieve managers' desired earnings targets (Chung, Firth & Kim, 2002; Koh, 2003). Prior literature finds that the adoption of IFRS could restrict earnings management and improve reporting quality (Barth et al., 2008). However, others suggest that IFRS still offers some flexibility, and may not ultimately reduce earnings management (Ball Robin & Wu, 2003; Christensen, Lee, Walker & Zeng, 2015; Jeanjean & Stolowy, 2008).

Burgstahler, Hail and Leuz (2006) suggest that firms' earnings management behaviour is difficult to constrain as long as they have some discretion and incentives. In the EU, Gray et al. (2015) find that the adoption of IFRS does not affect the level of discretionary accruals earnings management. But Callao and Jarne (2010) find that the level of earnings management in the EU has increased following IFRS adoption.

One of the main reasons for manipulating accounting accruals is to increase stock prices, which makes it suitable for M&A, IPO, and SEO firms (Erickson & Wang, 1999; Botsari & Meeks, 2008; Lee, Kim, Nam & Han, 2008; Ching et al., 2006; Chahine et al., 2012). Hence, I also explore EU public firms' earnings management behaviour using discretionary accruals.

The literature states that acquirer firms tend to use discretionary accruals to manage earnings before a takeover (Erickson & Wang, 1999; Pungaliya & Vijh, 2009; Louis, 2004; Baik, Kang & Kim, 2010; Botsari & Meeks, 2008; Gong et al., 2008). Botsari and Meeks (2008) and Kassamany, Ibrahim and Archbold (2017) suggest that U.K. firms manage accruals before the takeover of a firm. Thus, I posit that acquirer firms in the EU may manage discretionary accruals ahead of M&As. To test the EU acquirer firm's discretionary accruals management behaviour, I state the hypothesis in the null form:

Hypothesis 2.3.1a: Acquirer firms do not engage in other discretionary accruals management ahead of M&As under IAS 19.

As discussed in Section 2.3.1.1, target firms have a strong incentive to manage earnings ahead of M&As. Target firms' accrual earnings management behaviour could be affected by factors such as the degree of competition in different countries (Alexandridis, Petmezas & Travlos, 2010). Ben-Amar and Missonier-Piera (2008) find that Swiss target firms manage earnings using discretionary accruals. Anagnostopoulou and Tsekrekos (2013) find that target firms in the EU that seek to be acquired manage earnings using discretionary accruals. This leads to the following hypothesis, expressed in the null form:

Hypothesis 2.3.2a: Target firms do not engage in other discretionary accruals management ahead of M&As under IAS 19.

Previous literature has also suggested that firms use discretionary accruals to manage earnings ahead of IPOs in the U.S. (Hong et al., 2014; Lo, Wu & Kweh, 2017; Cotten, 2008; DuCharme et al., 2001; Zhu, Ong & Yeo, 2010), Taiwan (Shu, Chiang & Lin, 2012), China (Chen et al., 2013; Aerts & Cheng, 2011; Gao, Meng, Chan & Wu, 2017; Liu, Uchida & Gao, 2014), and Japan (Nagata & Hachiya, 2007). However, there has been only limited research in an EU context. Alhadab and Clacher (2018) and Buchner, Mohamed and Saadouni (2017) find that U.K.

firms manage discretionary accruals ahead of IPOs. Roosenboom et al. (2003) find similar results for the Netherlands. In this chapter, I extend the existing literature by examining IPO firms' discretionary accruals management behaviour in the EU to provide new insights. I propose the following hypothesis, expressed in the null form:

Hypothesis 2.3.3a: IPO firms do not engage in other discretionary accruals management ahead of IPOs under IAS 19.

Previous literature finds significant evidence of accruals earnings management behaviour ahead of new equity issuances (Rangan, 1998; Shivakumar, 2000; Teoh et al., 1998b; Lim et al., 2008; Cotten, 2017; Baryeh, 2013; Guthrie & Sokolowsky, 2010). Several studies have noted that firms' earnings management cannot usually be detected by investors during new share issues (Loughran & Ritter, 1997; Rangan, 1998; Teoh et al., 1998b). Iqbal et al. (2009) show that U.K. firms manage discretionary accruals before SEOs. Because there is such a strong incentive for firms to manage earnings upward ahead of SEOs, I examine SEO firm's discretionary accruals earnings management behaviour in the EU. This leads to the following hypothesis, expressed in the null form:

Hypothesis 2.3.4a: SEO firms do not engage in other discretionary accruals management ahead of SEOs under IAS 19.

As discussed in Section 2.3.2.2, when IAS 19R went into effect, managers were no longer able to manage earnings using the ERR. And the discount rate is not as effective at shaping earnings as the ERR. Therefore, firms may try to identify alternative tools to manage earnings, especially if they have strong incentives to do so. The adoption of IAS 19R may possibly increase the level of discretionary accruals management because of the reduced flexibility to manage actuarial assumptions used in pension accounting.

However, Cohen et al. (2008) find that, when accounting regulations become stricter, accruals management tends to decrease. Alhadab et al. (2016) also suggest that heavy regulation can reduce IPO firms' accruals earnings management levels. This chapter examines whether the adoption of IAS 19R has influenced firms' discretionary accruals management in the EU. This is likely to contribute to the literature examining the impact of accounting standards on earnings management. This leads to the following hypothesis, expressed in the null form:

Hypothesis 2.3.1b: The adoption of IAS 19R has no impact on acquirer firms' other discretionary accruals management behaviour.

Hypothesis 2.3.2b: The adoption of IAS 19R has no impact on target firms' other discretionary accruals management behaviour.

Hypothesis 2.3.3b: The adoption of IAS 19R has no impact on IPO firms' other discretionary accruals management behaviour.

Hypothesis 2.3.4b: The adoption of IAS 19R has no impact on SEO firms' other discretionary accruals management behaviour.

2.3.2.4 Real earnings management

Real earnings management is another way to manage earnings, and it has direct effects on cash flow. Real earnings management is achieved by altering investment and operating decisions such as marketing strategies, tactics, and budgets. It may involve, for example, decreasing investment in research and development (R&D), advertising, and employee training. Both accruals and real earnings management tools serve the same purpose: misleading stakeholders into believing that the reported financial performance has been achieved through the normal course of operations (Roychowdhury, 2006; Moorman, Wies, Mizik & Spencer, 2012; Chapman & Steenburgh, 2011).

Firms that report under IFRS prefer to use accruals management rather than real earnings management (Barth et al., 2012; Lang et al., 2003). Zang (2012) claims that managers sometimes use real earnings manipulation and accruals-based earnings management interchangeably. In contrast, Graham et al. (2005, p. 32) state that managers prefer real earnings management over accruals, and find "strong evidence that managers take real economic actions to maintain accounting appearances. In particular, 80% of survey participants report that they would decrease discretionary spending on R&D, advertising, and maintenance to meet an earnings target. More than half (55.3%) state that they would delay starting a new project to meet an earnings target, even if such a delay entailed a small sacrifice in value." Kothari et al. (2016) state that real earnings management is more challenging for investors to detect, and also more costly over the long-run. Louis (2004) finds this is difficult even for sophisticated investors. Accruals management is generally simpler for investors to unravel.

Prior literature suggests that using accruals management alone may not be effective for increasing earnings and boosting stock prices (Zang, 2012; Cohen et al., 2008; Kothari et al., 2016). In fact, firms are more likely to use both accruals and real earnings management (Cohen et al., 2008; Kothari et al., 2016). Therefore, firms have an incentive to use real earnings management to manage their earnings upward and increase stock prices. In this chapter, I further examine EU firms' real earnings management behaviour, as well as the impact of the adoption of IAS 19R.

Some research suggests that firms use real earnings management to meet earnings benchmarks (Bhojraj, Hribar, Picconi & Mclnnis, 2009; Leggett, Parsons & Reitenga, 2016; Mizik, 2010; Burnett, Cripe, Martin, & McAllister, 2012; Cheng, Lee & Shevlin, 2016; Beyer, Nabar & Rapley, 2018). Burnett et al. (2012) suggest that high audit quality can increase firms' incentives to choose real earnings management over accrual earnings management.

Farooqi, Ngo and Jory (2017) find positive evidence that acquirer firms in the U.S. engage in real earnings management ahead of acquisitions. Kassamany et al. (2017) find similar results for the U.K. EU provides unique features in a different institutional setting that renders it worth exploring whether acquirer firms have different incentives for real earnings management. No previous literature has examined the acquirer firm's real earnings management behaviour in the EU context. This chapter fills the gap by examining whether acquirer firms engage in real earnings management ahead of M&As in the EU. This leads to the following hypothesis, expressed in the null form:

Hypothesis 2.4.1a: Acquirer firms do not engage in real earnings management ahead of M&As under IAS 19.

Campa and Hajbaba (2016) suggest that target firms prefer to manage earnings upward using real rather than accruals earnings tools. Previous real earnings management literature is mainly focused on acquirer's behaviour, and existing literature that investigates the target firm's earnings management behaviour is focused on accrual earnings management. There is limited evidence on target firm's real earnings management behaviour, and no research has been done in the EU context. This chapter fills this gap by examining whether EU target firms engage in real earnings management ahead of M&As and shed more light on target firm's real earnings management behaviour. Thus, I test the following hypothesis, expressed in the null form:

Hypothesis 2.4.2a: Target firms do not engage in real earnings management ahead of M&As under IAS 19.

The literature on IPOs and accrual earnings management does not always find results consistent with the notion that firms manage earnings. For example, Ball and Shivakumar (2008) examine U.K. firms' accrual earnings management behaviour before IPOs, and find no significant results. They conclude that U.K. firms do not manage earnings before IPOs. However, Lo (2008) points out that Ball and Shivakumar's (2008) result is likely inaccurate, because it does not consider real earnings management.

Alhadab and Clacher (2018) examine U.K. firms' real earnings management behaviour around IPOs and find evidence suggesting that IPO firms engage in real earnings management ahead of IPOs. Darrough and Rangan (2005) and Wongsunwai (2013) also find evidence that IPO firms engage in real earnings management. Thus, I predict that EU IPO firms may also engage in real earnings management ahead of IPOs. I test this using the following hypothesis, expressed in the null form:

Hypothesis 2.4.3a: IPO firms do not engage in real earnings management ahead of IPOs under IAS 19.

Kothari et al. (2016) find that managers are likely to use real earnings management to overstate earnings before SEOs. However, they also find that using this method, either alone or together with accruals earnings management, can lead to post-SEO underperformance (Cohen & Zarowin, 2010). If a firm uses only accruals earnings management, the post-SEO performance is not significantly negative. Deng, Ong and Qian (2018) find that real estate investment trust firms also engage in real earnings management instead of accrual earnings management ahead of SEO issuance. This chapter examines whether EU firms use real earnings management before SEOs. I therefore propose the following hypothesis, expressed in the null form:

Hypothesis 2.4.4a: SEO firms do not engage in real earnings management ahead of SEOs under IAS 19.

Previous literature suggests that, when accruals constraints increase, firms tend to substitute accrual earnings management instruments with real earnings management instruments (Brown & Pinello, 2007; Chen et al., 2008; Barton, 2001; Das, Kim & Patro, 2011; Zhang, 2012; Ge & Kim, 2014). Cohen et al. (2008) find that when the regulatory environment tightens, real earnings management behaviour tends to increase. And Ewert and Wagenhofer (2005), Cohen et al. (2008), and Evans, Houston, Peters and Pratt (2015) also suggest that a stronger reporting environment encourages firms to switch from accruals to real earnings management tools. However, Alhadab et al. (2016) find that the level of real earnings management is constrained if the market is heavily regulated.

Sasaki (2017) finds that, when firms use pension actuarial assumptions to manage earnings, this tends to decrease real earnings management. Based on this finding, the reduced flexibility to manage pension actuarial assumptions could increase real earnings management. Ibrahim, Xu, and Rogers (2011) and Cohen and Zarowin (2010) find that SEO firms shifted from accruals to real earnings management after the regulatory change. As mentioned earlier, the adoption of IAS 19R eliminated the use of the ERR and replaced it with the discount rate. This change limits managers' flexibility to manage accruals. This chapter explores the impact of the IAS 19R adoption on firms' real earnings management behaviour in the EU, and sheds light on how regulatory changes affect real earnings management.

This leads to the following hypotheses, expressed in the null form:

Hypothesis 2.4.1b: The adoption of IAS 19R has no impact on acquirer firms' real earnings management behaviour.

Hypothesis 2.4.2b: The adoption of IAS 19R has no impact on target firms' real earnings management behaviour.

Hypothesis 2.4.3b: The adoption of IAS 19R has no impact on IPO firms' real earnings management behaviour.

Hypothesis 2.4.4b: The adoption of IAS 19R has no impact on SEO firms' real earnings management behaviour.

The next section discusses the research methods employed in the empirical analysis.

2.4 Research Methods

2.4.1 Research design

To test the hypotheses developed in the last section, I use DiD methods for the empirical analysis. I use a treatment group of firms that are involved in such events (M&As, IPOs, or SEOs), and a control group of firms that are not involved in such events. If the groups differ significantly, the prediction may be biased by unrelated or unobservable factors (Hainmueller, 2012). The estimation could be improved by comparing treated and control groups that are as similar as possible (Stuart, 2010).

Matching is a popular approach to estimating causal treatment effects. It is used across various fields of study with treated and control groups (Hitt & Frei, 2002; Davies, Pierce-Shimomura, Kim, VanHoven, Thiele, Bonci, Bargmann & Mclntire, 2003; Hainmueller, 2012). I use the entropy balance matching method (EBM hereinafter) to match the sample of treated and control firms. This method processes data so as to achieve a covariate balance in observational studies with binary treatments (Hainmueller, 2012). It assigns the covariate balance to the observations using a weighting function. The reweighting process then involves imposing a set of balance constraints, so the treatment and control groups match exactly on all pre-specified moments. EBM assigns a set of weights that satisfy the balance constraints. In this way, it allows for a high degree of covariate balance. I include country, year, industry, and firm size as balance constraints to match the firm observations. The EBM method is performed using Stata ebalance command.

EBM reweights units to achieve balance, but it simultaneously retains all the observations to prevent loss of information. This is especially beneficial for testing the hypotheses in this chapter, because treatment observations for some major corporate events, such as IPOs, are limited. EBM can help control for unobservable factors and reduce noise in the analysis while it uses all the data available.

Another common matching method used for binary treatment research is propensity score matching (PSM hereinafter). It can perform a one-on-one match and discards unmatched observations. I also use PSM matching method as a robustness test. The PSM method is carried out using Stata psmatch2 commend, one-on-one nearest neighbour (no caliper) and without replacement. The EBM method is performed using Stata ebalance command. Both matching methods match firms in the treatment group and control group using variables such as country, industry, year, total assets and fair value of pension assets. After matching, Stata creates a weight variable and I run the subsequent regressions carrying the different weight assigned to each observation by PSM and EBM and the results are reported in different columns.

In the following subsections, I discuss the methods used to capture earnings management.

2.4.1.1 Expected rate of return (ERR)

Figure 2.1 shows the timeline around firms' financial reporting periods and major corporate event announcement dates. According to IAS 19, the ERR is determined at the beginning of the reporting period (IASB, 2009). As the timeline illustrates, year t is the year the firm announces its involvement in the event (i.e., M&As, IPOs, or SEOs). If managers manage the ERR ahead of major corporate events, then they will begin at year t, because the change will be reflected immediately in earnings (Bergstresser et al., 2006; Picconi, 2006).

[Insert Figure 2.1 about here]

To test the hypothesis related to the ERR, I use the contemporaneous value since it is determined at the beginning of the reporting period to examine whether firms engage in earnings management ahead of major corporate events that were announced during that year. Compared with the ERR, other figures such as discount rate, discretionary accruals or real earnings are determined at the end of the reporting period. If managers use these tools to manage earnings ahead of major corporate events, they will have to manage these at year t-1.

To explore the association between the ERR and the major corporate events (M&As, for both acquirers and targets, IPOs, and SEOs), I use the following regression:

$$ERR = \beta_0 + \beta_1 CORP\_EVENTS + \beta_2 \%Equity + \beta_3 Maturity + \beta_4 TA + \beta_y Year_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe} \quad (2.1)$$

where the dependent variable, *ERR*, is the expected rate of return on pension plan assets in year t. The variable of interest is *CORP_EVENTS*, which is a dummy indicator variable that equals 1 when the firm engages in any of the three events (treatment group) in year t, and 0 otherwise. It captures the motivation to increase the ERR ahead of major corporate events.

Following previous literature, I also include several control variables that influence the determination of ERR. Asset composition is an operational determinant factor that managers consider when determining long-term ERR without any bias or discretion. I use the percentage of pension assets invested in equity (%*Equity*) to capture this. If a firm uses its best estimate of ERR assumptions, %*Equity* and *ERR* should have a positive relation, because equity investments are expected to earn higher returns than less risky assets (Amir et al. 2010; Li & Klumpes, 2013).

Pension maturity (*Maturity*) also affects the determination of ERR. Pension plan demographic characteristics may influence investment strategies. For example, pension obligations to retirees are relatively short-term, since firms need to make pension payouts each year; obligations to active employees are long-term, since firms will only have to pay benefits in the future. An older (younger) workforce indicates a shorter (longer) investment horizon. Managers need to consider their pension plans' maturities before pension asset allocation and when determining the ERR. Mature pension funds usually have lower risk tolerance and slower growth potential (Li & Klumpes, 2013). *Maturity* is measured as the natural logarithm of the ratio of the projected pension obligations (PBO hereinafter) to current service costs (Amir et al., 2010). Total assets (*TA*) is a control variable that controls for the impact of firm size on ERR determination. I also include year, industry, and country fixed effects in each regression to control for their impact on the dependent variable.

2.4.1.2 Discount rate

To explore the relationship between the discount rate and major corporate events, I use the following regression:

$$DR\_1 = \beta_0 + \beta_1 CORP\_EVENTS + \beta_2 IAS19R + \beta_3 CORP\_EVENTS * IAS19R + \beta_4 \%Equity\_1 + \beta_5 Maturity\_1 + \beta_6 TA\_1 + \beta_y Year_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe} \quad (2.2)$$

The dependent variable, *DR_1*, is the lagged discount rate used to determine PBOs and the interest rate before the adoption of IAS 19R, as well as the expected return on pension plan assets under IAS 19R. According to IAS 19 and the timeline presented in Figure 2.1, the discount rate is measured at the end of the reporting period t. *DR_1*, which is the lagged discount rate is measured at the end of the reporting period t-1, captures firm's reported discount rate at the year (t-1) prior to major corporate event taking place at year t. The main variables of interest are *CORP_EVENTS* and *CORP_EVENTS * IAS 19R*. IAS 19R is a dummy variable that equals to one after IAS 19R was adopted in 2013. It is equal to one for 2013 and post 2013 periods and zero otherwise. The interaction term *CORP_EVENTS * IAS 19R* captures the impact of the adoption of IAS 19R on firms' earnings management behaviour using the discount rate when they are involved in a major corporate event. I also include the following control variables: *%Equity_1, Maturity_1*, and *TA_1*, are the lagged value of *%Equity*, *Maturity*, and *TA* which are defined as previously. Following Bergstresser et al.

(2006), I include firm, year, industry, and country fixed effects are included to control for unobservable factors that may affect the dependent variable.

Both the dependent variable and the control variables included in this model are measured at year t-1. Given that the discount rate is determined at the end of the reporting period, it cannot be used to manage earnings in the same year that a major corporate event will take place. The timeline for discount rate determination is illustrated in Figure 2.1.

To test the hypotheses related to the discount rate, I use the lagged value (year t-1) of the discount rate and the control variables because managers can only manage discount rate in the year before the announcement of major corporate events (year t-1) since it is determined at the end of the reporting period. This allows me to examine whether firms manage earnings using the discount rate ahead of major corporate events.

2.4.1.3 Accruals earnings management

The most popular methods to investigate managers' use of discretionary accruals are the DeAngelo model, the Healy model, the Jones model, the modified Jones model, the industry model, and the cross-sectional Jones model (DeFond & Jiambalvo, 1994). Prior studies have examined the effectiveness of these models for detecting earnings management. The results show that all models except the DeAngelo model can detect earnings management, but the cross-sectional Jones and cross-sectional modified Jones models perform better than their time series counterparts in the presence of more testing variables (Bartov, Gul & Tsui, 2000; Dechow, Sloan & Sweeney, 1995; Guay, Kothari & Watts, 1996). A cross-sectional rather than a time series model is also less subject to survivorship bias, and more suitable for large sample data. It allows for the investigation of firms with shorter histories than would be possible with a time series model (Bartov et al., 2000). Therefore, I use the cross-sectional standard Jones model and the cross-sectional modified Jones model to estimate discretionary accruals.

The primary model is the modified cross-sectional Jones model as described in Dechow et al. (1995). The modified Jones model is estimated by SIC industry as follows:

$$\frac{TAS_{it}}{TA_{i,t-1}} = k_{1t}\frac{1}{TA_{i,t-1}} + k_2\frac{\Delta Rev_{it}}{TA_{i,t-1}} + k_3\frac{PPE_{it}}{TA_{i,t-1}} + \varepsilon_{it} \quad (2.3)$$

For fiscal year t and firm i, TAS represents total accruals, defined as:

$$TAS_{it} = EBXI_{it} - CFO_{it} \quad (2.4)$$

where EBXI is earnings before extraordinary items and discontinued operations, CFO is operating cash flow, $TA_{i,t-1}$ is lagged total assets, ΔRev_{it} is a change in revenue, and PPE_{it} is the gross value of property, plant, and equipment.

The coefficient estimates from the above equation are used to estimate firm-specific normal accruals (NA_{it}) for the sample firms as follows:

$$NA_{it} = k_{1t}\frac{1}{TA_{i,t-1}} + k_2\frac{(\Delta Rev_{it} - \Delta AR_{it})}{TA_{i,t-1}} + k_3\frac{PPE_{it}}{TA_{i,t-1}} \quad (2.5)$$

where ΔAR_{it} is the change in accounts receivable.

Discretionary accruals (DA_{it}) is the difference between total and normal accruals: $DA_{it} = \frac{TAS_{it}}{TA_{i,t-1}} - NA_{it}$.

To investigate the relationship between major corporate events and discretionary accruals management, I estimate the following equation:

$$DA\_1 = \beta_0 + \beta_1 CORP\_EVENTS + \beta_2 IAS19R + \beta_3 CORP\_EVENTS * IAS19R + \beta_4 \%Equity\_1 + \beta_5 Maturity\_1 + \beta_6 TA\_1 + \beta_y Year_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe} \quad (2.6)$$

DA_1 is the lagged value for discretionary accruals estimated using the modified Jones model stated above. The main variables of interest in this regression are *CORP_EVENTS* and *CORP_EVENTS * IAS19R*. The first variable captures whether firms manage discretionary accruals in the pre-merger period (year t-1). The interaction variable captures the incremental effect of the adoption of IAS 19R.

2.4.1.4 Real earnings management

I draw on prior studies to develop proxies for real earnings management (Dechow, Kothari & Watts, 1998; Roychowdhury, 2006). I adopt Roychowdhury's (2006) three proxies to study the tools of real earnings management: sales, production costs, and discretionary expenses. Subsequent studies have confirmed their validity (Zang, 2012; Gunny, 2010).

Management of sales

According to Roychowdhury (2006), a sales boost can be used to increase earnings to meet certain targets. This can be achieved by accelerating the timing of sales, or by generating additional unsustainable sales through increased price discounts. When firms offer limited-time price discounts, sales volume generally increases. Although cash inflows per sale may be lower than normal, overall earnings will still increase, assuming positive margins after the discount. Firms can also manage sales by offering more lenient credit terms, such as lower interest rates. Note that managing sales will lead to lower than normal current period cash flows from operations (*CFO*), given the sales levels.

I first generate the normal level of CFO using a model developed by Dechow et al. (1998) and implemented in Roychowdhury (2006). Normal CFO is a linear function of sales and change in sales, as follows:

$$\frac{CFO_{it}}{TA_{i,t-1}} = k_{1t} \cdot \frac{1}{TA_{i,t-1}} + k_2 \frac{Sales_{it}}{TA_{i,t-1}} + k_3 \frac{\Delta Sales_{it}}{TA_{i,t-1}} + \varepsilon_{it} \qquad (2.7)$$

where CFO_{it} is cash flow from operations in period t; $TA_{i,t-1}$ is lagged total assets*;* $Sales_{it}$ is sales revenue in period t; and $\Delta \mathrm{Sales}_{\mathrm{it}}$ is a change in sales from period t-1 to period t. Abnormal CFO (*R_CFO*) is actual CFO minus the normal level of CFO, calculated using the above estimated coefficients.

Overproduction

Overproduction, or increasing production levels, is another way firms can manage their earnings upward. Higher production levels will reduce the average unit cost and cost of goods sold (*COGS*), because fixed overhead costs are spread over more production units. This increases operating margins, and results in higher earnings.

Following Roychowdhury (2006), production costs are the sum of COGS and the change in inventory during the year. COGS is a linear function of contemporaneous sales:

$$\frac{COGS_{it}}{TA_{i,t-1}} = k_{1t} \cdot \frac{1}{TA_{i,t-1}} + k_2 \frac{Sales_{it}}{TA_{i,t-1}} + \varepsilon_{it} \qquad (2.8)$$

Change in inventory is a linear function of the contemporaneous and lagged change in sales:

$$\frac{\Delta INV_{it}}{TA_{i,t-1}} = k_{1t} \cdot \frac{1}{TA_{i,t-1}} + k_2 \frac{\Delta Sales_{it}}{TA_{i,t-1}} + k_3 \frac{\Delta Sales_{i,t-1}}{TA_{i,t-1}} + \varepsilon_{it} \qquad (2.9)$$

Using (2.8) and (2.9), the estimate of the normal level of production costs is:

$$\frac{Prod_{it}}{TA_{i,t-1}} = k_{1t} \cdot \frac{1}{TA_{i,t-1}} + k_2 \frac{Sales_{it}}{TA_{i,t-1}} + k_3 \frac{\Delta Sales_{it}}{TA_{i,t-1}} + k_4 \frac{\Delta Sales_{i,t-1}}{TA_{i,t-1}} + \varepsilon_{it} \qquad (2.10)$$

where $Prod_{it}$ represents production costs in period t and is the sum of COGS and the change in inventory, and $\Delta Sales_{i,t-1}$ is the lagged change in sales. Abnormal production costs (*R_PROD*) are computed as the difference between actual production costs and the normal levels predicted from Equation (2.10).

Reduction of discretionary expenses

The third proxy for real earnings management is discretionary expenses. Following Roychowdhury (2006), discretionary expenses include advertising, research and development (R&D), and selling, general, and administrative expenses (SG&A). Firms can boost their earnings without affecting current sales levels by reducing these expenses. However, that may affect long-term competitiveness and profitability.

The normal level of discretionary expenses can be expressed as a linear function of sales:

$$\frac{DiscExp_{it}}{TA_{i,t-1}} = k_{1t} \cdot \frac{1}{TA_{i,t-1}} + k_2 \frac{Sales_{i,t-1}}{TA_{i,t-1}} + \varepsilon_{it} \quad (2.11)$$

where $DiscExp_{it}$ represents discretionary expenditures in period t, and is the sum of advertising, R&D, and SG&A expenses. Abnormal discretionary expenses (*R_DISX*) are computed as the difference between actual values and the predicted normal discretionary expenditures level from Equation (2.11).

In this chapter, I use *R_CFO*, *R_PROD*, and *R_DISX* as proxies for real earnings management. When firms manage earnings upward, they may experience abnormally low cash flow from operations, abnormally high production costs, and/or abnormally low discretionary expenses.

To investigate the relationship between major corporate events and real earnings management, I use the following equations:

$$REM\_1 = \beta_0 + \beta_1 CORP\_EVENTS + \beta_2 IAS19R + \beta_3 CORP\_EVENTS * IAS19R + \beta_4 \%Equity\_1 + \beta_5 Maturity\_1 + \beta_6 TA\_1 + \beta_y Year_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe} \quad (2.12)$$

REM_1 is a dependent variable that captures any one of the three real earnings management proxy measures described earlier during the year t-1 which is the year prior any major corporate events take place in year t. *R_CFO_1* is the lagged value for abnormal sales, *R_PROD_1* is the lagged value for abnormal production costs, and *R_DISX_1* is the lagged value for abnormal discretionary expenses estimated using Roychowdhury's (2006) model.[6] These three dependent variables are measured using data reported at the end of the reporting period at t-1. The main variables of interest in this regression are *CORP_EVENTS* and *CORP_EVENTS * IAS19R*. The first variable captures whether firms manage discretionary accruals during the pre-major corporate event period (year t-1). The interaction variable captures the incremental effect of the adoption of IAS 19R.

2.4.2 Data and sample description

The initial sample consists of all public firms in the EU with available data in Thomson Worldscope on the ERR on pension assets and the discount rate between 2005 and 2016. I select 2005 as the beginning of our sample fiscal year because that is when the EU adopted IP.[7] All other pension data and financial data for the sample period come from Thomson One. To mitigate the impact of outliers, I winsorize all continuous variables at the 1st and 99th percentiles.

I collect data on M&As, IPOs and SEOs announced between 1st January 2005 and 31st December 2016 from Thomson One. I include both successful and withdrawn deals to examine the overall effects of the adoption of IAS 19R on

[6] Firms may have an incentive to manage pension asset investment decisions temporarily in order to justify their pension actuarial assumptions management. This can be another type of real earnings management. I use change in the percentage invested in equity (*Δ%Equity*) as a proxy to capture this. The results from Equation (2.12) show no conclusive evidence of increased equity investment for any of the major corporate event types. This proxy may not be able to effectively capture firms' risk-taking in their pension asset investment decisions, because they may make riskier investments than equity. However, there is no other variable available for the sample firms that would allow me to capture this empirically.

[7] The sample data come from EU member countries' public firms. Croatia is not included in the sample, because it joined in 2013 and it does not have data available for the entire sample period.

firms' earnings management behaviour when they are involved in any of these events. For M&A data, I collect both acquirer and target firm information. I exclude M&A deals of less than EUR 10 million in transaction value to ensure that firms involved in M&As have strong incentives to manage earnings ahead of M&As (Amihud & Lev, 1981). I also require that both the acquiring and target firms are publicly listed. If a firm has multiple acquisitions which means they engage in more than one acquisition within one year they are treated as one observation in the treatment group for the subsequent regression analysis (Bergstresser et al, 2006). Finally, I match all the major corporate event data with the initial sample. This significantly reduces the size of major corporate events because a lot of major corporate event observations collected from Thomson One do not have pension information in the initial sample.

For the various tests in this chapter, I use all observations with non-missing values for the required pension, earnings management, and control variables. Table 2.1 panel A presents the sample selection process used to test each earnings management method. The initial sample consists of all public firms that operate within the EU and only a subsample of these firms sponsors DB plans, which is the focus of the empirical analysis in this chapter. Thus, observations are lost for 66% and 71% of the initial sample for ERR and DR/DA/REM analysis respectively. The lack of data availability for reported ERR and discount rate, the variables used to compute discretionary accruals, and the key control variables such as pension plan assets invested in equity (*%Equity*) and pension maturity (*Maturity*), also reduced the initial sample size. The total number of observations is 4,473 and 3,765 for ERR analysis (equation 2.1) and DR/DA/REM analysis (equation 2.2, 2.6 and 2.12) respectively which include all sample (both treatment and control observations) used in the subsequent analysis. Each analysis focuses only on one corporate event such as M&A (acquirer/target) or IPO. Thus, the number of observations in each analysis does not match the total number of observations in Table 2.1 panel A.

Panel B of table 2.1 shows the breakdown of the sample size by corporate event and by country. It shows that the major corporate events data are collected from 15 countries within EU. The majority of the corporate events are collected from United Kingdom, Germany, France and Netherlands. There are only a few observations for some countries such as Greece and Luxembourg. There are 413 confounding events in the sample where a company engages in both M&A and SEO in the same year. In the empirical analysis, the confounding events are kept in the treatment group for several reasons. Firstly, these confounding events account for 54% and 20% of the total SEOs and M&As events, respectively. Removing these events from the sample will result in a major reduction of the sample size in the treatment group for both M&As and SEOs and may reduce the power of the tests. Secondly, based on previous literature discussed in the PhD thesis, firms have higher incentives to manage earnings before engaging in M&As or SEOs in order to obtain abnormal returns (eg. Erickson & Wang, 1999). When firms engage in both M&As and SEOs in the same year, this indicates that they are even more motivated to manage earnings since they can benefit from both events. If I remove these events from the sample, the incentives to manage earnings in the treatment group will be reduced. And finally, Bergstresser et al. (2006) investigate firms' earnings management behaviour ahead of M&As and SEOs separately and they do not appear to have removed the confounding events from their sample set. This chapter mainly follows Bergstresser et al.'s research design and kept the confounding events in the sample.

Appendix 2.2 panel A provides a detailed explanation of all variables used in the subsequent analysis. Panel B shows the summary of the results of the various hypotheses tested. In the next section, I discuss the empirical results.

[Insert Table 2.1 about here]

2.5 Empirical Results

2.5.1 ERR management and major corporate events

2.5.1.1 Acquirer firms

Appendix 2.3, panel A, shows the summary statistics for the key variables used in the empirical analysis. The mean of *Acquirer* is 0.38, which shows that the treatment group acquirer firms account for 38% of the total observations. Over the entire sample period, EU firms report an average *ERR* of 5.83%, which ranges from 5.2% (25th percentile) to 6.5% (75th percentile). This indicates that managers have the opportunity to exercise discretionary decisions when determining the ERR.

%Equity, which is an important factor that affects firms' reported ERR. *%Equity* has a mean and median of 44.19% and 44.7%, respectively and the range is from 29% (25th percentile) to 59.4% (75th percentile). In terms of *TA*, the mean and median are 48,764.14 and 2,016.81 respectively. *TA* ranges from a low of 482.77 million (25th percentile) to a high of 10,819.6 million (75th percentile). This indicates that sample firm sizes vary. The mean and median of *Maturity* are 4.05 and 3.95, respectively. *Maturity* ranges from 3.47 (25th

percentile) to 4.51 (75th percentile), suggesting that sample firms have different employee age compositions and investment horizons.

Appendix 2.3, panel B, provides pairwise Pearson and Spearman correlation coefficients across the variables used in the regression. The lower diagonal shows the Pearson correlation and the upper diagonal shows the Spearman correlation. The Spearman and Pearson correlations between reported ERR and the percentage of pension plan assets invested in equity (*%Equity*) are positive. The Pearson correlation coefficient is 0.3762 (lower diagonal) and is marginally significant at 10% level. This suggests that firms choose a higher ERR when they invest more in equities as the ERR reflects the riskiness of the portfolio. This indicates that firms consider investment risk to some extent when determining ERR. The correlation coefficients between the variables are modest, which indicates no multicollinearity in the subsequent multivariate analysis.

Table 2.2, panel A, reports the results from examining the relationship of firm-year ERR on pension assets ahead of M&A activities (acquirer firms). Model (1) shows the regression results for the model that includes only *Acquirer*, the main variable of interest. The 0.127 coefficient on *Acquirer* is significantly positive at the 1% level (t=2.967). This suggests that acquirer firms (treatment group) manage the ERR upward compared with control firms when they prepare to acquire another firm that year. A 0.127% increase in the ERR can have a significant economic impact on reported earnings. For example, consider a firm with £100 of operating assets, a 5% return on these operating assets, and £20 of pension assets. If this firm adjusts the ERR from 10% to 10.127%, it can increase net income by 0.51%. The impact increases for firms with larger pension assets.

[Insert Table 2.2 about here]

Model (2) adds year, industry, and country fixed effects to the model to control for unobservable factors. Standard errors are clustered at the firm-year level. Model (3) shows the estimation results for the model with the control variables for the ERR, as discussed in Section 2.4. Model (4) adds all the control variables, fixed effects, and clusters standard errors by firm and year. The coefficient on *Acquirer* range from 0.095 to 0.127, and it remains positive and statistically significant in all models, even when including control variables. Thus, the finding that acquirer firms use higher ERR than control firms not involved in any major corporate events is robust to the inclusion of these controls. This result rejects the null Hypothesis 2.1.1, which examines whether acquirer firms manage the ERR ahead of M&As and hypothesizes that acquirer firms do not manage the ERR under IAS 19.

The coefficients for the control variables *%Equity* and *Maturity* are positive and statistically significant in both Models (3) and (4). This indicates that both variables have a positive impact on ERR determination, consistent with prior literature that finds both equity percentage and pension maturity are determinants of the ERR (Li & Klumpes, 2013). If a firm allocates more pension assets to equity investments, the ERR should be higher, as equity investments are usually expected to generate higher rates of return. An increase in *Maturity* indicates that a firm has a relatively young workforce, and is likely more willing to take risks with its pension investment strategy.

2.5.1.2 Target firms

Appendix 2.4, panel A, reports the summary statistics for the key variables used to investigate target firms' earnings management behaviour using the ERR. *Target* is an indicator variable that equals 1 for the treatment firms, and 0 otherwise. Target firms account for 25% of the total observations. The total number of observations is smaller than that for the acquirer firm in Appendix 2.3, panel A, because the number of target firms is smaller. The *ERR* has a mean of 5.8 and a median of 5.89, and it ranges from 5.14 (25^{th} percentile) to 6.5 (75^{th} percentile), which is similar to the sample used for acquirer firms in Appendix 2.3, panel A.

Appendix 2.4, panel B, reports Pearson and Spearman correlation of the variables used in the following multivariate analysis. The Pearson correlation coefficient between *ERR* and *%Equity* is 0.3615 and it is marginally significant, which shows that the *ERR* and *%Equity* have a marginally significant positive relationship. This suggests that a higher percentage of pension assets invested in equities is related to a higher level of the ERR. The correlation coefficients between all variables are low, which indicates that multicollinearity is not a concern.

Table 2.2, panel B, reports the regression results for target firms' earnings management behaviour. The coefficients for *Target* range between 0.085 and 0.208 across Models (1) to (4) and are statistically significant in all four models. *Target* has the highest coefficient in Model (3) and is significant at the 1% level after including control variables %*Equity, Maturity* and *TA.* After including fixed effects in Model (4), the coefficients are marginally significant at the 10% significance level. The results indicate that target firms manage the ERR upward ahead of engaging in M&As. Hence, it rejects the null Hypothesis 2.1.2, which examines whether target firms manage ERR ahead of M&As and hypothesizes that target firms do not manage the ERR under IAS 19.

The coefficients for *%Equity* and *Maturity* are positive and statistically significant at the 1% level in both Models (3) and (4). This indicates that *%Equity* and *Maturity* are positively correlated with the dependent variable *ERR*.

2.5.1.3 IPO firms

In Section 2.3, I discussed how firms use the ERR to manage earnings upward when they are preparing to issue IPOs. Appendix 2.5, panel A, reports the summary statistics. *IPO* equals 1 for the treatment firms, and 0 otherwise. The *IPO* variable exhibits a 0.02 average value, which indicates that IPO firms account for only 2% of the sample.

The *ERR* ranges from 5.14% (25^{th} percentile) to 6.5% (75^{th} percentile) and the mean and median are 5.8% and 5.82% respectively. *%Equity* varies from 28% to 58% with the median of 43%, indicating the significant differences among firms' pension investment plans. The mean is 43.11% which is very close to the median. Mean *Maturity* is 4.02 and the median is 3.92; it also ranges from 3.44 (25^{th} percentile) to 4.48 (75^{th} percentile), indicating that sample firms also have varied pension maturity due to different age compositions of the workforce. *TA* ranges from a high of 10,205 million at the 75^{th} percentile to a low of 500.68 million at the 25^{th} percentile. The median is 2,079.71 million and the mean is 43,076.23 million, it shows that firm size varies dramatically

Panel B shows the Pearson and Spearman correlations for the variables used in the empirical analysis. The correlations are similar to those for the M&A sample. *ERR* and *%Equity* are positively correlated, and the coefficients are 0.3473 (Pearson) and 0.4330 (Spearman) respectively, which are marginally significant. The correlation coefficients are low, which indicates multicollinearity is not a concern in the subsequent multivariate analysis.

Table 2.2, panel C, reports the regression results for examining IPO firms' earnings management behaviour using the ERR. The coefficients on the *IPO* indicator range from 0.279 to 0.374, and they are significantly positive at a 1% level across all four models. The *IPO* coefficient in Model (4), which includes all controls and fixed effects, is 0.279, which indicates that treatment firms report 0.279% higher ERR ahead of an IPO than control firms. Using the same example, consider a firm with £100 of operating assets, a 5% return on these operating assets, and £20 of pension assets. If the firm changes the ERR from 10% to 10.279%, it can increase net income by 1.12%. This result suggests that EU firms manage ERR upward ahead of an IPO. Hence, it rejects the null Hypothesis 2.1.3, which hypothesizes that IPO firms do not manage the ERR under IAS 19.

The control variables *%Equity* and *Maturity* have significantly positive coefficients in both Models (3) and (4), which indicate they are positively associated with the determination of ERR. *Maturity* has a coefficient of 0.098 in Model (4) indicating that a 1% increase in pension maturity will increase ERR by 0.098% and this is significant at the 5% significance level. *%Equity* has a coefficient of 0.016 in Model (4) indicating that a 1% increase in *%Equity* will increase ERR by 0.016% and it is significant at the 1% significance level.

2.5.1.4 SEO firms

In Section 2.3, I discussed that, during the pre-SEO period, firms might use the ERR to manage earnings upward. Appendix 2.6, panel A, reports the summary statistics used to examine this. The *SEO* variable has a 0.21 average value, which indicates that SEO firms account for 21% of the sample. Thus, the treatment group observations are smaller than the control group observations. In this sample, the *ERR* ranges from 5.13% (25th percentile) to 6.5% (75th percentile).

The mean is 5.8% which is very close to the median (5.85%). This range is similar to those for the M&A and IPO sample. The mean of *%Equity* is 42.62%. It varies from 27.4% to 58% with a median of 42.4%), indicating the significant differences in pension asset allocations. *Maturity* has the mean of 4.04 and median of 3.94. It ranges from 3.45 (25th percentile) to 4.5 (75thpercentile), indicating that the firms have different workforce compositions. *TA* ranges from a low of 572.67 million at the 25th percentile to a high of 12,291.56 million at the 75th percentile and the median is 2,415.07 million. The mean is extremely high (60,090.56 million). Panel B shows the Pearson and Spearman correlations between the variables used for the following test. The correlation coefficients are low in both correlation tests, which indicate multicollinearity is not a concern in the subsequent multivariate analysis.

Table 2.2, panel D, reports the regression results for examining SEO firms' earnings management behaviour using the ERR. The coefficients on the *SEO* indicator range from 0.163 to 0.206 and are significantly positive across all four models. The *SEO* coefficient in Model (4), which includes all controls and fixed effects, is 0.168 and is significant at the 5% level. This indicates that the treatment group (SEO firms) report 168 basis point higher ERR on average than the control group during the pre-SEO period. Overall, these results provide evidence to reject the null Hypothesis 2.1.4 and suggest that EU firms manage the ERR upwards ahead of SEOs.

The control variables *%Equity* and *Maturity* have significantly positive coefficients in both Models (3) and (4), which suggests that firms undertaking more risky investment strategies or less mature pension plans, use a higher ERR.

2.5.2 Discount rate and major corporate events

The discount rate is used to compute the present value of pension obligations and to measure the interest costs of pension expenses under IAS 19. After the adoption of IAS 19R, the discount rate replaced the ERR as the measure of expected returns on pension assets.

In Section 2.5.1, I find that public firms in the EU engage in ERR management ahead of major corporate events. Since the introduction of IAS 19R eliminated utilisation of the ERR, it is interesting to examine whether firms are choosing the discount rate with a view to managing reported numbers. In this section, I first examine whether firms are using the discount rate to manage earnings during the pre-corporate event period for the entire sample period. Second, I examine the impact of IAS 19R in this context. The sample used in the following tests includes all observations with non-missing discount rate data.

2.5.2.1 Acquirer firms

Appendix 2.3, panel C, reports the summary statistics for the key variables used to investigate acquirer firms' earnings management behaviour using the discount rate. All the dependent and control variables used are in year t-1, since any earnings management will need to take place ahead of engaging in M&As. The reported discount rate, *DR_1*, ranges from 4.4% (25^{th} percentile) to 5.6% (75^{th} percentile), with an average of 4.95%. The mean and median of *%Equity_1* are 43.85% and 44% respectively. It varies from 29% to 58.8%, indicating the significant differences among firms' pension investment plans. *Maturity_1* has the mean of 4.13 and the median is 4.01. It ranges from 3.54 (25^{th} percentile) to 4.58 (75^{th} percentile), indicating that firms also have varied pension maturity due to different age compositions in workforce.

Panel D shows the Pearson and Spearman correlations for the variables used in the subsequent regression. The correlation between the reported discount rate (*DR_1*) and the percentage of pension plan assets invested in equity (*%Equity_1*) are marginally positive in both correlations, 0.2891 (Pearson) and 0.3375 (Spearman) respectively at 10% significance level, suggesting that they are positively correlated.

Table 2.3, panel A, reports the results for acquirer firms' earnings management behaviour using the discount rate. *Acquirer* has insignificant coefficients in all four models, indicating that acquirer firms do not manage the discount rate under IAS 19. Thus, there is no evidence to reject the null Hypothesis 2.2.1a, which examines whether acquirer firms manage discount rate ahead of M&A and hypothesizes that acquirer firms do not manage discount rate under IAS 19.

[Insert Table 2.3 about here]

The *IAS 19R* indicator variable has a significantly negative coefficient in all four models. This suggests that firms, both treatment and controls, report lower discount rates after IAS 19R. The interaction term *Acquirer * IAS 19R*, which captures the incremental effect of IAS 19R, has a significantly positive coefficient across all four models, implying that acquirer firms manage the discount rate upwards compared with control firms after IAS 19R.

*Acquirer * IAS 19R* has coefficients, which range from 0.327 to 0.411. Model (4) has a 0.344 coefficient significant at the 1% level, after including the control variables and fixed effects; this indicates that acquirer firms manage the discount rate 0.344% higher when preparing to acquire another firm after the adoption of IAS 19R. Thus, it provides evidence to reject the null Hypothesis 2.2.1b, that predicts adoption of IAS 19R has no impact on acquirer firm's discount rate management behaviour. The results show that EU acquirer firms manage the discount rate after the adoption of IAS 19R. The control variables *%Equity_1* and *Maturity_1* have positive and significant coefficients in both Models (3) and (4), suggesting that they are positively correlated with acquirer firm's discount rate.

2.5.2.2 Target firms

Appendix 2.4, panel C, reports the summary statistics for the key variables used to investigate target firms' earnings management behaviour using the discount rate. It shows that target firms account for 22% of the total observations. *DR_1* ranges from 4.33% to 5.60% with the average of 4.93%, which indicates that target firms also have an opportunity to manage the discount rate within this range. Appendix 2.4, panel D, reports the Pearson and Spearman correlation between the variables used in the multivariate analysis. *DR_1* and *%Equity_1* have a marginally positive Pearson and Spearman correlation coefficients, indicating that *%Equity* is positively related to discount rate.

Table 2.3, panel B, reports the estimation results for various specifications in order to test target firms' earnings management behaviour using the discount rate before being acquired. The *Target* indicator has insignificant coefficients in all model specifications. Thus, target firms did not manage the discount rate under IAS 19. Hence, there is no evidence to reject the null Hypothesis 2.2.2a, which examines whether target firms manage discount rate ahead of M&A and hypothesizes that target firms do not manage discount rate under IAS 19.

