Essays on Corporate Diversification

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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.

Signature: ……

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Abstract

This thesis consists of three empirical essays on corporate diversification. Researchers have both theoretically and empirically studied the value consequences, the costs and benefits of corporate diversification, but evidence so far has been inconclusive. This thesis investigates the implications of diversification from a number of perspectives that are under-explored in the literature.

Chapter 2 examines the impact of coinsurance across divisional investment opportunities on the value of corporate cash holdings. We find that coinsurance across divisional investment opportunities has a double-edged sword effect on the marginal value of cash. Specifically, empirical results indicate that coinsurance across divisional investment opportunities, on the one hand, decreases marginal value of cash in poorly governed firms and financially constrained firms; and on the other hand, increases the marginal value of cash in diversified firms with efficient internal markets. We also find that the agency channel dominates the other two in explaining the effect of coinsurance across divisional investment opportunities on the marginal value of cash. On average, coinsurance across divisional investment opportunities reduces the marginal value of an extra dollar in a diversified firm by 21 cents.

Chapter 3 examines the impact of coinsurance across divisional investment opportunities on merger outcomes. We find that coinsurance across divisional investment opportunities is also value-reducing, owing to agency problems. It leads to a reduction of 0.30% in announcement returns, and a reduction of 1.53% in post-merger operating performance. Poorly-governed firms are more likely to engage in a merger if the merger will induce an increase in the coinsurance across divisional investment

opportunities. Acquiring firms, on average, pay $6.1 million more in premiums for an increase in the coinsurance across divisional investment opportunities after the merger. Good corporate governance mitigates the negative impact of coinsurance across divisional investment opportunities. The evidence suggests a dark side of corporate diversification.

Chapter 4 examines the impact of product market competition on the relationship between corporate diversification and the cost of debt financing. The study finds that that product market competition amplifies the cost-reduction benefits of diversification in financially constrained firms and firms with efficient internal capital markets, but it can reduce the diversification benefits for firms with a high level of multimarket contacts. The average borrowing cost of diversified firms operating in competitive (less-competitive) industries is 60.8 (16.3) basis points lower than that of their single-segment rivals, which corresponds to a cost saving of $1,264,640 ($339,040) for every bond issued by an average firm. Evidence suggests that the diversification benefits in the debt market, to some extent, alleviate the negative effect of diversification in the equity market.

Contents

List of Figures and Tables

Chapter 2

Chapter 3

Chapter 4

Abbreviation

B/M	Book Value of Equity to Market Value of Equity
CAR	Cumulative Abnormal Return
CF	Cash Flows
EBIT	Earnings Before Interests and Taxes
EBITDA	Earnings Before Interest, Taxes, Depreciation, And Amortization
FASB	Financial Accounting Standards Board
GDP	Gross Domestic Product
HHI	Herfindahl Hirschman Industry Concentration ratio
Q	Tobin's Q
R&D	Research and Development
ROA	Return on Asset
S&P	Standard & Poor's
SIC	Standard Industrial Classification Code
UK	United Kingdom
US	United States of America

Chapter 1

Introduction

The "diversification discount" describes a phenomenon where a diversified firm is, as a whole, worth less than the sum of its parts if sold separately. First documented by Lang and Stulz (1994) and Berger and Ofek (1995), this phenomenon has been the subject of debate over two decades. At the core of the debate lies the question of whether "diversification discount" is a real phenomenon. In other words, is diversification value-enhancing or value-reducing?

Three main strands of theories have provided relevant explanations for this question. First, in his coinsurance hypothesis, Lewellen (1971) argues that pooling together imperfectly-correlated cash flows across segments increases debt capacity and is thus value-enhancing. Stein (2003) labels this as the "more-money" effect. Secondly, in his internal capital market (ICM) hypothesis, Stein (1997) argues that conglomerate headquarters can redistribute internal funds to more productive divisions, thereby creating value. Stein (2003) describes this as the "smarter-money" effect. Thirdly, through their agency theory, Rajan et al. (2000) and Scharfstein and Stein (2000) argue that diversification destroys value in the form of cross-subsidization.

As theories produce opposite predictions, a large number of empirical papers have explored the value consequences of diversification from the perspectives of the above-mentioned theories. Regarding the "more-money" effect, researchers show that diversified firms outperform single-segment firms in recessions (Dimitrov and Tice, 2006), in industry distress (Gopalan and Xie, 2011), and in financial crises

(Kuppuswamy and Villalonga, 2010; Matvos and Seru, 2012), and they have less cash holdings (Duchin, 2010), more bank lines of credits (Tong, 2012), and a lower cost of capital (Hann et al., 2013). Regarding the "smarter money" effect, diversified firms have the ability to abandon unpromising projects early (Guedj and Scharfstein, 2004) and respond to competition more efficiently (Khanna and Tice, 2001). In relation to the agency problem, researchers find that the diversified firms which show more socialism behaviours are discounted further (Rajan et al., 2000), have a lower marginal value of cash (Tong, 2011), innovate less (Seru, 2013), and overinvest in segments run by powerful managers (Glaser et al., 2013). In summary, despite the large body of empirical evidence, the overall value consequence of diversification remains unclear. Empirically, a further understanding of the costs and benefits of diversification from different perspectives is helpful.

Chapter 2, "Coinsurance across Divisional Investment Opportunities and the Value of Cash Holdings", is a joint work with Dr. Zhenxu Tong. The effect of coinsurance across divisional investment opportunities stems from the imperfect correlation among segment investment opportunities. We estimate the impact of the coinsurance across divisional investment opportunities on the value of corporate cash holdings. We develop three hypotheses to investigate various channels through which the coinsurance across divisional investment opportunities can increase or decrease the marginal value of cash holdings: the agency problem hypothesis which highlights the potential mismanagement of cash holdings; the financial constraints hypothesis which suggests that less correlated divisional investment opportunities reduces the precautionary demand for cash holdings; and the efficient internal capital market hypothesis which suggests that coinsurance in investment opportunities facilitates inter-segment transfers, resulting in more efficient use of cash holdings. Consist with all three hypotheses, we find that the coinsurance across divisional investment opportunities is a double-edged sword: on the one hand, it

is negatively associated with the marginal value of cash in poorly governed firms and financially constrained firms; on the other hand, it is positively associated with the marginal value of cash in diversified firms with efficient internal markets. We also find that the agency problem hypothesis dominates the other two