The *IAS 19R* indicator has significantly negative coefficients in all four models, suggesting that the firms (both treatment target firms, and control firms that are not involved in any major corporate events) use a lower discount rate after IAS 19R. The main variable of interest *Target * IAS 19R,* which captures the incremental effect of IAS 19R, has positive and significant coefficients in all four models, indicating that target firms manage the discount rate after the adoption of IAS 19R. Coefficients on *Target * IAS 19R* range from 0.372 to 0.435 across all models, suggesting that target firms manage the discount rate 0.4% higher on average ahead of M&As. Hence, it rejects the null Hypothesis 2.2.2b, which hypothesizes that the adoption of IAS 19R has no impact on target firm's discount rate management. The results suggest that firms manage the discount rate after the adoption of IAS 19R. The control variables *%Equity_1, Maturity_1*, and *TA_1* are all positive and significant in both Models (3) and (4), suggesting that pension investment risk taking, pension maturity and firm size are positively correlated with target firm's discount rate decisions.

2.5.2.3 IPO firms

In Section 2.5.1.3, I find that IPO firms in the EU engage in ERR management ahead of IPOs. In this section, I first examine whether firms use the discount rate to manage earnings ahead of IPOs for the entire sample period. Second, I examine the impact of IAS 19R in this context.

Appendix 2.5, panel C, reports the summary statistics for the key variables used to investigate IPO firms' earnings management behaviour using the discount rate. All dependent and control variables used are in year t-1, since firms are likely to manage their earnings during the pre-IPO period. The reported *DR_1* ranges from 4.2% (25^{th} percentile) to 5.6% (75^{th} percentile), with an average discount rate of 4.85%. The mean and median of *%Equity_1* are 42.08% and 41.85% respectively. It varies from 27.4% to 56.69%. *Maturity_1* ranges from 3.52 (25^{th} percentile) to 4.54 (75^{th} percentile). It has the mean of 4.1 and the median of 3.97. *TA_1* ranges from a low of 511.84 million at the 25th percentile to a high of 6,847.8 million at the 75th percentile. The mean of *TA_1* is 9,150.16 million. Panel D shows the Pearson and Spearman correlations between the variables used. *%Equity_1* is marginally positively correlated with *DR_1*; the Pearson correlation coefficient is 0.3046 in and it is significant at the 10% significance level, which indicates that pension asset allocation is correlated with the discount rate. The level of correlations is low, which indicates no multicollinearity concerns in the subsequent multivariate analysis.

Table 2.3, panel C, reports the results for IPO firms' earnings management behaviour using the discount rate. The main variable of interest, *IPO*, has significantly negative coefficients in Models (1) and (3). After adding fixed effects in Models (2) and (4), *IPO* is no longer significant. This indicates that the robustness of this result is sensitive to fixed effects. I find no conclusive evidence that IPO firms managed the discount rate before the adoption of IAS 19R. Thus, there is no conclusive evidence to reject the null Hypothesis 2.2.3.a, which examines whether IPO firms manage discount rate ahead of IPOs under IAS 19 and hypothesizes that IPO firms do not manage the discount rate ahead of IPOs.

The *IAS 19R* indicator has a significantly negative coefficient in all four models, suggesting that firms (both IPO firms and firms not involved in any major corporate events) report lower discount rates after the adoption of IAS 19R. The interaction term *IPO * IAS 19R*, which captures the incremental effect of IAS19R, has a coefficient range from 0.58 to 0.636 and it is statistically significant at 1% level across all four models. Model (4) has a coefficient of 0.635, after including all the control variables and fixed effects, indicating that IPO firms manage the discount rate upwards by 0.635% more on average during the pre-IPO period after the adoption of IAS 19R. Hence, it rejects the null Hypothesis 2.2.3b, which examines the impact of the adoption of IAS 19R on IPO firm's discount rate management and hypothesizes that the adoption of IAS 19R has no impact on IPO firm's discount rate management ahead of IPOs. This evidence shows that changes in pension actuarial assumptions when accounting for pensions can influence IPO firms' earnings management behaviour.

The economic significance of managing the discount rate upwards and its impact on reported earnings cannot be accurately estimated. This is because the discount rate is also used to compute pension obligations and interest costs. An increase in the discount rate will result in higher or lower interest costs depending on pension maturity, and assuming other factors remain unchanged. If interest cost increases after the discount rate changes, it may offset the increase in expected pension returns.

For the control variables, *%Equity_1* and *Maturity_1* have positive and significant coefficients in both Models (3) and (4).

2.5.2.4 SEO firms

In Section 2.5.1.4, I find that SEO firms in the EU engage in ERR management during the pre-SEO period. In this section, I first examine whether firms use the discount rate to manage earnings ahead of SEOs. Second, I examine the impact of IAS 19R in this context.

Appendix 2.6, panel C, reports the summary statistics for the key variables used to investigate SEO firms' earnings management behaviour using the discount rate. All dependent and control variables used are in year t-1, since firms will manage earnings during the pre-SEO period. The reported *DR_1* ranges from 4.23% (25th percentile) to 5.6% (75th percentile), with a 4.88% average value. The mean and median of *%Equity_1* are 41.88% and 41% respectively. It varies from 27.2% to 56.38%. *Maturity_1* ranges from 3.53 (25^{th} percentile) to 4.55 (75^{th} percentile) with the mean (4.1) and median (3.97). *TA_1* ranges from a low of 540.25 million at the 25^{th} percentile to a high of 6,902.8 million at the 75^{th} percentile. The mean of *TA_1* is 9,360.50 million. Panel D reports the Pearson and Spearman correlations of variables used in the following multivariate analysis. The levels are low, which indicate no multicollinearity concerns in the subsequent multivariate analysis.

Table 2.3, panel D, reports the results for SEO firms' earnings management behaviour using the discount rate. The main variable of interest, *SEO*, has significantly positive coefficients in Models (1) and (3). After adding fixed effects in Models (2) and (4), however, *SEO* is no longer significant. This indicates that the robustness of this result is sensitive to the inclusion of fixed effects. I find no conclusive evidence that the treatment group (SEO firms) manage the discount rate under IAS 19. Thus, I cannot reject the null Hypothesis 2.2.4a, which examines whether SEO firms manage discount rate ahead of IPOs under IAS 19 and hypothesizes that SEO firms do not manage discount rate ahead of IPOs. The *IAS 19R* indicator has a significantly negative coefficient in all four models, suggesting that firms (both treatment SEO firms, and control firms that are not involved in any major corporate event) report lower discount rates after IAS 19R.

The interaction term *SEO * IAS 19R*, which captures the incremental effect of IAS 19R, has insignificant coefficients across all four models, indicating that SEO firms do not manage the discount rate after IAS 19R. This result cannot reject the null Hypothesis 2.2.4b, which examines whether the adoption of IAS 19R has any incremental impact on SEO firms' discount rate management and hypothesizes that the adoption of IAS 19R has no impact. The control variables, *%Equity_1, Maturity_1,* and *TA_1*, have positive and significant coefficients in both Models (3) and (4). This indicates that the discount rate is positively correlated with firms' pension investment strategies, maturities, and firm size.

Overall, the results suggest that firms do not manage the discount rate ahead of major corporate events: M&As, IPOs and SEOs under IAS 19. However, the results suggest that after the adoption of IAS 19R, M&A firms (both acquirer and target) and IPO firms manage the discount rate. However, I find no evidence that SEO firms manage the discount rate.

2.5.3 Discretionary accruals and major corporate events

Previous literature showed that firms have a tendency to manage earnings before engaging in major corporate events, and discretionary accruals management is one of the primary tools. In this context, I examine whether firms manage discretionary accruals under IAS 19R. Given that the adoption of IAS 19R removed the use of the ERR, and given the discount rate is less effective at managing earnings, I examine whether firms manage discretionary accruals following the introduction of IAS 19R. The initial sample used for the following tests includes all firms that report the discount rate. It is then further filtered by the availability of data used to measure discretionary accruals. I use the maximum number of observations with non-missing data for the following tests.

2.5.3.1 Acquirer firms

Appendix 2.3, panel C, presents descriptive statistics for the sample used to test acquirer firms' earnings management using discretionary accruals during the pre-M&A period. All dependent and control variables used are lagged, since firms are likely to manage earnings ahead of engaging in M&As. The mean and median of *DA_1* are very close which are 0.02 and 0.01 respectively. It ranges from -0.03 (25th percentile) to 0.05 (75th percentile), which indicates that firms use discretionary accruals to manage earnings and meet their various goals. Both Pearson and Spearman correlations reported in panel D show that all the variables have low correlations with each other, which indicates no multicollinearity concerns in the subsequent multivariate analysis.

Table 2.4, panel A, reports the estimation results for various specifications in order to examine acquirer firms' earnings management behaviour using discretionary accruals. *Acquirer* has significantly negative coefficients in all four models, indicating that acquirer firms report lower discretionary accruals, compared with control firms, before IAS 19R. The coefficient is -0.011 in Model (4), after including all controls and fixed effects and it is significant at the 5% level. This result provides some evidence to reject the null Hypothesis 2.3.1a, which hypothesizes that acquirer firms do not engage in discretionary accruals management ahead of M&As under IAS 19. Previous literature finds that acquirer firms positively manage discretionary accruals to increase earnings ahead of mergers (Erickson & Wang, 1999). However, I find that EU acquirer firms reduce discretionary accruals management. Differences in country characteristics may contribute to this result. As shown by, for example, Baber, Kang and Li (2011) firms that use discretionary accruals to manage earnings ahead of M&As are more likely to have reverse consequences in future performance. My result suggests that EU firms' incentives to manage earnings using discretionary accruals may be reduced because of this long-term negative effect.

[Insert Table 2.4 about here]

The interaction term *Acquirer * IAS 19R*, which captures the incremental effect of IAS 19R, only has significant coefficient in Models (1) and (3). After including fixed effect in Models (2) and (4), the coefficient is no longer significant. This suggests that the result is sensitive to the inclusion of fixed effects. Hence, there is no conclusive evidence to reject the null Hypothesis 2.3.1b, which examines whether the adoption of IAS 19R has any incremental impact on acquirer firms' discretionary accruals management and hypothesizes that it has no impact. The control variables *%Equity_1, Maturity_1*, and *TA_1* have insignificant coefficients in Model (4) after including all control variables and fixed effects.

2.5.3.2 Target firms

Appendix 2.4, panel C, reports the summary statistics used in this analysis. The mean and median of *DA_1* are both equal to 0.01. It ranges from -0.03 to 0.05, indicating that firms may use discretionary accruals to manage earnings. Appendix 2.4, panel D, shows the Pearson and Spearman correlations between the variables. The levels are low, which indicates no multicollinearity.

Table 2.4, panel B, reports the estimation results for various specifications used to investigate target firms' earnings management behaviour using discretionary accruals ahead of M&As. The *Target* indicator has significantly negative coefficients in all four models, ranging from -0.021 to -0.033. It indicates that firms reduce discretionary accruals management prior to IAS 19R. The *Target* coefficient is -0.021 and is significant at the 1% level in Model (4) after including all control variables and fixed effects. This result rejects the null Hypothesis 2.3.2a, which examines target firm's discretionary accruals management and hypothesizes that target firms do not manage discretionary accruals ahead of M&As under IAS 19. The reduction in discretionary accruals ahead of M&As shows evidence that they are motivated to avoid future reverse consequences since previous literature finds positive links between discretionary accruals management and poor future stock performance (Teoh et al., 1998a). They thus reduce their discretionary accruals management before engaging in M&As to reduce these reverse consequences.

The interaction term *Target * IAS 19R*, which captures the incremental effect of IAS 19R, only has significant coefficients in Models (1) and (3). After adding fixed effects in Models (2) and (4), *Target * IAS 19R* is no longer significant. This finding provides no conclusive evidence to reject the null Hypothesis 2.3.2b, which examines whether the adoption of IAS 19R has any incremental impact on target firms' discretionary accruals management and hypothesizes that the adoption of IAS 19R has no impact. The control variables *%Equity_1*, *Maturity_1*, and *TA_1* have insignificant coefficients in Model (4), indicating that they are not correlated with the firm's discretionary accruals management.

Overall, EU target firms decrease discretionary accruals management before being acquired by another firm. The adoption of IAS 19R does not seem to have an impact on their earnings management behaviour.

2.5.3.3 IPO firms

Appendix 2.5, panel C, shows the descriptive statistics for the sample used to test IPO firms' earnings management using discretionary accruals ahead of IPOs. All dependent and control variables used are lagged, since firms are likely to manage earnings during the pre-IPO period. *DA_1* ranges from -0.03 (25^{th} percentile) to 0.05 (75^{th} percentile) with the average of 0.02, which indicates that firms use discretionary accruals to manage earnings. Panel D shows the correlations. The correlation coefficients are low, which indicates no multicollinearity in the subsequent multivariate analysis.

Table 2.4, panel C, reports the estimation results for various specifications to examine IPO firms' earnings management behaviour using discretionary accruals. The *IPO* indicator has coefficients ranging from 0.067 to 0.103 and are significantly positive in all four models at a 1% level. *IPO* has a coefficient of 0.067 in Model (4), which includes all controls and fixed effects. This indicates that IPO firms positively manage discretionary accruals during the IAS 19 period compared to control firms that were not involved in any major corporate events. Previous literature has found that IPO firms positively manage discretionary accruals in order to increase earnings ahead of mergers (Teoh et al., 1998a, 1998b; DuCharme et al., 2001). My results in relation to IPOs are consistent with those findings and reject the null Hypothesis 2.3.3a. Thus, EU firms manage earnings using discretionary accruals during the pre-IPO period.

The interaction term *IPO * IAS 19R*, which captures the incremental effect of IAS 19R, has coefficients ranging from -0.036 to -0.125 and are statistically significant in all four models. In Model (4), which includes all control variables and fixed effects, the -0.036 coefficient suggests that the magnitude of IPO firms' earnings management using discretionary accruals decreased after the adoption of IAS 19R. However, compared with control group firms, IPO firms continue to report higher discretionary accruals after IAS 19R. [8] The control

[8] The *IPO * IAS 19R* coefficient: 0.067 – 0.036 = 0.031. This positive coefficient indicating that IPO firms manage discretionary accruals more compared to control firms.

variables *%Equity_1, Maturity_1,* and *TA_1* have insignificant coefficients in Model (4).

Overall, I find that, prior to IAS 19R, IPO firms positively manage discretionary accruals during the pre-IPO period in order to increase earnings. Subsequently, this activity decreased somewhat. These results reject the null Hypothesis 2.3.3b, which predicts that the adoption of IAS 19R has no impact on IPO firm's discretionary accruals management. The results show the reduction of IPO firm's discretionary accruals earnings management behaviour after the adoption of IAS 19R.

2.5.3.4 SEO firms

Appendix 2.6, panel C, presents the descriptive statistics of the sample used to test SEO firms' earnings management using discretionary accruals ahead of SEOs. The mean and median of *DA_1* are both 0.01. It ranges from -0.03 (25^{th} percentile) to 0.05 (75^{th} percentile), which indicates firms use discretionary accruals to manage earnings. Panel D shows the Pearson and Spearman correlations between the variables. The Pearson correlation coefficient between *DA_1* and *%Equity_1* is positive and marginally significant o (coeff: 0.0543). The correlation coefficients are generally low, which indicate that there are no multicollinearity concerns in the subsequent multivariate analysis.

Table 2.4, panel D, reports the estimation results for various specifications used to investigate SEO firms' earnings management behaviour using discretionary accruals ahead of SEOs. The *SEO* indicator coefficients range from -0.019 to -0.035 and they are statistically significant in all four models at the 1% level, which indicates that the treatment group (SEO firms) decrease discretionary accruals management under IAS 19 compared to control firms. This result is the same as that for M&A firms' earnings management behaviour using discretionary accruals. Discretionary accruals management before SEO is positively associated with poor stock performance during the post-SEO period (Teoh et al., 1998b). Therefore, they are motivated to reduce their discretionary accruals management in the pre-SEO period to avoid these reverse consequences. Hence, the results reject null Hypothesis 2.3.4a, which examines whether SEO firms' manage discretionary accruals management ahead of SEOs and hypothesizes that SEO firms do not manage discretionary accruals under IAS 19.

The interaction term *SEO * IAS 19R*, which captures the incremental effect of IAS 19R, has a significantly positive coefficient of 0.023 and 0.024 in Models (1) and (3). However, after including fixed effects, the coefficient is no longer significant in Models (2) and (4). This suggests that SEO firms may positively manage discretionary accruals after the adoption of IAS 19R, but the result is sensitive to the inclusion of controls and fixed effects. These results provide no strong basis to reject the null Hypothesis 2.3.4b, that hypothesizes the adoption of IAS 19R has no impact on SEO firms discretionary accruals management behaviour.

Overall, SEO firms reduce discretionary accruals management during the pre-SEO period under IAS I9 and IAS 19R. In addition, the adoption of IAS 19R seems to have no impact on SEO firms' discretionary accruals management behaviour.

2.5.4 Real earnings management and major corporate events

As I noted in Section 2.3, real earnings management can be used together with accruals earnings management ahead of major corporate events. After the adoption of IAS 19R, accruals earnings management options were reduced, however, which may affect real earnings management behaviour (Chi, Lisic & Pevzner, 2011).The initial sample consists firms that have non-missing data for discount rate and discretionary accruals. Then it is filtered by the availability of data to estimate each real earnings management proxies. I use the maximum number of observations with non-missing data for each real earnings management proxies discussed in Section 2.4.1.4 for the following tests all dependent variables and controls are lagged, since firms are likely managing earnings during the pre-event period.

2.5.4.1 Acquirer firms

Appendix 2.3, panel C, shows the summary statistics for the samples used in the subsequent multivariate analysis. I use maximum number of observations with non-missing real earnings management variable for this analysis. The real earnings management proxies *R_CFO_1* range from -0.03 (25^{th} percentile) to 0.03 (75^{th} percentile), *R_PROD_1* range from -0.06 (25^{th} percentile) to 0.06 (75^{th} percentile) and *R_DISX_1* range from -0.06 (25^{th} percentile) to 0.04 (75^{th} percentile). And the mean and median of them are all zero. Panel D shows the Pearson and Spearman correlations between the variables; as it can be seen, there are no multicollinearity concerns since the correlation coefficients are low.

Table 2.5, panel A, reports the estimation results for various specifications using all three proxies, following Roychowdhury (2006). *Acquirer* has insignificant coefficients for all *R_CFO* and *R_PROD* models, which indicates that acquirer firms did not manage sales or production costs to boost earnings prior to IAS 19R. *Acquirer* also has a marginally significant coefficient of -0.012 *R_DISX* in Model (3). This indicates that there is some evidence that acquirer firms manage discretionary expenses before mergers; however this result is sensitive to the inclusion of fixed effects as the coefficient is not significant in Models (1), (2) and (4). Overall, prior to the adoption of IAS 19R, there is no conclusive evidence of acquirer firms engaging in real earnings management. Hence, there is no evidence to reject the null Hypothesis 2.4.1a, which examines acquirer firms' real earnings management behaviour ahead of M&As and hypothesizes that acquirer firms do not engage in real earnings management ahead of M&As under IAS 19.

[Insert Table 2.5 about here]

The interaction term *Acquirer * IAS 19R*, which captures the incremental effect of IAS 19R, has insignificant coefficients for *R_CFO* and *R_DISX* in all four models, indicating that IAS 19R has no impact on acquirer firms' real earnings management behaviour using sales or discretionary expenses. However, *Acquirer * IAS 19R* has positive coefficients ranging from 0.024 to 0.031 and which are statistically significant for *R_PROD* across all four models. The coefficient in Model (4) is 0.024 and marginally significant, which indicates that acquirer firms increase their production levels by 2.4%. This implies that they manage production costs upward to increase earnings after the adoption of IAS 19R. Increases in production levels and costs can lower COGS and raise operating margins. Hence, this result provides some evidence to reject the null Hypothesis 2.4.1b, that hypothesizes the adoption of IAS 19R has no impact on acquirer firm's real earnings management behaviour.

In summary, the results suggest that before the adoption of IAS 19R, acquirer firms only used ERR to manage earnings ahead of engaging in M&As. However, after IAS 19R, the results provide evidence that they manage the discount rate and use real earnings management to manage earnings. Overall, the results indicate that the adoption of IAS 19R significantly changed acquirer firms' earnings management behaviour.

2.5.4.2 Target firms

The sample used in this analysis is part of the sample reported in panel C of Appendix 2.4. Given that not all observations used in previous tests have real earnings management data, I use all observations with non-missing real earnings management data for this analysis. The real earnings management proxies *R_CFO_1* range from -0.03 (25^{th} percentile) to 0.03 (75^{th} percentile), *R_PROD_1* range from -0.06 (25^{th} percentile) to 0.06 (75^{th} percentile) and *R_DISX_1* range from -0.06 (25^{th} percentile) to 0.04 (75^{th} percentile), which provides some preliminary evidence that firms may use these three tools to manage earnings. These three variables have a mean and median of zero, except from the mean of *R_PROD_1*, which is equal to -0.01. Appendix 2.4, panel D, shows the Pearson and Spearman correlations between the variables which indicate no multicollinearity in the subsequent multivariate analysis.

Table 2.5, panel B, reports the estimation results for the relationship between target firm and real earnings management behaviour using three proxies (as per Roychowdhury, 2006). The first four columns report results for managing earnings using *R_CFO*. The *Target* indicator has a significantly negative coefficient ranging from -0.008 to -0.010 in all four models for *R_CFO* and it is significant at 1% level. This evidence indicates that Target firms manage sales to manipulate earnings upwards before the adoption of IAS 19R. This results provide evidence to reject the null Hypothesis 2.4.2a, which hypothesizes that target firms do not engage in real earnings management ahead of M&As under IAS 19. The *Target* coefficients *R_PROD* and *R_DISX* are insignificant across four models, indicating that target firms' do not manage production costs and discretionary expense.

The interaction term *Target * IAS 19R*, which captures the incremental effect of IAS 19, has insignificant coefficients across all models, indicating that firms do not engage in real earnings management to a greater extent after IAS 19R. Thus, it provides no evidence to reject the null Hypothesis 2.4.2b, which examines target firm's real earnings management after the adoption of IAS 19R and hypothesizes that it does not have any impact.

I find that target firms manage the ERR before the adoption of IAS 19R. In addition, the results suggest that they manage the discount rate after the adoption of IAS 19R, possibly because firms could no longer use the ERR under IAS 19R. Hence, it seems that the adoption of IAS 19R influences target firms' earnings management choices. However, the adoption of IAS 19R has no impact on target firm's discretionary accruals and real earnings management behaviour.

2.5.4.3 IPO firms

The sample used in this analysis contains all observations with non-missing real earnings management data. Appendix 2.5 panel C reports the summary statistics of the variables used in the multivariate analysis. The real earnings management proxies *R_CFO_1* range from -0.03 (25^{th} percentile) to 0.03 (75^{th} percentile), *R_PROD_1* range from -0.06 (25^{th} percentile) to 0.06 (75^{th} percentile) and *R_DISX_1* range from -0.06 (25^{th} percentile) to 0.05 (75^{th} percentile). The mean and median of these three variables are all zero, except from the mean of *R_PROD_1* which is -0.01) Panel D shows the Pearson and Spearman correlations between variables. The correlation coefficients are low, suggesting that multicollinearity is not likely to be a concern in the subsequent multivariate analysis.

Table 2.5, panel C, reports the results for the relationship between target firm and real earnings management behaviour using the three proxies (as per Roychowdhury, 2006). The first four columns report results using *R_CFO*. The *IPO* indicator has a significantly negative coefficient ranging from -0.020 to -0.023 in all four models and it is significant at the 1% level. The coefficient in Model (4) is -0.021, indicating that IPO firms keep their CFOs unusually low before IAS 19R compared to control group firms. This evidence supports the notion that IPO firms manage sales to manipulate earnings upward, consistent with previous findings (Cohen et al., 2008). The *IPO* indicator has significant coefficients only in Models (1) and (3) for *R_PROD* and *R_DISX*, which indicates that the result is sensitive to the inclusion of fixed effects. Thus, the results in relation to IPO firms' earnings management behaviour using production costs and discretionary expenses are inconclusive. Overall, they provide some evidence to reject the null Hypothesis 2.4.3a, which hypothesizes that IPO firms do not manage real earnings ahead of IPOs under IAS 19.

The interaction term *IPO * IAS 19R*, which captures the incremental effect of IAS 19, has a positively significant coefficient equal to 0.008, for *R_CFO* in Model (1). After including fixed effects and controls in subsequent Models (2) and (4), however, it loses significance. Therefore, IPO firms' real earnings management behaviour using CFO did not change after the adoption of IAS 19R. The *IPO * IAS 19R* coefficients for *R_PROD* are positive and marginally significant at 10% significance level in Model (4), which include all control variables and fixed effects. The results suggest that IPO firms manage production costs in order to increase reported earnings after IAS 19R. Hence, they provide evidence to reject the null Hypothesis 2.4.3b, which hypothesizes that the adoption of IAS 19R has no impact on IPO firms real earnings management behaviour ahead of IPOs. The results for the *R_DISX* proxy are inconclusive, since *IPO * IAS 19R* exhibits a significant coefficient only in Models (1) and (3), but not in the models including control variables and fixed effects.

Overall, I find that IPO firms manage the ERR, discretionary accruals, and real earnings management by managing sales before the adoption of IAS 19R. Subsequently, they seem to manage the discount rate, since the ERR is no longer allowed. Moreover, IPO firms engage more frequently in real earnings management by managing production costs. However, they decrease their earnings management behaviour using discretionary accruals after IAS 19R.

2.5.4.4 SEO firms

The sample used in this analysis includes the maximum number of observations with non-missing real earnings management data. Appendix 2.6 panel C reports the summary statistics of the variables used in the multivariate analysis. The real earnings management proxies *R_CFO_1* range from -0.03 (25^{th} percentile) to 0.03 (75^{th} percentile), *R_PROD_1* range from -0.06 (25^{th} percentile) to 0.06 (75^{th} percentile) and *R_DISX_1* range from -0.06 (25^{th} percentile) to 0.04 (75^{th} percentile). They all have a mean and median of zero. Panel D shows the Pearson and Spearman correlations between the variables. The levels are low, which indicates no multicollinearity in the subsequent multivariate analysis.

Table 2.5, panel D, reports the results for the relationship between SEO firms and real earnings management behaviour using the three proxies (as per

Roychowdhury, 2006). The first four columns report results for managing earnings using the first proxy, *R_CFO*. The *SEO* indicator has a significantly negative coefficient ranging from -0.017 to -0.018 in all four models and it is significant at a 1% level. In Model (4) with all controls and fixed effects included, the coefficient is -0.018. This indicates that SEO firms keep their CFOs low prior to IAS 19R adoption compared to the control group firms. This evidence supports the notion that SEO firms manage sales to manipulate earnings upward, which is consistent with previous findings (Cohen et al., 2008) and rejects the null Hypothesis 2.4.4a, which examines SEO firms' real earnings management behaviour ahead of SEOs and hypothesizes that SEO firms do not engage in real earnings management under IAS 19. The coefficients on *SEO* are insignificant in all models for *R_PROD* and *R_DISX*, indicating that SEO firms did not engage in managing production costs or discretionary expenses before IAS 19R.

The interaction term *SEO * IAS 19R,* which captures the incremental effect of IAS 19R, has insignificant coefficients across all models, indicating that firms do not engage in real earnings management to a greater extent after IAS 19R. This result provides no evidence to reject the null Hypothesis 2.4.4b, which hypothesizes that the adoption of IAS 19R has no impact on SEO firm's real earnings management behaviour.

Overall, under IAS 19, firms manage the ERR and engage in real earnings activity ahead of SEOs. Furthermore, SEO firms reduce discretionary accruals management during the pre-SEO period. The adoption of IAS 19R has no impact on SEO firms' earnings management behaviour using the alternative tools discussed above. Therefore, it seems that given that the ERR could no longer be used to manage earnings, the adoption of IAS 19R decreased SEO firms' earnings management behaviour.

2.6 Further Tests

2.6.1 Probability of M&A deal completion and pension actuarial assumptions earnings management

Based on the findings in Section 2.5.1, both acquirer and target firms manage the ERR upward during the pre-M&A period. After the adoption of IAS 19R, the results suggest that firms seem to manage the discount rate, since the ERR is no longer allowed. Both the ERR and the discount rate are pension actuarial assumptions that can be used as earnings management tools.

In this section, I investigate the impact of earnings management using pension accounting estimates on the probability of M&A deal completion for acquirers and targets separately. In particular, I predict that pension actuarial assumptions earnings management will have a positive impact on acquirer firms' completion probability, since they obtain greater benefits. I also predict it will negatively impact target firms' completion probability, because it can be used as a defence strategy against being acquired.

According to Muehlfeld, Sahib and Witteloostuijn (2012) and Aguilera, Dencker and Yalabik (2008), the following variables are used to examine this issue:

$$Complete = \beta_0 + \beta_1 ERR + \beta_2 Attitude + \beta_3 Deal_{size} + \beta_4 Method\_payment + \beta_5 \%Sought + \beta_f Firm_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe} \quad (2.13a)$$

$$Complete = \beta_0 + \beta_1 DR\_1 + \beta_2 Attitude + \beta_3 Deal\_size + \beta_4 Method\_payment + \beta_5 \%Sought + \beta_f Firm_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe} \quad (2.13b)$$

$$Complete = \beta_0 + \beta_1 DR_1 + \beta_2 DR_1 * IAS19R + \beta_3 Attitude + \beta_4 Deal_{size} + \beta_5 Method\_payment + \beta_6 \%Sought + \beta_f Firm_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe} \quad (2.13c)$$

I measure the dependent variable, *Complete*, by creating a dummy variable that equals 1 if an announced M&A was completed, and 0 otherwise.

For the control variables, I draw primarily on research in the financial economics literature that identifies influences on pre-completion processes in M&As (Muehlfeld et al., 2012; Wong & O'Sullivan, 2001). I also use literature focusing on the determinants of post-acquisition performance (King, Dalton, Daily & Covin, 2004). If a factor is positively related to post-acquisition performance, it could affect the likelihood of completion, because it provides positive deal indications. Deal attitude may also impact completion likelihood, and friendly takeovers face less resistance than hostile takeovers (Aguilera et al., 2008). *Attitude* is a dummy variable that equals 1 if the deal is friendly, and 0 otherwise.

The method of payment (*Method_payment*) may impact completion likelihood as well. Payment methods include cash, stock, debt, or some combination thereof. Cash offers may create more wealth for target shareholders, because they reduce the scope for disagreements during the public takeover phase. I include a dummy for *Method_payment* that equals 1 if the predominant mode of payment is cash, and 0 otherwise. *Deal_size* and percentage acquired (*%Sought*) during an M&A can also impact completion likelihood. Therefore, I also include firm, industry, year, and country fixed effects to control for other unobservable factors.

Table 2.6 panel A reports the summary statistics for the key variables to investigate pension actuarial assumption management's impact on M&A deal completion probability from both acquirer and target firm's perspectives. The acquirer sample has 1,915 observations. *Acquirer Completion* has a mean of 0.80, indicating that the acquirer firm's M&A completion rate is 80%. The reported *ERR* ranges from 5% (25^{th} percentile) to 6.46% (75^{th} percentile), with an average ERR of 5.69%. The reported *DR_1* ranges from 4.2% (25^{th} percentile) to 5.5% (75^{th} percentile), with an average discount rate of 4.8%. The ranges of *ERR* and *DR_1* indicate that firms usually report lower discount rates compared with ERR. The mean and median of *%Sought* are 77.41% and 100% respectively. It varies from 50% to 100%, indicating that most of the acquirer firms bought the majority of shares in the target firm. *Deal_size* ranges from 315 million (25^{th} percentile) to 1,696.5 million (75^{th} percentile). It has the mean of 1,037.24 and a median of 1,008.5. *Method_payment* has an average of 0.47, indicating that 47% of the acquirer firms use cash payment. *Attitude* has a mean of 0.86, indicating that 86% of the M&A deals are friendly. *TA_1* ranges from a low of 874.14 million at the 25^{th} percentile to a high of 17,470.98 million at the 75^{th} percentile. Target sample has 435 observations. *Target Completion* has a mean of 0.51, indicating that the target firm's M&A completion rate is 51%. This is much lower compared with EU acquirer firms. *ERR* and *DR_1* have similar descriptive results as acquirer firms. *%Sought* has a mean of 25.32% and ranges from 7.33% to 29.05%. This is much lower compared with acquirer firm's percentage sought in the M&A deal.

Table 2.6 panel B reports the results for Equation (2.13) for acquirers and target firms. The observations included are firms that are involved in M&As as acquirers or targets only. Column (1) examines Equation (2.13a) which includes the *ERR*, but only to capture the impact of ERR management on firms' completion probability; column (2) examines Equation (2.13b) which includes *DR_1*, but only to capture the potential impact of discount rate management; and column (3) examines Equation (2.13c) which includes both *DR_1* and the interaction term of *DR_1 * IAS 19R* to capture the impact of IAS 19R adoption on the discount rate management's ability to affect M&A completion.

[Insert Table 2.6 about here]

The results for the main variables of interest, including *ERR*, *DR_1*, and *DR_1 * IAS 19R* in all three columns for both acquirer and target firms are insignificant. This indicates that firms' earnings management behaviour using pension estimates such as the ERR and the discount rate have no impact on M&A completion probability, either for acquirers or for targets.

2.6.2 Alternative discretionary accrual methods

In this section, I run tests for firms' discretionary accruals management behaviour ahead of major corporate events using three other models: the Jones model (DAJM), the Healy model (DAHE), and the DeAngelo model (DADE).

The Jones model for non-discretionary accruals in the event year is:

$$NA_{it} = k_{1t}\frac{1}{TA_{i,t-1}} + k_2(\Delta Rev_{it}) + k_3(PPE_{it}) \quad (2.14)$$

Healy (1985) predicts that systematic earnings management occurs in every period. The equation for non-discretionary accruals is: $NA_t = \frac{\sum_t TAS_t}{\mathrm{T}}$.

DeAngelo (1986) tests for earnings management using the last period's total accruals as the measure of non-discretionary accruals: $NA_t = TAS_{t-1}$.

The results are reported in Table 2.7. The samples used for each type of event are the same as those for the main tests of discretionary accruals. As panels A and B show, neither acquirer nor target firms have any significant coefficients for the main variables of interest, *Acquirer* and *Target,* in all three models across various specifications. These results differ from those in the main tests using the modified Jones model.

According to the results in Sections 2.5.3.1 and 2.5.3.2, both *Acquirer* and *Target* have significantly negative coefficients. This suggests that acquirer and target firms manage discretionary accruals downward during the pre-M&A period. The robustness tests using the three other discretionary accruals models indicate that neither acquirer nor target firms managed discretionary accruals before engaging in mergers under IAS 19.

[Insert Table 2.7 about here]

The interaction terms *Acquirer * IAS 19R* and *Target * IAS 19R* have insignificant coefficients in all three models. This indicates that the adoption of IAS 19R has no impact on treatment firms' earnings management behaviour. This is consistent with the main test.

Panel C reports that *IPO* has significant coefficients using both Healy's (*DAHE*) and DeAngelo's (*DADE*) models, which indicates that IPO firms manage discretionary accruals ahead of IPOs. However, for the Jones model (*DAJM*), only *IPO* exhibits significant coefficients in Models (1) and (3). After including fixed effects and control variables in Models (2) and (4), the coefficients are no longer significant. Based on the Jones model, this result is inconclusive. This differs from the main test result using the modified Jones model, where *IPO* has significant coefficients in all models. This may be attributable to the fact that the Jones model is less effective at capturing firms' accruals earnings management than the modified Jones model.

Note that the Jones model assumes no discretion over revenue, while the modified Jones model takes discretion exercised over revenue into account when estimating discretionary accruals (Dechow et al., 1998). The interaction term *IPO * IAS 19R* has negative coefficients across all specifications, indicating that the adoption of IAS 19R decreased the incentive to manage earnings using discretionary accruals. These results are consistent with the main results.

The results reported in panel D do not provide conclusive evidence that SEO firms engage in discretionary accruals earnings management under all three models. And the results of the Jones model (*DAJM*) suggest that SEO firms manage discretionary accruals after the adoption of IAS 19R. These results differ from those reported in the main analysis, which may be due to the different proxies used by the models to estimate discretionary accruals. Both the DeAngelo and Healy models use total accruals from the estimation period as proxies to estimate non-discretionary accruals. And both models tend to generate errors when estimating non-discretionary accruals or other economic circumstances change (Dechow et al., 1998).

The Jones model does not take discretion over revenue into account when estimating non-discretionary accruals. Overall, consistent with Dechew et al. (1998)'s analysis which suggest that modified Jones model is more accurate compare with other models, the robustness test results indicate that the modified Jones model is the most powerful for capturing firms' discretionary accruals (Dechow et al., 1998).

2.7 Robustness Tests

As discussed in Section 2.4, PSM is one of the most commonly used matching methods in the literature. Therefore, I use this method to test the robustness of our main results.[9]

Table 2.8 reports the results for the relationship between the ERR and major corporate events. The main variables of interest, *Acquirer*, *Target*, and *IPO* display insignificant coefficients in panels A, B, and C.[10] Only *SEO* has positive and marginally significant coefficients (albeit marginally when including controls and fixed effects) in panel D Model (4), which indicates that SEO firms manage the ERR before issuing SEOs. In contrast, the results in the main analysis suggest that all firms manage the ERR ahead of major corporate events (M&As, IPOs, and SEOs).

[Insert Table 2.8 about here]

Table 2.9 reports the results for the relationship between the discount rate and major corporate events. The coefficients for both *Acquirer * IAS 19R* and *Target * IAS 19R* are significant across four models in panel A and B and the statistical significance ranges from marginal to highly significant, which indicates that there is evidence to suggest they manage the discount rate after IAS 19R. The coefficients reported in panel D for *SEO * IAS 19R* are insignificant across four models indicating that IAS 19R adoption has no impact on SEO firm's discount rate management. The results for acquirer, target and SEO firms are consistent with my main test results. However, *IPO * IAS 19R* reported in panel C shows inconclusive evidence for IPO firms since it only has a significant

[9] I also tested the robustness by adding the market return as control variable in order to control for time variations within countries. The results remain robust after adding this control variable.
[10] *Target* and *IPO* only have a significant coefficient in Model (3) with no fixed effects.

coefficient in Models (1) and (3) with no fixed effects. This result suggests that IPO firms do not manage discount rate after IAS 19R. This is inconsistent with the main test results reported in Section 2.5.2.3 which indicates the IPO firms manage discount rate after IAS 19R.

[Insert Table 2.9 about here]

Table 2.10 reports the results for the relationship between discretionary accruals and major corporate events using PSM. The results reported in panel D for SEO firms are consistent with those reported in my main analysis, showing that the adoption of IAS 19R has no impact on firm's discretionary accruals management.[11] *Acquirer * IAS 19R* and *Target * IAS 19R* have significant coefficients across all four models reported in panel A and B, indicating that acquirer and target firms manage discretionary accruals to a greater extent after the adoption of IAS 19R. The coefficients for *Target * IAS 19R* reported in panel B are only marginally significant in Models (2) and (4). Panel C shows that *IPO* IAS 19R* has a negative significant coefficient in Model (4) after including all fixed effects and control variables, indicating that IPO firms manage less discretionary accruals after the adoption of IAS 19R. While in the main tests, I find no evidence to support this point.

[Insert Table 2.10 about here]

Table 2.11 reports the relationship between real earnings management and major corporate events using PSM. Based on panel A's results for real earnings management using the three proxies, both *Acquirer* and *Acquirer * IAS 19R*

[11] Panel D *SEO*IAS 19R* only has marginally significant coefficients in Models (1) and (3), after including fixed effects and control variables in Models (2) and (4) the coefficients are no longer significant. Thus there's no conclusive evidence to support there is any impact of IAS 19R adoption.

exhibit insignificant coefficients.[12] This suggests that acquirer firms did not manage real earnings activity before or after the adoption of IAS 19R.

[Insert Table 2.11 about here]

Panel B reports target firms' real earnings management behaviour ahead of M&As. *Target* shows negative coefficients for the *R_CFO* proxy, which indicates that target firms managed their CFO levels downwards before IAS 19R and it is consistent with previous literature (Cohen et al., 2008). *Target * IAS 19R* shows insignificant coefficients for all three proxies, which suggests that the adoption of IAS 19R has no impact on their real earnings management behaviour.

Panel C reports IPO firms' real earnings management behaviour. *IPO* shows significant coefficients for the *R_PROD* proxy in Models (2) and (4) after including fixed effects and control variables, which indicates that IPO firms managed production costs upwards before the adoption of IAS 19R. *IPO * IAS 19R* shows significant coefficients in Models (2) and (4) for *R_CFO* and *R_PROD*, which suggests that IPO firms engage to a greater extent in CFO and production cost management after IAS 19R.

Panel D shows SEO firms' real earnings management behaviour. *SEO* has negative significant coefficients for the *R_CFO* proxy across all four models, which indicates that SEO firms managed their CFO levels downwards before IAS 19R. This is consistent with the notion of manage CFO downwards in order to manage earnings upwards before engage in SEO (Cohen et al., 2008). The interaction term *SEO * IAS 19R* has no significant coefficients in all three proxy,

[12] *Acquirer*IAS 19R* only has marginally significant coefficients for *R_PROD* and *R_DISX* in Models (1) and (3). After including fixed effects and control variables in Models (2) and (4), the coefficients are no longer significant, thus there are no conclusive results to support that the adoption of IAS 19R has any impact on acquirer firm's real earnings management behaviour.

which indicates that the adoption of IAS 19R has no impact on their real earnings management behaviour.

The different results may be caused by different firm observations. Under PSM, I use one-to-one nearest neighbour matching in order to match treatment and control firms. However, this results in the loss of many observations in the control group, which may impact the regression results. Therefore, EBM, which was used in my main analysis, may be more suitable because it reduces sample selection bias by retaining all the available observations.

2.8 Conclusion

This chapter explores firms' earnings management behaviour ahead of three types of major corporate events: M&As, IPOs, and SEOs. I examine the ERR, the discount rate, other discretionary accruals, and real earnings management. I find that firms tend to manage the ERR and discretionary accruals before engaging in these major corporate events. IPO and SEO firms all engage in real earnings management ahead of these events.

I also examine the impact of the adoption of IAS 19R on firms' earnings management behaviour ahead of major corporate events. In particular, I find that firms manage the ERR ahead of these events. This provides some support for the elimination of the ERR under IAS 19R, because it seems to be used to manage earnings ahead of corporate events.

The results suggest that, after the adoption of IAS 19R, firms manage the discount rate during the pre-M&A and pre-IPO periods. Acquirer, Target and IPO firms increase real earnings management after IAS 19R. However, the actual implementation of the revised standard has no impact on firms' discretionary accruals earnings management. Because the discount rate's effectiveness at managing earnings is limited, IAS 19R limits accruals earnings management behaviour using pension actuarial assumptions. My results also suggest that firms tend to switch from accruals earnings management to real earnings management ahead of major corporate events after the adoption of IAS 19R.

This chapter makes several key contributions to the existing literature. First, it investigates firms' earnings management behaviour ahead of major corporate events using ERR as well as alternative tools such as the discount rate, other discretionary accruals, and real earnings management. Previous literature examined earnings management primarily within a U.S. setting. I focus on an EU context to shed more light on this topic. EU provides a unique setting with different institutional and accounting standards.

In particular, no existing literature has investigated pension actuarial assumptions, such as the ERR and the discount rate, on firms' earnings management behaviour ahead of major corporate events in the EU. This chapter investigates the impact of the new pension accounting standard IAS 19R by exploring possible changes in the tools that companies may have used after the elimination of the ERR. I therefore contribute to the existing literature by documenting how the accounting standards changes affect earnings management. My results suggest the adoption of IAS 19R has no impact on firms' earnings management of accruals. But it has an impact on firm's choice over pension actuarial assumptions such as ERR and discount rate. Therefore, the adoption of IAS 19R reduced earnings management options since ERR can no longer be used.

Finally, this chapter finds positive evidence for the notion that overall earnings management behaviour decreased after the adoption of IAS 19R. This contributes to the existing literature by shedding more light on how accounting standard change could affect firm’s decision making and earnings management incentives. It also shows that firms subsequently tended to switch from accruals earnings management to real earnings management. This contributes to the prior accounting literature in the context of the relationship between accruals and real earnings management through providing another factor that could increase firm’s tendency to switch from accruals to real earnings management tools when they have incentive to manage earnings. This could be useful for practitioners such as regulators, auditors and stakeholders to understand deeply firm’s incentives and discover their earnings management behaviour.

Appendix 2.1: Comparison of SFAS 87, IAS 19, and IAS 19R accounting standards

This table presents the pension accounting standards comparison between SFAS 87, IAS 19 and IAS 19R. The accounting treatment for each items are selected from the main text of each accounting standard: FASB (1985). Summary of Statement of Financial Accounting Standards No. 87: Employers' Accounting for Pensions. Norwalk, CT: Financial Accounting Standards Board; IASB (2009). IAS19: Employee Benefits. London: International Accounting Standards Board; IASB (2011). IAS19R: Employee Benefits. London: International Accounting Standards Board.

	SFAS 87 (FASB, 1985)	IAS 19 (IASB, 2009)	IAS 19R (IASB, 2011)
Actuarial valuation method	None	Use the Projected Unit Credit Method to determine the present value of defined benefit obligations, the related current service costs, and the past service costs.	Same as IAS 19
Measurement dates for plan assets and benefit obligations	Date of the employer's fiscal year-end statement of financial position, unless the plan is sponsored by a subsidiary that has been consolidated using a fiscal period that differs from that of its parents.	The present and fair value recognised in the financial statement does not differ materially from what would be determined at the end of the reporting period.	Same as IAS 19
Discount rate	The rate at which pension benefits can effectively be settled. It is appropriate in estimating those rates to examine available information about rates implicit in current prices of annuity contracts that could be used to effect	Determined by using the market yields at the end of the reporting period on high-quality corporate bonds. In countries where there is no deep market in such bonds, the market yields on government bonds will be used. The currency and term of the corporate or government bonds will be consistent with the currency and estimated term of the post-employment benefit obligations.	Same as IAS 19

	settlements of obligations. Employers may also use rates of return on high-quality fixed-income investments that are currently available or expected to be available during the period to maturity of the pension benefits.		
Past service costs	Does not require the provision of prior service costs. To be included in the net periodic pension costs entirely in the year of the amendment, but provides for recognition during the future service periods of those employees active as of the date of amendment who are expected to receive benefits under the plan.	Recognise past service costs as an expense on a straight-line basis over the average period until the benefits become vested. To the extent that the benefits are already vested, immediately following the introduction of, or changes to, a defined benefit plan, an entity will recognise past service costs immediately.	Recognise past service costs as an expense at the earlier of the following dates: (a) when the plan amendment or curtailment occurs; or (b) when the entity recognises related restructuring costs or termination benefits.
Actuarial gains and losses	Does not distinguish between sources of gains or losses. Includes both realised and unrealised. Does not require recognition of gains or losses as components of net pension costs. Gains and	Recognise a portion as income or expense using the corridor approach. Any adjustments may be recognised in other comprehensive income. The portion of actuarial gains and losses to be recognised for each defined benefit plan is the excess determined in accordance with paragraph 92, divided by	Before determining past service costs, or a gain or loss on settlement, an entity will remeasure the net defined benefit liability (asset) using the current fair value of plan assets and current actuarial assumptions reflecting the benefits offered under the

	losses that are not recognised immediately as components of net periodic pension costs will be recognised as increases or decreases in other comprehensive income as they arise	the expected average remaining working lives of the employees participating in that plan. However, an entity may adopt any systematic method that results in faster recognition of actuarial gains and losses, providing that the same basis is applied to both gains and losses, and the basis is applied consistently from period to period.	plan before the plan amendment, curtailment, or settlement.
Multi-employer plans	Multiple employer plans are considered single employer plans. Accounted for as defined benefit plans.	An entity will classify a multi-employer plan as a defined contribution plan. Where a multi-employer plan is a defined benefit plan, an entity will: (a) account for its proportionate share of the defined benefit obligation, plan assets, and costs associated with the plan in the same way as for other defined benefit plans; and (b) disclose the information required.	Same as IAS 19
Expected rate of return	The expected return on plan assets will be determined based on the expected long-term rate of return and the market-related value of the plan assets.	The expected return on plan assets is based on market expectations at the beginning of the period for returns over the entire life of the related obligation. The expected return on plan assets reflects changes in the fair value of the assets held during the period as a result of actual contributions paid into the fund and actual benefits paid out of the fund.	None
Termination benefits	None	An entity will recognise termination benefits as a liability and an expense	An entity will recognise a liability and expense for

		when, and only when, the entity is demonstrably committed to either: (a) terminate the employment of an employee or group of employees before the normal retirement date; or (b) provide termination benefits as a result of an offer made in order to encourage voluntary redundancy.	termination benefits at the earlier of the following dates: (a) when the entity can no longer withdraw the offer of those benefits; and (b) when the entity recognises costs for a restructuring within the scope of IAS 37 that involves the payment of termination benefits.
Short-term employee benefits (page 495, 12)	Same as IAS 19	Employee benefits (other than termination benefits) that are due to be settled within twelve months after the end of the period in which the employees rendered the related service. No actuarial assumptions are required to measure the obligation or the cost. Obligations are measured on an undiscounted basis.	Employee benefits (other than termination benefits) that are expected to be settled wholly within twelve months after the end of the annual reporting period in which the employees rendered the related service. An entity will not reclassify if the expectations of the timing of settlement change temporarily. If the characteristics of the benefit changes, or if a change in the expectations of the timing of the settlement is not temporary, then the entity may consider whether the benefit still meets the definition of short-term employee benefits.
Employee benefits definition	Same as IAS 19	All forms of consideration given by an entity in	All forms of consideration given by an entity in

(495, 12)		exchange for service rendered by employees.	exchange for service rendered by employees or for the termination of employment.
Post-employment benefits	Same as IAS 19	Employee benefits (other than termination benefits) that are payable after the completion of employment	Employee benefits (other than termination or short-term employee benefits) that are payable after the completion of employment.
Post-employment benefits: defined benefit plans	Same as IAS 19	Accounting steps: (a) Use actuarial techniques to make a reliable estimate of the amount of benefit employees have earned in return for their service in current and prior periods. (b) Discount the benefit using the Projected Unit Credit Method in order to determine the present value of the defined benefit obligation and the current service costs. (c) Determine the fair value of the plan assets. (d) Determine the total amount of actuarial gains and losses and the amount of those gains and losses to be recognised. (e) Where a plan has been introduced or changed, determine the resulting past service costs. (f) Where a plan has been curtailed or	Accounting steps: (a) Determine the deficit or surplus. 1. Use an actuarial technique, the Projected Unit Credit Method, to make a reliable estimate of the amount of benefits employees have earned in return for their service in current and prior periods. 2. Discount the benefit in order to determine the present value of the defined benefit obligation and the current service costs. 3. Deduct the fair value of any plan assets from the present value of the

		settled, determine the resulting gain or loss.	defined benefit obligation. (b) Determine the amount of the net defined benefit liability (asset) as the amount of the deficit or surplus determined in (a), adjusted for any effect of limiting a net defined benefit asset to the asset ceiling. (c) Determine amounts to be recognised in profit or loss: 1. Current service costs. 2. Any past service costs and gains or losses on settlement. 3. Net interest on the net defined benefit liability (asset). (d) Determine the remeasurements of the net defined benefit liability (asset), to be recognised in other comprehensive income, comprised of: 1. Actuarial gains and losses. 2. Return on plan assets, excluding amounts included in

			net interest on the net defined benefit liability (asset). 3. Any change in the effect of the asset ceiling, excluding amounts included in net interest on the net defined benefit liability (asset). An entity will determine the net defined benefit liability (asset) with sufficient regularity so that the amounts recognised in the financial statements do not differ materially from the amounts that would be determined at the end of the reporting period.
Statement of financial position	None	None	An entity will recognise the net defined benefit liability (asset) in the statement of financial position.
Actuarial assumptions	Same as IAS 19	Financial assumptions: 1. The discount rate. 2. Future salary and benefit levels. 3. In the case of medical benefits, future medical costs, including, where material, the cost of administering claims	Demographic assumptions involving: the proportion of plan members who will select each form of payment option available under the plan term.

		and benefit payments. 4. The expected rate of return on plan assets.	Financial assumptions, involving: 1. The discount rate. 2. Benefit levels, excluding any benefit costs to be met by employees, and future salary. 3. In the case of medical benefits, future medical costs, including claim handling costs. 4. Taxes payable by the plan on contributions relating to service before the reporting date or on benefits resulting from that service.
Actuarial assumptions: mortality	None	None	Determine mortality assumptions by referring to the best estimate of the mortality of plan members both during and after employment.
Actuarial assumptions: salaries, benefits, and medical costs	None	None	Contributions from employees or third parties that reduce the ultimate cost to the entity of those benefits.
Gains and losses on settlement	None	None	Recognise a gain or loss on the settlement of a defined benefit plan when the settlement occurs.
Return on plan assets	Same as IAS 19	Expected return on plan assets is based on	Net interest on the net defined benefit

		market expectations for returns over the entire lifetime of the underlying obligation. Interest cost is calculated by multiplying the discount rate by the DBO over the reporting period.	liability (asset) will be determined by multiplying the net defined benefit liability (asset) over the reporting period by the discount rate.
Components of defined benefit costs			
Disclosure	Same as IAS 19	Disclose information that enables users of financial statements to evaluate the nature of its defined benefit plans and the financial effects of changes in those plans during the period.	Disclose information that: (a) Explains the characteristics of the defined benefit plans and the risks associated with them. (b) Identifies and explains the amounts in the financial statements arising from the defined benefit plans. (c) Describes how the defined benefit plans may affect the amount, timing, and uncertainty of the entity's future cash flows.

Appendix 2.2: Definition of variables and hypotheses result summary

Panel A shows the definition of variables used in the subsequent analysis. Panel B summarize the results of the various hypotheses being tested including robustness checks.

Panel A: Definition of variables

Notations	Definitions
Dependent variables	
COMPLETE	A dummy variable that equals 1 if an announced M&A was completed, and 0 otherwise in period t.
DA	The discretionary accruals in year t.
DR	The discount rate of pension accounting reported at the end of year t.
ERR	The expected rate of return on pension plan assets measured at the beginning of year t.
R_CFO	The abnormal cash flow from operations in period t.
R_DISX	The abnormal discretionary expenses in period t.
R_PROD	The abnormal production costs in period t.
Main variables of interest	
Acquirer	A dummy variable that equals 1 when the firm acquires another firm in year t, and 0 otherwise.
*Acquirer * IAS 19R*	The interaction term of Acquirer and IAS 19R, which captures the impact of IAS 19R adoption on firms' earnings management behaviour when they are involved in M&As as acquirers.
IAS 19R	A dummy variable that equals 1 when IAS 19R was adopted in 2013.
IPO	A dummy variable that equals 1 when a firm issues an IPO in year t, and 0 otherwise.
*IPO * IAS 19R*	The interaction term of IPO and IAS 19R, which captures the impact of IAS 19R adoption on firms' pre-IPO earnings management behaviour.
SEO	A dummy variable that equals 1 when a firm issues an SEO in year t, and 0 otherwise.
*SEO * IAS 19R*	The interaction term of SEO and IAS 19R, which captures the impact of IAS 19R adoption on firm's pre-SEO earnings management behaviour.
Target	A dummy variable that equals 1 when a firm is acquired by another firm in year t, and 0 otherwise.
*Target * IAS 19R*	The interaction term of Target and IAS 19R, which captures the impact of IAS 19R adoption on firms' earnings management behaviour when they are involved in M&As as targets.
Control variables	
% Equity	The percentage of pension assets invested in equity.
Maturity	The natural logarithm of the ratio of PBOs to current service costs.
TA	Firms 'reported total assets.
Fixed effects	
Country	Country fixed effects.
Industry	Industry fixed effects.
Year	Year fixed effects.

Appendix 2.2 (Continued)

Notations	Definitions
Other variables	
%Sought	Percentage of shares acquired during the M&A deal.
Attitude	M&A deal attitude is a dummy variable that equals 1 when M&A deal is friendly.
CFO	Operating cash flow.
COGS	Cost of goods sold.
Deal_size	M&A deal transaction value.
DiscExp	Normal level of discretionary expenditures.
EBXI	Earnings before extraordinary items and discontinued operations.
Method_payment	M&A deal payment methods, which equals 1 when the payment method is cash.
NA	Normal accruals.
PPE	Gross value of property, plant, and equipment.
Prod	Production costs.
Sales	Sales revenue.
TAS	Firms' total accruals.
ΔAR	Change in accounting receivables.
ΔINV	Change in inventory.
ΔRev	Change in revenue.
ΔSales	Change in sales.

Panel B: Hypotheses results summary

Hypothesis	Results	M&As - Acquirer	M&As- Target	IPOs	SEOs
2.1	Main result	Null Rejected	Null Rejected	Null Rejected	Null Rejected
	Robustness	Null Accepted	Null Accepted	Null Accepted	Null Rejected
2.2	Main result	Null Rejected	Null Rejected	Null Rejected	Null Accepted
	Robustness	Null Rejected	Null Rejected	Null Accepted	Null Accepted
2.3	Main result	Null Accepted	Null Accepted	Null Rejected	Null Accepted
	Robustness 1	Null Accepted	Null Accepted	Null Rejected	Null Rejected
	Robustness 2	Null Rejected	Null Rejected	Null Rejected	Null Accepted
2.4	Main result	Null Rejected	Null Accepted	Null Rejected	Null Accepted
	Robustness	Null Accepted	Null Accepted	Null Rejected	Null Rejected

Appendix 2.3: Summary statistics for M&A samples – Acquirer firms

Panel A presents the summary statistics of variables used in the analyses of acquirer firms and expected rate of return (*ERR*). *Acquirer* is a dummy variable that equals 1 when the firm acquires another firm in year t, and 0 otherwise. *ERR* is the expected rate of return on pension plan assets in year t. *%Equity* is the percentage of pension assets invested in equity. *Maturity* is the natural logarithm of the ratio of PBO to current service cost. *TA* is firms' total assets. Panel B presents the Pearson and Spearman correlation of the variables used in panel A. The lower diagonal presents Pearson correlation and upper diagonal presents Spearman correlation. Panel C presents the summary statistics of variables used in the analyses of acquirer firm and discount rate (*DR*), discretionary accruals (*DA*), and real earnings management (R_CFO, R_PROD, R_DISX). *DR_1* is the lagged value of the discount rate. *DA_1* is the lagged value of discretionary accruals, which are estimated using the modified Jones model. *%Equity_1* is the lagged value of the percentage of pension assets invested in equity. *Maturity_1* is the lagged value of the natural logarithm of the ratio of PBOs to current service costs. *TA_1* is the lagged value of firms' total assets. Panel D presents the Pearson and Spearman correlation of the variables used in Panel C. The lower diagonal presents Pearson correlation and upper diagonal presents Spearman correlation. The sample includes all public firms reporting pension information in Thomson Worldscope from January 2005 to December 2016. Appendix 2.2 provides detailed explanations of these variables.

Panel A: Descriptive statistics on the ERR

	N	Mean	STD	P25	Median	P75
Acquirer	3,406	0.38	0.49	0.00	0.00	1.00
ERR	3,406	5.83	1.29	5.20	5.90	6.50
%Equity	3,406	44.19	20.28	29.00	44.70	59.40
Maturity	3,406	4.05	0.90	3.47	3.95	4.51
TA	3,406	48,764.14	197,422.00	482.77	2,016.81	10,819.60

Panel B: Pearson and Spearman correlation of the variables

	ERR	%Equity	Maturity	TA
ERR	1	0.4289*	0.1231*	-0.0713*
%Equity	0.3762*	1	0.0166	-0.3571*
Maturity	0.0909*	0.0041	1	-0.1414*
TA	-0.0305*	-0.1356*	-0.0296*	1

Panel C: Descriptive statistics for DR/DA/REM

	N	Mean	STD	P25	Median	P75
Acquirer	3,260	0.37	0.48	0.00	0.00	1.00
DR_1	3,260	4.95	1.18	4.40	5.02	5.60
DA_1	3,260	0.02	0.13	-0.03	0.01	0.05
R_CFO_1	3,260	0.00	0.06	-0.03	0.00	0.03
R_PROD_1	2,593	0.00	0.15	-0.06	0.00	0.06
R_DISX_1	2,234	0.00	0.15	-0.06	0.00	0.04
%Equity_1	3,260	43.85	19.82	29.00	44.00	58.80
Maturity_1	3,260	4.13	0.93	3.54	4.01	4.58
TA_1	3,260	8,391.96	19,097.55	442.60	1,625.68	6,227.39

Appendix 2.3 (Continued)

Panel D: Pearson and Spearman correlation of the variables

	DR_1	DA_1	R_CFO_1	R_PROD_1	R_DISX_1	%Equity_1	Maturity_1	TA_1
DR_1	1	0.0150	-0.0238	0.0160	0.0254	0.3375*	0.0245	-0.1085*
DA_1	0.0123	1	-0.1047*	-0.0381*	0.0651*	0.0970*	-0.0289	-0.0941*
R_CFO_1	0.0019	-0.0722*	1	-0.4036*	-0.1493*	0.0537*	-0.0709*	-0.0626*
R_PROD_1	0.0165	-0.0323*	-0.4069*	1	-0.6447*	0.0331	0.0712*	0.0665*
R_DISX_1	0.0042	0.0439*	0.1053*	-0.6827*	1	-0.0235	-0.0741*	-0.0375*
%Equity_1	0.2891*	0.0685*	0.0566*	-0.0031	-0.0024	1	0.0427*	-0.3359*
Maturity_1	0.0307*	0.0041	-0.0692*	0.0753*	-0.0626*	-0.0210	1	-0.2102*
TA_1	0.0265	-0.0407*	-0.0156	0.0285	-0.0370*	-0.1447*	-0.0788*	1

Appendix 2.4: Summary statistics for M&A samples – Target firms

Panel A presents the summary statistics for the variables used in the analyses of target firms and the *ERR*. Panel B presents the Pearson and Spearman correlations of the variables used in panel A. The lower diagonal presents Pearson correlation and upper diagonal presents Spearman correlation. Panel C presents the summary statistics of the variables used in the analyses of target firms and the discount rate (*DR*), discretionary accruals (*DA*), and real earnings management. Panel D presents the Pearson and Spearman correlations of the variables used in panel C. The lower diagonal presents Pearson correlation and upper diagonal presents Spearman correlation. The sample includes all public firms reporting pension information in Thomson Worldscope from January 2005 to December 2016. Appendix 2.2 provides detailed explanations of these variables.

Panel A: Descriptive statistics for the ERR

	N	Mean	STD	P25	Median	P75
Target	2,782	0.25	0.43	0.00	0.00	0.00
ERR	2,782	5.80	1.34	5.14	5.89	6.50
%Equity	2,782	42.96	20.33	27.20	43.10	58.00
Maturity	2,782	4.05	0.91	3.45	3.96	4.52
TA	2,782	46,548.69	195,115.20	461.66	1,925.57	11,195.53

Panel B: Pearson and Spearman correlations of the variables

	ERR	%Equity	Maturity	TA
ERR	1	0.4226*	0.1491*	-0.0593*
%Equity	0.3615*	1	0.0362*	-0.3538*
Maturity	0.1164*	0.0192	1	-0.1303*
TA	0.0023	-0.1187*	-0.0181	1

Panel C: Descriptive statistics for DR/DA/REM

	N	Mean	STD	P25	Median	P75
Target	2,635	0.22	0.42	0.00	0.00	0.00
DR_1	2,635	4.93	1.20	4.33	5.00	5.60
DA_1	2,635	0.01	0.14	-0.03	0.01	0.05
R_CFO_1	2,635	0.00	0.06	-0.03	0.00	0.03
R_PROD_1	2,124	-0.01	0.15	-0.06	0.00	0.06
R_DISX_1	1,812	0.00	0.15	-0.06	0.00	0.04
%Equity_1	2,635	42.91	19.74	28.00	43.00	58.00
Maturity_1	2,635	4.12	0.92	3.53	4.01	4.59
TA_1	2,635	7,806.14	16,538.49	423.20	1,608.38	6,253.46

Panel D: Pearson and Spearman correlations of the variables

	DR_1	DA_1	R_CFO_1	R_PROD_1	R_DISX_1	%Equity_1	Maturity_1	TA_1
DR_1	1	-0.0042	-0.0366	0.0252	0.0030	0.3262*	0.0789*	-0.0998*
DA_1	0.0019	1	-0.1297*	-0.0086	0.0552*	0.0781*	-0.0469*	-0.0973*
R_CFO_1	-0.0065	-0.0753*	1	-0.4057*	0.1615*	0.0590*	-0.0794*	-0.0505*
R_PROD_1	0.0272	-0.0206	-0.3865*	1	-0.6377*	0.0038	0.0511*	0.0836*
R_DISX_1	-0.0051	0.0374	0.0991*	-0.6815*	1	-0.0159	-0.0615*	-0.0410
%Equity_1	0.2938*	0.0625*	0.0734*	-0.0238	-0.0052	1	0.0858*	-0.3326*
Maturity_1	0.0609*	0.0043	-0.0751*	0.0773*	-0.0605*	0.0179	1	-0.2032*
TA_1	0.0421*	-0.0648*	-0.0136	0.0353	-0.0461*	-0.1377*	-0.0816*	1

Appendix 2.5: Summary statistics for IPO firms

Panel A presents the summary statistics of variables used in the analyses of IPO firms and the *ERR*. *IPO* is a dummy variable that equals 1 when a firm issues an IPO in year t. Panel B presents the Pearson and Spearman correlation of the variables used in panel A. The lower diagonal presents Pearson correlation and upper diagonal presents Spearman correlation. Panel C presents the summary statistics of variables used in the analyses of IPO firms and the discount rate (*DR*), discretionary accruals (*DA*), and real earnings management. Panel D presents the Pearson and Spearman correlations of the variables used in panel C. The lower diagonal presents Pearson correlation and upper diagonal presents Spearman correlation. The sample includes all public firms reporting pension information in Thomson Worldscope from January 2005 to December 2016. Appendix 2.2 provides detailed explanations of these variables.

Panel A: Descriptive statistics for the ERR

	N	Mean	STD	P25	Median	P75
IPO	3,170	0.02	0.12	0.00	0.00	0.00
ERR	3,170	5.80	1.35	5.14	5.82	6.50
%Equity	3,170	43.11	20.35	28.00	43.00	58.00
Maturity	3,170	4.02	0.90	3.44	3.92	4.48
TA	3,170	43,076.23	175,260.20	500.68	2,079.71	10,205.00

Panel B: Pearson and Spearman correlations of the variables

	ERR	%Equity	Maturity	TA
ERR	1	0.4330*	0.1598*	-0.0636*
%Equity	0.3473*	1	0.0598*	-0.3498*
Maturity	0.1239*	0.0420*	1	-0.1322*
TA	-0.0412*	-0.1704*	-0.0110	1

Panel C: Descriptive statistics for DR/DA/REM

	N	Mean	STD	P25	Median	P75
IPO	3,190	0.01	0.10	0.00	0.00	0.00
DR_1	3,190	4.85	1.23	4.20	5.00	5.60
DA_1	3,190	0.02	0.14	-0.03	0.01	0.05
R_CFO_1	3,190	0.00	0.06	-0.03	0.00	0.03
R_PROD_1	2,593	-0.01	0.14	-0.06	0.00	0.06
R_DISX_1	2,242	0.00	0.14	-0.06	0.00	0.05
%Equity_1	3,190	42.08	19.63	27.40	41.85	56.69
Maturity_1	3,190	4.10	0.92	3.52	3.97	4.54
TA_1	3,190	9,150.16	21,048.83	511.84	1,867.29	6,847.80

Panel D: Pearson and Spearman correlations of the variables

	DR_1	DA_1	R_CFO_1	R_PROD_1	R_DISX_1	%Equity_1	Maturity_1	TA_1
DR_1	1	0.0181	-0.0216	0.0200	0.0046	0.3619*	0.0854*	-0.1395*
DA_1	0.0213	1	-0.1446*	-0.0143	0.0622*	0.0537*	-0.0252	-0.0677*
R_CFO_1	0.0076	-0.0938*	1	-0.3727*	0.1032*	0.0455*	-0.0892	-0.0161
R_PROD_1	0.0281	-0.0141	-0.3584*	1	-0.6401*	0.0318	0.0152	0.0641*
R_DISX_1	-0.0137	0.0406*	0.0565*	-0.6766*	1	-0.0246	-0.0292	-0.0431*
%Equity_1	0.3046*	0.0511*	0.0766*	0.0060	-0.0173	1	0.1198*	-0.3196*
Maturity_1	0.0651*	0.0178	-0.0745*	0.0200	-0.0245	0.0468*	1	-0.1873*
TA_1	0.0035	-0.0358*	-0.0219	0.0301	-0.0440*	-0.1329*	-0.0664*	1

Appendix 2.6: Summary statistics for SEO firms

Panel A presents the summary statistics of the variables used in the analyses of SEO firms and *ERR*. *SEO* is a dummy variable that equals 1 when a firm issues an SEO in year t. Panel B presents the Pearson and Spearman correlations of the variables used in panel A. The lower diagonal presents Pearson correlation and upper diagonal presents Spearman correlation. Panel C presents the summary statistics of variables used in the analyses of SEO firms and the discount rate (*DR*), discretionary accruals (*DA*), and real earnings management. Panel D presents the Pearson and Spearman correlations of the variables used in panel C. The lower diagonal presents Pearson correlation and upper diagonal presents Spearman correlation. The sample includes all public firms reporting pension information in Thomson Worldscope from January 2005 to December 2016. Appendix 2.2 provides detailed explanations of these variables.

Panel A: Descriptive statistics for the ERR

	N	Mean	STD	P25	Median	P75
SEO	3,560	0.21	0.41	0.00	0.00	0.00
ERR	3,560	5.80	1.34	5.13	5.85	6.50
%Equity	3,560	42.62	20.36	27.40	42.40	58.00
Maturity	3,560	4.04	0.89	3.45	3.94	4.50
TA	3,560	60,090.56	228,487.50	572.67	2,415.07	12,291.56

Panel B: Pearson and Spearman correlations of the variables

	ERR	%Equity	Maturity	TA
ERR	1	0.4424*	0.1388*	-0.0631*
%Equity	0.3585*	1	0.0357*	-0.3495*
Maturity	0.1031*	0.0119	1	-0.1052*
TA	-0.0339*	-0.1606*	-0.0212	1

Panel C: Descriptive statistics for DR/DA/REM

	N	Mean	STD	P25	Median	P75
SEO	3,504	0.19	0.39	0.00	0.00	0.00
DR_1	3,504	4.88	1.23	4.23	5.00	5.60
DA_1	3,504	0.01	0.13	-0.03	0.01	0.05
R_CFO_1	3,504	0.00	0.06	-0.03	0.00	0.03
R_PROD_1	2,862	0.00	0.14	-0.06	0.00	0.06
R_DISX_1	2,451	0.00	0.14	-0.06	0.00	0.04
%Equity_1	3,504	41.88	19.59	27.20	41.00	56.38
Maturity_1	3,504	4.10	0.91	3.53	3.97	4.55
TA_1	3,504	9,360.50	21,480.01	540.25	1,937.30	6,902.80

Panel D: Pearson and Spearman correlations of the variables

	DR_1	DA_1	R_CFO_1	R_PROD_1	R_DISX_1	%Equity_1	Maturity_1	TA_1
DR_1	1	-0.0076	-0.0390*	0.0237	0.0007	0.3419*	0.0846*	-0.1098*
DA_1	0.0054	1	-0.1214*	-0.0212	0.0705*	0.0570*	-0.0332	-0.0730*
R_CFO_1	0.0016	-0.0729*	1	-0.3719*	0.1088*	0.0437*	-0.0848*	-0.0169
R_PROD_1	0.0276	-0.0208	-0.3598*	1	-0.6400*	0.0224	0.0181	0.0729*
R_DISX_1	-0.0162	0.0403*	0.0564*	-0.6720*	1	-0.0164	-0.0216	-0.0588*
%Equity_1	0.2952*	0.0543*	0.0744*	-0.0054	-0.0180	1	0.1099*	-0.3091*
Maturity_1	0.0641*	0.0111	-0.0659*	0.0242	-0.0225	0.0296*	1	-0.1812*
TA_1	0.0128	-0.0411*	-0.0173	0.0285	-0.0457*	-0.1428*	-0.0555*	1

Figure 2.1: Timeline for pension plan estimates and major corporate event announcement dates

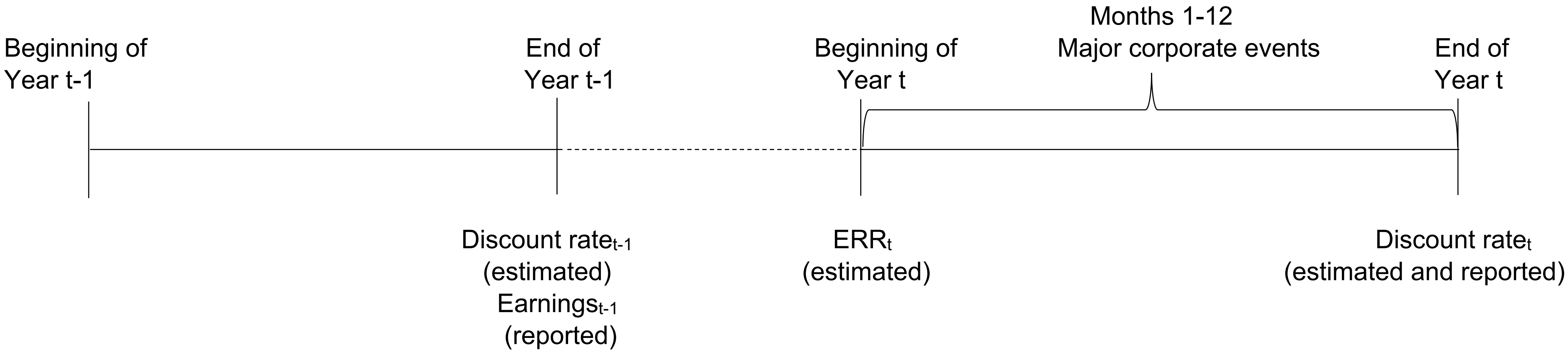

Table 2.1: Sample selection criteria

Panel A presents the sample selection process for the following multivariate analysis. Panel B shows the breakdown of the sample by corporate event and by country.

Panel A: Sample selection process

ERR	
Initial sample	13,088
- no reported ERR	(5,746)
- no reported %Equity	(2,152)
- no pension maturity	(621)
- no total assets	(96)
	4,473
DR/DA/REM	
Initial sample	13,088
no reported discount rate	(2,640)
- no discretionary accruals variable	(3,653)
- no reported %Equity	(2,027)
- no pension maturity	(1,003)
- no total assets	0
	3,765

Panel B: Sample breakdown by corporate events

Country	Acquirer		Target		IPO		SEO	
	ERR	DR/DA /REM	ERR	DR/DA /REM	ERR	DR/DA /REM	ERR	DR/DA/ REM
Austria	19	20	10	12	1	1	11	15
Belgium	27	18	12	9	0	0	23	17
Denmark	43	40	36	34	1	4	29	24
Finland	37	43	28	27	0	0	25	16
France	129	141	73	88	3	0	75	64
Germany	149	127	138	116	9	4	125	107
Greece	11	1	5	0	2	0	11	0
Ireland	38	45	18	19	6	5	17	24
Italy	32	13	26	6	0	0	43	9
Luxembourg	5	9	3	5	2	3	4	10
Netherlands	69	64	48	50	3	9	38	51
Portugal	17	11	22	12	0	0	16	7
Spain	27	12	15	13	3	1	32	21
Sweden	67	58	42	27	0	1	38	38
United Kingdom	644	631	212	178	19	4	279	264
Total	1,314	1,233	688	596	49	32	766	667

Table 2.2: Firm's expected rate of return and major corporate events

Panel A presents the results of regression testing acquirer firms' earnings management behaviour using the expected rate of return:

$$ERR = \beta_0 + \beta_1 Acquirer + \beta_2 \%Equity + \beta_3 Maturity + \beta_4 TA + \beta_y Year_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe}$$

The dependent variable *ERR* is the expected rate of return on pension plan assets in year t. *Acquirer* is a dummy variable that equals 1 when the firm acquires another firm in year t, and 0 otherwise.

The pooled regressions use data from 2005 to 2012, since ERR is no longer available after 2012. *Control variables: %Equity* is the percentage of pension assets invested in equity. *Maturity* is the natural logarithm of the ratio of PBOs to current service costs. *TA* is firm's total assets.

Model 1 includes the main variable of interest only; Model 2 includes both the main variable of interest and all fixed effects (year, industry, and country), clustered by firm-year level; Model 3 includes the main variable of interest and the control variables: *%Equity, Maturity*, and *TA*. Model 4 includes all the variables and fixed effects, clustered by firm-year level. t-statistics are in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Panel A: Acquirer firms

Variable	Model 1	Model 2	Model 3	Model 4
Acquirer	0.127***	0.126***	0.125***	0.095**
	(2.967)	(2.742)	(3.181)	(2.248)
%Equity			0.024***	0.021***
			(24.276)	(15.975)
Maturity			0.102***	0.099***
			(4.493)	(3.210)
TA			-0.000	0.000
			(-1.436)	(1.060)
Constant	5.757***	6.045***	4.313***	4.658***
	(190.309)	(24.922)	(40.246)	(18.867)
Observations	3,406	3,406	3,406	3,406
Adjusted R-squared	0.002	0.188	0.165	0.257
Year Fixed Effects	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes

Table 2.2 (Continued)

Panel B presents the results of regression testing target firms' earnings management behaviour using the expected rate of return:

$$ERR = \beta_0 + \beta_1 Target + \beta_2 \%Equity + \beta_3 Maturity + \beta_4 TA + \beta_y Year_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe}$$

Target is a dummy variable that equals 1 when a firm is being acquired by another firm in year t, and 0 otherwise. *Control variables: %Equity* is the percentage of pension assets invested in equity, *Maturity* is the natural logarithm of the ratio of PBOs to current service costs*, TA* is firms' total assets.

Model 1 includes the main variable of interest only; Model 2 includes both the main variable of interest and all fixed effects (year, industry, and country), clustered by firm-year level; Model 3 includes the main variable of interest and the control variables: *%Equity, Maturity,* and *TA*. Model 4 includes all variables and fixed effects, clustered by firm-year level. The pooled regressions use data from the entire 2005-2016 sample period. Only firms with both the discount rate and discretionary accruals data are included. t-statistics are in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Panel B: Target firms

Variable	Model 1	Model 2	Model 3	Model 4
Target	0.085*	0.134**	0.208***	0.108*
	(1.721)	(2.003)	(4.551)	(1.716)
%Equity			0.026***	0.022***
			(22.395)	(13.170)
Maturity			0.153***	0.160***
			(5.714)	(4.413)
TA			0.000	0.000***
			(0.201)	(2.599)
Constant	5.719***	6.039***	3.985***	4.432***
	(162.920)	(18.779)	(31.574)	(13.787)
Observations	2,782	2,782	2,782	2,782
Adjusted R-squared	0.001	0.216	0.167	0.285
Year Fixed Effects	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes

Table 2.2 (Continued)

Panel C presents the results of regression testing IPO firms' earnings management behaviour using the expected rate of return:

$$ERR = \beta_0 + \beta_1 IPO + \beta_2 \%Equity + \beta_3 Maturity + \beta_4 TA + \beta_y Year_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe}$$

IPO is a dummy variable that equals 1 when a firm issues an IPO in year t, and 0 otherwise. *%Equity* is the lagged value of the percentage of pension assets invested in equity. *Maturity* is the lagged value of the natural logarithm of the ratio of PBOs to current service costs. *TA* is the lagged value of firms' total assets.

Model 1 includes the main variable of interest only; Model 2 includes both the main variable of interest and all fixed effects (year, industry, and country), clustered by firm-year level; Model 3 includes the main variable of interest and the control variables: *%Equity, Maturity*, and *TA.* Model 4 includes all variables and fixed effects, clustered by firm-year level. The pooled regressions use data from the entire 2005-2016 sample period. Only firms with both the discount rate and discretionary accruals data are included. t-statistics are in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Panel C: IPO firms

Variable	Model 1	Model 2	Model 3	Model 4
IPO	0.368***	0.374***	0.307***	0.279***
	(10.141)	(4.153)	(9.416)	(3.080)
%Equity			0.023***	0.016***
			(27.143)	(7.389)
Maturity			0.100***	0.098**
			(5.142)	(1.989)
TA			0.000***	0.000
			(9.913)	(1.576)
Constant	5.683***	5.519***	4.276***	4.637***
	(221.755)	(16.913)	(48.603)	(12.523)
Observations	3,170	3,170	3,170	3,170
Adjusted R-squared	0.031	0.427	0.220	0.460
Year Fixed Effects	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes

Table 2.2 (Continued)

Panel D presents the results of regression testing SEO firms' earnings management behaviour using the expected rate of return:

$$ERR = \beta_0 + \beta_1 SEO + \beta_2 \%Equity + \beta_3 Maturity + \beta_4 TA + \beta_y Year_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe}$$

SEO is a dummy variable that equals 1 when a firm issues an SEO in year t, and 0 otherwise. *%Equity* is the lagged value of the percentage of pension assets invested in equity. *Maturity* is the lagged value of the natural logarithm of the ratio of PBOs to current service costs. *TA* is the lagged value of firms' total assets.

Model 1 includes the main variable of interest only; Model 2 includes both the main variable of interest and all fixed effects (year, industry, and country), clustered by firm-year level; Model 3 includes the main variable of interest and the control variables: *%Equity, Maturity,* and *TA*. Model 4 includes all the variables and fixed effects, clustered by firm-year level. The pooled regressions use data from the entire 2005-2016 sample period. Only firms with both the discount rate and discretionary accruals data are included. t-statistics are in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Panel D: SEO firms

Variable	Model 1	Model 2	Model 3	Model 4
SEO	0.163***	0.206***	0.181***	0.168**
	(3.621)	(2.933)	(4.355)	(2.481)
%Equity			0.025***	0.021***
			(23.754)	(12.146)
Maturity			0.124***	0.072*
			(5.133)	(1.702)
TA			-0.000	0.000
			(-0.108)	(0.647)
Constant	5.675***	6.454***	4.174***	5.174***
	(178.527)	(10.741)	(37.121)	(8.287)
Observations	3,560	3,560	3,560	3,560
Adjusted R-squared	0.003	0.160	0.153	0.219
Year Fixed Effects	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes

Table 2.3: Firm's discount rate and major corporate events

Panel A presents the results of regression testing acquirer firms' earnings management behaviour using the discount rate:

$$DR\_1 = \beta_0 + \beta_1 Acquirer + \beta_2 IAS19R + \beta_3 Acquirer * IAS19R + \beta_4 \%Equity\_1 + \beta_5 Maturity\_1 + \beta_6 TA\_1 + \beta_y Year_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe}$$

The dependent variable *DR_1* is the lagged value of the discount rate. *IAS19R* is a dummy variable that equals 1 when IAS 19R was adopted in 2013. The interaction term *Acquirer * IAS 19R* captures the impact of IAS 19R adoption on firms' earnings management behaviour using the discount rate during the pre-acquisition period. The pooled regressions use data from the entire 2005-2016 sample period, and only include firms with both the discount rate and discretionary accruals data. t-statistics are in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Panel A: Acquirer firms

Variable	Model 1	Model 2	Model 3	Model 4
Acquirer	-0.036	-0.001	-0.040	-0.011
	(-0.894)	(-0.023)	(-1.013)	(-0.401)
IAS19R	-1.457***	-1.638***	-1.393***	-1.541***
	(-25.393)	(-15.586)	(-24.224)	(-14.253)
*Acquirer*IAS19R*	0.411***	0.327***	0.410***	0.344***
	(5.059)	(2.634)	(5.137)	(2.772)
%Equity_1			0.009***	0.006***
			(9.370)	(5.658)
Maturity_1			0.124***	0.043**
			(6.530)	(2.155)
TA_1			0.000***	0.000***
			(4.674)	(2.674)
Constant	5.329***	4.170***	4.388***	3.653***
	(187.789)	(35.333)	(46.384)	(22.765)
Observations	3,260	3,260	3,260	3,260
Adjusted R-squared	0.230	0.445	0.260	0.455
Year Fixed Effects	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes

Table 2.3 (Continued)

Panel B presents the results of regression testing target firms' earnings management behaviour using the discount rate:

$$DR\_1 = \beta_0 + \beta_1 Target + \beta_2 IAS19R + \beta_3 Target * IAS19R + \beta_4 \%Equity\_1 + \beta_5 Maturity\_1 + \beta_6 TA\_1 + \beta_y Year_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe}$$

The dependent variable *DR_1* is the lagged value of the discount rate. *IAS19R* is a dummy variable that equals 1 when IAS 19R was adopted in 2013. The interaction term *Acquirer * IAS 19R* captures the impact of IAS 19R adoption on firms' earnings management behaviour using the discount rate when they prepare to acquire another firm. The pooled regressions use data from the entire sample period 2005-2016. Only firms with both the discount rate and discretionary accruals data are included. t-statistics are in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Panel B: Target firms

Variable	Model 1	Model 2	Model 3	Model 4
Target	-0.041	0.040	-0.013	0.026
	(-0.884)	(0.979)	(-0.287)	(0.645)
IAS19R	-1.480***	-1.674***	-1.432***	-1.679***
	(-22.035)	(-12.418)	(-21.407)	(-12.516)
*Target*IAS19R*	0.401***	0.372*	0.435***	0.401**
	(4.146)	(1.932)	(4.614)	(2.058)
%Equity_1			0.009***	0.006***
			(8.202)	(4.645)
Maturity _1			0.185***	0.100***
			(7.983)	(3.879)
TA_1			0.000***	0.000**
			(6.275)	(2.052)
Constant	5.329***	4.252***	4.114***	3.598***
	(160.840)	(23.059)	(36.807)	(16.039)
Observations	2,635	2,635	2,635	2,635
Adjusted R-squared	0.216	0.439	0.259	0.452
Year Fixed Effects	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes

Table 2.3 (Continued)

Panel C presents the results of regression testing IPO firms' earnings management behaviour using the discount rate:

$$DR\_1 = \beta_0 + \beta_1 IPO + \beta_2 IAS19R + \beta_3 IPO * IAS19R + \beta_4 \%Equity\_1 + \beta_5 Maturity\_1 + \beta_6 TA\_1 + \beta_y Year_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe}$$

The dependent variable *DR_1* is the lagged value of the discount rate. *IAS19R* is a dummy variable that equals 1 when IAS 19R was adopted in 2013. The interaction term *IPO * IAS 19R* captures the impact of IAS 19R adoption on firms' pre-IPO earnings management behaviour using the discount rate. The pooled regressions use data from the entire 2005-2016 sample period. Only firms with both the discount rate and discretionary accruals data are included.
t-statistics are in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Panel C: IPO firms

Variable	Model 1	Model 2	Model 3	Model 4
IPO	-0.362***	-0.082	-0.323***	-0.067
	(-9.467)	(-1.334)	(-8.409)	(-1.100)
IAS19R	-1.485***	-2.118***	-1.439***	-2.105***
	(-30.486)	(-22.387)	(-29.051)	(-21.221)
*IPO*IAS19R*	0.580***	0.616***	0.636***	0.635***
	(8.627)	(4.882)	(9.502)	(5.169)
%Equity_1			0.005***	0.002*
			(6.222)	(1.775)
Maturity _1			0.092***	0.053**
			(5.086)	(2.058)
TA_1			0.000***	0.000***
			(7.386)	(4.772)
Constant	5.263***	4.913***	4.579***	4.564***
	(199.168)	(28.502)	(52.291)	(22.084)
Observations	3,190	3,190	3,190	3,190
Adjusted R-squared	0.300	0.637	0.322	0.642
Year Fixed Effects	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes

Table 2.3 (Continued)

Panel D presents the results of regression testing SEO firms' earnings management behaviour using the discount rate:

$$DR\_1 = \beta_0 + \beta_1 SEO + \beta_2 IAS19R + \beta_3 SEO * IAS19R + \beta_4 \%Equity\_1 + \beta_5 Maturity\_1 + \beta_6 TA\_1 + \beta_y Year_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe}$$

The dependent variable *DR_1* is the lagged value of the discount rate. *IAS19R* is a dummy variable that equals 1 when IAS 19R was adopted in 2013. The interaction term *SEO * IAS 19R* captures the impact of IAS 19R adoption on firms' pre-SEO earnings management behaviour using the discount rate. The pooled regressions use data from the entire 2005-2016 sample period. Only firms with both the discount rate and discretionary accruals data are included. t-statistics are in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Panel D: SEO firms

Variable	Model 1	Model 2	Model 3	Model 4
SEO	0.080*	-0.029	0.106***	-0.019
	(1.875)	(-0.705)	(2.585)	(-0.478)
IAS19R	-1.485***	-1.525***	-1.425***	-1.472***
	(-27.371)	(-13.722)	(-26.587)	(-12.640)
*SEO*IAS19R*	0.057	0.097	0.053	0.104
	(0.741)	(0.771)	(0.716)	(0.826)
%Equity_1			0.009***	0.005***
			(9.931)	(3.019)
Maturity _1			0.194***	0.058**
			(10.168)	(2.392)
TA_1			0.000***	0.000**
			(7.922)	(2.363)
Constant	5.309***	4.438***	4.042***	3.923***
	(176.406)	(16.967)	(43.919)	(13.026)
Observations	3,504	3,504	3,504	3,504
Adjusted R-squared	0.291	0.521	0.337	0.529
Year Fixed Effects	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes

Table 2.4: Firm's discretionary accruals and major corporate events

Panel A presents the results of regression testing acquirer firms' earnings management behaviour using discretionary accruals:

$$DA\_1 = \beta_0 + \beta_1 Acquirer + \beta_2 IAS19R + \beta_3 Acquirer * IAS19R + \beta_4 \%Equity\_1 + \beta_5 Maturity\_1 + \beta_6 TA\_1 + \beta_y Year_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe}$$

The dependent variable *DA_1* is the lagged value of discretionary accruals, which are estimated using the modified Jones model. The pooled regressions use data from the entire 2005-2016 sample period, and only include firms with both the discount rate and discretionary accruals data. t-statistics are in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Panel A: Acquirer firms

Variable	Model 1	Model 2	Model 3	Model 4
Acquirer	-0.014***	-0.010**	-0.014***	-0.011**
	(-2.974)	(-2.444)	(-2.910)	(-2.436)
IAS19R	-0.025***	-0.036***	-0.019***	-0.039***
	(-3.681)	(-3.571)	(-2.773)	(-3.655)
*Acquirer*IAS19R*	0.020**	0.015	0.019**	0.015
	(2.123)	(1.512)	(2.043)	(1.492)
%Equity_1			0.000***	-0.000
			(3.159)	(-1.098)
Maturity_1			-0.000	-0.001
			(-0.070)	(-0.271)
TA_1			-0.000***	0.000
			(-3.007)	(0.558)
Constant	0.024***	0.026*	0.011	0.033*
	(7.376)	(1.845)	(1.014)	(1.823)
Observations	3,260	3,260	3,260	3,260
Adjusted R-squared	0.005	0.129	0.011	0.128
Year Fixed Effects	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes

Table 2.4 (Continued)

Panel B presents the results of regression testing target firms' earnings management behaviour using discretionary accruals:

$$DA\_1 = \beta_0 + \beta_1 Target + \beta_2 IAS19R + \beta_3 Acquirer * IAS19R + \beta_4 \%Equity\_1 + \beta_5 Maturity\_1 + \beta_6 TA\_1 + \beta_y Year_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe}$$

The dependent variable *DA_1* is the lagged value of discretionary accruals, which are estimated using the modified Jones model. The pooled regressions use data from the entire sample period 2005-2016. Only firms with both the discount rate and discretionary accruals data are included. t-statistics are in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Panel B: Target firms

Variable	Model 1	Model 2	Model 3	Model 4
Target	-0.033***	-0.022***	-0.030***	-0.021***
	(-5.206)	(-2.922)	(-4.738)	(-2.872)
IAS19R	-0.030***	-0.040***	-0.023**	-0.040***
	(-3.288)	(-3.772)	(-2.426)	(-3.824)
*Target*IAS19R*	0.031**	0.021	0.027**	0.020
	(2.364)	(1.520)	(2.093)	(1.465)
%Equity_1			0.000**	-0.000
			(2.122)	(-1.569)
Maturity _1			-0.004	-0.003
			(-1.317)	(-0.678)
TA_1			-0.000***	-0.000
			(-4.268)	(-0.661)
Constant	0.028***	0.019	0.036**	0.040
	(6.208)	(0.902)	(2.284)	(1.620)
Observations	2,635	2,635	2,635	2,635
Adjusted R-squared	0.011	0.183	0.020	0.184
Year Fixed Effects	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes

Table 2.4 (Continued)

Panel C presents the results of regression testing IPO firms' earnings management behaviour using discretionary accruals:

$$DA\_1 = \beta_0 + \beta_1 IPO + \beta_2 IAS19R + \beta_3 IPO * IAS19R + \beta_4 \%Equity\_1 + \beta_5 Maturity\_1 + \beta_6 TA\_1 + \beta_y Year_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe}$$

The dependent variable *DA_1* is the lagged value of discretionary accruals, which are estimated using the modified Jones model. The pooled regressions use data from the entire 2005-2016 sample period. Only firms with both the discount rate and discretionary accruals data are included. t-statistics are in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Panel C: IPO firms

Variable	Model 1	Model 2	Model 3	Model 4
IPO	0.088***	0.067***	0.103***	0.067***
	(9.409)	(4.273)	(10.895)	(4.273)
IAS19R	-0.017	-0.042***	-0.006	-0.042***
	(-1.410)	(-3.040)	(-0.484)	(-2.947)
*IPO*IAS19R*	-0.125***	-0.036**	-0.123***	-0.036**
	(-7.586)	(-2.151)	(-7.460)	(-2.175)
%Equity_1			0.001***	-0.000
			(5.265)	(-0.097)
Maturity _1			0.020***	-0.001
			(4.501)	(-0.348)
TA_1			-0.000***	0.000
			(-4.885)	(0.188)
Constant	0.021***	0.060***	-0.103***	0.065***
	(3.288)	(3.289)	(-4.796)	(2.690)
Observations	3,190	3,190	3,190	3,190
Adjusted R-squared	0.055	0.785	0.080	0.784
Year Fixed Effects	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes

Table 2.4 (Continued)

Panel D presents the results of regression testing SEO firms' earnings management behaviour using discretionary accruals:

$$DA\_1 = \beta_0 + \beta_1 SEO + \beta_2 IAS19R + \beta_3 SEO * IAS19R + \beta_4 \%Equity\_1 + \beta_5 Maturity\_1 + \beta_6 TA\_1 + \beta_y Year_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe}$$

The dependent variable *DA_1* is the lagged value of discretionary accruals, which are estimated using the modified Jones model. The pooled regressions use data from the entire 2005-2016 sample period. Only firms with both the discount rate and discretionary accruals data are included. t-statistics are in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Panel D: SEO firms

Variable	Model 1	Model 2	Model 3	Model 4
SEO	-0.035***	-0.019***	-0.035***	-0.019***
	(-7.032)	(-3.034)	(-7.051)	(-3.039)
IAS19R	-0.018***	-0.052***	-0.015**	-0.051***
	(-2.836)	(-5.530)	(-2.387)	(-5.222)
*SEO *IAS19R*	0.023**	0.015	0.024***	0.016
	(2.526)	(1.459)	(2.709)	(1.458)
%Equity_1			0.000*	0.000
			(1.887)	(0.295)
Maturity _1			0.000	-0.001
			(0.128)	(-0.204)
TA_1			-0.000**	-0.000
			(-2.333)	(-0.145)
Constant	0.021***	0.070***	0.012	0.070***
	(5.898)	(4.130)	(1.087)	(3.417)
Observations	3,504	3,504	3,504	3,504
Adjusted R-squared	0.014	0.209	0.017	0.208
Year Fixed Effects	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes

Table 2.5: Firm's real earnings management and major corporate events

Panel A presents the results of regression testing acquirer firms' earnings management behaviour using real earnings management:

$$R\_CFO\_1 = \beta_0 + \beta_1 Acquirer + \beta_2 IAS19R + \beta_3 Acquirer * IAS19R + \beta_4 \%Equity\_1 + \beta_5 Maturity\_1 + \beta_6 \mathrm{TA\_1} + \beta_y Year_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe}$$

$$R\_PROD\_1 = \beta_0 + \beta_1 Acquirer + \beta_2 IAS19R + \beta_3 Acquirer * IAS19R + \beta_4 \%Equity\_1 + \beta_5 Maturity\_1 + \beta_6 TA\_1 + \beta_y Year_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe}$$

$$R\_DISX\_1 = \beta_0 + \beta_1 Acquirer + \beta_2 IAS19R + \beta_3 Acquirer * IAS19R + \beta_4 \%Equity\_1 + \beta_5 Maturity\_1 + \beta_6 TA\_1 + \beta_y Year_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe}$$

The dependent variables *R_CFO_1* is the lagged value for abnormal sales, *R_PROD_1* is the lagged value for abnormal production costs, and *R_DISX_1* is the lagged value for abnormal discretionary expenses. The pooled regressions use data from the entire 2005-2016 sample period. Firms with necessary non-missing variables within the sample used for the discount rate and the discretionary accruals data test are included. t-statistics are in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Panel A: Acquirer firms

Variable	R_CFO				R_PROD				R_DISX			
	1	2	3	4	1	2	3	4	1	2	3	4
Acquirer	0.002	-0.000	0.002	-0.000	-0.001	0.001	-0.001	0.000	-0.012	-0.011	-0.012*	-0.009
	(1.078)	(-0.017)	(1.043)	(-0.012)	(-0.224)	(0.107)	(-0.216)	(0.053)	(-1.612)	(-1.202)	(-1.670)	(-1.067)
IAS19R	-0.000	0.002	0.003	0.001	-0.005	-0.006	-0.008	-0.008	-0.008	0.003	-0.007	0.005
	(-0.007)	(0.318)	(0.767)	(0.295)	(-0.542)	(-0.501)	(-0.826)	(-0.627)	(-0.738)	(0.198)	(-0.650)	(0.292)
*Acquirer*IAS19R*	-0.001	0.001	-0.000	0.002	0.031**	0.026**	0.030**	0.024*	-0.016	-0.012	-0.013	-0.009
	(-0.156)	(0.150)	(-0.027)	(0.366)	(2.449)	(2.040)	(2.353)	(1.872)	(-1.042)	(-0.850)	(-0.852)	(-0.659)
%Equity_1			0.000**	0.000			0.000	0.000			-0.000	0.000
			(2.097)	(0.154)			(0.500)	(0.094)			(-0.697)	(0.346)
Maturity _1			-0.004***	-0.007***			0.013***	0.017***			-0.011***	-0.008*
			(-4.134)	(-5.225)			(4.285)	(4.389)			(-3.123)	(-1.831)
TA_1			-0.000	-0.000			0.000**	0.000***			-0.000**	-0.000***
			(-1.587)	(-0.733)			(2.103)	(4.277)			(-2.058)	(-6.956)
Constant	0.003**	0.004	0.016***	0.032***	-0.005	0.026	-0.064***	-0.042*	0.004	-0.073**	0.057***	-0.023
	(2.039)	(0.428)	(3.081)	(3.244)	(-1.030)	(1.369)	(-4.192)	(-1.715)	(0.728)	(-2.335)	(3.282)	(-0.631)
Observations	3,260	3,260	3,260	3,260	2,593	2,593	2,593	2,593	2,234	2,234	2,234	2,234
Adjusted R-squared	-0.000	0.020	0.006	0.030	0.003	0.017	0.010	0.029	0.004	0.011	0.008	0.018
Year Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Table 2.5 (Continued)

Panel B presents the results of regression testing target firms' earnings management behaviour using real earnings management:

$R\_CFO\_1 = \beta_0 + \beta_1\text{target} + \beta_2 IAS19R + \beta_3\text{target} * IAS19R + \beta_4\%Equity\_1 + \beta_5 Maturity\_1 + \beta_6\text{TA\_1} + \beta_y Year_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe}$

$R\_PROD\_1 = \beta_0 + \beta_1\text{target} + \beta_2 IAS19R + \beta_3\text{target} * IAS19R + \beta_4\%Equity\_1 + \beta_5 Maturity\_1 + \beta_6 TA\_1 + \beta_y Year_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe}$

$R\_DISX\_1 = \beta_0 + \beta_1\text{target} + \beta_2 IAS19R + \beta_3\text{target} * IAS19R + \beta_4\%Equity\_1 + \beta_5 Maturity\_1 + \beta_6 TA\_1 + \beta_y Year_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe}$

The dependent variables *R_CFO_1* is the lagged value for abnormal sales, *R_PROD_1* is the lagged value for abnormal production costs, and *R_DISX_1* is the lagged value for abnormal discretionary expenses. The pooled regressions use data from the entire 2005-2016 sample period. Firms with necessary non-missing variables within the sample used for discount rate and discretionary accruals data test are included. t-statistics are in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Panel B: Target firms

Variable	R_CFO				R_PROD				R_DISX			
	1	2	3	4	1	2	3	4	1	2	3	4
Target	-0.008***	-0.010***	-0.008***	-0.010***	0.003	0.011	0.002	0.009	-0.008	-0.009	-0.010	-0.007
	(-3.146)	(-2.914)	(-3.121)	(-2.832)	(0.515)	(1.213)	(0.330)	(0.996)	(-1.220)	(-0.944)	(-1.422)	(-0.768)
IAS19R	-0.000	0.009	0.003	0.010	-0.003	-0.022	-0.010	-0.026*	-0.007	-0.019	-0.008	-0.034*
	(-0.012)	(1.495)	(0.713)	(1.564)	(-0.284)	(-1.473)	(-1.005)	(-1.759)	(-0.650)	(-1.078)	(-0.783)	(-1.788)
*Target*IAS19R*	0.003	0.003	0.002	0.004	0.018	0.010	0.022	0.013	0.013	0.011	0.012	0.009
	(0.487)	(0.495)	(0.418)	(0.530)	(1.345)	(0.618)	(1.627)	(0.859)	(0.872)	(0.678)	(0.789)	(0.530)
%Equity_1			0.000*	-0.000			-0.000	-0.000			-0.000	-0.000
			(1.814)	(-0.559)			(-1.332)	(-0.115)			(-1.565)	(-0.929)
Maturity_1			-0.007***	-0.010***			0.018***	0.022***			-0.010***	-0.004
			(-5.597)	(-5.039)			(5.269)	(4.264)			(-2.645)	(-0.711)
TA_1			0.000	0.000			0.000***	0.000***			-0.000***	-0.000**
			(0.028)	(0.483)			(2.581)	(3.256)			(-2.982)	(-5.475)
Constant	0.003*	0.002	0.027***	0.038**	-0.005	0.011	-0.072***	-0.071**	0.004	0.041	0.060***	0.108*
	(1.669)	(0.190)	(4.342)	(2.480)	(-1.084)	(0.375)	(-4.332)	(-2.229)	(0.712)	(0.811)	(3.459)	(1.756)
Observations	2,635	2,635	2,635	2,635	2,124	2,124	2,124	2,124	1,812	1,812	1,812	1,812
Adjusted R-Square	0.003	0.036	0.015	0.051	0.001	0.032	0.015	0.047	-0.001	0.029	0.007	0.036
Year Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Table 2.5 (Continued)

Panel C presents the results of regression testing IPO firms’ earnings management behaviour using real earnings management:

$$R\_CFO\_1 = \beta_0 + \beta_1 IPO + \beta_2 IAS19R + \beta_3 IPO * IAS19R + \beta_4 \%Equity\_1 + \beta_5 Maturity\_1 + \beta_6 TA\_1 + \beta_y Year_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe}$$

$$R\_PROD\_1 = \beta_0 + \beta_1 IPO + \beta_2 IAS19R + \beta_3 IPO * IAS19R + \beta_4 \%Equity\_1 + \beta_5 Maturity\_1 + \beta_6 TA\_1 + \beta_y Year_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe}$$

$$R\_DISX\_1 = \beta_0 + \beta_1 IPO + \beta_2 IAS19R + \beta_3 IPO * IAS19R + \beta_4 \%Equity\_1 + \beta_5 Maturity\_1 + \beta_6 TA\_1 + \beta_y Year_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe}$$

The dependent variables *R_CFO_1* is the lagged value for abnormal sales, *R_PROD_1* is the lagged value for abnormal production costs, and *R_DISX_1* is the lagged value for abnormal discretionary expenses. *%Equity_1* is the lagged value of the percentage of pension assets invested in equity. *TA_1* is the lagged value of firms’ total assets. The pooled regressions use data from the entire 2005-2016 sample period. Firms with data available to estimate each of the three proxies within the sample used in the previous discount rate and discretionary accruals regressions are included. The observations are smaller in the following result due to data availability. t-statistics are in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Panel C: IPO firms

Variable	R_CFO				R_PROD				R_DISX			
	1	2	3	4	1	2	3	4	1	2	3	4
IPO	-0.023***	-0.020***	-0.021***	-0.021***	0.015***	0.010	0.017***	0.010	-0.021***	-0.017	-0.022***	-0.014
	(-10.624)	(-3.010)	(-9.880)	(-3.236)	(2.611)	(0.980)	(2.927)	(1.028)	(-3.336)	(-0.644)	(-3.342)	(-0.592)
IAS19R	-0.001	-0.001	0.005*	0.008	-0.001	-0.006	0.002	-0.000	-0.002	0.014	-0.007	0.058*
	(-0.326)	(-0.193)	(1.882)	(1.419)	(-0.167)	(-0.334)	(0.354)	(-0.003)	(-0.269)	(0.689)	(-0.878)	(1.749)
*IPO*IAS19R*	0.008**	0.001	0.003	0.003	0.011	0.020	0.011	0.022*	-0.029***	-0.013	-0.025**	-0.018
	(2.174)	(0.126)	(0.804)	(0.362)	(1.199)	(1.619)	(1.258)	(1.790)	(-2.663)	(-0.702)	(-2.296)	(-0.973)
%Equity_1			0.000***	0.000***			0.000**	0.000*			-0.000	0.000
			(5.998)	(3.483)			(2.221)	(1.698)			(-1.159)	(0.088)
Maturity _1			-0.009***	-0.007***			-0.000	0.002			0.011***	0.008
			(-9.026)	(-3.685)			(-0.108)	(0.300)			(3.640)	(1.082)
TA_1			-0.000	-0.000			0.000**	0.000**			-0.000**	-0.000***
			(-0.051)	(-0.407)			(2.047)	(2.495)			(-2.047)	(-3.271)
Constant	0.003*	0.004	0.025***	0.010	-0.009**	0.005	-0.024*	-0.024	0.011**	0.017	-0.020	-0.050
	(1.841)	(0.583)	(5.115)	(0.996)	(-2.236)	(0.225)	(-1.874)	(-0.769)	(2.508)	(0.440)	(-1.398)	(-0.966)
Observations	3,190	3,190	3,190	3,190	2,593	2,593	2,593	2,593	2,242	2,242	2,242	2,242
Adjusted R-squared	0.040	0.241	0.073	0.256	0.007	0.050	0.009	0.052	0.023	0.160	0.029	0.163
Year Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Table 2.5 (Continued)

Panel D presents the results of regression testing SEO firms' earnings management behaviour using real earnings management:

$$R\_CFO\_1 = \beta_0 + \beta_1 SEO + \beta_2 IAS19R + \beta_3 SEO * IAS19R + \beta_4 \%Equity\_1 + \beta_5 Maturity\_1 + \beta_6 TA\_1 + \beta_y Year_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe}$$

$$R\_PROD\_1 = \beta_0 + \beta_1 SEO + \beta_2 IAS19R + \beta_3 SEO * IAS19R + \beta_4 \%Equity\_1 + \beta_5 Maturity\_1 + \beta_6 TA\_1 + \beta_y Year_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe}$$

$$R\_DISX\_1 = \beta_0 + \beta_1 SEO + \beta_2 IAS19R + \beta_3 SEO * IAS19R + \beta_4 \%Equity\_1 + \beta_5 Maturity\_1 + \beta_6 TA\_1 + \beta_y Year_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe}$$

The dependent variables *R_CFO_1* is the lagged value for abnormal sales, *R_PROD_1* is the lagged value for abnormal production costs, and *R_DISX_1* is the lagged value for abnormal discretionary expenses. The pooled regressions use data from the entire 2005-2016 sample period. Firms with data available to estimate each of the three proxies within the sample used in the previous discount rate and discretionary accruals regressions are included. The observations are smaller in the following result due to data availability. t-statistics are in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Panel D: SEO firms

Variable	R_CFO				R_PROD				R_DISX			
	1	2	3	4	1	2	3	4	1	2	3	4
SEO	-0.017***	-0.018***	-0.017***	-0.018***	0.008	0.010	0.009	0.012	0.000	-0.004	-0.001	-0.005
	(-7.457)	(-4.341)	(-7.264)	(-4.384)	(1.327)	(1.045)	(1.359)	(1.200)	(0.063)	(-0.348)	(-0.087)	(-0.494)
IAS19R	0.000	0.005	0.003	0.011	-0.002	0.003	-0.004	-0.000	-0.006	-0.026	-0.010	-0.036*
	(0.046)	(0.639)	(0.930)	(1.398)	(-0.283)	(0.189)	(-0.472)	(-0.026)	(-0.698)	(-1.342)	(-1.127)	(-1.738)
*SEO*IAS19R*	0.004	0.005	0.005	0.007	-0.005	-0.014	-0.007	-0.016	-0.001	0.010	-0.002	0.008
	(1.073)	(0.749)	(1.326)	(1.082)	(-0.490)	(-0.752)	(-0.626)	(-0.881)	(-0.113)	(0.539)	(-0.188)	(0.432)
%Equity_1			0.000***	0.000**			-0.000	-0.000			-0.000**	-0.000
			(3.627)	(2.037)			(-0.772)	(-0.492)			(-2.422)	(-0.944)
Maturity_1			-0.003***	-0.006***			0.002	0.002			0.000	0.008
			(-2.909)	(-3.158)			(0.621)	(0.284)			(0.133)	(1.196)
TA_1			0.000	-0.000			0.000	0.000***			-0.000***	-0.000***
			(0.795)	(-0.396)			(1.365)	(2.997)			(-2.850)	(-5.963)
Constant	0.003**	-0.012	0.007	-0.001	-0.004	-0.030	-0.008	-0.039	0.004	0.116**	0.024	0.121*
	(1.993)	(-0.969)	(1.285)	(-0.063)	(-0.848)	(-0.941)	(-0.553)	(-0.956)	(0.827)	(2.095)	(1.590)	(1.846)
Observations	3,504	3,504	3,504	3,504	2,862	2,862	2,862	2,862	2,451	2,451	2,451	2,451
Adjusted R-squared	0.019	0.068	0.024	0.077	-0.000	0.041	-0.000	0.043	-0.001	0.059	0.003	0.068
Year Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Table 2.6: Acquirer and target firms' completion probability and pension actuarial assumptions

This table presents the impact of earnings management using pension accounting estimates on the probability of M&A deal completion for acquirers and targets separately. Panel A presents the descriptive statistics of the variables used in the following multivariate analysis. Panel B presents the result from the multivariate analysis. The probit regression used is:

$$Complete = \beta_0 + \beta_1 ERR + \beta_2 DR\_1 + \beta_3 DR\_1 * IAS19R + \beta_4 Attitude + \beta_5 Deal\_size + \beta_6 Method\_payment + \beta_7 \%Sought + \beta_f Firm_{fe} + \beta_i Industry_{fe} + \beta_c Country_{fe}$$

Complete is a dummy variable that equals 1 when an M&A deal is completed. *Attitude* is a dummy variable that equals 1 when an M&A deal is friendly. *Deal_size* is the M&A deal transaction value. *Method_payment* is a dummy variable that equals 1 when the payment method is cash. *%Sought* is the percentage sought in the M&A deal. The sample used in this table includes acquirer and target firms only from 2005 to 2016. t-statistics are in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Panel A: Descriptive statistics

Variable	N	Mean	STD	P25	Median	P75
Acquirer Completion						
Acquirer Completion	1,915	0.80	0.40	1	1	1
ERR	1,515	5.69	1.28	5	5.8	6.46
DR_1	1,915	4.80	1.27	4.2	5	5.5
%Sought	1,915	77.41	34.89	50	100	100
Deal_size	1,915	1,037.24	764.10	315	1,008.5	1,696.5
Method_payment	1,915	0.47	0.50	0	0	1
Attitude	1,915	0.86	0.35	1	1	1
TA	1,915	75,601.79	260,786.4	874.14	3,002.29	17,470.98
Target Completion						
Target Completion	435	0.51	0.50	0	0	1
ERR	342	5.43	1.31	4.6	5.5	6.24
DR_1	435	4.39	1.43	3.5	4.6	5.34
%Sought	435	25.32	30.46	7.33	10	29.05
Deal_size	435	1,768.81	4,172.50	77.78	329.39	1,353.92
Method_payment	435	0.64	0.48	0	1	1
Attitude	435	0.44	0.50	0	0	1
TA	435	114,326.4	395,937.4	807.92	2,934.64	18,295.5

Table 2.6 (Continued)

Panel B: Multivariate analysis

	Acquirer Completion			Target Completion		
Variable	1	2	3	1	2	3
ERR	0.010			-0.142		
	(0.272)			(-1.583)		
DR_1		0.010	-0.002		-0.028	-0.208
		(0.259)	(-0.039)		(-0.284)	(-1.238)
IAS19R			-0.228			-1.051
			(-0.607)			(-1.115)
*DR_1 * IAS 19R*			0.019			0.259
			(0.256)			(1.313)
Deal_size	0.002*	0.002	0.002	-0.004	-0.007*	-0.006*
	(1.731)	(1.618)	(1.609)	(-0.884)	(-1.836)	(-1.768)
Method_payment	0.112	0.044	0.045	-0.623***	-0.894***	-0.921***
	(1.240)	(0.548)	(0.559)	(-2.673)	(-4.566)	(-4.670)
Attitude	1.111***	1.192***	1.194***	1.455***	0.861***	0.875***
	(9.528)	(11.143)	(11.143)	(5.249)	(4.258)	(4.310)
%Sought	0.031	0.055	0.055	0.134	0.054	0.072
	(0.609)	(1.311)	(1.310)	(0.939)	(0.498)	(0.654)
TA	0.000	0.000	0.000	0.000**	0.000***	0.000***
	(1.382)	(1.568)	(1.575)	(2.209)	(2.834)	(2.956)
Constant	-0.693	-0.951*	-0.750	-0.455	-3.990	-3.375
	(-1.107)	(-1.935)	(-1.369)	(-0.499)	(-0.026)	(-0.022)
Observations	1,515	1,915	1,915	342	435	435
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Table 2.7: Firms' discretionary accruals management and major corporate events using other models

This table uses three other methods to estimate discretionary accruals, and then runs the same analysis. The models are the Jones model (DAJM), the Healy model (DAHE), and the DeAngelo model (DADE). Appendix 2.2 provides detailed explanations of the variables used.
Model 1 includes the main variable of interest only; Model 2 includes both the main variable of interest and all fixed effects (year, industry, and country), clustered by firm-year level; Model 3 includes the main variable of interest and the control variables: *%Equity*, *Maturity*, and *TA*. Model 4 includes all variables and fixed effects, clustered by firm-year level. The pooled regressions use data from the entire 2005-2016 sample period. Firms with data available to estimate each of the three models within the sample used in the previous discount rate and discretionary accruals regressions are included. The observations are smaller in the following result due to data availability. t-statistics are in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Panel A: Acquirer firms

Variable	DAJM				DAHE				DADE			
	1	2	3	4	1	2	3	4	1	2	3	4
Acquirer	-0.000	0.001	-0.000	0.000	-0.003	-0.004	-0.003	-0.005	-0.000	-0.002	0.000	-0.002
	(-0.095)	(0.282)	(-0.155)	(0.139)	(-1.108)	(-1.382)	(-1.103)	(-1.446)	(-0.018)	(-0.442)	(0.042)	(-0.476)
IAS19R	-0.004	-0.008	-0.004	-0.009*	-0.001	-0.014***	-0.002	-0.014***	-0.004	-0.000	-0.005	-0.002
	(-1.024)	(-1.458)	(-1.112)	(-1.736)	(-0.310)	(-3.080)	(-0.534)	(-3.175)	(-0.739)	(-0.000)	(-0.954)	(-0.285)
*Acquirer*IAS19R*	-0.001	0.000	-0.001	0.000	0.003	0.006	0.003	0.006	0.001	0.003	0.000	0.003
	(-0.261)	(0.036)	(-0.199)	(0.062)	(0.609)	(1.085)	(0.573)	(1.079)	(0.122)	(0.449)	(0.062)	(0.404)
%Equity_1			-0.000	-0.000**			-0.000*	-0.000			-0.000	-0.000*
			(-1.226)	(-2.540)			(-1.758)	(-1.491)			(-1.238)	(-1.914)
Maturity _1			-0.003**	-0.002			-0.001	-0.001			0.001	0.000
			(-2.221)	(-0.980)			(-0.832)	(-0.605)			(0.591)	(0.077)
TA_1			-0.000	0.000**			-0.000	0.000			-0.000	0.000
			(-0.034)	(2.268)			(-1.034)	(0.338)			(-0.525)	(1.157)
Constant	-0.035***	-0.050***	-0.020***	-0.040***	0.000	0.015	0.010	0.024**	0.000	-0.008	0.001	0.000
	(-18.698)	(-3.595)	(-3.117)	(-2.650)	(0.122)	(1.610)	(1.597)	(2.057)	(0.064)	(-0.410)	(0.133)	(0.020)
Observations	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318	2,871	2,871	2,871	2,871
Adjusted R-squared	0.000	0.083	0.001	0.087	-0.001	0.026	-0.000	0.027	-0.001	0.014	-0.001	0.016
Year Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Table 2.7 (Continued)

Panel B: Target firms

Variable	DAJM				DAHE				DADE			
	1	2	3	4	1	2	3	4	1	2	3	4
Target	-0.003	-0.004	-0.002	-0.004	-0.003	-0.006	-0.003	-0.006	-0.003	-0.005	-0.002	-0.005
	(-0.828)	(-0.844)	(-0.772)	(-0.890)	(-1.007)	(-1.269)	(-0.939)	(-1.281)	(-0.524)	(-0.540)	(-0.458)	(-0.531)
IAS19R	-0.006	-0.014**	-0.005	-0.014**	-0.001	-0.020***	-0.002	-0.021***	-0.004	-0.022*	-0.004	-0.027**
	(-1.248)	(-2.105)	(-1.070)	(-2.223)	(-0.283)	(-2.984)	(-0.476)	(-3.027)	(-0.556)	(-1.756)	(-0.582)	(-2.115)
*Target*IAS19R*	0.007	0.008	0.006	0.009	0.009	0.011	0.007	0.011	0.009	0.009	0.008	0.009
	(1.018)	(1.031)	(0.892)	(1.126)	(1.264)	(1.325)	(1.082)	(1.300)	(0.893)	(0.667)	(0.794)	(0.676)
%Equity_1			-0.000	-0.000			-0.000*	-0.000*			-0.000	-0.000
			(-0.316)	(-1.533)			(-1.914)	(-1.841)			(-0.722)	(-0.892)
Maturity _1			-0.002	-0.003			0.001	0.002			0.000	0.000
			(-1.156)	(-0.944)			(0.589)	(0.511)			(0.119)	(0.038)
TA_1			-0.000	0.000			-0.000***	-0.000			-0.000	0.000
			(-1.463)	(0.958)			(-2.946)	(-0.520)			(-1.227)	(0.029)
Constant	-0.034***	-0.066***	-0.024***	-0.052**	0.000	0.024	0.005	0.028	0.000	0.008	0.004	0.018
	(-14.580)	(-3.083)	(-2.990)	(-2.226)	(0.074)	(1.525)	(0.614)	(1.425)	(0.028)	(0.245)	(0.321)	(0.499)
Observations	2,720	2,720	2,720	2,720	2,720	2,720	2,720	2,720	2,372	2,372	2,372	2,372
Adjusted R-squared	-0.000	0.118	-0.000	0.120	-0.000	0.096	0.003	0.099	-0.001	0.049	-0.001	0.049
Year Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Table 2.7 (Continued)

Panel C: IPO firms

Variable	DAJM				DAHE				DADE			
	1	2	3	4	1	2	3	4	1	2	3	4
IPO	0.013***	0.009	0.012***	0.009	0.019***	0.019**	0.018***	0.019**	0.034***	0.031**	0.031***	0.031***
	(5.009)	(1.027)	(4.561)	(1.010)	(8.324)	(2.310)	(8.020)	(2.343)	(7.891)	(2.551)	(7.163)	(2.621)
IAS19R	0.001	-0.007	-0.000	0.001	0.000	-0.009	-0.001	0.004	0.001	0.006	-0.010*	0.003
	(0.463)	(-0.932)	(-0.045)	(0.086)	(0.129)	(-1.355)	(-0.295)	(0.421)	(0.184)	(0.683)	(-1.944)	(0.257)
*IPO*IAS19R*	-0.028***	-0.012*	-0.026***	-0.013*	-0.023***	-0.024***	-0.021***	-0.024***	-0.050***	-0.044***	-0.042***	-0.046***
	(-6.171)	(-1.772)	(-5.804)	(-1.758)	(-6.078)	(-3.124)	(-5.386)	(-3.064)	(-7.016)	(-3.838)	(-5.919)	(-4.007)
%Equity_1			-0.000	-0.000			-0.000	0.000			-0.001***	-0.000
			(-1.610)	(-0.620)			(-0.496)	(0.332)			(-6.702)	(-0.413)
Maturity _1			0.001	-0.000			0.003***	0.001			0.016***	0.003
			(1.196)	(-0.014)			(3.240)	(0.277)			(7.926)	(1.119)
TA_1			0.000	0.000			0.000***	0.000			0.000	0.000***
			(1.291)	(1.187)			(2.760)	(1.391)			(0.546)	(3.080)
Constant	-0.035***	-0.055***	-0.037***	-0.063***	-0.000	0.005	-0.014***	-0.012	-0.002	-0.014	-0.036***	-0.032
	(-20.02)	(-3.100)	(-6.240)	(-2.810)	(-0.151)	(0.497)	(-2.703)	(-0.901)	(-0.662)	(-0.978)	(-3.687)	(-1.580)
Observations	3,048	3,048	3,048	3,048	3,048	3,048	3,048	3,048	2,680	2,680	2,680	2,680
Adjusted R-squared	0.023	0.212	0.024	0.212	0.032	0.209	0.037	0.209	0.039	0.379	0.076	0.384
Year Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Table 2.7 (Continued)

Panel D: SEO firms

Variable	DAJM				DAHE				DADE			
	1	2	3	4	1	2	3	4	1	2	3	4
SEO	0.008***	0.006	0.008***	0.006	-0.003	-0.002	-0.003	-0.001	-0.012**	-0.007	-0.011**	-0.006
	(2.848)	(1.524)	(2.876)	(1.581)	(-1.428)	(-0.389)	(-1.354)	(-0.343)	(-2.565)	(-0.864)	(-2.473)	(-0.815)
IAS19R	0.000	-0.021***	0.001	-0.021***	-0.000	-0.015**	-0.000	-0.014**	-0.006	0.001	-0.007	-0.010
	(0.135)	(-3.086)	(0.402)	(-3.062)	(-0.131)	(-2.515)	(-0.134)	(-2.331)	(-1.034)	(0.052)	(-1.286)	(-0.870)
*SEO*IAS19R*	-0.019***	-0.014**	-0.018***	-0.014**	0.004	0.000	0.004	0.000	0.017**	0.006	0.015*	0.003
	(-3.878)	(-2.048)	(-3.777)	(-2.071)	(0.966)	(0.036)	(0.930)	(0.066)	(2.082)	(0.571)	(1.897)	(0.245)
%Equity_1			0.000	-0.000			-0.000	-0.000			-0.000*	-0.000*
			(0.295)	(-0.709)			(-0.872)	(-0.062)			(-1.911)	(-1.712)
Maturity_1			-0.003***	-0.002			-0.003***	-0.002			-0.003	-0.003
			(-2.781)	(-0.580)			(-2.843)	(-0.877)			(-1.533)	(-0.845)
TA_1			-0.000	0.000			0.000	0.000			0.000**	0.000
			(-0.742)	(0.680)			(1.494)	(0.523)			(2.004)	(0.447)
Constant	-0.038***	-0.033**	-0.024***	-0.026	0.001	0.023*	0.015***	0.030*	0.004	-0.014	0.024**	0.003
	(-19.817)	(-2.209)	(-4.019)	(-1.396)	(0.335)	(1.850)	(2.737)	(1.842)	(1.300)	(-0.736)	(2.409)	(0.080)
Observations	3,353	3,353	3,353	3,353	3,353	3,353	3,353	3,353	2,959	2,959	2,959	1,880
Adjusted R-squared	0.008	0.133	0.009	0.133	-0.000	0.043	0.003	0.043	0.002	0.045	0.005	0.052
Year Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Table 2.8: Robustness test for firms' expected rate of return and major corporate events

This table presents the results of Table 2.2's analyses using propensity score matching to pre-process data. The observations are much smaller after the one-on-one matching of the treatment and control groups. Appendix 2.2 provides detailed explanation of all the variables.
t-statistics are in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Panel A: Acquirer firms

Variable	Model 1	Model 2	Model 3	Model 4
Acquirer	0.021	0.079	0.073	0.061
	(0.419)	(1.420)	(1.509)	(1.200)
%Equity			0.022***	0.021***
			(18.046)	(14.105)
Maturity			0.100***	0.094***
			(3.610)	(2.826)
TA			0.000	0.000
			(0.288)	(0.707)
Constant	5.865***	6.058***	4.465***	4.725***
	(163.482)	(23.458)	(33.960)	(17.069)
Observations	2,640	2,640	2,640	2,640
Adjusted R-squared	-0.000	0.131	0.114	0.190
Year Fixed Effects	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes

Panel B: Target firms

Variable	Model 1	Model 2	Model 3	Model 4
Target	0.088	0.088	0.172**	0.061
	(1.156)	(1.080)	(2.417)	(0.785)
%Equity			0.027***	0.023***
			(14.598)	(10.570)
Maturity			0.176***	0.165***
			(4.222)	(3.352)
TA			0.000*	0.000***
			(1.674)	(2.740)
Constant	5.723***	5.934***	3.893***	4.218***
	(106.789)	(14.789)	(20.139)	(9.985)
Observations	1,376	1,376	1,376	1,376
Adjusted R-squared	0.000	0.161	0.142	0.231
Year Fixed Effects	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes

Table 2.8 (Continued)

Panel C: IPO firms

Variable	Model 1	Model 2	Model 3	Model 4
IPO	0.203	0.201	0.274*	0.191
	(1.121)	(0.848)	(1.668)	(0.771)
%Equity			0.020***	-0.003
			(4.546)	(-0.279)
Maturity			0.135	0.042
			(1.475)	(0.191)
TA			0.000*	-0.000
			(1.976)	(-0.254)
Constant	5.848***	7.541***	4.287***	8.302***
	(45.688)	(4.827)	(10.171)	(6.809)
Observations	98	98	98	98
Adjusted R-squared	0.003	0.554	0.187	0.529
Year Fixed Effects	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes

Panel D: SEO firms

Variable	Model 1	Model 2	Model 3	Model 4
SEO	0.154**	0.164*	0.159**	0.158*
	(2.064)	(1.815)	(2.261)	(1.863)
%Equity			0.027***	0.023***
			(15.349)	(9.590)
Maturity			0.098**	0.045
			(2.516)	(0.909)
TA			0.000	0.000
			(0.972)	(0.059)
Constant	5.684***	6.660***	4.210***	5.218***
	(107.675)	(11.404)	(23.363)	(8.210)
Observations	1,532	1,532	1,532	1,532
Adjusted R-squared	0.002	0.149	0.138	0.207
Year Fixed Effects	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes

Table 2.9: Robustness test for firms' discount rate and corporate events

This table presents the results of Table 2.3's analyses using propensity score matching to pre-process data. The observations are much smaller after the one-on-one matching of the treatment and control groups. Appendix 2.2 provides detailed explanations of all the variables.
t-statistics are in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Panel A: Acquirer firms

Variable	Model 1	Model 2	Model 3	Model 4
Acquirer	-0.007	0.012	-0.016	-0.006
	(-0.164)	(0.381)	(-0.368)	(-0.181)
IAS19R	-1.366***	-2.735***	-1.300***	-1.594***
	(-20.463)	(-21.812)	(-19.502)	(-12.871)
*Acquirer*IAS19R*	0.259***	0.240*	0.253***	0.245*
	(2.760)	(1.864)	(2.775)	(1.934)
%Equity_1			0.009***	0.007***
			(8.810)	(5.343)
Maturity_1			0.163***	0.076***
			(7.504)	(3.407)
TA_1			0.000***	0.000***
			(4.940)	(2.737)
Constant	5.294***	5.297***	4.165***	3.665***
	(164.801)	(32.740)	(39.103)	(19.527)
Observations	2,444	2,444	2,444	2,444
Adjusted R-squared	0.223	0.444	0.265	0.458
Year Fixed Effects	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes

Table 2.9 (Continued)

Panel B: Target firms

Variable	Model 1	Model 2	Model 3	Model 4
Target	-0.058	0.024	-0.040	-0.001
	(-0.821)	(0.447)	(-0.578)	(-0.023)
IAS19R	-1.457***	-1.682***	-1.411***	-1.607***
	(-13.621)	(-7.285)	(-13.264)	(-6.947)
*Target*IAS19R*	0.372**	0.387*	0.403***	0.411*
	(2.457)	(1.708)	(2.725)	(1.792)
%Equity_1			0.008***	0.006***
			(5.093)	(3.377)
Maturity _1			0.180***	0.084**
			(4.956)	(2.432)
TA_1			0.000***	0.000
			(4.194)	(1.476)
Constant	5.352***	4.368***	4.181***	3.755***
	(107.093)	(20.238)	(24.289)	(13.633)
Observations	1,172	1,172	1,172	1,172
Adjusted R-squared	0.196	0.410	0.235	0.419
Year Fixed Effects	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes

Table 2.9 (Continued)

Panel C: IPO firms

Variable	Model 1	Model 2	Model 3	Model 4
IPO	-0.251	-0.038	-0.188	1.379**
	(-0.784)	(-0.093)	(-0.599)	(2.323)
IAS19R	-1.976***	-2.633**	-1.953***	-3.102**
	(-5.197)	(-2.451)	(-4.757)	(-2.283)
*IPO*IAS19R*	1.071*	-0.602	1.172**	-1.118
	(1.992)	(-0.580)	(2.173)	(-0.636)
%Equity_1			0.005	0.008
			(0.749)	(0.689)
Maturity _1			0.047	1.351**
			(0.288)	(2.543)
TA_1			0.000**	0.000**
			(2.580)	(2.211)
Constant	5.152***	4.386***	4.499***	0.636
	(22.751)	(3.284)	(5.955)	(0.268)
Observations	62	62	62	62
Adjusted R-squared	0.329	0.933	0.380	0.959
Year Fixed Effects	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes

Table 2.9 (Continued)

Panel D: SEO firms

Variable	Model 1	Model 2	Model 3	Model 4
SEO	0.107	-0.019	0.116*	-0.018
	(1.535)	(-0.360)	(1.711)	(-0.339)
IAS19R	-1.428***	-1.993***	-1.397***	-1.962***
	(-16.245)	(-11.294)	(-15.997)	(-11.263)
*SEO*IAS19R*	0.001	0.069	-0.004	0.080
	(0.005)	(0.443)	(-0.031)	(0.509)
%Equity_1			0.008***	0.004*
			(4.881)	(1.902)
Maturity _1			0.198***	0.057*
			(6.131)	(1.706)
TA_1			0.000***	0.000*
			(4.257)	(1.651)
Constant	5.282***	4.969***	4.099***	4.554***
	(107.076)	(16.842)	(26.711)	(13.926)
Observations	1,328	1,328	1,328	1,328
Adjusted R-squared	0.283	0.489	0.320	0.494
Year Fixed Effects	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes

Table 2.10: Robustness test for firms' discretionary accruals and major corporate events

This table presents the results of Table 2.4's analyses using propensity score matching to pre-process data. The observations are much smaller after the one-on-one matching of the treatment and control groups. Appendix 2.2 provides detailed explanations of all the variables.
t-statistics are in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Panel A: Acquirer firms

Variable	Model 1	Model 2	Model 3	Model 4
Acquirer	-0.013***	-0.010**	-0.012**	-0.011**
	(-2.637)	(-2.165)	(-2.457)	(-2.314)
IAS19R	-0.029***	-0.019	-0.024***	-0.035***
	(-4.169)	(-1.240)	(-3.279)	(-3.838)
*Acquirer*IAS19R*	0.021**	0.018**	0.021**	0.018**
	(2.107)	(2.076)	(2.115)	(2.059)
%Equity_1			0.000***	-0.000
			(3.055)	(-1.023)
Maturity_1			-0.002	-0.003
			(-1.050)	(-1.090)
TA_1			-0.000	0.000**
			(-1.481)	(2.010)
Constant	0.025***	0.023	0.019*	0.050***
	(7.390)	(1.316)	(1.690)	(2.686)
Observations	2,444	2,444	2,444	2,444
Adjusted R-squared	0.008	0.133	0.012	0.135
Year Fixed Effects	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes

Table 2.10 (Continued)

Panel B: Target firms

Variable	Model 1	Model 2	Model 3	Model 4
Target	-0.044***	-0.032***	-0.041***	-0.031***
	(-4.591)	(-3.491)	(-4.301)	(-3.362)
IAS19R	-0.030**	-0.088***	-0.022	-0.089***
	(-2.080)	(-3.007)	(-1.485)	(-2.878)
*Target*IAS19R*	0.031	0.031*	0.027	0.030*
	(1.505)	(1.902)	(1.358)	(1.847)
%Equity_1			0.000*	-0.000
			(1.851)	(-0.830)
Maturity_1			-0.006	-0.005
			(-1.258)	(-0.743)
TA_1			-0.000***	-0.000
			(-2.717)	(-0.840)
Constant	0.039***	0.070**	0.051**	0.096**
	(5.815)	(2.421)	(2.158)	(2.562)
Observations	1,172	1,172	1,172	1,172
Adjusted R-squared	0.017	0.189	0.026	0.188
Year Fixed Effects	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes

Table 2.10 (Continued)

Panel C: IPO firms

Variable	Model 1	Model 2	Model 3	Model 4
IPO	0.063	-0.007	0.075	0.010
	(0.903)	(-0.125)	(1.063)	(0.100)
IAS19R	-0.047	0.069	-0.007	0.305
	(-0.570)	(0.495)	(-0.072)	(1.506)
*IPO*IAS19R*	-0.095	0.017	-0.113	-0.543**
	(-0.819)	(0.126)	(-0.926)	(-2.304)
%Equity_1			0.002	0.002
			(1.202)	(1.172)
Maturity_1			0.020	0.096
			(0.547)	(1.054)
TA_1			-0.000	-0.000
			(-0.756)	(-1.453)
Constant	0.047	-0.174	-0.110	-0.641*
	(0.960)	(-0.864)	(-0.642)	(-1.943)
Observations	62	62	62	62
Adjusted R-squared	0.009	0.956	-0.004	0.961
Year Fixed Effects	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes

Table 2.10: (Continued)

Panel D: SEO firms

Variable	Model 1	Model 2	Model 3	Model 4
SEO	-0.041***	-0.021***	-0.041***	-0.021***
	(-5.305)	(-2.772)	(-5.265)	(-2.776)
IAS19R	-0.019*	-0.024*	-0.016	-0.024*
	(-1.921)	(-1.700)	(-1.585)	(-1.659)
*SEO*IAS19R*	0.024*	0.008	0.025*	0.007
	(1.689)	(0.629)	(1.753)	(0.608)
%Equity_1			0.000	0.000
			(1.570)	(0.039)
Maturity_1			0.005	0.001
			(1.214)	(0.203)
TA_1			-0.000	-0.000
			(-1.516)	(-0.451)
Constant	0.027***	0.032	-0.002	0.029
	(4.897)	(1.628)	(-0.090)	(1.057)
Observations	1,328	1,328	1,328	1,328
Adjusted R-squared	0.021	0.307	0.024	0.305
Year Fixed Effects	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes

Table 2.11: Robustness test for firms' real earnings management and major corporate events

This table presents the results of Table 2.5's analyses using propensity score matching to pre-process data. The observations are much smaller after the one-on-one matching of the treatment and control groups. Appendix 2.2 provides detailed explanations of all the variables. t-statistics are in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Panel A: Acquirer firms

Variable	R_CFO				R_PROD				R_DISX			
	1	2	3	4	1	2	3	4	1	2	3	4
Acquirer	0.002	-0.000	0.002	-0.000	-0.005	-0.003	-0.005	-0.005	-0.012	-0.011	-0.011	-0.009
	(0.632)	(-0.138)	(0.681)	(-0.095)	(-0.693)	(-0.401)	(-0.708)	(-0.515)	(-1.358)	(-1.180)	(-1.284)	(-0.964)
IAS19R	-0.003	0.004	-0.001	-0.007	-0.001	0.007	-0.002	0.005	-0.004	-0.039	-0.002	-0.000
	(-0.855)	(0.589)	(-0.164)	(-1.187)	(-0.104)	(0.338)	(-0.225)	(0.287)	(-0.283)	(-1.406)	(-0.160)	(-0.019)
*Acquirer*IAS19R*	0.002	0.003	0.002	0.003	0.028*	0.022	0.027*	0.021	-0.034*	-0.029	-0.031*	-0.026
	(0.352)	(0.491)	(0.382)	(0.607)	(1.890)	(1.514)	(1.820)	(1.440)	(-1.810)	(-1.570)	(-1.664)	(-1.390)
%Equity_1			0.000*	0.000			0.000	0.000			-0.000	0.000
			(1.653)	(0.148)			(0.903)	(0.456)			(-0.581)	(0.157)
Maturity _1			-0.004***	-0.006***			0.012***	0.012***			-0.012***	-0.008
			(-2.873)	(-3.668)			(3.391)	(2.591)			(-2.895)	(-1.462)
TA_1			-0.000	-0.000			0.000	0.000***			-0.000*	-0.000***
			(-0.554)	(-0.379)			(1.645)	(4.108)			(-1.770)	(-5.661)
Constant	0.004**	-0.002	0.014**	0.029**	-0.002	-0.003	-0.061***	-0.053**	0.004	-0.033	0.063***	-0.032
	(2.068)	(-0.238)	(2.130)	(2.458)	(-0.423)	(-0.151)	(-3.407)	(-1.984)	(0.718)	(-0.803)	(3.001)	(-0.688)
Observations	2,444	2,444	2,444	2,444	1,934	1,934	1,934	1,934	1,672	1,672	1,672	1,672
Adjusted R-squared	-0.001	0.016	0.003	0.022	0.002	0.013	0.008	0.019	0.007	0.004	0.012	0.010
Year Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Table 2.11 (Continued)

Panel B: Target firms

Variable	R_CFO				R_PROD				R_DISX			
	1	2	3	4	1	2	3	4	1	2	3	4
Target	-0.009**	-0.012***	-0.009**	-0.011**	0.002	0.013	0.001	0.012	0.000	0.002	-0.001	0.004
	(-2.327)	(-2.729)	(-2.393)	(-2.511)	(0.206)	(1.132)	(0.134)	(0.998)	(0.030)	(0.197)	(-0.153)	(0.384)
IAS19R	-0.009*	-0.000	-0.008	0.002	-0.008	-0.021	-0.013	-0.009	-0.014	-0.003	-0.018	-0.012
	(-1.671)	(-0.029)	(-1.402)	(0.211)	(-0.619)	(-0.809)	(-0.964)	(-0.363)	(-1.086)	(-0.152)	(-1.361)	(-0.505)
*Target*IAS19R*	0.012	0.012	0.012	0.013	0.024	0.012	0.027	0.016	0.020	0.015	0.020	0.014
	(1.493)	(1.420)	(1.531)	(1.580)	(1.269)	(0.599)	(1.422)	(0.789)	(1.073)	(0.781)	(1.054)	(0.714)
%Equity_1			0.000	-0.000			-0.000	-0.000			-0.000*	-0.000
			(0.252)	(-1.037)			(-0.524)	(-0.088)			(-1.932)	(-1.413)
Maturity _1			-0.009***	-0.011***			0.011**	0.016**			-0.011**	-0.003
			(-4.510)	(-4.406)			(2.351)	(2.106)			(-2.238)	(-0.388)
TA_1			0.000	0.000			0.000	0.000**			-0.000*	-0.000***
			(0.894)	(0.863)			(1.334)	(2.174)			(-1.675)	(-3.487)
Constant	0.004	0.008	0.036***	0.048***	-0.004	-0.020	-0.048**	-0.095**	-0.005	-0.019	0.061***	0.030
	(1.413)	(0.559)	(4.026)	(2.704)	(-0.593)	(-0.506)	(-2.022)	(-2.275)	(-0.806)	(-0.305)	(2.710)	(0.378)
Observations	1,172	1,172	1,172	1,172	982	982	982	982	802	802	802	802
Adjusted R-squared	0.003	0.013	0.019	0.034	-0.000	0.009	0.004	0.016	-0.002	0.031	0.008	0.038
Year Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Table 2.11 (Continued)

Panel C: IPO firms

Variable	R_CFO				R_PROD				R_DISX			
	1	2	3	4	1	2	3	4	1	2	3	4
IPO	-0.028*	-0.007	-0.020	0.077	0.061	0.277***	0.038	0.306***	-0.048	0.085	-0.047	0.005
	(-1.896)	(-0.096)	(-1.415)	(1.283)	(0.803)	(0.000)	(0.483)	(0.000)	(-1.658)	(1.541)	(-1.550)	(0.046)
IAS19R	-0.015	-0.069	0.007	-0.548***	0.026	-0.171***	0.034	-0.296***	-0.113***	0.086*	-0.107**	0.049
	(-0.879)	(-0.475)	(0.393)	(-3.659)	(0.300)	(0.000))	(0.356)	(0.000)	(-2.839)	(1.691)	(-2.395)	(0.846)
*IPO*IAS19R*	0.023	0.185*	0.012	0.553***	-0.017	0.446***	-0.040	0.169***	0.081	0.072	0.079	0.366
	(0.915)	(1.852)	(0.474)	(3.209)	(-0.137)	(0.000)	(-0.296)	(0.000)	(1.532)	(1.169)	(1.352)	(0.821)
%Equity_1			0.001***	-0.002**			-0.002	-0.001***			0.000	0.002
			(3.124)	(-2.051)			(-1.187)	(0.000)			(0.479)	(0.563)
Maturity _1			0.002	0.011			-0.008	-0.013***			0.001	0.008
			(0.279)	(0.199)			(-0.224)	(0.000)			(0.045)	(0.137)
TA_1			0.000	0.000**			0.000	0.000***			-0.000	0.000
			(0.168)	(2.256)			(0.303)	(0.000)			(-0.128)	(0.611)
Constant	0.008	0.076	-0.049	0.449*	-0.055	-0.553***	0.072	-0.235***	0.037*	-0.163	0.021	-0.256
	(0.766)	(0.390)	(-1.432)	(1.815)	(-1.048)	(0.000)	(0.401)	(0.000)	(1.928)	(-1.567)	(0.295)	(-0.478)
Observations	62	62	62	62	44	44	44	44	50	50	50	50
Adjusted R-squared	0.013	0.544	0.116	0.720	-0.050	1.000	-0.076	1.000	0.134	0.847	0.080	0.821
Year Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Table 2.11: (Continued)

Panel D: SEO firms

Variable	R_CFO				R_PROD				R_DISX			
	1	2	3	4	1	2	3	4	1	2	3	4
SEO	-0.016***	-0.018***	-0.016***	-0.018***	0.002	0.006	0.002	0.007	0.002	-0.003	0.001	-0.005
	(-4.230)	(-3.509)	(-4.135)	(-3.545)	(0.176)	(0.454)	(0.179)	(0.554)	(0.190)	(-0.257)	(0.061)	(-0.400)
IAS19R	0.001	-0.010	0.003	-0.007	-0.009	0.008	-0.010	0.008	-0.002	0.016	-0.007	-0.001
	(0.240)	(-1.093)	(0.634)	(-0.789)	(-0.733)	(0.334)	(-0.756)	(0.358)	(-0.196)	(0.556)	(-0.532)	(-0.049)
*SEO*IAS19R*	0.003	0.003	0.005	0.005	0.001	-0.010	-0.000	-0.012	-0.005	0.005	-0.007	0.003
	(0.508)	(0.352)	(0.664)	(0.654)	(0.083)	(-0.443)	(-0.001)	(-0.521)	(-0.278)	(0.210)	(-0.390)	(0.140)
%Equity_1			0.000*	0.000			0.000	0.000			-0.001**	-0.000
			(1.910)	(1.450)			(0.078)	(0.156)			(-2.065)	(-0.996)
Maturity_1			-0.002	-0.005*			0.003	0.002			0.001	0.009
			(-1.294)	(-1.902)			(0.624)	(0.246)			(0.156)	(1.141)
TA_1			0.000	-0.000			0.000	0.000**			-0.000**	-0.000***
			(0.571)	(-0.585)			(1.088)	(2.522)			(-2.128)	(-4.832)
Constant	0.002	0.002	0.004	0.014	0.003	-0.016	-0.012	-0.032	0.002	0.095	0.027	0.109
	(0.773)	(0.170)	(0.422)	(0.770)	(0.401)	(-0.486)	(-0.526)	(-0.681)	(0.322)	(1.400)	(1.178)	(1.368)
Observations	1,328	1,328	1,328	1,328	1,106	1,106	1,106	1,106	926	926	926	926
Adjusted R-squared	0.015	0.044	0.017	0.048	-0.002	0.005	-0.003	0.005	-0.003	0.047	0.002	0.062
Year Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Country Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Chapter 3: Labour unemployment risk and pensions

3.1 Introduction

Previous literature finds that pension investment strategies can be affected by financial performance (e.g., Rauh, 2009; Bartram, 2018), pension plan contributions (e.g., Harrison & Sharpe, 1983), corporate events (e.g., Bergstresser, Desai & Rauh, 2006; Amir & Benartzi, 1998), and changes in accounting standards (e.g., Anantharaman & Lee, 2014; Barthelme, Kiosse & Sellhorn, 2019). Rauh (2009) suggests that additional factors affecting pension asset investment strategies need to be identified, because a large percent of firm-level variation remains unexplained. However, no study has yet explored whether and how they are affected by explicit and implicit contracts between firms and their rank and file employees. Employees' perceived unemployment risk could have a significant impact on the firm's overall investment decisions (Agrawal & Matsa, 2013). I therefore examine the role of unemployment risk on pension investment strategies.

According to the labour economics literature, employees demand compensation for the costs of potential unemployment (Smith, 1979; Blaug, 1976). When employees become involuntarily unemployed, they bear significant costs, including potentially lengthy job searches, layoff discouragement effects, limited job opportunities, and significant wage cuts after returning to work (Farber, 2005; Agrawal & Matsa, 2013). These costs boost employees' concerns about risk when job-seeking. The implicit contracts include "wage differentials" that compensate employees for unemployment risk, and the amount of this compensation can be substantial (Agrawal & Matsa, 2013; Dou, Khan & Zou, 2016; Graham, Kim, Li & Qiu, 2019). The size of the "wage differentials" is generally affected by employees' work experience, industry, labour force size, and resignation rates (Burdett & Mortensen, 1998; Cotton, 1988).

In this chapter, I study whether and how pension investments are affected by employees' perceptions of unemployment risk. Prior literature has shown that to ease these perceptions and foster job security, firms have a tendency to choose more conservative leverage policies (Agrawal & Matsa, 2013), manage earnings upward (Dou et al., 2016), and increase positive disclosures (Ji & Tan, 2016). In this way, they aim to reduce the size of any wage differentials. Low unemployment risk can help firms to reduce the costs of employee compensation, and improve employee motivation and efficiency.

According to Shivdasani and Stefanescu (2010), the leverage ratio increases by an average of 35% when pension assets and liabilities are incorporated into the capital structure. Therefore, I expect that an increase in unemployment insurance (UI hereinafter) benefits will affect pension asset allocations through their impact on workers' exposure to unemployment risk.

I use the changes in state UI benefits laws to proxy for unemployment risk. I examine their relationship to the pension asset allocation strategy of United States (U.S. hereinafter) firms from 1990 to 2017. To test how an increase in UI affects pension asset allocation, I follow Dou et al. (2016), and use both a fixed effects model and a difference-in-differences (DiD hereinafter) model. The DiD model design compares pension asset allocations before and after an exogenous increase in UI benefits for treatment and control firms. Treatment firms are those headquartered in states with a large increase (>10%) in maximum benefits; control firms are those headquartered in matched neighbouring states without a large increase (>10%) in benefits.

I adopt three different matching techniques, entropy balance matching (EBM hereinafter), coarsened exact matching (CEM hereinafter), and propensity score matching (PSM hereinafter), in order to balance the covariance of the treatment and control firms. The results show that firms tend to take greater pension investment risks by investing more pension assets in equity after an increase in UI benefits. The results are consistent with my main hypothesis, and with findings in prior literature.

In order to mitigate the unobservable macroeconomic impacts and omitted variable problem I add state-level controls in all the regression models. I also conduct a falsification test to trace the timing of the relation between pension asset allocations and UI benefits. To test the timing of this relation, I include contemporaneous and forward values of unemployment benefits. The results of those additional tests are consistent with my main results.

Moreover, I conduct analyses to examine the impact of a UI benefit increase on other pension decisions, such as, a pension plan freeze probability, and pension actuarial assumptions management. Recent papers noticed the trend of shift from a defined benefit pension plan (DB hereinafter) to defined contribution plan (DC hereinafter) (Comprix & Muller, 2011). I note that employees bear greater risk under DC plans than under DB plans. Thus, a company’s decision to freeze a DB plan will increase employees’ unemployment costs. The results show that the probability of a freeze increases after a UI benefit increase. This result is consistent with the notion that firms take on more risk when employees’ perceived unemployment risk is reduced.

Pension accounting standards provide some flexibility when setting actuarial assumptions. Therefore, firms can use their own discretion when choosing actuarial assumptions to manage earnings (Bergstresser et al., 2006; Chuk, 2013). Previous literature suggests that firms' incentives to manage earnings upward decrease after a UI benefit increase, given that the need to provide employees with (perceived) job security decreases (Dou et al., 2016). I examine whether unemployment benefits have any impact on firms' pension actuarial assumptions. Using expected rate of return (ERR hereinafter) as a proxy for pension actuarial assumptions, I find that firms manage ERR downward to unwind prior upward earnings management using ERR. This result is consistent with Dou et al.'s (2016) findings that firms reduce their level of earnings management after unemployment benefit increases.

This chapter makes several contributions to the existing literature. First, it fills a gap noted by Rauh (2009) that factors affecting pension asset investment strategy are still not well understood. This chapter finds new evidence that unemployment risk can affect pension investment and other pension decisions, such as freezes and actuarial assumptions. I contribute to the pensions literature by providing new evidence on the role of employee perceptions in shaping pension decisions in the context of pension freeze and actuarial assumptions.

This chapter also adds to the labour economics literature by showing that unemployment risk is not only related to firms' capital structure decisions and accounting choices, but also to their pension decisions. The evidence suggests that employee perceptions of unemployment risk are one of the important determinants on firm's pension asset allocation strategies, freeze decisions, and earnings management decisions using pension actuarial assumptions.

The remainder of this chapter is structured as follows. Section 3.2 discusses the background and related literature, and develops the main hypothesis. Section 3.3 describes the variable definitions and sample construction, while Section 3.4 discusses the research design. Section 3.5 reports the main findings. Section 3.6

outlines some further analyses, and Section 3.7 presents the robustness tests. Section 3.8 concludes.

3.2 Background, Related Literature, and Hypothesis Development

In this section, I first provide some background on unemployment risk and pension insurance policy, and then discuss how they impact firm policy. In addition, I outline the UI benefits program, and discuss how it can affect unemployment risk and pension decisions. Finally, I discuss the related literature and develop my main hypothesis.

3.2.1 Unemployment risk

Previous literature suggests that employees require compensation for unemployment risk, in the form of higher wages, additional benefits, and improved working conditions (Burdett & Mortensen, 1998; Cotton, 1988; Agrawal & Matsa, 2013). These payments are usually referred to as “compensating wage differentials” in the existing literature (Smith, 1979, p. 111). Their size is directly linked to the level of unemployment risk (Cotton, 1988; Agrawal & Matsa, 2013). Increases in this risk mean firms must pay higher compensation to ensure employees’ full commitment (Dou et al., 2016).

Increased unemployment risk may also lead to increased employee risk aversion, and increased cost burdens on employees during increases in unemployment. Pinheiro and Visschers (2015) find that employees are willing to give up some wages in exchange for higher job security. Therefore, firms have an incentive to maximise employees’ perceived job security in order to minimise compensation.

Employees are exposed to high unemployment risk when firms are financially distressed, because they may be forced to lay off employees to meet outstanding debt obligations (Ofek, 1993; Asquith, Gertner & Scharfstein, 1994). Graham (2000) states that firms with low leverage ratios are considered stable, liquid, and profitable, and thus have low financial distress. High financial leverage, in contrast, increases firm risk and the probability of entering distress. Therefore, when firms face higher financial leverage, their employees will have less job security, and the compensating "wage differentials" will be higher. Agrawal and Matsa (2013) find that firms are inclined to choose conservative financial policies in order to decrease the risk of financial distress, which offsets employees' need for a compensation premium.

The financial policies of a firm affect its capital structure. According to capital structure theory, firms can use different sources of funds to finance operations, e.g., a mixture of debt and equity financing (Bradley, Jarrell & Kim, 1984). Generally, debt financing has lower costs than equity financing, and it also offers tax advantages. However, high leverage will increase firm risk and the cost of financing after a certain amount of leverage (Graham, 2000).

According to the labour economics literature, during labour contract negotiations, a firm's optimal risk-taking level depends on the trade-off between the benefits of corporate leverage and the costs of human capital (Blaug, 1976). If contract agreements are breached (leading to an increase in firm risk), employees may require more compensation. Their risk aversion levels may also increase as firm risk increases, which can lead to demands for higher compensation to make up for the potentially higher unemployment risk. The benefits of taking leverage are offset by the increase in the cost of human capital. Therefore, firms usually maintain their optimal risk levels until they experience exogenous events that change employees' risk aversion levels, such as changes in UI.

Topel (1984) finds that UI can significantly reduce compensating wage differentials. An increase in UI decreases unemployment costs and risk aversion levels (Agrawal & Matsa, 2013). When UI benefits increase, for example, firm leverage increases and interest coverage ratios decrease. This indicates that firms seem to take on more risk after employees' perceived unemployment risk decreases. The reduced wage premiums required by employees then allow firms to increase their leverage and benefit from debt financing.

According to Shivdasani and Stefanescu (2010), the leverage ratio increases by an average of 35% when pension assets and liabilities are incorporated into the capital structure. This result reflects the importance of pension investments to a company's financial policy. DB pension plans require firms to make investment decisions regarding the pension portfolio in order to meet the pension plan obligations. Plans can become underfunded if their pension liabilities exceed their assets. Under the Employee Retirement Income Security Act of 1974 (ERISA hereinafter), firms have a legal responsibility to sufficiently fund their DB plans (Shivdasani & Stefanescu, 2010).

3.2.2 Pension liability insurance

ERISA is the principal law that regulates DB pension plans. It establishes minimum funding levels, investment requirements, and contribution requirements. The basic principle of ERISA is that pension plans must be managed solely in the participants' best interests. If a pension plan is severely underfunded, ERISA can mandate accelerated funding requirements. However, firms experiencing temporary business difficulties can apply for hardship waivers to temporarily halt minimum funding requirements. Firms who request such waivers must demonstrate that the requirements hurt their plan participants. ERISA also established the Pension Benefit Guaranty Corporation (PBGC hereinafter) to provide insurance in case of plan defaults or terminations. Overall, ERISA monitors firms' DB plans, and protects plan participants' future benefits.

The Pension Protection Act (PPA hereinafter) of 2006 further tightened ERISA's requirements, and established new rules to prevent large unfunded liabilities. Specifically, PPA requires that firms sponsoring DB plans must contribute enough to cover accrued benefits for the entire year, and amortise any funding shortfall over seven years. If a firm chooses this option and accepts a waived funding deficiency for one year, the subsequent five years' of minimum required contributions must include the aggregate amount of the waiver, equally distributed over the five years (PBGC, 2017).

If firms fail to meet minimum funding requirements, or file for bankruptcy with an underfunded pension plan, the PBGC is empowered to recover the benefits by filing a claim against the firm's assets. The claim can include the full amount of the underfunded benefit liabilities, the unpaid minimum funding contributions, and the unpaid premiums to the PBGC. Such claims proceed according to the ranking order on firm assets under the Bankruptcy Code. Thus, secured claims generally rank ahead of unsecured claims. And, if the PBGC effects a lien prior to the commencement of a bankruptcy case, it is considered a secured creditor and will have the highest ranking for payouts. If the claim arises after the bankruptcy case, it will be treated as a general unsecured claim and will rank among the lowest to be paid out. However, the PBGC's claims are usually the largest among general unsecured creditors, and often provide significant negotiating power (Latham, 2017; PBGC, 2017).

However, if firms are unable to fund their pension plans, or if they experience bankruptcy with an underfunded pension plan, there is always a risk that employees may not receive their full pension benefits (Graham et al,, 2019). The PBGC is a federal agency created by ERISA to protect pension benefits in DB plans. If firms experience financial stress and cannot fund their plans, PBGC's insurance program will cover the employee benefits provided by the plans up to the limits set by law (PBGC, 2017). However, the PBGC does not guarantee benefits greater than the original pension plans' stated benefits, and it only guarantees vested benefits. These are benefits that employees have earned the right to receive before a pension plan terminates. The guarantee is adjusted annually to reflect increases in the cost of living.

According to ERISA Sec. 4022A(c), the maximum guaranteed benefit equals 100% of the first $11 of the monthly benefit rate, plus 75% of the next $33 of the monthly benefit rate, times the participant's years of credited service. Therefore, employees may lose at least 25% of their monthly benefit above $11 if their pension sponsor defaults. This guaranteed maximum level does not adjust for inflation or cost-of-living increases. The PBGC also does not guarantee any pension benefits or benefit increases that were included for less than 60 months (PBGC, 2017). The 2017 maximum monthly guarantee for a 65-year-old retiree is $5,369.32, which amounts to about $64,432 per year. According to the U.S. Census Bureau's Current Population Survey 2017, the average retirement income is $68,905 for a household aged 65 to 74. Thus, the maximum PBGC coverage is below the average retirement income, and the majority of employees will not be fully covered under the PBGC insurance program (Chuk, 2013; Graham et al., 2019).

Employee pension benefits are similar to holding risky debt. Firms' financial performance and pension plan funding status can influence employees' job security. If a firm is experiencing a performance decline or financial distress, they are at risk of failing to meet the minimum pension plan contributions or of going bankrupt. This could cause employees to lose part of their pension benefits (Graham et al., 2019). For those with higher than average potential pension income, this could further contribute to the unemployment costs borne by employees. Thus, the “compensation wage differential” demanded by employees would be even higher. As a result, firms can improve employees’ job security by improving their pension plan funding status.

3.2.3 The U.S. unemployment insurance system

American UI is comprised of a two-tier joint federal and state system, which includes all fifty-two states, as well as the District of Columbia, Puerto Rico, the U.S. Virgin Islands, and the federal government. It was created by Congress in 1935. The federal government and the states interact and complement each other in providing UI. The basic framework is common across all states, but individual states retain a certain amount of autonomy over program parameters.

In essence, each state runs an independent UI program following federal guidelines. UI programs generally provide temporary financial assistance to eligible employees who are unemployed through no fault of their own. The purpose of the program is to mitigate the loss of income during the unemployment period. Each state establishes its own UI benefit laws, and determines eligibility, maximum benefit amounts, and the maximum duration of the benefit.

Typically, employees who are involuntarily unemployed and actively seeking new jobs are eligible to claim UI benefits. The amount provided by each state is determined based on wage benefit formulas that are set by state law. The formula typically calculates the highest earnings realised by a worker over the most recent 52-week period, and then aims to cover approximately 50% of those earnings through weekly benefit payments. The amount is subject to minimum and maximum bounds set by individual states each year, and the maximum weekly benefit is subject to change. In most states, benefits are paid for a maximum of 26 weeks.

UI is financed through federal and state employer payroll taxes. Employers must pay both state and federal taxes if they pay more than $1,500 in wages to employees in any quarter, or if they have full-time employees for more than 20 weeks in a calendar year. State UI tax rates are determined by individual state law.

The Federal Unemployment Tax Act (FUTA hereinafter) authorises the Internal Revenue Service (IRS hereinafter) to collect federal employer taxes. They are used to fund state workforce agencies, and to cover the administrative costs of the UI and its job service programs at the state level. They are also used to cover half of the extended unemployment benefit costs. States can borrow from the federal government to pay benefits when they experience a deficit.

Federal taxes are calculated by multiplying the federal tax rate (6%) by employers' taxable wages, which are mandated as the first $7,000 paid in wages to each employee per calendar year. The federal tax rate can be reduced to a minimum of 0.6% if employers pay their state unemployment taxes on time. For employers that are eligible for the federal tax rate reduction, the maximum FUTA tax is $42 per employee per year.

UI benefits can have a significant impact on the unemployed by, e.g., providing consumption smoothing benefits (Gruber, 1997b). The relative amount of the UI benefit can also affect employees' personal savings and investment decisions (Gormley, Liu & Zhou, 2010). For example, UI recipients are more likely to return to work when their benefits are about to expire. In addition, according to

Katz and Meyer (1990), Topel and Welch (1980), and Meyer and Mok (2007), the increase in the duration of unemployment benefits has led to an increase in the average duration of unemployment.

Thus, because UI benefits can mitigate unemployment risk by reducing the costs borne by employees, changes in the rate can result in meaningful shocks to unemployment-related costs. According to Agrawal and Matsa (2013), the variations in UI laws provide a clean setting in which to explore the impact of unemployment risk on firms' decision-making. The laws affect employees' exposure to unemployment risk, but without any direct impact on firms.

I use these shocks to examine whether firms consider employees' unemployment risk when they establish their pension investment policies. Next, I develop the hypothesis to be tested in the empirical analysis.

3.2.4 Hypothesis development

Many factors affect firms' pension investment strategies and levels of risk (e.g., Bodie, Light and Morck, 1987; Friedman, 1982; Rauh, 2009; Bergstresser et al., 2006). Sharpe (1976) suggests that, from a firm perspective, sponsoring a DB pension plan is similar to holding a put option on the pension assets. An increase in pension risk increases the value of the option. Also, the risk-shifting hypothesis suggests that an increase in pension risk is actually value-maximising for shareholders, since it can transfer wealth from employees to shareholders (Sharpe, 1976; Treynor, 1977).

Pension risk can be increased by either underfunding the plan or by increasing its asset risk by allocating its assets in risky investments. However, underfunding pension plans is less beneficial to firms over the long-run

(Anantharaman & Lee, 2014; An, Huang, & Zhang, 2013).[13] Thus, pension investment risk-taking can be vital to pension risk. The risky investment strategies could increase pension assets' fair value if the returns are high. The firm can benefit from potential reductions in future contributions. However, risky investments also increase the volatility of pension investment returns, and could lead to higher required contributions if the risky investment fails. As discussed in Section 3.2.2, the PBGC guarantees minimum pension benefits to participants in the event of firm bankruptcy or plan termination. This provides more incentives for firms to shift risk, since firms can essentially shift unfunded pension obligations to the PBGC (Broeders & Chen, 2013).

From an employee perspective, pension assets resemble debt-like characteristics (Anantharaman & Lee, 2014; Mohan & Zhang, 2014; Boon, Briere & Rigot, 2018). The employee beneficiaries hold claims on the firm's pension assets, similarly to the firm's debtholders. If the firm goes bankrupt, and the pension plan becomes underfunded, employee beneficiaries will receive a reduced payout from what assets are left in the plan, or will be compensated by the PBGC up to the maximum coverage. This illustrates how pension investment risk can be shifted from shareholders to both the PBGC and the employees. Thus, while the increase in risk in pension assets may be beneficial for shareholders, it may simultaneously increase the risk that pension beneficiaries will not receive full pension benefits.

If the firm increases pension investment risk by investing in riskier securities such as equity, it increases the volatility of pension investment returns. If a firm goes bankrupt from such investments, employees could lose both their jobs and

[13] The passage of the Pension Protection Act of 2006 (PPA) raised required pension funding levels, and mandated that any shortfalls must be amortized over seven years.

part of their pensions. If a firm does not go bankrupt or terminate its pension plan, but faces severe underfunding caused by taking on overly high pension investment risks, it must continue to fund the plan by using its own resources (Rauh, 2009). Because of the minimum funding level mandated by ERISA, firms cannot make capital expenditures, project investments, or dividend payments if their pension funding level is below the minimum (Comprix & Muller, 2011). Thus, their other obligations' default risk will increase because the pension contributions may reduce firms' liquidity. This further contributes to firms' financial distress and probability of bankruptcy. It can increase both the employees' unemployment risk, and the "wage differentials," because of the difference between PBGC coverage and total pension benefits.

Previous literature has found that, in order to avoid large contributions, firms are inclined to allocate more pension funds to safe securities, and to take on less investment risk if their pension plan is underfunded or if they are in financial distress (Rauh, 2009). In addition, less risky pension investments can help firms minimise employees' perceived unemployment risk and therefore reduce "wage differentials." It is in employees' interests to have less risky pension plan investments, because the low default risk tends to increase job security (Bartram, 2018). As I noted earlier, if a firm fails to fund its pensions, employees could lose part of their benefits, since the PBGC only covers a certain percentage of pension benefits.

An increase in UI benefits can reduce compensating "wage differentials". If UI benefits increase, the cost of unemployment is reduced, and the unemployment risk perceived by employees decreases. This in turn decreases costs for the firm since "wage differentials" are reduced. Firms may thus be encouraged to take more risks with pension plan asset investments, consistent with their overall financial policy. This could also motivate them to invest a higher proportion of pension assets in equity, and obtain higher returns on pension assets. In order to examine the relationship between unemployment risk and firms' pension plan investment risk-taking, I use UI benefits to capture the impact of unemployment risk. Thus, the main hypothesis is as follows:

Hypothesis 3.1: Firms' pension asset allocations are expected to be riskier after an unemployment insurance benefits increase.

3.3 Variable Definitions and Sample Construction

In this section, I define the variables used in the empirical analysis, and subsequently discuss the sample selection.

3.3.1 Unemployment insurance benefits measure

UI benefits data are hand-collected from the U.S. Department of Labour (DOL hereinafter) website. The DOL has published UI benefits data from the significant provision of state UI law reports since 1965. They are updated semi-annually, in January and July. I hand-collected these provisions from 1990 through 2017, and manually recorded information on weekly benefit amounts and the duration of covered weeks. There are minimum and maximum figures provided for these two parameters in the provisions. The key variable of interest is the level of each state's UI benefit. Following Agrawal and Matsa (2013), I select the highest reported figures for weekly benefits and the duration for each state-year, and use them to measure the level of each state's UI benefit.

Log max weekly benefit is the natural log of the maximum weekly wage benefit allowance provided to employees in a state-year. *Log max duration* is the natural log of the maximum number of weeks a state provides UI benefits to claimants. The average sample state-year amount is approximately 26 weeks.

Benefit is the natural log of the maximum number of weeks times the maximum weekly benefit amount. *Benefit* provides a proxy for the total UI benefits that a UI claimant can receive in a given year.

3.3.2 Definition of the dependent variable

The pension asset investment data are collected from IRS Form 5500 filings from 1990 through 2017. I obtain Form 5500 data for 1990-1998 from the Center for Retirement Research at Boston College. From 1999 onward, I obtain these data from the DOL website.

Form 5500 provides asset class information at the plan level. The assets are disaggregated into categories such as interest-bearing cash, U.S. government securities, corporate debt instruments, and corporate stocks. Following Jin, Merton and Bodie’s (2006) model, I aggregate Form 5500 plan-level data with company-level pension data, and then further classify pension asset investments into four categories: equities, bonds, cash, and real estate. Equities include preferred stock, common stock, joint ventures, employer securities, and interests in registered investment companies.

I use the percentage of pension assets invested in equities as a proxy to measure firms’ pension investment risk-taking levels. The dependent variable *%Equity* is measured using pension assets invested in equity divided by the fair value of total pension assets reported on Form 5500. Note that equities are the riskiest investment that can be captured by reported data. Thus, if a firm’s pension investment percentage in equity has increased, this would indicate an increase in investment risk.

3.3.3 Control variables

I follow Amir, Guan and Oswald (2010), and select the underlying control variables that can affect firms' pension asset allocations (besides UI benefit differences). The pension funding level can affect the allocations because of tax and regulatory factors. Previous literature has found that overfunded pensions prefer to allocate assets to bonds, while underfunded plans allocate to equities (Rauh, 2009). The variable *Fund* is the fair value of pension assets divided by the projected benefit obligation (PBO hereinafter).

A pension plan's demographic characteristics may also affect its investment strategy. Generally, a younger workforce has a relatively longer investment horizon, and will take greater risk by investing more heavily in equities. *Maturity* is measured as the natural logarithm of the ratio of PBO to current service costs. A younger workforce typically leads to a higher ratio. Based on previous literature, pension maturity should have a positive relationship with a pension's allocation to equity.

Moreover, debt contracts and dividend payout policies can influence firms' pension asset allocations. When a firm has tighter debt covenants and higher dividend payout ratios, they will have stronger incentives to improve their asset/liability ratios in order to reduce volatility and future pension contributions. *Leverage* is measured as debt in current liabilities plus long-term debt divided by total assets. *Divp* is dividends per share, divided by retained earnings per share.

Firms with higher tax rates will be motivated to allocate assets to bonds, since they are heavily taxed and are deductible. *Tax* is total tax expense, divided by pre-tax income. Detailed variable definitions are provided in Appendix 3.1.

3.4 Research Design

In this section, I first discuss the equation used to test the main hypothesis. I then describe the matching methods used for improving causal inferences.

3.4.1 Unmatched sample

I use a panel regression analysis to examine the relationship between UI level and pension asset allocation policy at the firm-year level. Based on previous literature (Amir et al., 2010; Li & Klumpes, 2013), I use the following regression:[14]

$$\begin{aligned}\%\,Equity_{i,t+1} = {}& \beta_0 + \beta_1 Benefit_{i,t} + \beta_2 \%\,Equity_{i,t} + \beta_3 Fund_{i,t+1} + \\ & \beta_4 Maturity_{i,t+1} + \beta_5 Leverage_{i,t+1} + \beta_6 Divp_{i,t+1} + \beta_7 Tax_{i,t+1} + \\ & \beta_8 Assets_{i,t+1} + \beta_9 ROA_{i,t+1} + \beta_{10} GDP_{i,t+1} + \beta_{11} Unemp\_rate_{i,t+1} + \\ & \beta_{12} Election_{i,t+1} + \beta_{13} Democrat_{i,t+1} + \beta_f Firm + \beta_s State \qquad (3.1a)\end{aligned}$$

$$\begin{aligned}\%Equity_{i,t+1} = {}& \beta_0 + \beta_1 Treat + \beta_2 Post + \beta_3 Treat * Post + \beta_4 \%\,Equity_{i,t} + \\ & \beta_5 Fund_{i,t+1} + \beta_6 Maturity_{i,t+1} + \beta_7 Leverage_{i,t+1} + \\ & \beta_8 Divp_{i,t+1} + \beta_9 Tax_{i,t+1} + \beta_{10} Assets_{i,t+1} + \beta_{11} ROA_{i,t+1} + \\ & \beta_{12} GDP_{i,t+1} + \beta_{13} Unemp_{rate\,i,t+1} + \beta_{14} Election_{i,t+1} + \\ & \beta_{15} Democrat_{i,t+1} \qquad (3.1b)\end{aligned}$$

The dependent variable in Equation (3.1a), *% Equity*$_{t+1}$, is the market value of pension assets allocated to equity securities, divided by the market value of total pension assets for firm i. The main variable of interest is *Benefit*$_t$, which is the natural log of the maximum number of weeks, times the maximum weekly wage benefit amount given to employees in state-year t. I include the lagged dependent variable, *%Equity*$_t$, as control variable in state-year t in order to capture

[14] State-year t is the year the state experienced a large increase in unemployment benefits. State-year t+1 is the year after the large increase.

the stickiness in the pension investment strategy, as well as the importance of the previous year's strategy in determining the magnitude of the current year's %Equity. According to Finkel (1995), there is a possibility that the dependent variable will be affected by the lagged dependent variable, so including it is necessary for proper model specification.

The control variable $Fund_{t+1}$ is the fair value of pension assets divided by the PBO in state-year t+1; $Maturity_{t+1}$ is pension maturity, measured as the natural logarithm of the ratio of PBO to current service costs in state-year t+1; $Leverage_{t+1}$ is measured as the debt in current liabilities plus the long-term debt divided by total assets in state-year t+1; $Divp_{t+1}$ is dividends per share, divided by retained earnings per share in state-year t+1; and Tax_{t+1} is total tax expense divided by pre-tax income in state-year t+1.

Other firm characteristics may influence firms' pension asset allocations. I include $Assets_{t+1}$, the natural logarithm of total assets in state-year t+1, and ROA_{t+1}, return on assets, in order to measure profitability and capture firms' investment opportunities in state-year t+1.

I use states' gross domestic product (GDP_{t+1}), unemployment rate ($Unemp\_rate_{t+1}$), $Election_{t+1}$, and $Democrat_{t+1}$ to control for contemporaneous local macroeconomic conditions. $Election_{t+1}$ is an indicator variable that equals 1 if there is a presidential election that year, and 0 otherwise in state-year t+1. $Democrat_{t+1}$ equals 1 if the Democratic presidential candidate received more votes in state-year t+1. Firm and state fixed effects are also included.

Equation (3.1b) shows the DiD model to examine the relationship between UI level and pension asset allocation policy at the firm-year level. *Treat* is an indicator that equals 1 for treatment firms, and 0 otherwise. *Post* is an indicator that equals 1 in the year following the increase in unemployment benefits, and 0 otherwise. The main independent variable of interest is *Treat*Post*, which captures the impact of unemployment benefit increases on the treatment group. Other control variables are the same as Equation (3.1a).

3.4.2 Matching techniques

Following Dou et al. (2016), I use a matched sample for testing. I identify the "event" as the state-year with a *Benefit* that experienced a large increase of more than 10%, but with no large increase in the prior year. Each event-year is then matched to at least one adjacent state that did not experience a large increase in *Benefit* for the same or prior year. The treatment group consists of firms that operate in states that experienced a large increase in maximum UI benefits. The control group consists of firms in states that did not experience a large increase in maximum UI benefits. The treatment and control states are adjacent. This chapter first uses the unmatched observations selected using Dou et al.'s (2016) criteria, and then explores alternative matching techniques for robustness.

Matching is often used in observational studies to pre-process the data before the estimation of causal inferences. I use three methods: 1) EBM, 2) CEM, and 3) PSM. EBM is used to pre-process the sample data and achieve a covariate balance between the treatment and control groups by means of a reweighting scheme (Hainmueller, 2012). It directly incorporates covariate balance into the weight function by using a set of balance constraints. The treatment and control groups in the pre-processed data match exactly on all pre-specified constraints. This provides a ranking for the balance constraints, and helps retain valuable information by keeping all the observations (e.g., Hirano, Imbens & Ridder, 2003; Ho, Imai, King & Stuart, 2007).

CEM is conducted similarly to EBM. First, each variable is temporarily coarsened, and the same values are grouped into stratum. Within the same stratum, control units are weighted to equal the number of treated units. The unbalanced stratum, or unreasonable match, is then excluded from the sample dataset. This method allows multiple control units to be matched to one treatment unit using a weighting function. However, it excludes observations from both the treatment and control groups if the stratum is unable to be balanced or matched (Lacus, King & Porro, 2012).

PSM is the third common matching method. It uses a different technique than EBM or CEM. It provides a scalar propensity score to the control observations, and conducts one-to-one nearest-neighbour matching using that score. The control units with the lowest propensity scores are then excluded from the sample set. This method drops numerous observations from the control group, especially in this setting, where we have multiple control states matched to each treatment state (King, Nielsen, Coberley, Pope & Wells, 2011).

I use these three methods to balance further the unmatched observations chosen using Dou et al.'s (2016) model. For each firm operating in the event state, I use EBM, CEM, and PSM separately to choose another firm in the specific control state in the same year with the same firm size, pension size, and industry constraints. The EBM method is performed using Stata ebalance command. The CEM method is carried out using cem commond in Stata. The PSM method is carried out using Stata psmatch2 commend, one-on-one nearest neighbour (no caliper) and without replacement. After matching, Stata creates a weight variable which assign a weight to each observation based on the matching criteria. All the subsequent analysis is performed including the different weight assigned by each matching method and the results are reported in different columns. The matched observations may be able to minimise any spurious factor effects driving the changes in pension plan investment strategies.

3.4.3 Statistics

I use U.S. public firms from 1990 to 2017 that have DB plans. This is because SFAS No. 87, the FASB statement that governs pension accounting in the U.S., became effective for firms with fiscal years beginning after December 15, 1986. My tests use data from all firms headquartered in the selected state-years. Financial statement data are retrieved from Compustat, and state-level data from the U.S. DOL website.

Table 3.1, panel A, shows descriptive statistics for both the treatment group (93 state-years) and the control group (221 state-years) from 1990 through 2017. The entire sample consists of 8,434 firm observations. To mitigate the effect of extreme values, I winsorize the firm-level continuous variables used in the regression analysis at the 1% and 99% levels. I use percentage invested in equity (*%Equity*) as the main proxy to measure pension investment risk. $\%Equity_{t+1}$ has a mean of 0.276, which indicates that firms invest an average of 27.6% of their pension assets in equities. The mean and median of *Benefit* are 18.931 and 18.991, respectively. The mean and median of $Fund_{t+1}$ are 1.031 and 0.904, respectively. This indicates that half the firms have underfunded pension plans.

[Insert Table 3.1 about here]

Table 3.1, panel B, shows the pairwise Pearson and Spearman correlations across variables used in the following multivariate analysis. Pearson correlation is reported in the lower diagonal and Spearman correlation is reported in the upper diagonal. There is a positive correlation reported in Pearson correlation between *Benefit* and $\%Equity_{t+1}$ of 0.0909. The correlation between the dependent variable *%Equity*$_{t+1}$ and the control variable *%Equity* is 0.8621 reported in Pearson correlation, indicating that they are significantly correlated.

3.5 Results

I first test the hypothesis that firms take on greater pension investment risk when unemployment benefits increase. Section 3.5.1 examines Hypothesis 3.1, while Section 3.5.2 describes further tests designed to enhance identification.

3.5.1 Main tests

Table 3.2, panel A, presents the coefficients, with t-statistics in parentheses, from a pooled regression estimation of Equation (3.1a). Columns (1) and (2) show the results using the observations without matching techniques; columns (3) and (4) show the results using the EBM matching method; columns (5) and (6) show the results using the CEM matching method; and columns (7) and (8) show the results using the PSM matching method. Columns (1), (3), (5), and (7) include state economic control variables (*GDP, Unemp_rate, Election, Democrat*); columns (2), (4), (6), and (8) include both firm financial (*Asses, ROA*) and state economic control variables (*GDP, Unemp_rate, Election, Democrat*). The dependent variable is *%Equity*$_{t+1}$, the percentage of pension assets invested in equity in the year after the unemployment benefits increase.

The primary independent variable of interest is *Benefit*. It has positive and significant coefficients across all models, which they range from 0.015 to 0.026. The results indicate that an increase in *Benefit* can predict changes in the dependent variable. The relation is economically meaningful and statistically significant at the 1% level. The 0.016 coefficient in column (4), which use EBM matching method and includes all controls and fixed effects, indicates that a 100-log point increase in the maximum total unemployment benefit is associated with a 1.6% increase in pension assets invested in equities.[15] This result supports Hypothesis 3.1 that firms tend to increase pension investment risk after an increase in UI. It indicates that firms consider employees' exposure to unemployment risk when determining pension investment strategy.

[Insert Table 3.2 about here]

The control variable *%Equity* shows positive and significant coefficients across the different matching methods, suggesting that pension asset allocation decisions in the prior year can be an important determinant of the magnitude of the current year's $\%Equity_{t+1}$. $Maturity_{t+1}$ has positive coefficients in the CEM matching method in Columns (5) and (6), consistent with previous literature showing that firms invest more in equity when pension plan maturity is longer. Pension plan funding status ($Fund_{t+1}$), financial leverage ($Leverage_{t+1}$), dividend payout ratio ($Divp_{t+1}$), and tax rate (Tax_{t+1}) show insignificant coefficients.

Table 3.2, panel B, shows results using a DiD specification (Equation 3.1b). The positive and significant coefficients for the interaction variable *Treat*Post* in the first four columns suggest that firms take more risks with pension asset allocations after an increase in unemployment benefits in the unmatched observation and the EBM matching method. The 0.020 and 0.019 coefficients in Models (2) and (4) which include all control variables in the unmatched sample and EBM sample indicate that firms increase pension assets invested in equity by 2.0% to 1.9%, respectively, after a UI increase. The results are consistent with those of the fixed effects model in panel A.

The results of the observations using the CEM and PSM matching techniques show insignificant coefficients for *Treat*Post.* This difference may be

[15] The coefficients of *Benefit* remain positive and statistically significant across the unmatched sample (columns (1) – (2)) and three matching methods (columns (3)-(8)).

driven by the sample difference under the various matching methods. For example, under CEM, observations are discarded from both the treatment and control groups by using pre-specified matching criteria. And PSM conducts one-on-one matching, which excludes extra observations from the control group. Both matching methods lose information compared to the EBM. Also, the DiD model implicitly controls for unobservable factors that may affect the dependent variable. Thus EBM and DiD model may deliver a more precise estimation of the relationship. The coefficients under CEM and PSM may be sensitive to these unobservable factors and may lose significance under the DiD model. Note that firms may need more time to adjust their pension investment strategies after experiencing a large UI increase.

The control variable, *%Equity*, and the firm-specific independent variables, $Maturity_{t+1}$, $Leverage_{t+1}$, and $Divp_{t+1}$, have significant coefficients in Model (1), which is consistent with previous literature. This indicates that the DiD model is better at capturing the relationship between the control and dependent variables since it controls for unobservable factors and reduces noise in the test.

Overall, the results in panels A and B of Table 3.2 show a positive and significant association between a UI benefit increase and firms' pension asset allocations. Firms are willing to increase equity investments when employees become eligible to receive higher benefits from state governments. These empirical findings are consistent with the theory that firms take more risks when employees' perceptions of unemployment risk are reduced. These results indicate that UI benefits can have an economically significant impact on pension investment composition, and the increased equity investments can have a significant economic impact on firms' overall performance.

3.5.2 Extended windows

The main test in Table 3.2 compares observations for years t and t+1 for firms in treatment and control states. In this section, I expand the window to three years after a UI benefit increase in event year t. I posit that it may take longer for firms to adjust their pension investment policies after a UI increase. Moreover, the pension investment strategy period affected by an unemployment benefits increase may be longer than one year.

Table 3.3, panel A, shows the results of Equation (3.1a) using the fixed effects model. The coefficients for the main variable of interest, *Benefit*, are positive and significant across all specifications: using the control variables and the state-level control variables (*GDP, Unemp_rate, Election, Democrat*) in the unmatched observations (column (1)); controlling for the firm financial variables (*Assets, ROA*) in the unmatched observations (column (2)); using EBM to match the unmatched observations (columns (3) and (4)); using CEM to match the unmatched observations (columns (5) and (6)); and using PSM to match the unmatched observations (columns (7) and (8)). The coefficients are similar to the main test, and indicate that firms allocate more pension assets into equity investments after UI increase. An increase in UI influences firms' pension asset allocation strategies for more than one year. The control variables *%Equity* and *Maturity*$_{t+1}$ show similarly positive coefficients in the No Matching and CEM specifications as in the main test.

[Insert Table 3.3 about here]

Table 3.3, panel B, shows the results of Equation (3.1b) using the DiD model. The main variable of interest, *Treat*Post*, has significant coefficients across all specifications, including the observations without matching, and the matched observations with the three different techniques. This indicates that firms may adjust their pension investment plans during the extended windows after a UI increase.

3.5.3 Importance of firm financial constraints

According to previous literature, employees' perceived unemployment risk is higher when firms are financially constrained (Ofek, 1993; John, Lang & Netter, 1992; Agrawal & Matsa, 2013). Agrawal and Matsa (2013) suggest that firms face more pressure to maintain conservative financial policies when they are constrained by the higher wage differentials required by employees to compensate for unemployment risk. The increase in UI benefits can reduce this pressure, and financially constrained firms are more likely to take greater financial risks.

However, in contrast, some previous literature has found that financially constrained firms are inclined to have less risky pension investments (An et al., 2013; Bartram, 2018; Rauh, 2009). I predict that financially constrained firms are less likely to take greater pension investment risks after an increase in UI benefits.

I examine this by grouping firms based on the financial constraint indicators used by Agrawal and Matsa (2013), such as dividend policy, cash flows, and firm size. I then explore the relation between UI benefits and pension assets invested in equity for each group separately.

The first constraint indicator classifies firms according to their dividend policies. As Agrawal and Matsa (2013) note, firms that do not issue dividends are more likely to be financially constrained. Also, firms with low operating cash flows are likely to have difficulty raising external financing (Kaplan & Zingales, 1997; Agrawal & Matsa, 2013). Moreover, smaller firms usually face tighter constraints than larger firms (Hadlock & Pierce, 2010).

I examine the impact of UI benefits on pension asset allocation strategies for firms with above- and below-median measures for the three financial constraint indicators. Table 3.4 presents the results: column (1) for firms that issue zero dividends; column (2) for firms that issue positive dividends; column (3) for firms with below-median operating cash flows; column (4) for firms with above-median operating cash flows; column (5) for firms with below-median total assets; and column (6) for firms with above-median total assets. Thus, columns (1), (3), and (5) show results for firms facing stronger financial constraints, while columns (2), (4), and (6) show results for firms facing weaker financial constraints.

As the table shows, the relation between UI benefit levels and pension asset allocations is particularly strong for firms with higher operating cash flows (column (4)) or larger sizes (column (6)). A 100-log point increase in the maximum total UI benefit is associated with a 5% increase in equity pension investments (column (4)). This is much higher than the 2% average increase reported in my main test in Table 3.2. It also implies that, when firms face stronger financial constraints, the relationship between UI benefits and pension asset allocations is less economically significant (column (1)) or insignificant (columns (3) and (5)). The difference between the coefficients is statistically significant for all the financial constraints models.

[Insert Table 3.4 about here]

These findings suggest that firms are more likely to consider employee unemployment costs when setting pension investment policy if they face lower financial constraints. This is consistent with previous pension literature showing that less financially constrained firms take greater pension investment risks.

3.6 Additional Analysis

3.6.1 Pension plan freeze

The main analysis so far has been based solely on DB plans. However, there are two types of pension plans, DB and DC. Under a DB plan, employees are guaranteed a specific level of benefits after they retire until their deaths. Under a DC plan, the employer makes a fixed contribution each year to employees' individual accounts. The most common DC plan used by firms is a 401(k) plan, which allows employees to choose their own retirement investments, with no guaranteed minimum or maximum benefits.

The level of contributions needed in DB plans is uncertain, as they depend on the returns on the pension plan assets. Firms bear the risks associated with the provision of future payouts, such as pension investment risk and mortality risk (Munnell, Golub-Sass, Soto & Vitagliano, 2007). DC plans are generally cheaper for employers to offer than DB plans, because they ultimately transfer most of the pension plan risk to employees (Kieso, Weygandt & Warfield, 2016; Munnell & Soto, 2004). Coopers (2005) estimates that DB plans cost approximately 5%-7% of total payroll, while DC plans cost about 3%. Moreover, because they are responsible for their own pension investments, employees face greater longevity risk under DC plans. Since the early 2000s, a growing number of firms have opted to freeze their DB plans, and have switched to DC plans (Comprix & Muller, 2011).

Sundaram and Yermack (2007) find that, for S&P 500 firms with DB plans, CEO pensions are a major part of overall compensation. Employees with DB pension plans have unsecured debt-like claims on firms. Thus, in the event of a bankruptcy, employees with pension claims are ranked last, alongside other unsecured debtholders. The PBGC cannot cover all the pension benefits for managers, so managers' incentives may be aligned with those of debtholders. And they may take on less risk in order to avoid bankruptcy and pension losses, especially if pension benefits comprise a large part of their overall compensation. When managers bear the same default risk as other outside unsecured creditors, this is referred to as "debt bias" (PBGC, 2017).

A DB plan freeze reduces managers' "debt bias," and better aligns their incentives with those of shareholders. Choy, Lin and Officer (2014) find that, after a DB plan freeze, firms become more aggressive and take on greater investment and financing risk. Atanasova and Hrazdil (2010) state that a DB plan freeze has a positive effect on firms' equity returns and credit ratings.

From an employee perspective, when the firm switches to a DC plan, such as a 401k, it greatly increases employees' pension risk. Because employees must assume responsibility for their own investments, they can lose value if their portfolios perform poorly. This lowers employees' perceived job security, and increases the wage differentials required to compensate for the risk of DC investments (McFarland, Pang & Warshawsky, 2009).

However, DC plans feature some positive characteristics. Any investment growth is tax-free, and there is no cap on growth. Employees can earn higher pension benefits than under DB plans if their portfolios perform well. Also, if they switch jobs or experience a merger, it is much easier to move and continue contributing to a DC plan. DB plans are more beneficial for employees when they stay with the same firm for many years, as they are based on employee wages and length of employment. The wage compensation demanded by employees to cover DC investment risk differs according to individual risk aversion and preferences.

Overall, when firms freeze their DB plans, employees' unemployment risk increases, concurrently with their pension risk. This increased unemployment risk can be offset by unemployment benefit increases. It could also encourage firms to switch to DC plans to obtain long-term benefits for the firm. Because DC plans reduce pension risk and costs, they can also reduce firm risk dramatically in the long-run. To test the impact of UI benefit change on firm's pension plan freeze decisions, I posit the following hypothesis:

Hypothesis 3.2: Firms' pension plan freezes probabilities are expected to be higher after an increase in unemployment insurance benefits.

3.6.1.1 Main tests

To test the above hypothesis, I use the following regression:

$$\begin{aligned} Freeze_{i,t+1} = {} & \beta_0 + \beta_1 Benefit_{i,t} + \beta_2 Fund_{i,t+1} + \beta_3 Plan\_Size_{i,t+1} + \beta_4 Loss_{i,t+1} + \\ & \beta_5 \Delta Lev_{i,t+1} + \beta_6 \Delta Sales\%_{i,t+1} + \beta_7 \Delta Dividends_{i,t+1} + \beta_8 Asset_{i,t+1} + \\ & \beta_9 ROA_{i,t+1} + \beta_{10} GDP_{i,t+1} + \beta_{11} Unemp\_rate_{i,t+1} + \beta_{12} Election_{i,t+1} + \\ & \beta_{13} Democrat_{i,t+1} + \beta_f Firm + \beta_s State \end{aligned} \tag{3.2a}$$

$$\begin{aligned} Freeze_{i,t+1} = {} & \beta_0 + \beta_1 Treat + \beta_2 Post + \beta_3 Treat * Post + \beta_4 Fund_{i,t+1} + \\ & \beta_5 Plan\_Size_{i,t+1} + \beta_6 Loss_{i,t+1} + \beta_7 \Delta Lev_{i,t+1} + \beta_8 \Delta Sales\%_{i,t+1} + \\ & \beta_9 \Delta Dividends_{i,t+1} + \beta_{10} Asset_{i,t+1} + \beta_{11} ROA_{i,t+1} + \beta_{12} GDP_{i,t+1} + \\ & \beta_{13} Unemp\_rate_{i,t+1} + \beta_{14} Election_{i,t+1} + \beta_{15} Democrat_{i,t+1} \end{aligned} \tag{3.2b}$$

where the dependent variable $Freeze_{t+1}$ is an indicator variable that equals 1 when firms freeze their DB pension plans. Pension plan freeze data are collected from Form 5500.[16] Certain factors influence a firm's decision to freeze

[16] There are three types of pension freeze: "hard" freeze (accruals of new benefits are closed for all employees), "soft" freeze (limited growth in benefits) or "partially" freeze (pension plan is closed for some employees and is still open for other employees). Due to lack of reliable information, I

its pension plan. In this chapter, I include $Fund_{t+1}$, $Plan\_Size_{t+1}$, $Loss_{t+1}$, ΔLev_{t+1}, $\Delta Sales\%_{t+1}$, and $\Delta Dividends_{t+1}$ as control variables (Choy et al., 2014). $Fund_{t+1}$ is the percentage funded, measured as pension assets divided by PBO in state year t+1. $Plan\_Size_{t+1}$ is pension plan size, measured as PBO divided by total assets in state year t+1. $Loss_{t+1}$ is an indicator variable that equals 1 if the firm reported a loss in the prior year in state year t+1. ΔLev_{t+1} is the change in leverage in the prior year in state year t+1. $\Delta Sales\%_{t+1}$ is the percentage change in sales in state year t+1. $\Delta Dividends_{t+1}$ is the change in dividend payouts of the prior year in state year t+1. I include the same firm characteristic control and state-level control variables as in Equation (3.1). Equation (3.2a) shows the fixed effect model and Equation (3.2b) shows the DiD model.

Appendix 3.2 reports the summary statistics and correlations for the firm observations used for the following tests. Panel A shows the summary statistics for the observations used to test the relationship between pension plan freezes and UI benefits. The observation size is smaller than that for the main test, because pension plan freeze data are only available since 2002.

The dependent variable $Freeze_{t+1}$ has a mean of 0.159, which indicates that 15.9% of firms freeze their DB plans. The mean and median of $Plan\_Size_{t+1}$ is 0.193 and 0.131 respectively, which indicates that pension obligations account for 19.3% on average of total assets. The mean of $Loss_{t+1}$ is 0.095, which indicates that 9.5% of total observations report a loss.

Appendix 3.2, panel B, shows the pairwise Pearson and Spearman correlations across variables used in the following multivariate analysis. The correlation between $Loss_{t+1}$ and $Freeze_{t+1}$ is significantly positive (0.1099) in

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focus only on hard pension freeze. Pension plan hard freeze data are available on Form 5500 from 2002.

Pearson correlation, indicating a positive relationship between a firm's pension plan freeze and its reported loss. Overall, correlation coefficients are modest, which indicates multicollinearity in the subsequent multivariate analysis is not a concern.

Table 3.5, panel A, shows the coefficients, with t-statistics in parentheses, from the pooled regression estimation of Equation (3.2a). Columns (1) and (2) show results using the observations without matching techniques; columns (3) and (4) show results using the EBM matching method; columns (5) and (6) show results using the CEM matching method; and columns (7) and (8) show results using the PSM matching method. Columns (1), (3), (5), and (7) include state economic control variables (*GDP, Unemp_rate, Election, Democrat*); columns (2), (4), (6), and (8) include both firm financial (*Assets, ROA*) and state economic control variables (*GDP, Unemp_rate, Election, Democrat*).

[Insert Table 3.5 about here]

The dependent variable is $Freeze_{t+1}$, an indicator that equals 1 if firms hard freeze their DB plans. The primary independent variable of interest is *Benefit*. The coefficient in column (1) is 0.143, which indicates that a 100-log point increase in the maximum total unemployment benefit is associated with a 14.3% higher probability of a DB plan freeze. This result is robust to the inclusion of firm financial controls (*Assets, ROA*) in column (2). The coefficients on *Benefit* remain positive and statistically significant across the three matching methods (columns (3) to (8)). The coefficients indicate that a firm's probability of freezing its DB plan increases from 8.1% to 14.3% after a state unemployment benefit increase across all specifications using the different matching techniques. The results support my prediction and indicate that an increase in *Benefit* significantly predicts changes in the dependent variable.

Control variable $Plan\_Size_{t+1}$ has generally positive and significant coefficients, which indicates that firms with larger pension obligations are more likely to freeze their DB plans. ΔLev_{t+1} also shows positive coefficients, even though they are not always significant, which indicates that firms may freeze their plans when leverage increases.

Table 3.5, panel B, shows results using the DiD specification in Equation (3.2b). *Treat* is an indicator that equals 1 for treatment firms, and 0 otherwise. Post is an indicator that equals 1 in the year following the increase in unemployment benefits, and 0 otherwise. The main independent variable of interest is *Treat*Post*, which captures the impact of unemployment benefit increases on the treatment group.

The coefficients for *Treat*Post* are insignificant across all models. This result differs from that for the fixed effects model in panel A. I posit that the difference is driven by the DiD model specification. DiD models implicitly control for unobservable factors that may affect the dependent variable, and deliver a more precise estimate of the relationship. The relationship between a pension plan freeze and a UI benefit increase could be sensitive to those unobservable factors, and could, therefore, lose significance under the DiD model.

Overall, the results in Table 3.5, panel A, show a significantly positive association between a UI benefit increase and firms' pension plan freeze decisions. The probability of a DB plan freeze tends to increase when employees are eligible to receive higher benefits from state governments. My empirical findings are consistent with the notion that firms take more risk when employees' perceptions of unemployment risk are reduced.

3.6.1.2 Extended windows

The test in Table 3.5 in the previous subsection compares observations for years t and t+1 for firms in the treatment and control states. In this section, I expand the window to three years after a UI benefit increase in event year t. In this case, it may take longer for firms to freeze their DB plans after a UI benefit increase.

Table 3.6, panel A, shows the result of Equation (3.2a) using a fixed effects model. The coefficients for the main variable of interest, *Benefit*, are positive and significant across all specifications.

[Insert Table 3.6 about here]

The coefficients for *Benefit* are similar to those in the main test, which indicates that a UI benefit increase impacts firms' pension plan freeze decision in subsequent periods. Table 3.6, panel B, shows the results of Equation (3.2b) using a DiD model. The main variable of interest, *Treat*Post*, is insignificant across all models.

The results from the fixed effects model are more pronounced than those from the main test, which indicates that firms may decide to freeze their pension plans during the extended windows after an increase in UI benefits.

3.6.1.3 Importance of firm financial constraints

The size of the compensating wage differentials can be affected by factors such as financial constraints (Pinheiro & Visschers, 2015). Firms that are financially constrained are generally considered to have higher unemployment risk. The compensation required will, therefore, be higher than for a firm with lower unemployment risk, so those firms will have higher incentives to make decisions that will decrease their unemployment risk. Prior literature suggests that employees' perceived unemployment risk will increase if firms freeze their DB plans. An increase in UI benefits can help reduce this risk.

As described earlier, the three financial constraint indicators used to divide the observations are dividend policy, cash flows, and firm size. The first financial constraint indicator classifies firms according to their dividend policies. As per previous literature, firms that do not issue dividends are more likely to be financially constrained (Agrawal & Matsa, 2013). It is also difficult for firms with low operating cash flows to raise external financing (Kaplan & Zingales, 1997; Agrawal & Matsa, 2013). Moreover, smaller firms usually face tighter constraints than larger firms (Hadlock & Pierce, 2010).

I examine the impact of UI benefits on firms' pension plan freeze probabilities for firms with above- and below-median measures for the three financial constraint indicators. Table 3.7 reports the results: column (1) for firms that issue zero dividends; column (2) for firms that issue positive dividends; column (3) for firms with below-median operating cash flows; column (4) for firms with above-median operating cash flows; column (5) for firms with below-median total assets; and column (6) for firms with above-median total assets. Thus, columns (1), (3), and (5) show results for firms facing stronger financial constraints, while columns (2), (4), and (6) show results for firms facing weaker financial constraints.

[Insert Table 3.7 about here]

As the table shows, the relationship between the level of UI benefits and pension plan freeze probabilities is particularly strong for firms facing weaker financial constraints. A 100-log point increase in the maximum total UI benefit is associated with a 25.9% increase in pension plan freeze probability (column 2). This is much higher than the average 10% increase for firms facing stronger financial constraints (columns (1), (3), and (5)).

These findings suggest that firms are more likely to consider employees' unemployment costs when deciding to freeze their DB pension plans if they face weaker financial constraints. The result is consistent with previous pension literature that finds firms with weaker constraints are more likely to take greater pension risks (Rauh, 2009).[17]

3.6.2 Pension plan accounting actuarial assumptions

There are other ways to increase employees' job security and decrease compensating wage differentials. Dou et al. (2016) claim that firms may manage long-run earnings upward to increase employees' perceptions of employment security. This can be achieved by managing long-run income-increasing choices such as depreciation, inventory, short-run accrual, and real earnings management (Dou et al., 2016). And, according to Bergstresser et al. (2006), the pension ERR can be used as an accrual earnings management tool.

According to both SFAS 87 and 158, firm has to use ERR to estimate pension plan assets' return. The ERR is an assumption made by managers based on long-run market expectations. The estimated expected return is deducted from pension expenses recorded on the income statement. A higher ERR will reduce pension expenses and increase reported earnings. The ERR is a long-run accounting estimate that does not have an immediate reverse effect. Differences between the ERR and actual returns give rise to actuarial gains and losses; however, these are recorded as other comprehensive income as long as it does not trigger corridor threshold under SFAS 87 or 158, so they can be shielded from reported earnings. Firms can manage ERR upward to increase earnings and enhance employee job security. After a UI benefit increase, firms may decrease

[17] I run the same tests using a control sample without the state filter. The results are consistent with those reported above.

reported ERR to reverse previous upwards ERR management. This leads to the next hypothesis:

Hypothesis 3.3: Firms' expected rate of return is expected to be lower after an unemployment insurance benefits increase.

3.6.2.1 Tests

To test the above prediction, I use the following equation:

$$ERR_{i,t+1} = \beta_0 + \beta_1 Benefit_{i,t} + \beta_2 ERR_{i,t} + \beta_3 \%Equity_{i,t+1} + \beta_4 Maturity_{i,t+1} + \beta_5 Fund_{i,t+1} + \beta_6 Leverage_{i,t+1} + \beta_7 Plan\_Size_{i,t+1} + \beta_8 Asset_{i,t+1} + \beta_9 ROA_{i,t+1} + \beta_{10} GDP_{i,t+1} + \beta_{11} Unemp\_rate_{i,t+1} + \beta_{12} Election_{i,t+1} + \beta_{13} Democrat_{i,t+1} + \beta_f Firm + \beta_s State \quad (3.3a)$$

$$ERR_{i,t+1} = \beta_0 + \beta_1 Treat + \beta_2 Post + \beta_3 Treat * Post + \beta_4 ERR_{i,t} + \beta_5 \%Equity_{i,t+1} + \beta_6 Maturity_{i,t+1} + \beta_7 Fund_{i,t+1} + \beta_8 Leverage_{i,t+1} + \beta_9 Plan\_Size_{i,t+1} + \beta_{10} Asset_{i,t+1} + \beta_{11} ROA_{i,t+1} + \beta_{12} GDP_{i,t+1} + \beta_{13} Unemp\_rate_{i,t+1} + \beta_{14} Election_{i,t+1} + \beta_{15} Democrat_{i,t+1} \quad (3.3b)$$

where the dependent variable here, ERR_{t+1}, is the assumed expected rate of return on DB pension plan assets. The main variable of interest is *Benefit.* Explanatory control variables that may affect ERR, other than *Benefit*, are lag-dependent variable *ERR*, $\%Equity_{t+1}$, $Maturity_{t+1}$, $Fund_{t+1}$, $Leverage_{t+1}$, and $Plan\_Size_{t+1}$. I include the same firm characteristics and control and state-level control variables as in Equation (3.1). Equation (3.3a) shows the fixed effect model and Equation (3.3b) shows the DiD model.

Appendix 3.3 reports the summary statistics and correlations for the firm observations used in the following tests. Panel A shows the summary statistics for the firm observations used to test the relationship between ERR_{t+1} and the UI benefit. The dependent variable ERR_{t+1} has a mean of 8.474. The mean of $Plan\_Size_{t+1}$ is 0.183, which indicates that pension obligations account for an average of 18.3% of total assets. Panel B shows the pairwise Pearson and Spearman correlations across the variables used in the following multivariate analysis. The correlation between ERR_{t+1} and $Plan\_Size_{t+1}$ is significantly positive (0.1353) in Pearson correlation test, indicating a positive relationship between firms' pension ERR and plan size. However, there is a strong correlation between ERR_{t+1} and *ERR* which is expected due to the stickiness of ERR determination.

Table 3.8, panel A, shows coefficients, with t-statistics in parentheses, from the pooled regression estimation of Equation (3.3a). Columns (1) and (2) show results using the observations without matching techniques; columns (3) and (4) show results using the EBM matching method; columns (5) and (6) show results using the CEM matching method; and columns (7) and (8) show results using the PSM matching method. Columns (1), (3), (5), and (7) include state economic control variables (*GDP, Unemp_rate, Election, Democrat*); columns (2), (4), (6), and (8) include both firm financial (*Assets, ROA*) and state economic control variables (*GDP, Unemp_rate, Election, Democrat*). The dependent variable is ERR_{t+1}, which is the expected rate of return used to estimate pension investment returns.

[Insert Table 3.8 about here]

The primary independent variable of interest is *Benefit*. The coefficient in column (1) is -0.232 and significant at the 1% level, which indicates that a 100-log point increase in the maximum total unemployment benefit is associated with a 23.2% decrease in reported ERR. This is economically significant, since the majority of the ERR range difference is around 1%. This result is robust after including firm financial controls (Assets, ROA) in column (2). The coefficients of

Benefit remain statistically significant across the three matching methods (columns (3) to (8)). The coefficients indicate that firms decrease reported ERR after a state unemployment benefits increase across observations using the different matching techniques. The results support my prediction and indicate that an increase in *Benefit* significantly predicts changes in the dependent variable.

The explanatory control variables generally have significant coefficients in the different models, even though they are not always significant, indicating that they have an impact on firms' ERR estimate, consistent with prior research.

Table 3.8, panel B, shows results using a DiD specification (Equation 3.3b). *Treat* is an indicator that equals 1 for the treatment firms, and 0 otherwise. *Post* is an indicator that equals 1 in the year following an increase in unemployment benefits, and 0 otherwise. The main independent variable of interest is *Treat*Post*, which captures the impact of an unemployment benefits increase on the treatment group.

The coefficients for *Treat*Post* are only significant in the CEM matching observations. This result differs from that for the fixed effects model in panel A. I posit that the difference is driven by the DiD model specification. DiD models implicitly control for unobservable factors that may affect the dependent variable, and deliver a more precise estimation of the relationship. The relationship between pension ERR and a UI benefit increase could be sensitive to those unobservable factors, and could therefore lose significance under the DiD model. The difference may also be driven by the sample differences under the various matching methods.

Overall, the results in panels A and B of Table 3.8 show some evidence that there is a negative association between a UI benefit increase and firms' reported ERR. There is some evidence to show that firms tend to unwind prior upward

ERR management when employees are eligible to receive higher benefits from state governments. These empirical findings are consistent with previous literature (Dou et al., 2016), and with the theory that firms take greater risks when employee perceptions of unemployment risk are reduced.

3.6.2.2 Extended windows

The test in Table 3.8 reported in the previous subsection compares observations for years t and t+1 for firms in the treatment and control states. In this section, I expand the window to three years after the UI benefits increase in event year t. I posit that it may take longer for firms to unwind prior to ERR management after a UI benefit increase.

Table 3.9, panel A, shows the results of Equation (3.3a) using a fixed effects model. The coefficients for the main variable of interest, *Benefit*, are negative and statistically significant at the 1% level across all specifications. The coefficients are similar to those in my main test, and indicate that an increase in the UI benefit has an impact on firms' ERR management behaviour in the following periods. Table 3.9, panel B, shows the results of Equation (3.3b) using a DiD model. The main variable of interest, *Treat*Post*, is insignificant across all models.

The results for the fixed effects model are more pronounced than those for the main test. This indicates that firms may decide to unwind their prior ERR management during the extended windows after a UI benefit increase.[18]

[Insert Table 3.9 about here]

[18] I run the same tests using the control sample without the state filter. The results are consistent to those reported above.

3.6.2.3 Importance of firm financial constraints

As previously discussed, the size of the compensating wage differentials can be affected by factors such as financial constraints (Pinheiro & Visschers, 2015). Financially constrained firms have higher incentives to decrease unemployment risk when making decisions. Previous literature has found that managing earnings upward can decrease employees' perceived unemployment risk. An increase in UI benefits can help reduce this risk.

I examine the impact of UI benefits on pension ERR management for firms with above and below-median measures for the three financial constraint indicators. Table 3.10 reports the results: column (1) for firms that issue zero dividends; column (2) for firms that issue positive dividends; column (3) for firms with below-median operating cash flows; column (4) for firms with above-median operating cash flows; column (5) for firms with below-median total assets; and column (6) for firms with above-median total assets. Thus, columns (1), (3), and (5) show results for firms facing stronger financial constraints, while columns (2), (4), and (6) show results for firms facing weaker financial constraints.

As the table shows, the relationship between UI benefit levels and pension ERR management is particularly strong for firms facing weaker financial constraints. A 100-log point increase in the maximum total UI benefit is associated with a 0.29% decrease in pension reported ERR (column (2)). This is higher than the 0.177% decrease for firms facing stronger financial constraints (column (1)).

[Insert Table 3.10 about here]

These findings suggest that firms are more likely to consider employees' unemployment costs when deciding to unwind their prior ERR management if they face lower financial constraints. This result is consistent with previous pension literature that firms with lower financial constraints are more willing to take more pension risk.

3.7 Robustness Tests

In this section, I describe several tests intended to enhance identification and examine robustness. First, I run a falsification test to estimate omitted state-level economic conditions. Next, I use less strict matching criteria to select the treatment and control firms, and examine the robustness of the main results.

3.7.1 Falsification test

The relation between *Benefit* and pension asset allocations, $\%Equity_{t+1}$, examined in the main tests may be affected by unobserved state and regional economic conditions that are correlated with UI benefits (Dou et al., 2016). To address this concern, I use Dou et al.'s (2016) research design, which matches firms in treatment states with those in adjacent states. This method can help reduce regional economic differences across firms.

I test for unobserved state-level economic conditions by adding $Benefit_{t+1}$ and $Benefit_{t+2}$ to the main test equation. If such unobserved conditions are correlated with the UI benefit, they are likely to affect the relation between lagged unemployment benefit changes and pension asset allocations.

Table 3.11 presents the results of the falsification test, which shows that only $Benefit_t$ has significant coefficients in both models. Future benefits $Benefit_{t+1}$ and $Benefit_{t+2}$ are insignificant. This suggests that the probability that $Benefit_t$ can capture unobserved correlated economic conditions, rather than pension asset allocation strategies, is remote.

[Insert Table 3.11 about here]

3.7.2 Matched sample without state filter

Next, I examine Equation (3.1) using different matching criteria for the treatment and control group selection as a robustness test. The treatment group is the same as in the main test: states that experienced a 10% increase in maximum unemployment benefits in a state-year, and no increase in the prior year. The control group includes states that did not experience large increases in the event year or the prior year. I do not require that the treatment states and control states be adjacent. By removing the neighbouring state filter, the sample size increases significantly, since there are more control states matched to treatment states.

Table 3.12, panel A, shows the results of examining Equation (3.1) using a fixed effects model. The main variable of interest, *Benefit*, has positive and significant coefficients across all groups of observations with different matching techniques. The coefficients are more pronounced than those in my main test results in Table 3.2, panel A. The highest coefficient in Model (8), 0.031, indicates that firms increase the percentage invested in equity by 3.1% after an increase in UI benefits.

Panel B shows the results of the relationship between firms' pension asset allocation strategies and the UI benefit using a DiD model. The main variable of interest, *Treat*Post*, exhibits significantly positive coefficients across all matching models (columns (1) to (8)).

[Insert Table 3.12 about here]

Table 3.13 shows the results of Equation (3.1), using the extended window of three years of data after an increase in UI. Panel A shows the results of examining Equation (3.1) using a fixed effects model. The main variable of interest, $Benefit_t$, has significant coefficients across all groups of observations with different matching techniques. The coefficients are more pronounced than those in the main test results in Table 3.3, panel A. The highest coefficient in Model (6), 0.027, indicates that firms increase their percentage invested in equity by 2.7% after an increase in UI benefits.

[Insert Table 3.13 about here]

Panel B shows the results of the relationship between firms' pension asset allocation strategies and the UI benefit using a DiD model. The main variable of interest, *Treat*Post*, exhibits significantly positive coefficients across all matching models (columns (1) to (8)). These results are also stronger than my main result in Table 3.3, panel B, especially under PSM matching.

Overall, the results of the robustness tests are consistent with the main test. The results show a more powerful relationship between firms' pension asset allocations and the UI benefit. Note that the increased sample size may increase the power of the test, and hence explain these results.

3.8 Conclusion

The labour economics literature states that employees bear substantial costs in the event of involuntary unemployment. This leads to higher wage premiums to compensate for that risk. Therefore, firms have an incentive to reduce the wage premium by reducing employees' perceptions of unemployment risk. Previous literature has found that firms use capital policies, earnings management, and disclosure strategies to reduce these perceptions. This chapter contributes to the literature by providing new evidence that pension asset allocations and pension earnings management can also be used in this way.

Specifically, this chapter hypothesises and tests whether firms change their pension investment strategies as a way to manage employees' perceptions of unemployment risk. I use the percentage invested in equities as a measure of pension investment risk, and the UI benefit as a proxy for unemployment risk. I provide empirical evidence using both a fixed effect model and a DiD model. The results provide some evidence suggesting that firms increase pension asset investment risk after a UI benefit increase.

I also use a falsification test, extended windows, and a different control group to enhance identification and check the robustness of the main results. Moreover, I control for local macroeconomic effects and political considerations. In further tests, I find that pension plan freeze decisions and pension actuarial earnings management can also impact employees' perceived unemployment risk. I use various cross-sectional tests for pension plan freezes and pension actuarial assumptions earnings management. My evidence is consistent with the idea that firms take more risks with their pension decisions after an increase in UI benefits. This contributes to prior literature in the context of pension decision-making. It provides evidence showing that unemployment risk could affect firm's pension decisions including pension investment strategy, pension plan freeze and pension actuarial assumptions management. This may also help practitioners to understand the managerial incentives firms have when making pension decisions and discover potential earnings management behaviour.

Appendix 3.1: Variable descriptions

Notations	Definitions [Source]
Dependent variables	
% Equity	Market value of pension assets allocated to equity securities, divided by the market value of total pension assets. [Form 5500]
ERR	Assumed expected rate of return on defined benefit pension plan assets. [Compustat]
Freeze	Indicator variable that equals 1 when firms freeze their defined benefit pension plans, and 0 otherwise. [Form 5500]
Main independent variables	
Benefit	Natural log of the maximum number of weeks times the maximum weekly wage benefit amount given to employees in state-year t. [BLS]
Pension asset allocation control variables	
Fund	Fair value of pension assets divided by projected benefit obligation (PBO). [Compustat]
Maturity	Pension maturity measured as the natural logarithm of the ratio of PBO to current service costs. [Compustat]
Leverage	Debt in current liabilities, plus long-term debt divided by total assets. [Compustat]
Divp	Dividends per share divided by retained earnings per share. [Compustat]
Tax	Total tax expense divided by pre-tax income. [Compustat]
ERR control variables	
Plan_Size	PBO divided by total assets. [Compustat]
Pension freeze control variables	
Loss	Indicator variable that equals 1 if the firm reported a loss in the prior year. [Compustat]
Δ*Lev*	Change in leverage in the prior year. [Compustat]
Δ*Sales %*	Percentage change in sales. [Compustat]
Δ*Dividends*	Change in the dividend payout in the prior year. [Compustat]
Firm control variables	
Assets	Natural logarithm of total assets. [Compustat]
ROA	Return on assets to measure profitability. [Compustat]
State-level control variables	
GDP	State GDP growth. [BLS]
Unemp_rate	State unemployment rate. [BLS]
Election	Indicator that equals 1 if there is a presidential election in that year, and 0 otherwise.
Democrat	Indicator that equals 1 if the Democratic presidential candidate received more votes.
Fixed effects	
Firm	Firm fixed effects
State	State fixed effects

Appendix 3.1 (Continued)

Notations	Definitions [Source]
Other variables	
Log max weekly benefit	The natural log of the maximum weekly wage benefit allowance provided to employees in a state-year.
Log max duration	The natural log of the maximum number of weeks a state provides unemployment insurance benefits to claimants.

Appendix 3.2: Pension plan freeze summary statistics

Panel A: Summary statistics for pension freeze decisions

Panel A provides summary statistics for the variables used in estimating the probability of a defined benefit pension plan freeze, while panel B presents the Pearson and Spearman correlations for the variables used. The lower diagonal presents Pearson correlation and upper diagonal presents Spearman correlation. *Freeze* is an indicator that equals 1 when firms freeze their defined benefit pension plans. *Loss* is an indicator that equals 1 if a firm reported a loss in the prior year. *ΔLev* is the change in leverage in the prior year. *ΔSales%* is the percentage change in sales. *ΔDividends* is the change in dividend payout in the prior year. Detailed variable definitions are provided in Appendix 3.1.

stats	N	mean	SD	p25	p50	p75
$Freeze_{t+1}$	5,259	0.159	0.366	0.000	0.000	0.000
Benefit	5,259	19.289	0.839	18.834	19.336	19.816
$Fund_{t+1}$	5,259	0.890	0.522	0.586	0.788	1.022
$Plan\_Size_{t+1}$	5,259	0.193	0.205	0.053	0.131	0.254
$Loss_{t+1}$	5,259	0.095	0.293	0.000	0.000	0.000
ΔLev_{t+1}	5,259	-0.005	0.071	-0.036	-0.007	0.015
$\Delta Sales\%_{t+1}$	5,259	0.040	0.190	-0.047	0.038	0.125
$\Delta Dividends_{t+1}$	5,259	8.813	56.994	0.000	0.025	3.921
$Assets_{t+1}$	5,259	7.681	1.792	6.407	7.717	8.906
ROA_{t+1}	5,259	0.076	0.070	0.035	0.071	0.114

Panel B: Pearson and Spearman correlations for variables

	$Freeze_{t+1}$	*Benefit*	$Fund_{t+1}$	$Plan\_Size_{t+1}$	$Loss_{t+1}$	ΔLev_{t+1}	$\Delta Sales\%_{t+1}$	$\Delta Dividends_{t+1}$	$Assets_{t+1}$	ROA_{t+1}
$Freeze_{t+1}$	1	0.0470*	-0.0884*	-0.0997*	0.1098*	0.0700*	-0.0354*	-0.0670*	-0.0171	-0.0903*
Benefit	0.0541	1	-0.0712*	0.0389*	0.0366*	0.0568*	-0.0706*	-0.0108	0.0144	-0.0760*
$Fund_{t+1}$	-0.0932	-0.0554	1	0.0002	-0.0288*	-0.0273*	-0.0037	-0.0020	-0.1085*	-0.0184
$Plan\_Size_{t+1}$	-0.0277	0.0299	0.0238	1	0.0894*	-0.0096	-0.0714*	-0.0720*	-0.2336*	0.0730*
$Loss_{t+1}$	0.1099	0.0271	-0.0131	0.1528	1	0.1087*	-0.0321*	-0.1599*	-0.1486*	-0.3627*
ΔLev_{t+1}	0.0559	0.0488	-0.0070	0.0093	0.0759	1	-0.0476*	-0.0478*	0.0351*	-0.1896*
$\Delta Sales\%_{t+1}$	-0.0278	-0.0654	0.0060	-0.0569	-0.0308	-0.0221	1	0.1798*	0.0562*	0.2566*
$\Delta Dividends_{t+1}$	-0.0455	0.0049	-0.0233	-0.0398	-0.0643	0.0219	0.0937	1	0.3037*	0.2628*
$Assets_{t+1}$	-0.0224	0.0096	-0.0979	-0.2033	-0.1574	0.0135	0.0480	0.2349	1	0.0484*
ROA_{t+1}	-0.0868	-0.0813	-0.0104	-0.0913	-0.3858	-0.1520	0.2570	0.1459	0.0490	1

Appendix 3.3: Pension actuarial assumptions summary statistics

Panel A: Summary statistics for ERR

Panel A provides summary statistics for the variables used in estimating ERR management, while panel B presents the Pearson and Spearman correlations for the variables used. The lower diagonal presents Pearson correlation and upper diagonal presents Spearman correlation. *ERR* is the expected rate of return on pension assets. *Plan_Size is* PBO divided by total assets. Detailed variable definitions are in Appendix 3.1.

stats	N	mean	SD	min	p25	p50	p75	max
ERR_{t+1}	7,210	8.474	0.837	6.000	8.000	8.500	9.000	10.500
Benefit	7,210	19.035	1.026	16.192	18.300	19.177	19.656	23.136
ERR	7,210	8.585	0.879	2.500	8.000	8.500	9.000	13.000
$\%Equity_{t+1}$	7,210	0.292	0.346	0.000	0.000	0.043	0.594	1.000
$Fund_{t+1}$	7,210	1.038	0.641	0.044	0.668	0.892	1.238	4.068
$Maturity_{t+1}$	7,210	3.623	0.796	1.892	3.148	3.541	3.962	6.617
$Leverage_{t+1}$	7,210	0.289	0.202	0.000	0.149	0.272	0.388	1.088
$Plan\_Size_{t+1}$	7,210	0.183	0.185	0.004	0.059	0.126	0.243	0.980
$Assets_{t+1}$	7,210	7.409	1.848	3.190	6.108	7.425	8.688	11.970
ROA_{t+1}	7,210	0.082	0.069	-0.121	0.042	0.078	0.118	0.295

Panel B: Pearson and Spearman correlations for the variables

	ERR_{t+1}	*Benefit*	*ERR*	$\%Equity_{t+1}$	$Fund_{t+1}$	$Maturity_{t+1}$	$Leverage_{t+1}$	$Plan\_Size_{t+1}$	$Assets_{t+1}$	ROA_{t+1}
ERR_{t+1}	1	-0.1927*	0.8974*	-0.0944*	0.2549*	-0.1167*	0.1573*	0.1714*	-0.0475*	0.0757*
Benefit	-0.1632	1	-0.1691*	0.0471*	-0.1807*	0.1842*	-0.0486*	0.0816*	0.1173*	-0.0734*
ERR	0.8798	-0.1464	1	-0.1015*	0.2148*	-0.0902*	0.1507*	0.1821*	-0.0153	0.0643*
$\%Equity_{t+1}$	-0.0698	0.0585	-0.0742	1	0.0274*	-0.0787*	-0.1081*	-0.1349*	-0.2254*	-0.0488*
$Fund_{t+1}$	0.1980	-0.1192	0.1686	0.0065	1	-0.1394*	-0.0007	-0.0057	-0.1597*	0.0207*
$Maturity_{t+1}$	-0.1518	0.1664	-0.1331	-0.0482	-0.1235	1	0.0679*	0.3657*	0.1583*	-0.0786*
$Leverage_{t+1}$	0.1200	-0.0441	0.1195	-0.0705	0.0038	0.0283	1	-0.0532*	0.0991*	-0.1074
$Plan\_Size_{t+1}$	0.1353	0.0741	0.1429	-0.0873	-0.0010	0.3505	-0.0834	1	-0.1851*	0.0843*
$Assets_{t+1}$	-0.0315	0.1122	-0.0021	-0.2299	-0.1249	0.0982	0.0381	-0.1368	1	0.0129
ROA_{t+1}	0.0677	-0.0662	0.0554	-0.0291	0.0115	-0.0939	-0.0754	-0.0673	0.0171	1

Table 3.1: Descriptive statistics

Panel A: Summary statistics for pension asset allocation

Table 3.1, panel A, provides summary statistics for the variables used in estimating the model where the dependent variable is pension asset allocation, while panel B presents the Pearson and Spearman correlations for the variables used. The lower diagonal presents Pearson correlation and upper diagonal presents Spearman correlation. *%Equity* is the percentage of pension assets invested in equity in the year after the benefit increase. *Benefit* is the natural log of the maximum number of weeks times the maximum weekly wage benefit amount given to employees in state-year t. *Treat* is an indicator that equals 1 for firm-years in the treatment sample, and 0 otherwise. *Post* is an indicator that equals 1 for the period after an increase in unemployment benefits, and 0 otherwise. *Fund* is the fair value of pension assets divided by the PBO. *Maturity* is pension maturity, which is measured as the natural logarithm of the ratio of PBO to current service costs. *Leverage* is debt in current liabilities, plus long-term debt divided by total assets. *Divp* is dividends per share divided by retained earnings per share. *Tax* is total tax expense divided by pre-tax income. *Assets* is the natural logarithm of total assets. *ROA* is return on assets to measure profitability. *GDP* is the state GDP growth rate. *Unemp_rate* is the state unemployment rate. *Election* is an indicator that equals 1 if there is a presidential election in that year, and 0 otherwise. *Democrat* is an indicator that equals 1 if the Democratic presidential candidate received more votes. Detailed variable definitions are provided in Appendix 3.1.

STATS	N	MEAN	SD	MIN	P25	P50	P75	MAX
%Equity$_{t+1}$	8,434	0.276	0.338	0.000	0.000	0.019	0.559	0.996
Benefit	8,434	18.931	1.046	16.192	18.240	18.991	19.601	23.136
%Equity	8,434	0.270	0.333	0.000	0.000	0.015	0.547	1.000
Fund$_{t+1}$	8,434	1.031	0.641	0.039	0.661	0.904	1.238	4.068
Maturity$_{t+1}$	8,434	3.553	0.783	1.756	3.085	3.490	3.906	6.389
Leverage$_{t+1}$	8,434	0.284	0.192	0.000	0.148	0.270	0.384	0.986
Divp$_{t+1}$	8,434	0.072	0.208	-0.666	0.000	0.032	0.080	1.314
Tax$_{t+1}$	8,434	0.180	0.517	-3.342	0.141	0.258	0.334	1.775
Assets$_{t+1}$	8,434	7.304	1.848	3.176	5.988	7.328	8.570	11.926
ROA$_{t+1}$	8,434	0.083	0.069	-0.119	0.045	0.079	0.119	0.299

Table 3.1 (Continued)

Panel B: Pearson and Spearman correlations for variables

	$\%Equity_{t+1}$	*Benefit*	*%Equity*	$Fund_{t+1}$	$Maturity_{t+1}$	$Leverage_{t+1}$	$Divp_{t+1}$	Tax_{t+1}	$Assets_{t+1}$	ROA_{t+1}
$\%Equity_{t+1}$	1	0.0788*	0.8753*	0.0232*	-0.0500*	-0.0953*	-0.0981*	0.0301*	-0.2151*	-0.0413*
Benefit	0.0909	1	0.0692*	-0.1780*	0.2175*	-0.0467*	-0.0897*	-0.0499*	0.1262*	-0.0770*
%Equity	0.8621	0.069	1	0.0202*	-0.0413*	-0.0869*	-0.0950*	0.0258*	-0.2003*	-0.0524*
$Fund_{t+1}$	0.0039	-0.1064	-0.0050	1	-0.1394*	-0.0148	0.0847*	0.0863*	-0.1773*	0.0178
$Maturity_{t+1}$	-0.0198	0.1945	-0.0100	-0.1359	1	0.0744*	0.0084	-0.0938*	0.1995*	-0.0981*
$Leverage_{t+1}$	-0.0669	-0.0380	-0.0598	-0.0121	0.0398	1	-0.0529*	-0.3785*	0.1203*	-0.1437*
$Divp_{t+1}$	-0.0554	-0.0472	-0.0518	0.0307	0.0300	-0.0011	1	0.1524*	0.2145*	0.2138*
Tax_{t+1}	0.0145	-0.0224	0.0225	0.0187	-0.0259	-0.1305	0.0400	1	-0.0523*	0.3411*
$Assets_{t+1}$	-0.2146	0.1196	-0.1981	-0.1335	0.1365	0.0734	0.0933	0.0183	1	0.0362*
ROA_{t+1}	-0.0298	-0.0696	-0.0354	-0.0002	-0.0988	-0.1243	0.0806	0.1982	0.0426	1

Table 3.2: Pension asset allocation and unemployment insurance benefit increases – One year

Table 3.2 presents coefficients and t-statistics in parentheses from pooled regressions where the dependent variable is ($\%Equity_{t+1}$). Columns (1) and (2) show results using no matching methods; columns (3) and (4) show results using the EBM method; columns (5) and (6) show results using the CEM method; and columns (7) and (8) show results using the PSM method. Panel A gives results for fixed effects specifications, while panel B gives results for difference-in-differences specifications. *%Equity* is the percentage of pension assets invested in equity in the year after the benefit increase. *Benefit* is the natural log of the maximum number of weeks times the maximum weekly wage benefit amount given to employees in state-year t. *Treat* is an indicator that equals 1 for firm-years in the treatment sample, and 0 otherwise. *Post* is an indicator that equals 1 for the period after an increase in unemployment benefits, and 0 otherwise. *Fund* is the fair value of pension assets divided by PBO. *Maturity* is pension maturity, which is measured as the natural logarithm of the ratio of PBO to current service costs. *Leverage* is debt in current liabilities, plus long-term debt divided by total assets. *Divp* is dividends per share divided by retained earnings per share. *Tax* is total tax expense divided by pre-tax income. *Assets* is the natural logarithm of total assets. *ROA* is return on assets to measure profitability. *GDP* is the state GDP growth rate. *Unemp_rate* is the state unemployment rate. *Election* is an indicator that equals 1 if there is a presidential election that year, and 0 otherwise. *Democrat* is an indicator that equals 1 if the Democratic presidential candidate received more votes. Detailed variable definitions are provided in Appendix 3.1. ***p<0.01, **p<0.05, *p<0.1.

Panel A: Fixed effects specification

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
Benefit	0.018***	0.023***	0.015***	0.016***	0.019***	0.021***	0.022***	0.026***
	(4.530)	(4.828)	(4.008)	(3.499)	(4.020)	(3.517)	(4.101)	(4.053)
%Equity	0.580***	0.579***	0.584***	0.584***	0.587***	0.587***	0.564***	0.563***
	(60.525)	(60.398)	(61.755)	(61.717)	(49.965)	(49.948)	(43.137)	(43.041)
$Fund_{t+1}$	0.001	0.000	0.002	0.001	-0.006	-0.006	-0.003	-0.003
	(0.238)	(0.071)	(0.430)	(0.386)	(-1.221)	(-1.244)	(-0.500)	(-0.608)
$Maturity_{t+1}$	0.005	0.004	0.006	0.006	0.013**	0.013**	0.008	0.007
	(1.168)	(0.919)	(1.290)	(1.224)	(2.309)	(2.223)	(1.381)	(1.244)
$Leverage_{t+1}$	-0.006	-0.006	0.006	0.005	-0.035	-0.033	-0.001	-0.003
	(-0.305)	(-0.311)	(0.282)	(0.240)	(-1.394)	(-1.340)	(-0.041)	(-0.111)
$Divp_{t+1}$	-0.006	-0.006	0.002	0.002	-0.018	-0.018	-0.014	-0.013
	(-0.568)	(-0.521)	(0.158)	(0.173)	(-1.303)	(-1.301)	(-0.939)	(-0.888)

Table 3.2 Panel A (Continued)

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
Tax_{t+1}	0.001	0.001	0.001	0.001	0.003	0.003	-0.002	-0.002
	(0.156)	(0.356)	(0.207)	(0.283)	(0.570)	(0.545)	(-0.465)	(-0.315)
$Assets_{t+1}$		-0.013**		-0.003		-0.004		-0.011
		(-2.192)		(-0.580)		(-0.558)		(-1.388)
ROA_{t+1}		-0.050		-0.021		0.011		-0.057
		(-1.153)		(-0.485)		(0.200)		(-0.981)
GDP_{t+1}	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.001	-0.001
	(-0.266)	(-0.179)	(-0.468)	(-0.431)	(-0.312)	(-0.365)	(-1.134)	(-1.045)
$Unemp\_rate_{t+1}$	-0.002	-0.002	-0.002*	-0.002*	-0.002	-0.003	-0.004*	-0.004**
	(-1.196)	(-1.357)	(-1.648)	(-1.689)	(-1.389)	(-1.417)	(-1.930)	(-2.034)
$Election_{t+1}$	0.008*	0.008*	0.007	0.007	-0.001	-0.001	0.016***	0.016***
	(1.893)	(1.953)	(1.622)	(1.632)	(-0.232)	(-0.212)	(2.720)	(2.722)
$Democrat_{t+1}$	0.022***	0.022***	0.021***	0.021***	0.012	0.011	0.017*	0.017*
	(3.035)	(3.048)	(2.969)	(2.981)	(1.375)	(1.342)	(1.693)	(1.738)
Constant	0.036	0.012	0.037	0.034	0.017	-0.001	-0.024	-0.038
	(0.374)	(0.126)	(0.436)	(0.392)	(0.157)	(-0.005)	(-0.202)	(-0.309)
Observations	8,434	8,434	8,434	8,434	6,049	6,049	5,168	5,168
Adjusted R-squared	0.795	0.795	0.811	0.811	0.818	0.818	0.795	0.795
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 3.2 (Continued)

Panel B: Difference-in-differences specification

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
Treat	-0.021***	-0.021***	-0.019***	-0.019***	-0.017**	-0.016**	-0.017**	-0.017**
	(-3.014)	(-3.043)	(-3.523)	(-3.554)	(-2.223)	(-2.085)	(-2.344)	(-2.384)
Post	-0.008**	-0.008**	-0.007	-0.008	0.002	0.002	-0.008	-0.008
	(-1.986)	(-2.002)	(-1.436)	(-1.483)	(0.319)	(0.410)	(-0.876)	(-0.878)
*Treat*Post*	0.020**	0.020**	0.019***	0.019***	0.011	0.011	0.018	0.019
	(2.075)	(2.090)	(2.601)	(2.642)	(1.126)	(1.080)	(1.413)	(1.482)
%Equity	0.875***	0.867***	0.880***	0.871***	0.880***	0.870***	0.874***	0.865***
	(155.238)	(151.247)	(159.837)	(155.510)	(136.008)	(132.020)	(120.850)	(117.155)
$Fund_{t+1}$	0.003	0.000	0.004	0.002	-0.004	-0.005	-0.000	-0.003
	(0.932)	(0.145)	(1.304)	(0.577)	(-1.226)	(-1.527)	(-0.043)	(-0.628)
$Maturity_{t+1}$	-0.005*	-0.002	-0.005**	-0.002	-0.006**	-0.003	-0.003	-0.001
	(-1.863)	(-0.996)	(-2.003)	(-0.718)	(-2.116)	(-0.985)	(-1.059)	(-0.396)
$Leverage_{t+1}$	-0.026***	-0.020**	-0.022**	-0.016*	-0.004	-0.001	-0.022*	-0.016
	(-2.614)	(-2.035)	(-2.417)	(-1.740)	(-0.414)	(-0.134)	(-1.757)	(-1.237)
$Divp_{t+1}$	-0.018**	-0.013	-0.011	-0.004	-0.021**	-0.015	-0.009	-0.004
	(-1.998)	(-1.399)	(-1.305)	(-0.542)	(-2.278)	(-1.569)	(-0.809)	(-0.323)
Tax_{t+1}	-0.003	-0.003	-0.002	-0.001	-0.002	-0.002	-0.008*	-0.008*
	(-0.904)	(-0.794)	(-0.435)	(-0.326)	(-0.492)	(-0.469)	(-1.874)	(-1.850)
$Assets_{t+1}$		-0.008***		-0.008***		-0.009***		-0.008***
		(-7.481)		(-8.627)		(-7.129)		(-6.054)

Table 3.2 Panel B (Continued)

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
ROA_{t+1}		0.025		0.030		0.038		0.050
		(0.880)		(1.104)		(1.169)		(1.381)
GDP_{t+1}	-0.002***	-0.002***	-0.001**	-0.002**	-0.000	-0.001	-0.004***	-0.004***
	(-2.849)	(-3.323)	(-1.993)	(-2.554)	(-0.326)	(-1.067)	(-4.126)	(-4.693)
$Unemp\_rate_{t+1}$	-0.001	-0.000	0.000	0.000	-0.000	-0.000	-0.002	-0.002
	(-0.467)	(-0.222)	(0.026)	(0.281)	(-0.260)	(-0.199)	(-1.412)	(-1.160)
$Election_{t+1}$	0.015***	0.015***	0.009**	0.009**	-0.002	-0.003	0.030***	0.030***
	(3.433)	(3.373)	(2.120)	(2.021)	(-0.349)	(-0.560)	(5.128)	(5.074)
$Democrat_{t+1}$	0.013***	0.011***	0.010**	0.008**	0.008*	0.007	0.007	0.004
	(3.355)	(2.768)	(2.558)	(2.244)	(1.920)	(1.604)	(1.302)	(0.809)
Constant	0.069***	0.121***	0.062***	0.113***	0.068***	0.121***	0.080***	0.133***
	(5.045)	(7.670)	(4.460)	(7.318)	(4.136)	(6.560)	(4.528)	(6.483)
Observations	8,324	8,324	8,324	8,324	5,910	5,910	5,168	5,168
Adjusted R-squared	0.746	0.748	0.757	0.759	0.763	0.765	0.741	0.743

Table 3.3: Pension asset allocation and unemployment insurance benefit increases – Three year

Table 3.3 presents coefficients and t-statistics in parentheses from pooled regressions of the dependent variable *%Equityt+1.* I expand the event window to three years after the event year. Columns (1) and (2) show results using no matching methods; columns (3) and (4) show results using the EBM method; columns (5) and (6) show results using the CEM method; and columns (7) and (8) show results using the PSM method. Panel A gives results for fixed effects specifications, while panel B gives results for difference-in-differences specifications. *%Equity* is the percentage of pension assets invested in equity in the year after the benefit increase. Benefit is the natural log of the maximum number of weeks times the maximum weekly wage benefit amount given to employees in state-year t. *Treat* is an indicator that equals 1 for firm-years in the treatment sample, and 0 otherwise. *Post* is an indicator that equals 1 for the period after an increase in unemployment benefits, and 0 otherwise. *Fund* is the fair value of pension assets divided by PBO. *Maturity* is pension maturity, which is measured as the natural logarithm of the ratio of PBO to current service costs. *Leverage* is debt in current liabilities, plus long-term debt divided by total assets. *Divp* is dividends per share divided by retained earnings per share. *Tax* is total tax expense divided by pre-tax income. *Assets* is the natural logarithm of total assets. *ROA* is return on assets to measure profitability. *GDP* is the state GDP growth rate. *Unemp_rate* is the state unemployment rate. *Election* is an indicator that equals 1 if there is a presidential election that year, and 0 otherwise. *Democrat* is an indicator that equals 1 if the Democratic presidential candidate received more votes. Detailed variable definitions are provided in Appendix 3.1. ***p<0.01, **p<0.05, *p<0.1.

Panel A: Fixed effects specification

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
Benefit	0.011***	0.019***	0.015***	0.016***	0.014***	0.022***	0.011***	0.020***
	(3.638)	(4.974)	(4.030)	(3.517)	(3.966)	(4.927)	(2.923)	(4.295)
%Equity	0.608***	0.607***	0.584***	0.584***	0.616***	0.616***	0.571***	0.569***
	(77.580)	(77.342)	(61.764)	(61.727)	(69.096)	(69.037)	(58.352)	(58.090)
$Fund_{t+1}$	0.007**	0.006*	0.002	0.002	0.004	0.003	0.004	0.003
	(2.168)	(1.833)	(0.463)	(0.419)	(1.119)	(0.853)	(1.015)	(0.703)
$Maturity_{t+1}$	0.007**	0.006*	0.006	0.005	0.011***	0.010**	0.006	0.005
	(1.992)	(1.679)	(1.272)	(1.207)	(2.588)	(2.258)	(1.579)	(1.301)
$Leverage_{t+1}$	0.009	0.009	0.006	0.005	-0.005	-0.004	0.002	-0.002
	(0.549)	(0.530)	(0.293)	(0.250)	(-0.244)	(-0.199)	(0.094)	(-0.081)
$Divp_{t+1}$	-0.010	-0.009	0.002	0.002	-0.010	-0.010	-0.015	-0.015
	(-1.055)	(-1.006)	(0.219)	(0.234)	(-1.036)	(-1.008)	(-1.373)	(-1.329)

Table 3.3 Panel A (Continued)

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
Tax_{t+1}	0.002	0.003	0.001	0.002	-0.000	0.000	0.007	0.008*
	(0.620)	(0.885)	(0.310)	(0.388)	(-0.075)	(0.044)	(1.596)	(1.871)
$Assets_{t+1}$		-0.017***		-0.003		-0.016***		-0.021***
		(-3.706)		(-0.584)		(-3.010)		(-3.607)
ROA_{t+1}		-0.062*		-0.022		-0.023		-0.094**
		(-1.716)		(-0.495)		(-0.525)		(-2.174)
GDP_{t+1}	-0.001	-0.001	-0.000	-0.000	-0.001	-0.001	-0.001	-0.001
	(-1.394)	(-1.371)	(-0.469)	(-0.432)	(-0.989)	(-1.148)	(-1.525)	(-1.423)
$Unemp\_rate_{t+1}$	-0.000	-0.000	-0.002	-0.002*	-0.000	-0.001	0.000	-0.000
	(-0.114)	(-0.354)	(-1.639)	(-1.680)	(-0.242)	(-0.437)	(0.176)	(-0.109)
$Election_{t+1}$	0.011***	0.012***	0.007	0.007	0.002	0.002	0.012***	0.012***
	(3.295)	(3.416)	(1.617)	(1.627)	(0.457)	(0.589)	(2.844)	(2.988)
$Democrat_{t+1}$	0.016***	0.016***	0.021***	0.021***	0.006	0.006	0.021***	0.022***
	(2.665)	(2.691)	(2.969)	(2.981)	(0.868)	(0.842)	(2.765)	(2.858)
Constant	0.086	0.056	0.035	0.033	0.020	-0.024	0.115	0.086
	(1.073)	(0.678)	(0.414)	(0.372)	(0.224)	(-0.263)	(1.261)	(0.919)
Observations	12,078	12,078	8,434	8,434	9,497	9,497	8,484	8,484
Adjusted R-squared	0.780	0.781	0.811	0.811	0.800	0.800	0.784	0.785
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 3.3 (Continued)

Panel B: Difference-in-differences specification

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
Treat	-0.021***	-0.021***	-0.019***	-0.019***	-0.017**	-0.016**	-0.017**	-0.017**
	(-3.028)	(-3.048)	(-3.541)	(-3.575)	(-2.183)	(-2.060)	(-2.417)	(-2.459)
Post	-0.014***	-0.014***	-0.006	-0.007	-0.005	-0.004	-0.015**	-0.014**
	(-3.692)	(-3.682)	(-1.252)	(-1.305)	(-1.015)	(-0.871)	(-2.221)	(-2.052)
*Treat*Post*	0.025***	0.025***	0.018**	0.018**	0.018**	0.017**	0.019*	0.020**
	(3.025)	(3.083)	(2.475)	(2.520)	(2.001)	(1.964)	(1.920)	(1.994)
%Equity	0.871***	0.863***	0.880***	0.871***	0.876***	0.869***	0.869***	0.859***
	(186.491)	(181.921)	(160.513)	(156.132)	(168.537)	(164.981)	(136.231)	(131.683)
$Fund_{t+1}$	0.006**	0.004*	0.004	0.002	0.004	0.004	0.005	0.002
	(2.552)	(1.698)	(1.334)	(0.615)	(1.631)	(1.335)	(1.310)	(0.581)
$Maturity_{t+1}$	-0.004**	-0.002	-0.005*	-0.002	-0.008***	-0.006**	-0.001	0.001
	(-2.004)	(-1.041)	(-1.937)	(-0.698)	(-3.558)	(-2.563)	(-0.532)	(0.213)
$Leverage_{t+1}$	-0.024***	-0.020**	-0.023**	-0.017*	-0.011	-0.008	-0.023**	-0.018
	(-2.934)	(-2.413)	(-2.461)	(-1.802)	(-1.205)	(-0.881)	(-2.007)	(-1.557)
$Divp_{t+1}$	-0.020***	-0.015**	-0.010	-0.004	-0.018**	-0.015**	-0.018*	-0.012
	(-2.822)	(-2.144)	(-1.242)	(-0.486)	(-2.508)	(-2.012)	(-1.860)	(-1.256)
Tax_{t+1}	-0.003	-0.002	-0.002	-0.002	-0.003	-0.003	-0.004	-0.004
	(-0.971)	(-0.694)	(-0.547)	(-0.401)	(-0.693)	(-0.655)	(-0.981)	(-0.855)
$Assets_{t+1}$		-0.007***		-0.008***		-0.006***		-0.008***
		(-8.103)		(-8.587)		(-6.468)		(-6.813)

Table 3.3 Panel B (Continued)

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
ROA_{t+1}		-0.001		0.023		0.022		0.027
		(-0.056)		(0.858)		(0.837)		(0.845)
GDP_{t+1}	-0.001**	-0.002***	-0.001*	-0.002**	-0.001	-0.001	-0.003***	-0.003***
	(-2.414)	(-2.838)	(-1.820)	(-2.357)	(-1.035)	(-1.528)	(-3.586)	(-4.122)
$Unemp\_rate_{t+1}$	0.001	0.002*	0.000	0.000	0.001	0.001	-0.000	0.000
	(1.454)	(1.691)	(0.011)	(0.264)	(0.729)	(0.826)	(-0.088)	(0.239)
$Election_{t+1}$	0.016***	0.016***	0.008*	0.008*	0.002	0.002	0.029***	0.029***
	(4.296)	(4.334)	(1.900)	(1.792)	(0.480)	(0.504)	(5.752)	(5.784)
$Democrat_{t+1}$	0.009***	0.007**	0.010***	0.009**	0.006*	0.004	0.006	0.004
	(2.805)	(2.108)	(2.674)	(2.362)	(1.709)	(1.183)	(1.335)	(0.807)
Constant	0.053***	0.101***	0.061***	0.113***	0.064***	0.103***	0.056***	0.109***
	(4.622)	(7.729)	(4.410)	(7.318)	(4.632)	(6.655)	(3.542)	(6.027)
Observations	12,064	12,064	8,434	8,434	9,465	9,465	6,566	6,566
Adjusted R-squared	0.745	0.747	0.756	0.758	0.755	0.756	0.742	0.744

Table 3.4: Cross-sectional tests: importance of financial constraints– Pension asset allocation

This table summarises the results from firm-panel regressions of firms' pension asset allocations on the natural log of the maximum total potential benefit available under states' unemployment insurance systems and a set of controls. Columns (1), (3), and (5) restrict the sample to firms that face greater financial constraints (zero dividends, below-median operating cash flows, or below-median total assets). Columns (2), (4), and (6) restrict the sample to firms that face lower financial constraints (positive dividends, above-median operating cash flows, or above-median total assets). *%Equity* is the percentage of pension assets invested in equity in the year after the benefit increase. Benefit is the natural log of the maximum number of weeks times the maximum weekly wage benefit amount given to employees in state-year t. *Treat* is an indicator that equals 1 for firm-years in the treatment sample, and 0 otherwise. *Post* is an indicator that equals 1 for the period after an increase in unemployment benefits, and 0 otherwise. *Fund* is the fair value of pension assets divided by PBO. *Maturity* is pension maturity, which is measured as the natural logarithm of the ratio of PBO to current service costs. *Leverage* is debt in current liabilities, plus long-term debt divided by total assets. *Divp* is dividends per share divided by retained earnings per share. *Tax* is total tax expense divided by pre-tax income. *Assets* is the natural logarithm of total assets. *ROA* is return on assets to measure profitability. *GDP* is the state GDP growth rate. *Unemp_rate* is the state unemployment rate. *Election* is an indicator that equals 1 if there is a presidential election that year, and 0 otherwise. *Democrat* is an indicator that equals 1 if the Democratic presidential candidate received more votes. Detailed variable definitions are provided in Appendix Table 3.1. ***p<0.01, **p<0.05, *p<0.1.

	Dividends		Cash flows		Firm size	
	Zero	Positive	Low	High	Small	Large
Variables	1	2	3	4	5	6
Benefit	0.015***	0.037***	0.006	0.050***	0.000	0.056***
	(2.863)	(2.647)	(0.906)	(5.807)	(0.039)	(6.526)
%Equity	0.589***	0.481***	0.571***	0.549***	0.540***	0.545***
	(53.690)	(21.172)	(40.961)	(37.381)	(39.003)	(37.845)
$Fund_{t+1}$	0.005	-0.021**	0.002	-0.007	0.009*	-0.007
	(1.122)	(-2.122)	(0.392)	(-1.082)	(1.842)	(-1.061)
$Maturity_{t+1}$	0.021***	-0.036***	0.009	-0.009	0.018***	-0.004
	(3.981)	(-3.598)	(1.359)	(-1.282)	(3.135)	(-0.552)
$Leverage_{t+1}$	-0.058**	0.077*	-0.038	0.043	-0.070**	0.045
	(-2.244)	(1.817)	(-1.222)	(1.389)	(-2.353)	(1.465)
$Divp_{t+1}$	-0.006	-0.046	0.004	0.007	-0.001	-0.020
	(-0.521)	(-0.952)	(0.335)	(0.328)	(-0.042)	(-0.985)
Tax_{t+1}	-0.005	0.020***	-0.001	0.004	-0.002	0.004
	(-1.005)	(2.792)	(-0.138)	(0.818)	(-0.442)	(0.681)
$Assets_{t+1}$	-0.013*	0.006	-0.012	-0.012	-0.012	-0.010
	(-1.938)	(0.411)	(-1.471)	(-1.116)	(-1.527)	(-0.926)
ROA_{t+1}	-0.005	-0.195**	0.017	-0.079	0.074	-0.068
	(-0.094)	(-2.008)	(0.291)	(-1.155)	(1.236)	(-1.007)
GDP_{t+1}	-0.002**	0.004**	-0.001	0.001	-0.001	0.002
	(-2.313)	(2.165)	(-1.336)	(0.511)	(-1.498)	(1.264)

Table 3.4 (Continued)

	Dividends		Cash flows		Firm size	
	Zero	Positive	Low	High	Small	Large
Variables	1	2	3	4	5	6
$Unemp\_rate_{t+1}$	-0.003*	-0.004	-0.002	-0.003	-0.003	0.000
	(-1.955)	(-1.058)	(-1.214)	(-0.999)	(-1.608)	(0.021)
$Election_{t+1}$	0.012**	-0.002	0.013**	0.007	0.011**	0.005
	(2.550)	(-0.200)	(2.332)	(0.960)	(2.096)	(0.714)
$Democrat_{t+1}$	0.024***	0.036	0.017*	0.028**	0.013	0.025**
	(3.145)	(1.624)	(1.862)	(2.318)	(1.316)	(2.151)
Constant	0.121	-0.263	-0.038	-0.459***	0.039	-0.603***
	(1.223)	(-0.986)	(-0.236)	(-2.984)	(0.335)	(-3.955)
Observations	6,412	2,008	4,175	4,175	4,217	4,217
Adjusted R-squared	0.802	0.793	0.815	0.776	0.807	0.775
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Table 3.5: Pension plan freeze and unemployment insurance benefit increases – One year

Table 3.5 presents coefficients and t-statistics in parentheses from pooled regressions of the dependent variable *Freeze*. Columns (1) and (2) show results using no matching methods; columns (3) and (4) show results using the EBM method; columns (5) and (6) show results using the CEM method; and columns (7) and (8) show results using the PSM method. Panel A gives results for fixed effects specifications, while panel B gives results for difference-in-differences specifications. *Freeze* is an indicator that equals 1 when firms freeze their defined benefit pension plans. *Benefit* is the natural log of the maximum number of weeks times the maximum weekly wage benefit amount given to employees in state-year t. *Treat* is an indicator that equals 1 for firm-years in the treatment sample, and 0 otherwise. *Post* is an indicator that equals 1 for the period after an increase in unemployment benefits, and 0 otherwise. Fund is the fair value of pension assets divided by PBO. *Plan_Size* is PBO divided by total assets. Loss is an indicator that equals 1 if firms reported a loss in the prior year. *ΔLev* is the change in leverage in the prior year. *ΔSales%* is the percentage of change in sales. Δ*Dividends* is the change in dividend payout in the prior year. *Assets* is the natural logarithm of total assets. ROA is return on assets to measure profitability. *GDP* is the state GDP growth rate. *Unemp_rate* is the state unemployment rate. *Election* is an indicator that equals 1 if there is a presidential election that year, and 0 otherwise. *Democrat* is an indicator that equals 1 if the Democratic presidential candidate received more votes. Detailed variable definitions are in Appendix 3.1. ***p<0.01, **p<0.05, *p<0.1.

Panel A: Fixed effects model

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
Benefit	0.143***	0.121***	0.138***	0.130***	0.102***	0.081***	0.109***	0.085***
	(11.487)	(9.008)	(11.964)	(10.676)	(6.681)	(5.012)	(7.132)	(5.228)
$Fund_{t+1}$	-0.002	0.003	-0.005	-0.004	-0.021**	-0.015	-0.012	-0.007
	(-0.177)	(0.319)	(-0.601)	(-0.420)	(-1.997)	(-1.451)	(-0.953)	(-0.552)
$Plan\_Size_{t+1}$	0.179***	0.330***	0.189***	0.249***	0.073	0.317***	0.214***	0.394***
	(2.970)	(4.765)	(3.186)	(3.735)	(0.842)	(3.118)	(2.697)	(4.359)
$Loss_{t+1}$	-0.013	-0.003	-0.017	-0.012	0.003	0.011	-0.002	0.006
	(-0.754)	(-0.190)	(-1.076)	(-0.725)	(0.165)	(0.584)	(-0.092)	(0.264)
ΔLev_{t+1}	0.101*	0.089*	0.083*	0.091*	0.075	0.093	0.167**	0.142*
	(1.904)	(1.648)	(1.809)	(1.937)	(1.174)	(1.412)	(2.345)	(1.943)
$\Delta Sales\%_{t+1}$	0.021	0.004	0.021	0.008	0.059**	0.023	0.039	0.023
	(0.975)	(0.170)	(1.033)	(0.381)	(2.268)	(0.841)	(1.454)	(0.833)

Table 3.5 Panel A (Continued)

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
ΔDividends$_{t+1}$	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(-0.829)	(-1.050)	(-0.734)	(-0.936)	(-0.938)	(-1.640)	(-0.949)	(-1.065)
Assets$_{t+1}$		0.067***		0.027*		0.086***		0.085***
		(4.317)		(1.784)		(4.173)		(4.126)
ROA$_{t+1}$		0.144		0.156*		0.360***		0.099
		(1.618)		(1.784)		(3.035)		(0.889)
GDP$_{t+1}$	-0.001	-0.001	0.003*	0.002*	0.000	-0.000	-0.000	-0.000
	(-0.398)	(-0.501)	(1.850)	(1.688)	(0.078)	(-0.128)	(-0.005)	(-0.009)
Unemp_rate$_{t+1}$	0.024***	0.024***	0.027***	0.026***	0.044***	0.039***	0.026***	0.025***
	(7.726)	(7.488)	(7.977)	(7.654)	(11.035)	(9.469)	(6.372)	(6.009)
Election$_{t+1}$	0.035***	0.031***	0.030***	0.029***	0.075***	0.065***	0.037***	0.033***
	(3.450)	(3.051)	(3.283)	(3.115)	(6.045)	(5.151)	(2.932)	(2.623)
Democrat$_{t+1}$	0.002	-0.006	-0.026	-0.029	-0.008	-0.016	0.018	0.008
	(0.064)	(-0.246)	(-1.097)	(-1.226)	(-0.250)	(-0.510)	(0.544)	(0.249)
Constant	-3.045***	-3.058***	-2.846***	-2.890***	-2.244***	-2.400***	-2.414***	-2.497***
	(-11.035)	(-11.101)	(-11.758)	(-11.904)	(-6.831)	(-7.294)	(-6.513)	(-6.739)
Observations	5,259	5,259	5,259	5,259	3,604	3,604	3,262	3,262
Adjusted R-squared	0.684	0.686	0.683	0.683	0.691	0.693	0.725	0.726
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 3.5 (Continued)

Panel B: Difference-in-differences specification

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
Treat	-0.067***	-0.066***	-0.017	-0.016	-0.025	-0.023	-0.059***	-0.058***
	(-3.531)	(-3.498)	(-1.381)	(-1.328)	(-1.519)	(-1.420)	(-3.199)	(-3.169)
Post	0.011	0.011	0.011	0.011	0.006	0.008	0.007	0.007
	(0.971)	(1.003)	(0.940)	(0.953)	(0.552)	(0.681)	(0.273)	(0.262)
*Treat*Post*	-0.003	-0.005	-0.006	-0.007	0.002	0.001	0.013	0.012
	(-0.132)	(-0.197)	(-0.381)	(-0.449)	(0.074)	(0.027)	(0.368)	(0.340)
$Fund_{t+1}$	-0.044***	-0.046***	-0.026***	-0.027***	-0.034***	-0.034***	-0.035***	-0.037***
	(-4.519)	(-4.778)	(-3.388)	(-3.578)	(-3.734)	(-3.732)	(-3.071)	(-3.222)
$Plan\_Size_{t+1}$	-0.069***	-0.082***	-0.049**	-0.058***	-0.103***	-0.112***	-0.064**	-0.075**
	(-2.795)	(-3.272)	(-2.340)	(-2.735)	(-4.136)	(-4.410)	(-2.116)	(-2.439)
$Loss_{t+1}$	0.134***	0.109***	0.117***	0.099***	0.090***	0.091***	0.119***	0.091***
	(7.717)	(5.800)	(8.244)	(6.378)	(5.335)	(4.972)	(5.803)	(4.083)
ΔLev_{t+1}	0.225***	0.205***	0.210***	0.192***	0.228***	0.232***	0.219**	0.186**
	(3.232)	(2.915)	(3.737)	(3.388)	(3.330)	(3.361)	(2.477)	(2.081)
$\Delta Sales\%_{t+1}$	-0.029	-0.011	-0.050**	-0.036	0.046*	0.044	0.001	0.024
	(-1.051)	(-0.380)	(-2.102)	(-1.445)	(1.653)	(1.520)	(0.040)	(0.719)
$\Delta Dividends_{t+1}$	-0.000***	-0.000**	-0.000	0.000	-0.000***	-0.000***	-0.000	-0.000
	(-3.347)	(-2.319)	(-0.409)	(0.307)	(-4.079)	(-3.661)	(-1.607)	(-0.815)
$Assets_{t+1}$		-0.008***		-0.006**		-0.006**		-0.006*
		(-2.857)		(-2.411)		(-2.303)		(-1.826)
ROA_{t+1}		-0.204**		-0.139**		0.041		-0.259***
		(-2.542)		(-2.053)		(0.504)		(-2.713)

Table 3.5 Panel B (Continued)

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
GDP_{t+1}	-0.003**	-0.003**	0.002	0.002	-0.001	-0.002	-0.005**	-0.005**
	(-1.984)	(-1.965)	(0.922)	(0.933)	(-0.439)	(-0.673)	(-2.236)	(-2.185)
$Unemp\_rate_{t+1}$	0.030***	0.031***	0.024***	0.025***	0.047***	0.047***	0.030***	0.031***
	(9.949)	(10.117)	(8.644)	(8.767)	(15.301)	(15.377)	(7.846)	(7.966)
$Election_{t+1}$	0.081***	0.081***	0.074***	0.075***	0.074***	0.074***	0.066***	0.065***
	(5.872)	(5.902)	(6.030)	(6.081)	(4.740)	(4.777)	(4.020)	(3.996)
$Democrat_{t+1}$	-0.062***	-0.065***	-0.056***	-0.057***	-0.031***	-0.032***	-0.085***	-0.087***
	(-6.016)	(-6.252)	(-6.459)	(-6.558)	(-3.088)	(-3.119)	(-6.753)	(-6.877)
Constant	0.049*	0.133***	-0.004	0.050*	-0.136***	-0.091***	0.052	0.124***
	(1.880)	(3.700)	(-0.180)	(1.650)	(-4.908)	(-2.588)	(1.607)	(2.819)
Observations	5,161	5,161	5,161	5,161	3,467	3,467	3,262	3,262
Adjusted R-squared	0.067	0.069	0.051	0.052	0.105	0.106	0.069	0.072

Table 3.6: Pension plan freeze and unemployment insurance benefit increases – Three years

Table 3.6 presents coefficients and t-statistics in parentheses from pooled regressions of the dependent variable $Freeze_{t+1}$. I expand the event window to three years after the event year. Columns (1) and (2) show results using no matching methods; columns (3) and (4) show results using the EBM method; columns (5) and (6) show results using the CEM method; and columns (7) and (8) show results using the PSM method. Panel A gives results for fixed effects specifications, while panel B gives results for difference-in-differences specifications. *Freeze* is an indicator that equals 1 when firms freeze their defined benefit pension plans. *Benefit* is the natural log of the maximum number of weeks times the maximum weekly wage benefit amount given to employees in state-year t. *Treat* is an indicator that equals 1 for firm-years in the treatment sample, and 0 otherwise. *Post* is an indicator that equals 1 for the period after an increase in unemployment benefits, and 0 otherwise. *Fund* is the fair value of pension assets divided by PBO. *Plan_Size* is PBO divided by total assets. *Loss* is an indicator that equals 1 if firms reported a loss in the prior year. *ΔLev* is the change in leverage in the prior year. *ΔSales%* is the percentage of change in sales. *ΔDividends* is the change in dividend payout in the prior year. *Assets* is the natural logarithm of total assets. *ROA* is return on assets to measure profitability. *GDP* is the state GDP growth rate. *Unemp_rate* is the state unemployment rate. *Election* is an indicator that equals 1 if there is a presidential election that year, and 0 otherwise. *Democrat* is an indicator that equals 1 if the Democratic presidential candidate received more votes. Detailed variable definitions are in Appendix 3.1. ***p<0.01, **p<0.05, *p<0.1.

Panel A: Fixed effects model

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
Benefit	0.151***	0.124***	0.138***	0.130***	0.166***	0.138***	0.122***	0.092***
	(15.788)	(12.068)	(11.960)	(10.649)	(14.940)	(11.389)	(11.088)	(7.839)
$Fund_{t+1}$	0.002	0.009	-0.005	-0.003	-0.004	0.003	-0.015	-0.008
	(0.194)	(1.150)	(-0.587)	(-0.395)	(-0.446)	(0.427)	(-1.587)	(-0.822)
$Plan\_Size_{t+1}$	0.238***	0.423***	0.196***	0.257***	0.213***	0.401***	0.262***	0.465***
	(4.932)	(7.737)	(3.327)	(3.892)	(3.447)	(5.821)	(4.763)	(7.482)
$Loss_{t+1}$	-0.014	-0.004	-0.017	-0.012	0.004	0.013	0.012	0.024
	(-1.030)	(-0.284)	(-1.087)	(-0.720)	(0.247)	(0.838)	(0.775)	(1.487)
ΔLev_{t+1}	0.069	0.041	0.087*	0.095**	0.063	0.054	0.117**	0.091*
	(1.546)	(0.899)	(1.867)	(2.004)	(1.254)	(1.060)	(2.229)	(1.690)
$\Delta Sales\%_{t+1}$	-0.004	-0.023	0.021	0.007	0.030	0.001	-0.003	-0.025
	(-0.230)	(-1.223)	(1.031)	(0.352)	(1.441)	(0.056)	(-0.166)	(-1.152)

Table 3.6 Panel A (Continued)

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
$\Delta Dividends_{t+1}$	0.000	0.000	-0.000	-0.000	-0.000	-0.000	0.000	-0.000
	(0.603)	(0.209)	(-0.768)	(-0.969)	(-0.276)	(-0.708)	(0.224)	(-0.083)
$Assets_{t+1}$		0.084***		0.028*		0.082***		0.099***
		(7.094)		(1.847)		(5.900)		(6.881)
ROA_{t+1}		0.116		0.165*		0.222**		0.106
		(1.564)		(1.868)		(2.452)		(1.266)
GDP_{t+1}	-0.000	-0.000	0.003*	0.002*	0.001	0.001	-0.001	-0.001
	(-0.304)	(-0.346)	(1.845)	(1.680)	(0.450)	(0.424)	(-1.100)	(-1.046)
$Unemp\_rate_{t+1}$	0.019***	0.018***	0.027***	0.026***	0.025***	0.023***	0.018***	0.017***
	(7.741)	(7.428)	(7.972)	(7.644)	(8.295)	(7.713)	(6.517)	(6.231)
$Election_{t+1}$	0.007	0.003	0.030***	0.029***	0.021***	0.017**	0.013	0.008
	(0.920)	(0.449)	(3.268)	(3.095)	(2.651)	(2.166)	(1.560)	(0.977)
$Democrat_{t+1}$	0.028	0.017	-0.026	-0.029	0.010	0.000	-0.014	-0.022
	(1.400)	(0.887)	(-1.095)	(-1.226)	(0.467)	(0.007)	(-0.627)	(-0.987)
Constant	-3.226***	-3.253***	-2.845***	-2.891***	-3.522***	-3.512***	-2.615***	-2.681***
	(-14.864)	(-15.028)	(-11.758)	(-11.910)	(-13.829)	(-13.827)	(-10.186)	(-10.478)
Observations	7,635	7,635	5,259	5,259	5,756	5,756	5,450	5,450
Adjusted R-squared	0.650	0.652	0.683	0.683	0.653	0.656	0.683	0.686
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 3.6 (Continued)

Panel B: Difference-in-differences specification

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
Treat	-0.079***	-0.078***	-0.017	-0.017	-0.026	-0.023	-0.065***	-0.064***
	(-4.045)	(-4.026)	(-1.403)	(-1.347)	(-1.370)	(-1.247)	(-3.527)	(-3.509)
Post	0.031***	0.031***	0.010	0.010	0.043***	0.045***	0.033*	0.034*
	(2.971)	(3.046)	(0.867)	(0.866)	(3.474)	(3.665)	(1.865)	(1.901)
*Treat*Post*	0.018	0.016	-0.005	-0.006	0.011	0.009	0.026	0.025
	(0.773)	(0.713)	(-0.310)	(-0.369)	(0.498)	(0.437)	(0.977)	(0.962)
$Fund_{t+1}$	-0.049***	-0.051***	-0.026***	-0.027***	-0.033***	-0.034***	-0.037***	-0.039***
	(-5.916)	(-6.128)	(-3.427)	(-3.621)	(-4.321)	(-4.384)	(-3.573)	(-3.677)
$Plan\_Size_{t+1}$	-0.041**	-0.053**	-0.046**	-0.055***	-0.055**	-0.071***	-0.044*	-0.052*
	(-1.980)	(-2.515)	(-2.243)	(-2.670)	(-2.554)	(-3.283)	(-1.656)	(-1.933)
$Loss_{t+1}$	0.117***	0.094***	0.114***	0.097***	0.093***	0.087***	0.108***	0.081***
	(7.701)	(5.649)	(8.158)	(6.306)	(6.004)	(5.255)	(5.713)	(3.920)
ΔLev_{t+1}	0.198***	0.183***	0.218***	0.201***	0.138**	0.142**	0.239***	0.212***
	(3.262)	(2.984)	(3.860)	(3.513)	(2.279)	(2.319)	(2.966)	(2.596)
$\Delta Sales\%_{t+1}$	-0.049**	-0.034	-0.055**	-0.040	-0.036	-0.032	-0.035	-0.014
	(-2.016)	(-1.332)	(-2.279)	(-1.619)	(-1.448)	(-1.252)	(-1.156)	(-0.461)
$\Delta Dividends_{t+1}$	-0.000**	-0.000	-0.000	0.000	-0.000*	-0.000	-0.000	0.000
	(-2.171)	(-0.971)	(-0.340)	(0.402)	(-1.795)	(-0.931)	(-0.806)	(0.009)
$Assets_{t+1}$		-0.008***		-0.006**		-0.010***		-0.006*
		(-3.359)		(-2.553)		(-4.073)		(-1.896)
ROA_{t+1}		-0.182***		-0.136**		0.007		-0.233***
		(-2.634)		(-2.027)		(0.094)		(-2.708)

Table 3.6 Panel B (Continued)

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
GDP_{t+1}	-0.002	-0.002	0.002	0.002	0.003	0.002	-0.004*	-0.004*
	(-1.538)	(-1.521)	(0.915)	(0.914)	(1.418)	(1.207)	(-1.835)	(-1.792)
$Unemp\_rate_{t+1}$	0.028***	0.029***	0.025***	0.025***	0.038***	0.039***	0.028***	0.028***
	(11.060)	(11.270)	(8.736)	(8.873)	(13.342)	(13.646)	(8.001)	(8.110)
$Election_{t+1}$	0.043***	0.044***	0.075***	0.076***	0.008	0.009	0.034**	0.033**
	(3.992)	(4.053)	(6.095)	(6.158)	(0.751)	(0.831)	(2.468)	(2.427)
$Democrat_{t+1}$	-0.041***	-0.043***	-0.056***	-0.057***	-0.027***	-0.028***	-0.079***	-0.080***
	(-4.699)	(-4.909)	(-6.502)	(-6.615)	(-3.044)	(-3.161)	(-6.970)	(-7.064)
Constant	0.055**	0.135***	-0.005	0.051*	-0.101***	-0.029	0.067**	0.132***
	(2.408)	(4.418)	(-0.231)	(1.685)	(-3.837)	(-0.891)	(2.243)	(3.332)
Observations	7,622	7,622	5,259	5,259	5,728	5,728	4,162	4,162
Adjusted R-squared	0.052	0.054	0.050	0.052	0.052	0.054	0.058	0.060

Table 3.7: Cross-sectional tests: importance of financial constraints – Pension plan freeze

This table summarises the results from firm-panel regressions of firms' pension plan freeze decisions on the natural log of the maximum total potential benefit available under states' unemployment insurance systems, and a set of controls. Columns (1), (3), and (5) restrict the sample to firms that face greater financial constraints (zero dividends, below-median operating cash flows, or below-median total assets). Columns (2), (4), and (6) restrict the sample to firms that face lower financial constraints (positive dividends, above-median operating cash flows, or above-median total assets). *Freeze* is an indicator that equals 1 when firms freeze their defined benefit pension plans. *Benefit* is the natural log of the maximum number of weeks times the maximum weekly wage benefit amount given to employees in state-year t. *Treat* is an indicator that equals 1 for firm-years in the treatment sample, and 0 otherwise. *Post* is an indicator that equals 1 for the period after an increase in unemployment benefits, and 0 otherwise. *Fund* is the fair value of pension assets divided by PBO. *Plan_Size* is PBO divided by total assets. *Loss* is an indicator that equals 1 if firms reported a loss in the prior year. *ΔLev* is the change in leverage in the prior year. *ΔSales%* is the percentage of change in sales. *ΔDividends* is the change in dividend payout in the prior year. *Assets* is the natural logarithm of total assets. ROA is return on assets to measure profitability. *GDP* is the state GDP growth rate. *Unemp_rate* is the state unemployment rate. *Election* is an indicator that equals 1 if there is a presidential election that year, and 0 otherwise. *Democrat* is an indicator that equals 1 if the Democratic presidential candidate received more votes. Detailed variable definitions are in Appendix 3.1. ***p<0.01, **p<0.05, *p<0.1.

	Dividends		Cash flows		Firm size	
	Zero	Positive	Low	High	Small	Large
Variables	1	2	3	4	5	6
Benefit	0.086***	0.259***	0.076***	0.183***	0.115***	0.149***
	(5.877)	(8.544)	(4.465)	(8.077)	(6.531)	(6.682)
$Fund_{t+1}$	-0.004	0.039**	0.008	-0.001	0.016	-0.003
	(-0.322)	(1.980)	(0.597)	(-0.044)	(1.127)	(-0.177)
$Plan\_Size_{t+1}$	0.264***	0.348***	0.153	0.313***	0.049	0.541***
	(2.920)	(3.137)	(1.396)	(3.394)	(0.443)	(5.764)
$Loss_{t+1}$	-0.007	-0.030	-0.047	-0.021	0.016	-0.034
	(-0.317)	(-1.042)	(-1.569)	(-0.972)	(0.641)	(-1.482)
ΔLev_{t+1}	0.191***	0.069	0.124	-0.043	0.233**	-0.030
	(2.784)	(0.764)	(1.381)	(-0.621)	(2.575)	(-0.441)
$\Delta Sales\%_{t+1}$	-0.002	0.064	-0.087***	0.056	-0.048	0.063**
	(-0.072)	(1.404)	(-2.779)	(1.621)	(-1.509)	(1.968)
$\Delta Dividends_{t+1}$	-0.000	0.000	0.000	-0.000**	-0.000	-0.000
	(-1.594)	(1.121)	(0.102)	(-2.217)	(-0.373)	(-1.624)
$Assets_{t+1}$	0.063***	0.026	0.081***	0.072***	-0.005	0.121***
	(3.299)	(0.934)	(3.688)	(2.870)	(-0.214)	(4.924)
ROA_{t+1}	0.233**	-0.058	0.480***	-0.058	0.279**	0.122
	(2.246)	(-0.348)	(3.919)	(-0.446)	(2.144)	(0.981)
GDP_{t+1}	-0.002	0.002	0.001	-0.001	-0.001	0.001
	(-1.440)	(0.648)	(0.412)	(-0.580)	(-0.557)	(0.244)

Table 3.7 (Continued)

	Dividends		Cash flows		Firm size	
	Zero	Positive	Low	High	Small	Large
Variables	1	2	3	4	5	6
$Unemp\_rate_{t+1}$	0.014***	0.038***	0.010**	0.036***	0.019***	0.033***
	(4.108)	(5.654)	(2.497)	(6.600)	(4.652)	(6.414)
$Election_{t+1}$	0.015	0.036*	0.023*	0.027*	0.034**	0.018
	(1.372)	(1.832)	(1.652)	(1.846)	(2.406)	(1.288)
$Democrat_{t+1}$	0.036	-0.059	0.011	0.001	-0.024	0.058
	(1.315)	(-1.025)	(0.343)	(0.029)	(-0.702)	(1.426)
Constant	-2.306***	-5.882***	-2.212***	-4.388***	-2.449***	-4.098***
	(-7.965)	(-10.277)	(-7.151)	(-9.916)	(-6.350)	(-9.522)
Observations	3,778	1,481	2,563	2,559	2,631	2,628
Adjusted R-squared	0.685	0.792	0.721	0.731	0.700	0.721
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Table 3.8: Pension earnings management reversal and unemployment insurance benefit increases – One year

Table 3.8 presents coefficients and t-statistics in parentheses from pooled regressions of the dependent variable *ERR*. Columns (1) and (2) show results using no matching methods; columns (3) and (4) show results using EBM methods; columns (5) and (6) show results using MDM methods; columns (7) and (8) show results using CEM methods; and columns (9) and (10) show results using PSM methods. Panel A presents results for fixed effects specifications, while panel B presents results for difference-in-differences specifications. *Benefit* is the natural log of the maximum number of weeks times the maximum weekly wage benefit amount given to employees in state-year t. *Treat* is an indicator that equals 1 for firm-years in the treatment sample, and 0 otherwise. *Post* is an indicator that equals 1 for the period after an increase in unemployment benefits, and 0 otherwise. *ERR* is the expected rate of return on pension assets. *%Equity* is the percentage of pension assets invested in equity in the year after the benefit increase. *Fund* is the fair value of pension assets divided by PBO. *Maturity* is pension maturity, which is measured as the natural logarithm of the ratio of PBO to current service costs. *Leverage* is debt in current liabilities, plus long-term debt divided by total assets. *Plan_Size* is PBO divided by total assets. Loss is an indicator that equals 1 if firms reported a loss in the prior year. *ΔLev* is the change in leverage in the prior year. *ΔSales%* is the percentage of change in sales. *ΔDividends* is the change in dividend payout in the prior year. *Assets* is the natural logarithm of total assets. *ROA* is return on assets to measure profitability. *GDP* is the state GDP growth rate. *Unemp_rate* is the state unemployment rate. *Election* is an indicator that equals 1 if there is a presidential election that year, and 0 otherwise. *Democrat* is an indicator that equals 1 if the Democratic presidential candidate received more votes. Detailed variable definitions are in Appendix 3.1. ***p<0.01, **p<0.05, *p<0.1.

Panel A: Fixed effects model

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
Benefit	-0.232***	-0.202***	-0.238***	-0.213***	-0.245***	-0.213***	-0.226***	-0.191***
	(-19.873)	(-13.847)	(-20.609)	(-14.559)	(-15.645)	(-10.955)	(-14.278)	(-9.879)
ERR	0.557***	0.556***	0.511***	0.511***	0.380***	0.381***	0.559***	0.557***
	(62.774)	(62.357)	(55.191)	(55.000)	(35.625)	(35.738)	(46.506)	(46.178)
%Equity$_{t+1}$	0.072***	0.070***	0.046*	0.047*	0.075**	0.075**	0.055	0.053
	(2.951)	(2.880)	(1.784)	(1.821)	(2.282)	(2.280)	(1.634)	(1.588)
Fund$_{t+1}$	0.030***	0.026***	0.016*	0.013	0.036***	0.033***	0.025*	0.020
	(3.145)	(2.620)	(1.721)	(1.363)	(3.109)	(2.777)	(1.934)	(1.504)
Maturity$_{t+1}$	-0.065***	-0.065***	-0.058***	-0.057***	-0.074***	-0.071***	-0.079***	-0.078***
	(-5.823)	(-5.857)	(-4.633)	(-4.589)	(-4.593)	(-4.432)	(-5.267)	(-5.240)

Table 3.8 Panel A (Continued)

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
$Leverage_{t+1}$	0.031	0.055	0.111**	0.131**	0.106	0.142**	0.020	0.041
	(0.627)	(1.071)	(2.147)	(2.499)	(1.619)	(2.151)	(0.289)	(0.597)
$Plan\_Size_{t+1}$	-0.131*	-0.242***	-0.210***	-0.296***	-0.460***	-0.530***	-0.141	-0.289***
	(-1.827)	(-2.997)	(-2.792)	(-3.527)	(-4.354)	(-4.519)	(-1.432)	(-2.597)
$Assets_{t+1}$		-0.056***		-0.045***		-0.049**		-0.071***
		(-3.307)		(-2.589)		(-2.262)		(-3.073)
ROA_{t+1}		0.156		0.190		0.559***		0.114
		(1.442)		(1.601)		(3.714)		(0.796)
GDP_{t+1}	-0.002	-0.002	-0.003	-0.003	-0.012***	-0.013***	-0.003	-0.003
	(-1.023)	(-1.168)	(-1.455)	(-1.641)	(-4.601)	(-4.941)	(-1.390)	(-1.411)
$Unemp\_rate_{t+1}$	-0.038***	-0.039***	-0.055***	-0.055***	-0.070***	-0.070***	-0.036***	-0.037***
	(-10.497)	(-10.547)	(-13.726)	(-13.780)	(-13.656)	(-13.448)	(-6.758)	(-6.814)
$Election_{t+1}$	0.003	0.003	0.008	0.007	0.038***	0.039***	-0.006	-0.007
	(0.276)	(0.259)	(0.707)	(0.678)	(2.794)	(2.793)	(-0.400)	(-0.490)
$Democrat_{t+1}$	0.002	0.005	0.011	0.015	0.070**	0.063**	0.018	0.022
	(0.088)	(0.195)	(0.467)	(0.600)	(2.218)	(1.971)	(0.599)	(0.728)
Constant	8.581***	8.363***	9.039***	8.834***	10.431***	10.082***	8.483***	8.271***
	(28.814)	(27.544)	(31.437)	(29.988)	(26.562)	(25.056)	(21.990)	(21.135)
Observations	7,210	7,210	7,210	7,210	5,249	5,249	4,437	4,437
Adjusted R-squared	0.832	0.833	0.822	0.822	0.824	0.825	0.824	0.824
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 3.8 (Continued)

Panel B: Difference-in-differences specification

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
Treat	0.009	0.010	0.008	0.008	0.049**	0.049**	0.015	0.016
	(0.519)	(0.569)	(0.538)	(0.592)	(2.381)	(2.346)	(0.873)	(0.918)
Post	0.013	0.013	0.019	0.018	0.046***	0.043***	0.003	0.004
	(1.295)	(1.238)	(1.422)	(1.320)	(3.360)	(3.134)	(0.121)	(0.189)
*Treat*Post*	-0.011	-0.010	-0.019	-0.018	-0.048*	-0.046*	-0.021	-0.022
	(-0.461)	(-0.430)	(-1.007)	(-0.933)	(-1.757)	(-1.657)	(-0.676)	(-0.698)
ERR	0.805***	0.805***	0.789***	0.788***	0.757***	0.751***	0.808***	0.808***
	(142.767)	(141.424)	(134.816)	(132.705)	(109.938)	(106.398)	(110.137)	(108.906)
$\%Equity_{t+1}$	-0.009	-0.011	-0.019	-0.019	0.011	0.028	-0.001	-0.005
	(-0.696)	(-0.814)	(-1.320)	(-1.277)	(0.655)	(1.542)	(-0.041)	(-0.301)
$Fund_{t+1}$	0.034***	0.034***	0.029***	0.030***	0.032***	0.034***	0.023**	0.022**
	(4.611)	(4.578)	(3.903)	(3.934)	(3.467)	(3.739)	(2.334)	(2.242)
$Maturity_{t+1}$	-0.027***	-0.026***	-0.030***	-0.029***	-0.019**	-0.022***	-0.029***	-0.027***
	(-4.252)	(-4.028)	(-4.375)	(-4.145)	(-2.333)	(-2.649)	(-3.552)	(-3.277)
$Leverage_{t+1}$	0.072***	0.076***	0.074***	0.080***	0.052*	0.060**	0.084***	0.089***
	(3.107)	(3.263)	(3.166)	(3.399)	(1.907)	(2.161)	(2.921)	(3.074)
$Plan\_Size_{t+1}$	0.122***	0.121***	0.111***	0.114***	0.173***	0.207***	0.098***	0.093**
	(4.449)	(4.330)	(3.805)	(3.794)	(4.770)	(5.492)	(2.795)	(2.558)
$Assets_{t+1}$		-0.003		-0.001		0.010***		-0.005
		(-0.970)		(-0.501)		(2.808)		(-1.326)
ROA_{t+1}		0.163**		0.203***		0.235***		0.188**
		(2.399)		(2.897)		(2.704)		(2.247)

Table 3.8 Panel B (Continued)

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
GDP_{t+1}	0.006***	0.005***	0.008***	0.007***	0.003	0.004	0.006***	0.005**
	(3.459)	(3.109)	(4.030)	(3.665)	(1.370)	(1.489)	(2.815)	(2.450)
$Unemp\_rate_{t+1}$	-0.032***	-0.031***	-0.037***	-0.037***	-0.034***	-0.035***	-0.032***	-0.031***
	(-11.085)	(-10.791)	(-12.515)	(-12.251)	(-9.295)	(-9.292)	(-8.277)	(-7.930)
$Election_{t+1}$	0.065***	0.064***	0.074***	0.074***	0.136***	0.139***	0.049***	0.051***
	(6.033)	(5.979)	(6.703)	(6.694)	(9.466)	(9.557)	(3.458)	(3.573)
$Democrat_{t+1}$	0.039***	0.037***	0.022**	0.021**	0.035***	0.037***	0.020	0.016
	(4.156)	(3.842)	(2.259)	(2.081)	(2.934)	(3.010)	(1.639)	(1.341)
Constant	1.699***	1.701***	1.896***	1.893***	2.071***	2.021***	1.706***	1.710***
	(28.164)	(27.173)	(29.652)	(28.862)	(27.107)	(25.906)	(21.807)	(21.217)
Observations	7,102	7,102	7,102	7,102	5,096	5,096	4,437	4,437
Adjusted R-squared	0.790	0.790	0.761	0.761	0.744	0.743	0.778	0.778

Table 3.9: Pension earnings management and unemployment insurance benefit increases – Three years

Table 3.9 presents coefficients and t-statistics in parentheses from pooled regressions of the dependent variable ERR_{t+1}. I expand the event window to three years after the event year. Columns (1) and (2) show results using no matching methods; columns (3) and (4) show results using EBM methods; columns (5) and (6) show results using MDM methods; columns (7) and (8) show results using CEM methods; and columns (9) and (10) show results using PSM methods. Panel A presents results for fixed effects specifications, while panel B presents results for difference-in-differences specifications. *Benefit* is the natural log of the maximum number of weeks times the maximum weekly wage benefit amount given to employees in state-year t. *Treat* is an indicator that equals 1 for firm-years in the treatment sample, and 0 otherwise. *Post* is an indicator that equals 1 for the period after an increase in unemployment benefits, and 0 otherwise. *ERR* is the expected rate of return on pension assets. *%Equity* is the percentage of pension assets invested in equity in the year after the benefit increase. Fund is the fair value of pension assets divided by PBO. *Maturity* is pension maturity, which is measured as the natural logarithm of the ratio of PBO to current service costs. *Leverage* is debt in current liabilities, plus long-term debt divided by total assets. *Plan_Size* is PBO divided by total assets. Loss is an indicator that equals 1 if firms reported a loss in the prior year. *ΔLev* is the change in leverage in the prior year. *ΔSales%* is the percentage of change in sales. *ΔDividends* is the change in dividend payout in the prior year. *Assets* is the natural logarithm of total assets. *ROA* is return on assets to measure profitability. *GDP* is the state GDP growth rate. *Unemp_rate* is the state unemployment rate. *Election* is an indicator that equals 1 if there is a presidential election that year, and 0 otherwise. *Democrat* is an indicator that equals 1 if the Democratic presidential candidate received more votes. Detailed variable definitions are provided in Appendix 3.1. ***p<0.01, **p<0.05, *p<0.1.

Panel A: Fixed effects model

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
Benefit	-0.205***	-0.166***	-0.238***	-0.213***	-0.220***	-0.165***	-0.216***	-0.172***
	(-23.836)	(-15.638)	(-20.617)	(-14.572)	(-20.707)	(-12.472)	(-18.982)	(-12.646)
ERR	0.593***	0.589***	0.511***	0.511***	0.526***	0.523***	0.599***	0.595***
	(87.265)	(86.170)	(55.191)	(55.001)	(63.630)	(62.988)	(69.992)	(69.031)
$\%Equity_{t+1}$	0.078***	0.075***	0.046*	0.047*	0.096***	0.098***	0.065***	0.061***
	(4.216)	(4.045)	(1.781)	(1.818)	(4.163)	(4.229)	(2.782)	(2.606)
$Fund_{t+1}$	0.025***	0.018**	0.016*	0.013	0.011	-0.001	0.034***	0.026***
	(3.256)	(2.260)	(1.710)	(1.356)	(1.193)	(-0.080)	(3.443)	(2.643)
$Maturity_{t+1}$	-0.070***	-0.069***	-0.058***	-0.057***	-0.084***	-0.081***	-0.078***	-0.076***
	(-8.241)	(-8.066)	(-4.630)	(-4.586)	(-7.331)	(-7.109)	(-7.769)	(-7.586)

Table 3.9 Panel A (Continued)

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
$Leverage_{t+1}$	0.046	0.068*	0.114**	0.135**	0.030	0.051	0.003	0.027
	(1.172)	(1.682)	(2.184)	(2.543)	(0.607)	(1.005)	(0.055)	(0.552)
$Plan\_Size_{t+1}$	-0.057	-0.220***	-0.207***	-0.293***	-0.178**	-0.402***	-0.038	-0.238***
	(-1.057)	(-3.623)	(-2.772)	(-3.505)	(-2.499)	(-5.092)	(-0.574)	(-3.128)
$Assets_{t+1}$		-0.078***		-0.045***		-0.104***		-0.092***
		(-6.211)		(-2.581)		(-6.819)		(-5.752)
ROA_{t+1}		0.058		0.193		0.111		0.086
		(0.680)		(1.622)		(0.976)		(0.839)
GDP_{t+1}	-0.003*	-0.003**	-0.003	-0.003	-0.012***	-0.013***	0.001	0.001
	(-1.922)	(-2.086)	(-1.451)	(-1.639)	(-5.729)	(-6.158)	(0.467)	(0.419)
$Unemp\_rate_{t+1}$	-0.035***	-0.036***	-0.055***	-0.055***	-0.054***	-0.056***	-0.021***	-0.022***
	(-12.341)	(-12.647)	(-13.729)	(-13.779)	(-14.483)	(-14.912)	(-5.730)	(-5.987)
$Election_{t+1}$	0.024***	0.025***	0.008	0.007	0.051***	0.054***	-0.004	-0.004
	(2.984)	(3.067)	(0.710)	(0.681)	(5.062)	(5.289)	(-0.451)	(-0.426)
$Democrat_{t+1}$	0.001	0.004	0.012	0.015	0.060***	0.059***	0.013	0.016
	(0.070)	(0.227)	(0.471)	(0.604)	(2.752)	(2.701)	(0.590)	(0.741)
Constant	7.785***	7.564***	9.040***	8.834***	8.764***	8.404***	7.893***	7.670***
	(33.469)	(32.071)	(31.441)	(29.988)	(31.646)	(29.749)	(27.618)	(26.612)
Observations	10,647	10,647	7,210	7,210	8,031	8,031	7,187	7,187
Adjusted R-squared	0.835	0.836	0.822	0.822	0.831	0.832	0.832	0.833
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 3.9 (Continued)

Panel B: Difference-in-differences specification

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
Treat	0.002	0.003	0.008	0.009	-0.002	-0.002	0.012	0.012
	(0.108)	(0.156)	(0.587)	(0.642)	(-0.098)	(-0.090)	(0.716)	(0.737)
Post	0.006	0.005	0.017	0.016	-0.005	-0.006	-0.005	-0.002
	(0.607)	(0.567)	(1.272)	(1.178)	(-0.361)	(-0.459)	(-0.306)	(-0.097)
*Treat*Post*	-0.014	-0.013	-0.017	-0.016	-0.007	-0.006	-0.028	-0.030
	(-0.684)	(-0.658)	(-0.907)	(-0.839)	(-0.306)	(-0.276)	(-1.179)	(-1.255)
ERR	0.803***	0.803***	0.786***	0.785***	0.790***	0.789***	0.812***	0.813***
	(178.127)	(177.034)	(135.056)	(132.925)	(150.111)	(147.894)	(125.289)	(124.248)
$\%Equity_{t+1}$	-0.012	-0.016	-0.019	-0.019	-0.008	-0.006	0.003	-0.003
	(-1.056)	(-1.393)	(-1.362)	(-1.311)	(-0.602)	(-0.458)	(0.207)	(-0.196)
$Fund_{t+1}$	0.038***	0.038***	0.029***	0.030***	0.031***	0.031***	0.025***	0.024***
	(6.230)	(6.090)	(3.958)	(3.989)	(4.325)	(4.333)	(2.924)	(2.775)
$Maturity_{t+1}$	-0.045***	-0.043***	-0.030***	-0.029***	-0.048***	-0.048***	-0.032***	-0.031***
	(-8.654)	(-8.152)	(-4.458)	(-4.221)	(-7.375)	(-7.155)	(-4.655)	(-4.348)
$Leverage_{t+1}$	0.070***	0.075***	0.080***	0.086***	0.083***	0.090***	0.074***	0.078***
	(3.544)	(3.789)	(3.390)	(3.631)	(3.623)	(3.899)	(2.857)	(2.985)
$Plan\_Size_{t+1}$	0.131***	0.126***	0.108***	0.111***	0.162***	0.170***	0.127***	0.118***
	(5.806)	(5.465)	(3.751)	(3.753)	(5.632)	(5.732)	(4.124)	(3.741)
$Assets_{t+1}$		-0.005**		-0.001		0.000		-0.005*
		(-2.145)		(-0.499)		(0.003)		(-1.664)
ROA_{t+1}		0.160***		0.203***		0.237***		0.134*
		(2.796)		(2.908)		(3.326)		(1.816)

Table 3.9 Panel B (Continued)

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
GDP_{t+1}	0.006***	0.006***	0.007***	0.007***	0.007***	0.007***	0.006***	0.005***
	(4.177)	(3.837)	(3.900)	(3.547)	(3.432)	(3.317)	(3.001)	(2.744)
$Unemp\_rate_{t+1}$	-0.027***	-0.026***	-0.038***	-0.037***	-0.027***	-0.026***	-0.031***	-0.030***
	(-11.303)	(-10.984)	(-12.652)	(-12.386)	(-8.925)	(-8.813)	(-8.862)	(-8.531)
$Election_{t+1}$	0.051***	0.051***	0.078***	0.078***	0.077***	0.078***	0.035***	0.036***
	(5.934)	(5.898)	(7.049)	(7.030)	(7.167)	(7.152)	(2.906)	(2.980)
$Democrat_{t+1}$	0.054***	0.051***	0.021**	0.020**	0.056***	0.055***	0.023**	0.021**
	(6.886)	(6.442)	(2.159)	(1.986)	(5.985)	(5.779)	(2.238)	(1.969)
Constant	1.742***	1.759***	1.921***	1.917***	1.863***	1.850***	1.663***	1.678***
	(35.557)	(34.396)	(30.166)	(29.367)	(31.207)	(30.099)	(23.954)	(23.433)
Observations	10,634	10,634	7,210	7,210	8,014	8,014	5,577	5,577
Adjusted R-squared	0.792	0.793	0.759	0.759	0.768	0.768	0.784	0.784

Table 3.10: Cross-sectional tests: importance of financial constraints– Pension earnings management

The table summarises the results from firm-panel regressions of firms' pension actuarial assumptions on the natural log of the maximum total potential benefit available under states' unemployment insurance systems, and a set of controls. Columns (1), (3), and (5) restrict the sample to firms that face greater financial constraints (zero dividends, below-median operating cash flows, or below-median total assets). Columns (2), (4), and (6) restrict the sample to firms that face lower financial constraints (positive dividends, above-median operating cash flows, or above-median total assets). *Benefit* is the natural log of the maximum number of weeks times the maximum weekly wage benefit amount given to employees in state-year t. *ERR* is the percentage of pension assets invested in equity. *%Equity* is the percentage of pension assets invested in equity in the year after the benefit increase. *Fund* is the fair value of pension assets divided by PBO. *Maturity* is pension maturity, which is measured as the natural logarithm of the ratio of PBO to current service costs. *Leverage* is debt in current liabilities, plus long-term debt divided by total assets. *Plan_Size* is PBO divided by total assets. *Loss* is an indicator that equals 1 if firms reported a loss in the prior year. *ΔLev* is the change in leverage in the prior year. *ΔSales%* is the percentage of change in sales. *ΔDividends* is the change in dividend payout in the prior year. *Assets* is the natural logarithm of total assets. ROA is return on assets to measure profitability. *GDP* is the state GDP growth rate. *Unemp_rate* is the state unemployment rate. *Election* is an indicator that equals 1 if there is a presidential election that year, and 0 otherwise. *Democrat* is an indicator that equals 1 if the Democratic presidential candidate received more votes. Detailed variable definitions are provided in Appendix 3.1. ***p<0.01, **p<0.05, *p<0.1.

	Dividends		Cash flows		Firm size	
	Zero	Positive	Low	High	Small	Large
Variables	1	2	3	4	5	6
Benefit	-0.177***	-0.290***	-0.172***	-0.233***	-0.192***	-0.249***
	(-10.998)	(-7.322)	(-8.309)	(-10.829)	(-9.495)	(-11.040)
ERR	0.564***	0.420***	0.624***	0.464***	0.595***	0.435***
	(55.639)	(19.996)	(49.113)	(34.736)	(48.819)	(31.096)
%Equity$_{t+1}$	0.010	0.228***	0.007	0.091***	0.020	0.081**
	(0.360)	(4.197)	(0.180)	(2.921)	(0.496)	(2.572)
Fund$_{t+1}$	0.031***	0.019	0.018	0.040***	-0.000	0.039***
	(2.817)	(0.831)	(1.276)	(2.866)	(-0.002)	(2.697)
Maturity$_{t+1}$	-0.058***	-0.099***	-0.059***	-0.078***	-0.054***	-0.085***
	(-4.308)	(-4.082)	(-3.266)	(-5.017)	(-3.319)	(-5.380)
Leverage$_{t+1}$	0.040	0.169	0.095	0.039	-0.017	0.059
	(0.624)	(1.623)	(1.099)	(0.592)	(-0.208)	(0.876)
PlanSize$_{t+1}$	-0.435***	0.140	-0.523***	-0.007	-0.362***	0.032
	(-4.358)	(0.850)	(-4.040)	(-0.070)	(-2.960)	(0.273)
Assets$_{t+1}$	-0.078***	-0.030	-0.089***	-0.017	-0.113***	-0.018
	(-3.920)	(-0.757)	(-3.458)	(-0.638)	(-4.416)	(-0.625)

Table 3.10 (Continued)

	Dividends		Cash flows		Firm size	
	Zero	Positive	Low	High	Small	Large
Variables	1	2	3	4	5	6
ROA_{t+1}	0.249**	-0.039	0.333**	-0.078	0.352**	0.127
	(1.961)	(-0.168)	(2.027)	(-0.530)	(2.128)	(0.858)
GDP_{t+1}	0.001	-0.010**	0.001	-0.011***	-0.001	-0.006*
	(0.324)	(-2.437)	(0.471)	(-3.840)	(-0.294)	(-1.939)
$Unemp\_rate_{t+1}$	-0.033***	-0.064***	-0.025***	-0.057***	-0.028***	-0.058***
	(-7.933)	(-6.429)	(-5.248)	(-9.417)	(-5.783)	(-9.284)
$Election_{t+1}$	0.018	-0.054**	0.019	-0.010	0.022	-0.013
	(1.509)	(-2.117)	(1.251)	(-0.700)	(1.490)	(-0.866)
$Democrat_{t+1}$	0.016	-0.057	0.060*	-0.015	0.027	-0.043
	(0.617)	(-0.814)	(1.798)	(-0.431)	(0.765)	(-1.191)
Constant	7.918***	11.463***	8.621***	9.673***	8.642***	10.292***
	(24.428)	(14.348)	(16.912)	(23.205)	(19.356)	(23.692)
Observations	5,399	1,761	3,542	3,522	3,612	3,598
Adjusted R-squared	0.848	0.807	0.857	0.839	0.854	0.823
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Table 3.11: Falsification Tests

This table presents coefficients and t-statistics in parentheses from pooled regressions of the dependent variables *%Equity* on the independent variables listed. *Benefit* in years t+1 and t+2 are included. *%Equity* is the percentage of pension assets invested in equity in the year after the benefit increase. *Benefit* is the natural log of the maximum number of weeks times the maximum weekly wage benefit amount given to employees in state-year t. *Treat* is an indicator that equals 1 for firm-years in the treatment sample, and 0 otherwise. *Post* is an indicator that equals 1 for the period after an increase in unemployment benefits, and 0 otherwise. *Fund* is the fair value of pension assets divided by PBO. *Maturity* is pension maturity, which is measured as the natural logarithm of the ratio of PBO to current service costs. *Leverage* is debt in current liabilities, plus long-term debt divided by total assets. *Divp* is dividends per share divided by retained earnings per share. *Tax* is total tax expense divided by pre-tax income. *Assets* is the natural logarithm of total assets. *ROA* is return on assets to measure profitability. *GDP* is the state GDP growth rate. *Unemp_rate* is the state unemployment rate. *Election* is an indicator that equals 1 if there is a presidential election that year, and 0 otherwise. *Democrat* is an indicator that equals 1 if the Democratic presidential candidate received more votes. Detailed variable definitions are in Appendix 3.1. ***p<0.01, **p<0.05, *p<0.1.

	No Matching	
Variables	1	2
Benefit	0.020*	0.025**
	(1.952)	(2.362)
$Benefit_{t+1}$	-0.014	-0.013
	(-1.340)	(-1.245)
$Benefit_{t+2}$	0.013	0.013
	(1.525)	(1.538)
%Equity	0.581***	0.580***
	(60.528)	(60.397)
$Fund_{t+1}$	0.001	0.000
	(0.225)	(0.057)
$Maturity_{t+1}$	0.005	0.004
	(1.194)	(0.946)
$Leverage_{t+1}$	-0.005	-0.005
	(-0.255)	(-0.261)
$Divp_{t+1}$	-0.006	-0.005
	(-0.518)	(-0.472)
Tax_{t+1}	0.001	0.001
	(0.171)	(0.369)
$Assets_{t+1}$		-0.013**
		(-2.168)
ROA_{t+1}		-0.050
		(-1.143)
GDP_{t+1}	-0.000	-0.000
	(-0.276)	(-0.183)
$Unemp\_rate_{t+1}$	-0.001	-0.002
	(-0.926)	(-1.065)

Table 3.11 (Continued)

	No Matching	
Variables	1	2
Election$_{t+1}$	0.008*	0.008*
	(1.736)	(1.814)
Democrat$_{t+1}$	0.022***	0.022***
	(2.997)	(3.007)
Constant	0.021	-0.004
	(0.212)	(-0.044)
Observations	8,434	8,434
Adjusted R-squared	0.795	0.795
Firm Fixed Effects	Yes	Yes
State Fixed Effects	Yes	Yes

Table 3.12: Pension asset allocation and unemployment insurance benefit increases – Robustness one year

Table 3.12 presents coefficients and t-statistics in parentheses from pooled regressions of the dependent variable *%Equity*$_{t+1}$. The control samples are constructed without applying neighbouring state filter, and it includes all states and firms in an event year that do not have a large increase in UI. Columns (1) and (2) show results using no matching methods; columns (3) and (4) show results using the EBM method; columns (5) and (6) show results using the CEM method; and columns (7) and (8) show results using the PSM method. Panel A gives results for fixed effects specifications, while panel B gives results for difference-in-differences specifications. *%Equity* is the percentage of pension assets invested in equity in the year after the benefit increase. *Benefit* is the natural log of the maximum number of weeks times the maximum weekly wage benefit amount given to employees in state-year t. *Treat* is an indicator that equals 1 for firm-years in the treatment sample, and 0 otherwise. *Post* is an indicator that equals 1 for the period after an increase in unemployment benefits, and 0 otherwise. *Fund* is the fair value of pension assets divided by PBO. *Maturity* is pension maturity, which is measured as the natural logarithm of the ratio of PBO to current service costs. *Leverage* is debt in current liabilities, plus long-term debt divided by total assets. *Divp* is dividends per share divided by retained earnings per share. *Tax* is total tax expense divided by pre-tax income. *Assets* is the natural logarithm of total assets. *ROA* is return on assets to measure profitability. *GDP* is the state GDP growth rate. *Unemp_rate* is the state unemployment rate. *Election* is an indicator that equals 1 if there is a presidential election that year, and 0 otherwise. *Democrat* is an indicator that equals 1 if the Democratic presidential candidate received more votes. Detailed variable definitions are in Appendix 3.1. ***p<0.01, **p<0.05, *p<0.1.

Panel A: Fixed effects specification

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
Benefit	0.015***	0.022***	0.012***	0.015***	0.018***	0.027***	0.023***	0.031***
	(14.299)	(17.778)	(11.511)	(12.382)	(11.662)	(14.370)	(15.766)	(17.551)
%Equity	0.625***	0.624***	0.620***	0.620***	0.606***	0.605***	0.626***	0.624***
	(239.919)	(239.294)	(238.119)	(238.139)	(157.277)	(156.933)	(172.626)	(171.989)
Fund$_{t+1}$	0.009***	0.007***	0.006***	0.005***	0.008***	0.007***	0.009***	0.008***
	(8.158)	(6.997)	(5.728)	(5.324)	(5.681)	(5.015)	(6.021)	(5.199)
Maturity$_{t+1}$	0.009***	0.008***	0.008***	0.008***	0.012***	0.011***	0.011***	0.010***
	(8.677)	(7.648)	(7.236)	(6.845)	(6.877)	(6.062)	(7.132)	(6.281)
Leverage$_{t+1}$	-0.005	-0.003	0.004	0.007	-0.000	0.000	-0.009	-0.007
	(-0.910)	(-0.631)	(0.764)	(1.275)	(-0.058)	(0.060)	(-1.192)	(-0.852)
Divp$_{t+1}$	0.000	0.001	0.008***	0.008***	-0.006	-0.006	-0.003	-0.003
	(0.059)	(0.195)	(3.162)	(3.138)	(-1.599)	(-1.449)	(-0.727)	(-0.706)

Table 3.12 Panel A (Continued)

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
Tax_{t+1}	0.002*	0.003**	0.003***	0.003**	0.001	0.001	0.003*	0.003*
	(1.924)	(2.216)	(2.592)	(2.405)	(0.343)	(0.515)	(1.892)	(1.923)
$Assets_{t+1}$		-0.015***		-0.007***		-0.018***		-0.016***
		(-10.623)		(-4.900)		(-8.420)		(-8.008)
ROA_{t+1}		-0.010		0.024**		-0.000		0.009
		(-0.807)		(1.979)		(-0.026)		(0.526)
GDP_{t+1}	-0.001***	-0.002***	-0.001***	-0.001***	-0.000	-0.000	-0.002***	-0.002***
	(-6.370)	(-6.637)	(-4.580)	(-4.914)	(-0.901)	(-1.187)	(-6.852)	(-7.179)
$Unemp\_rate_{t+1}$	-0.000	-0.001**	-0.001***	-0.001***	-0.004***	-0.004***	-0.003***	-0.003***
	(-1.181)	(-2.005)	(-2.903)	(-3.230)	(-6.493)	(-7.272)	(-5.874)	(-6.465)
$Election_{t+1}$	0.013***	0.013***	0.009***	0.009***	0.008***	0.008***	0.020***	0.019***
	(10.686)	(10.902)	(7.424)	(7.417)	(4.368)	(4.527)	(11.618)	(11.469)
$Democrat_{t+1}$	0.008***	0.008***	0.008***	0.008***	0.005*	0.006**	0.004	0.004
	(3.964)	(4.065)	(3.982)	(4.005)	(1.871)	(2.048)	(1.401)	(1.526)
Constant	-0.072***	-0.117***	0.008	-0.017	-0.102***	-0.151***	-0.204***	-0.254***
	(-2.919)	(-4.646)	(0.343)	(-0.708)	(-2.976)	(-4.296)	(-5.732)	(-7.034)
Observations	89,668	89,668	89,667	89,667	44,079	44,079	43,429	43,429
Adjusted R-squared	0.813	0.813	0.833	0.833	0.837	0.837	0.825	0.825
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 3.12 (Continued)

Panel B: Difference-in-differences specification

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
Treat	-0.021***	-0.020***	-0.020***	-0.019***	-0.016***	-0.016***	-0.021***	-0.021***
	(-3.387)	(-3.372)	(-12.531)	(-12.364)	(-2.664)	(-2.585)	(-3.406)	(-3.403)
Post	-0.010***	-0.010***	-0.010***	-0.010***	-0.005***	-0.005***	-0.133***	-0.126***
	(-8.735)	(-8.619)	(-6.373)	(-6.304)	(-3.270)	(-3.062)	(-3.147)	(-2.976)
*Treat*Post*	0.021**	0.021**	0.021***	0.021***	0.017**	0.017**	0.144***	0.137***
	(2.574)	(2.567)	(9.911)	(9.877)	(2.063)	(2.025)	(3.331)	(3.176)
%Equity	0.886***	0.878***	0.887***	0.878***	0.883***	0.875***	0.896***	0.888***
	(528.141)	(515.891)	(539.541)	(524.885)	(376.008)	(365.797)	(369.349)	(360.243)
$Fund_{t+1}$	0.005***	0.003***	0.005***	0.003***	0.004***	0.003**	0.004***	0.003**
	(5.583)	(3.389)	(5.609)	(3.595)	(3.711)	(2.338)	(3.478)	(2.037)
$Maturity_{t+1}$	-0.004***	-0.002***	-0.005***	-0.002***	-0.007***	-0.005***	-0.001	0.001
	(-5.307)	(-2.995)	(-6.815)	(-2.672)	(-6.568)	(-4.621)	(-0.932)	(0.684)
$Leverage_{t+1}$	-0.030***	-0.025***	-0.019***	-0.015***	-0.031***	-0.025***	-0.030***	-0.024***
	(-10.170)	(-8.411)	(-6.751)	(-5.195)	(-7.611)	(-6.113)	(-7.175)	(-5.753)
$Divp_{t+1}$	-0.010***	-0.006***	-0.004**	0.001	-0.012***	-0.008***	-0.015***	-0.010***
	(-4.470)	(-2.598)	(-2.100)	(0.323)	(-3.799)	(-2.577)	(-4.525)	(-3.179)
Tax_{t+1}	-0.004***	-0.003**	-0.002	-0.001	-0.003	-0.002	-0.004**	-0.003*
	(-3.105)	(-2.496)	(-1.581)	(-0.945)	(-1.625)	(-1.404)	(-2.044)	(-1.954)
$Assets_{t+1}$		-0.007***		-0.008***		-0.008***		-0.007***
		(-22.899)		(-28.116)		(-16.912)		(-16.579)
ROA_{t+1}		-0.000		0.018**		0.031**		0.021*
		(-0.025)		(2.242)		(2.495)		(1.718)

Table 3.12 Panel B (Continued)

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
GDP_{t+1}	-0.003***	-0.003***	-0.002***	-0.002***	-0.001***	-0.002***	-0.005***	-0.005***
	(-11.719)	(-12.889)	(-7.828)	(-9.353)	(-3.717)	(-4.068)	(-15.825)	(-17.179)
$Unemp\_rate_{t+1}$	0.000	0.001**	0.001**	0.001***	-0.001*	-0.001	-0.002***	-0.002***
	(1.249)	(2.112)	(2.280)	(3.544)	(-1.726)	(-1.037)	(-4.241)	(-3.798)
$Election_{t+1}$	0.016***	0.015***	0.008***	0.007***	0.011***	0.011***	0.030***	0.029***
	(11.747)	(11.298)	(5.955)	(5.383)	(5.491)	(5.422)	(16.344)	(15.534)
$Democrat_{t+1}$	-0.001	-0.002	0.000	-0.000	-0.001	-0.001	-0.002	-0.003**
	(-0.718)	(-1.557)	(0.382)	(-0.129)	(-0.393)	(-0.532)	(-1.380)	(-2.006)
Constant	0.067***	0.115***	0.061***	0.111***	0.079***	0.124***	0.078***	0.128***
	(16.106)	(24.362)	(14.500)	(23.791)	(13.161)	(18.378)	(13.198)	(18.864)
Observations	89,392	89,392	89,391	89,391	44,043	44,043	43,429	43,429
Adjusted R-squared	0.760	0.761	0.767	0.769	0.765	0.767	0.762	0.763

Table 3.13: Pension asset allocation and unemployment insurance benefit increases – Robustness three years

Table 3.13 presents coefficients and t-statistics in parentheses from pooled regressions of the dependent variable *%Equity*$_{t+1}$. The control samples are constructed without applying neighbouring state filter. I expand the event window to three years after the event year. Columns (1) and (2) show results using no matching methods; columns (3) and (4) show results using the EBM method; columns (5) and (6) show results using the CEM method; and columns (7) and (8) show results using the PSM method. Panel A gives results for fixed effects specifications, while panel B gives results for difference-in-differences specifications. *%Equity* is the percentage of pension assets invested in equity in the year after the benefit increase. *Benefit* is the natural log of the maximum number of weeks times the maximum weekly wage benefit amount given to employees in state-year t. *Treat* is an indicator that equals 1 for firm-years in the treatment sample, and 0 otherwise. *Post* is an indicator that equals 1 for the period after an increase in unemployment benefits, and 0 otherwise. *Fund* is the fair value of pension assets divided by PBO. *Maturity* is pension maturity, which is measured as the natural logarithm of the ratio of PBO to current service costs. *Leverage* is debt in current liabilities, plus long-term debt divided by total assets. *Divp* is dividends per share divided by retained earnings per share. *Tax* is total tax expense divided by pre-tax income. *Assets* is the natural logarithm of total assets. ROA is return on assets to measure profitability. *GDP* is the state GDP growth rate. *Unemp_rate* is the state unemployment rate. *Election* is an indicator that equals 1 if there is a presidential election that year, and 0 otherwise. *Democrat* is an indicator that equals 1 if the Democratic presidential candidate received more votes. Detailed variable definitions are provided in Appendix 3.1. ***p<0.01, **p<0.05, *p<0.1.

Panel A: Fixed effects specification

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
Benefit	0.015***	0.022***	0.012***	0.015***	0.018***	0.027***	0.018***	0.026***
	(14.310)	(17.789)	(11.511)	(12.382)	(11.638)	(14.341)	(12.220)	(14.850)
%Equity	0.625***	0.624***	0.620***	0.620***	0.606***	0.605***	0.620***	0.618***
	(240.072)	(239.460)	(238.119)	(238.139)	(156.916)	(156.574)	(169.207)	(168.641)
Fund$_{t+1}$	0.009***	0.008***	0.006***	0.005***	0.008***	0.007***	0.010***	0.008***
	(8.260)	(7.104)	(5.727)	(5.324)	(5.667)	(5.002)	(6.053)	(5.127)
Maturity$_{t+1}$	0.009***	0.008***	0.008***	0.008***	0.012***	0.011***	0.009***	0.008***
	(8.682)	(7.671)	(7.236)	(6.845)	(6.814)	(6.002)	(5.963)	(5.284)
Leverage$_{t+1}$	-0.004	-0.002	0.004	0.007	-0.001	0.000	-0.001	0.000
	(-0.712)	(-0.427)	(0.765)	(1.275)	(-0.070)	(0.046)	(-0.113)	(0.017)
Divp$_{t+1}$	-0.000	0.000	0.008***	0.008***	-0.006	-0.006	-0.005	-0.005
	(-0.007)	(0.129)	(3.162)	(3.138)	(-1.595)	(-1.444)	(-1.367)	(-1.272)

Table 3.13 Panel A (Continued)

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
Tax_{t+1}	0.002*	0.003**	0.003***	0.003**	0.000	0.001	0.003*	0.003*
	(1.830)	(2.120)	(2.596)	(2.409)	(0.185)	(0.361)	(1.672)	(1.831)
$Assets_{t+1}$		-0.015***		-0.007***		-0.018***		-0.017***
		(-10.628)		(-4.900)		(-8.407)		(-8.476)
ROA_{t+1}		-0.009		0.024**		-0.001		-0.012
		(-0.773)		(1.978)		(-0.042)		(-0.731)
GDP_{t+1}	-0.001***	-0.002***	-0.001***	-0.001***	-0.000	-0.000	-0.002***	-0.003***
	(-6.342)	(-6.622)	(-4.581)	(-4.914)	(-0.923)	(-1.207)	(-7.647)	(-7.939)
$Unemp\_rate_{t+1}$	-0.000	-0.001*	-0.001***	-0.001***	-0.004***	-0.004***	-0.001**	-0.002***
	(-1.032)	(-1.838)	(-2.903)	(-3.230)	(-6.426)	(-7.207)	(-2.153)	(-2.867)
$Election_{t+1}$	0.013***	0.013***	0.009***	0.009***	0.008***	0.008***	0.018***	0.018***
	(10.682)	(10.906)	(7.424)	(7.417)	(4.371)	(4.529)	(10.852)	(10.971)
$Democrat_{t+1}$	0.008***	0.008***	0.008***	0.008***	0.005*	0.005**	0.008***	0.009***
	(3.998)	(4.093)	(3.982)	(4.005)	(1.867)	(2.043)	(2.958)	(3.025)
Constant	-0.072***	-0.116***	0.008	-0.017	-0.102***	-0.150***	-0.104***	-0.146***
	(-2.918)	(-4.629)	(0.343)	(-0.708)	(-2.957)	(-4.274)	(-2.887)	(-4.034)
Observations	89,868	89,868	89,667	89,667	43,929	43,929	45,143	45,143
Adjusted R-squared	0.812	0.813	0.833	0.833	0.837	0.837	0.810	0.810
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 3.13 (Continued)

Panel B: Difference-in-differences specification

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
Treat	-0.020***	-0.020***	-0.020***	-0.019***	-0.016***	-0.016***	-0.021***	-0.021***
	(-3.355)	(-3.341)	(-12.472)	(-12.305)	(-2.663)	(-2.584)	(-3.412)	(-3.408)
Post	-0.011***	-0.011***	-0.011***	-0.011***	-0.005***	-0.005***	-0.125***	-0.117***
	(-9.586)	(-9.454)	(-7.047)	(-6.964)	(-3.353)	(-3.141)	(-3.054)	(-2.859)
*Treat*Post*	0.025***	0.026***	0.022***	0.022***	0.018**	0.018**	0.136***	0.129***
	(3.216)	(3.299)	(10.366)	(10.322)	(2.187)	(2.139)	(3.246)	(3.092)
%Equity	0.883***	0.876***	0.886***	0.877***	0.883***	0.874***	0.896***	0.888***
	(525.876)	(513.590)	(538.346)	(523.682)	(375.153)	(364.934)	(370.390)	(361.216)
$Fund_{t+1}$	0.005***	0.003***	0.005***	0.003***	0.005***	0.003**	0.005***	0.003**
	(5.821)	(3.616)	(5.745)	(3.728)	(3.727)	(2.349)	(3.560)	(2.101)
$Maturity_{t+1}$	-0.004***	-0.002***	-0.005***	-0.002***	-0.007***	-0.005***	-0.001	0.001
	(-5.559)	(-3.253)	(-6.939)	(-2.805)	(-6.623)	(-4.678)	(-0.935)	(0.680)
$Leverage_{t+1}$	-0.029***	-0.024***	-0.019***	-0.014***	-0.031***	-0.025***	-0.030***	-0.024***
	(-9.794)	(-8.063)	(-6.605)	(-5.060)	(-7.577)	(-6.082)	(-7.024)	(-5.613)
$Divp_{t+1}$	-0.010***	-0.006**	-0.004**	0.001	-0.012***	-0.008**	-0.015***	-0.010***
	(-4.363)	(-2.473)	(-2.042)	(0.393)	(-3.789)	(-2.563)	(-4.534)	(-3.192)
Tax_{t+1}	-0.004***	-0.003**	-0.002	-0.001	-0.003*	-0.003	-0.004**	-0.003*
	(-3.141)	(-2.490)	(-1.583)	(-0.920)	(-1.746)	(-1.512)	(-2.013)	(-1.927)
$Assets_{t+1}$		-0.007***		-0.008***		-0.008***		-0.007***
		(-22.948)		(-28.157)		(-16.920)		(-16.547)
ROA_{t+1}		-0.002		0.017**		0.030**		0.021*
		(-0.231)		(2.108)		(2.444)		(1.726)

Table 3.13 Panel B (Continued)

	No Matching		EBM		CEM		PSM	
Variables	1	2	3	4	5	6	7	8
GDP_{t+1}	-0.003***	-0.003***	-0.002***	-0.002***	-0.001***	-0.002***	-0.005***	-0.005***
	(-11.283)	(-12.437)	(-7.654)	(-9.176)	(-3.690)	(-4.039)	(-15.782)	(-17.121)
$Unemp\_rate_{t+1}$	0.001**	0.001***	0.001***	0.001***	-0.001	-0.000	-0.002***	-0.002***
	(2.356)	(3.193)	(2.783)	(4.034)	(-1.581)	(-0.903)	(-4.203)	(-3.771)
$Election_{t+1}$	0.016***	0.016***	0.008***	0.007***	0.011***	0.011***	0.030***	0.028***
	(12.070)	(11.615)	(6.145)	(5.567)	(5.531)	(5.460)	(16.313)	(15.513)
$Democrat_{t+1}$	-0.001	-0.002*	0.000	-0.000	-0.001	-0.001	-0.002	-0.003*
	(-0.929)	(-1.759)	(0.324)	(-0.185)	(-0.419)	(-0.556)	(-1.226)	(-1.848)
Constant	0.065***	0.114***	0.060***	0.110***	0.079***	0.124***	0.078***	0.127***
	(15.571)	(23.955)	(14.280)	(23.640)	(13.107)	(18.347)	(13.124)	(18.784)
Observations	89,868	89,868	89,667	89,667	43,929	43,929	43,621	43,621
Adjusted R-squared	0.757	0.759	0.766	0.768	0.765	0.767	0.762	0.764

Chapter 4: Conclusion

Defined benefit plans (DB hereinafter) involve complex accounting estimates and other decisions for example about how to invest pension assets. This thesis carried out research on two aspects of pensions: 1) whether pension actuarial assumptions, accruals management more generally and real earnings management can be used in earnings management in the context of major corporate events in European Union (EU hereinafter), and 2) how pension investment strategy is affected by employees' levels of unemployment risk in the U.S.

The determination of pension actuarial assumptions offers managers the opportunity to exercise discretion. The purpose of the first empirical study presented in Chapter 2 was to examine the role of pension actuarial assumptions on firms' earnings management behaviour leading up to major corporate events. It also explored how accounting regulation changes in relation to pension actuarial assumptions potentially influence earnings management behaviour. This line of research is motivated by the significant impact pension assumptions can have on reported earnings. Thus far, little is known about their role in firms' earnings management strategy ahead of major corporate events in EU. This chapter attempts to fill this void.

In Chapter 2, I examined the role of pension actuarial assumptions ahead of corporate events in EU using available data on EU public firms from Year to Year. The focus was on examining whether pension actuarial assumptions are used to manage earnings, and how a pension accounting change (the requirement to use the discount instead of the expected rate of return (ERR hereinafter) under IAS 19R) influenced that behaviour. In particular, in the empirical analysis, I examined

EU firms' earnings management behaviour leading up to major corporate events such as mergers and acquisitions (M&As hereinafter), initial public offerings (IPOs hereinafter), and seasoned equity offerings (SEOs hereinafter).

I carried out analysis using a treatment group consisting of firms involved in one of the major corporate events, and a control group consisting of firms that were not involved in any such events. I examined two of the pension actuarial assumptions, i.e., ERR and the discount rate since these can have a direct impact on reported earnings and data are readily and consistently available. Using EBM matching methods to match the treatment and control firms, I find that firms manage the ERR leading up to all three types of major corporate events under IAS 19. Consistent with Bergstresser, Desai and Rauh (2006), my findings show that EU firms use ERR to manage earnings ahead of M&As and SEOs. I further contribute to the existing literature by examining these issues for target and IPO firms' earnings management behaviour using ERR and find positive evidence to suggest that target and IPO firms manage ERR. This contributes to prior literature by examining earnings management using pension actuarial assumptions in the context of target and IPO firms.

In addition, I find that EU firms do not engage in earnings management using the discount rate ahead of major corporate events under IAS 19. In this chapter, I also investigated the impact of the IAS 19R pension accounting standard change on firms' earnings management behaviour. The results suggest that, after the elimination of the ERR, firms manage the discount rate instead to increase reported earnings ahead of major corporate events. This finding contributes to the existing literature by shedding more light on the role of the discount rate on firm's earnings management behaviour. Further, I examine whether pension actuarial assumption management has any impact on M&As completion probability. The results show that both pension actuarial assumptions, i.e., ERR and the discount rate have no effect on M&As completion probability.

Chapter 2 also investigates EU firms' earnings management behaviour using alternative tools, including discretionary accruals and real earnings management. I use the modified Jones model to estimate firms' discretionary accruals, and use sales, production costs, and discretionary expenses as proxies for real earnings management. The results show that, target, IPO, and SEO firms use other discretionary accruals and real earnings management tools while acquirer firms only use discretionary accruals to manage earnings under IAS 19. After the adoption of IAS 19R, acquirer firms use real earnings management tools to manage earnings. And IPO firms manage both discretionary accruals and real earnings management tools to a greater extent. I find evidence consistent with the notion that firms increase real earnings management when managerial discretion is decreased.

Overall, the study provides new evidence that is useful in understanding how firms set their pension actuarial assumptions ahead of major corporate events where earnings management incentives are strong. Moreover, when the flexibility around the determination of pension actuarial assumptions was constrained, I find that firms engage in real earnings management to a greater extent. Real earnings management can have future economic consequences. By exploring pension actuarial assumptions, discretionary accruals and real earnings management, I provide new evidence that sheds light on how changes in standard-setting can alter firms' real transaction decisions.

Chapter 3 focuses on how pension investment risk is affected by employees' unemployment risk. Pension investment risk can be affected by various factors such as financial performance and pension plan contribution. I measure pension investment risk using the percentage invested in equity. I use state-level unemployment benefit insurance data from the United States (U.S. hereinafter) as proxy for employees' unemployment risk. I use a sample of U.S. public firms, because the unique data of state-level unemployment insurance (UI hereinafter) benefits provide an unbiased proxy to measure unemployment risk changes without capturing any firm-level changes.

This chapter uses several matching techniques, including entropy balance, coarsened exact, and propensity score matching, to reduce endogenous problems such as causality issues and omitted variables. It also relaxes the linear assumptions of multiple regression models.

Moreover, this chapter analyses both a fixed effect and difference-in-differences model to capture the relationship between unemployment risk and pension asset allocation. The results suggest a negative relationship between unemployment risk and firms' pension investment risk. When unemployment risk decreases, firms are more likely to increase their pension investment risk. This study allows me to contribute to prior research by establishing links between labour economics and pensions in the context of firms' pension investment decisions. In addition, I provide new evidence that unemployment risk is one of the factors that affect firms' pension investment decisions.

Chapter 3 also explores two further pension-related decisions in the context of the relationship between unemployment risk and pension decisions, i.e., pension plan freeze decisions and pension actuarial assumptions earnings management. A dummy variable is used to capture firms' pension plan freeze decisions, which equals 1 when firms freeze their DB plans. The ERR is used as a proxy for firms' pension actuarial assumptions management.

Chapter 3 provides additional evidence that unemployment risk can affect firms' pension plan freeze decisions and pension actuarial assumptions management. The results show that firms are more likely to freeze their DB plans and reduce pension actuarial assumptions management after unemployment risk decreases. This thesis provides novel evidence of how U.S. companies' pension accounting decisions can be affected by employees' unemployment risk.

This thesis contributes to the academic literature in several ways. First, Chapter 2 contributes to existing earnings management literature by providing evidence that EU firms manage earnings upwards ahead of major corporate events. Specifically, it finds that firms use pension actuarial assumptions to manage earnings. This contributes to pension accounting literature by shedding more light on how the flexibility inherent in the choice of pension actuarial assumptions is used by EU firms to manage earnings ahead of major corporate events. Further, it explores the impact of the new pension accounting standard IAS 19R and specifically the replacement of the ERR with the discount rate for pension actuarial assumptions on firm's earnings management behaviour. This contributes to pension accounting literature by shedding more light on the pension accounting standard's impact on firm's choice of pension actuarial assumptions. Specifically, it examines how discount rate is used to manage earnings both before and after the pension standard change. The results contribute to prior accounting literature in the context of how accounting standard changes affect firm's real decision making. In addition, this contributes to earnings management literature by identifying another factor that may potentially provide incentives for firms to switch from accruals to real earnings management.

Chapter 3 contributes to prior labour employment literature by providing some evidence that firm's pension related decisions are important to employee's perceived unemployment risk. It also contributes to prior pension literature such as Rauh (2009) by identifying another factor i.e., unemployment risk that could affect firm's pension investment decisions. Further, the additional tests in Chapter 3 provide some evidence that employee's perceived unemployment risk can affect firm's pension actuarial assumptions management and pension plan freeze decisions. This contributes to prior pension accounting literature by shedding more light on the incentives that firms may have to use pension actuarial assumptions to manage earnings. In addition, it contributes to existing literature by identifying another factor that could affect firm's pension plan freeze decisions.

This thesis also provides several implications for practitioners such as managers, investors, and regulators. First, the study presented in Chapter 2 provides empirical evidence that firms manage earnings upward ahead of major corporate events. This result may be of interest to investors who need to be aware of this tendency. Second, the research in this chapter may contribute to accounting standard-setting, since it finds evidence that firms continue to use pension actuarial assumptions to manage earnings after the change in the accounting standard. Finally, this chapter provides evidence that firms increase their use of real earnings management following the adoption of IAS 19R, which has implications for investors and regulators.

The study presented in Chapter 3 provides empirical evidence that employees' perceived unemployment risk is a significant factor in pension-related decisions. The results show that employees are sensitive to any changes in pension asset allocation, pension actuarial assumptions and pension plan freeze decisions. It also shows that pension asset investment is an important part of firms' overall investment strategy. This significant relationship may help managers to construct effective strategies to better manage DB pension plans according to their employees' perceived unemployment risk level. And it helps other practitioners such as potential investors, auditors or shareholders to better understand firm's pension related decision-making.

A limitation of my research in this thesis is the availability of data on pension information. One of the limitations in Chapter 2 is related to the availability of pensions related data. According to IFRS, firms have to disclose pension related information in the annual report. And firms usually report their pension related data such as ERR, discount rate and fair value of the pension plan assets etc. in the notes to the financial statements. Some of the firms do not disclose all the necessary pension related data to carry the analysis in Chapter 2 in their annual report. And some firm's pension related data are missing from Thomson Worldscope database. This results in a reduction in the sample size in Chapter 2In Chapter 2, the number of observations dropped dramatically after matching pension information with major corporate events since a large portion of firms that participate in major corporate events do not have enough pension information available in the database, particularly for the IPO sample. This was reduced to less than 100 observations to test pension actuarial assumptions management, which lowers the power of the tests.

In Chapter 3, the data on pension asset allocation was collected from Form 5500. One of the drawbacks of using Form 5500 is that there is a two-year lag between the filing date and the publicly available date (Jin, Merton & Bodie, 2006; Chuk, 2013). In addition, data errors in both the Form 5500 and Compustat databases may further lower the power of the tests. I address this issue by winsorizing the firm observations. I acknowledge that there are other controls that could be added in the empirical analysis of both chapters 2 and 3, such as time varying variables within countries and pension plan related variables. However, as the primary focus of this thesis is to explore the impact of the IAS 19R adoption and unemployment benefit change, I only include the most relevant controls following previous literature (eg. Bergstresser et al., 2006; Agrawal & Matsa, 2013; Amir, Guan and Oswald, 2010).

However, the limitations of my study provide opportunities for future research. In this thesis, each corporate event type was examined together, due to the relatively limited number of observations available, especially after matching with pension data. Future studies could separate the major corporate events into subgroups, based on criteria such as deal size, deal status, or the payment method. They could also be separated using participant characteristics, such as public/private, institution type, audit quality, etc. Future studies may, therefore, wish to explore the impact of these factors when more data is available. The market reaction to EU firms' earnings management following major corporate events, and the impact of IAS 19R adoption on the market's reaction, are further topics to explore. Future research could also focus on other earnings management incentives such as meeting or beating earnings forecasts.

Another fertile avenue for future research might explore other pension accounting decisions that are affected by unemployment risk. As discussed in this thesis, pension actuarial assumptions involve life expectancy and the discount rate, which are used to estimate pension benefit obligations and funding status. Changes in pension benefit obligations and funding status may also affect employees’ perceived unemployment risk.

In Chapter 3, pension investment risk is measured using the percentage invested in equities investment. However, the OECD (2015) reports there are other high-yield pension asset classes, such as real estate, private equities, hedge funds, and mutual funds. Although Form 5500 provides more categories for pension assets, the availability of data within each category is limited (Jin et al., 2006). When more data become available, future studies could build on this research using other types of pension investments.

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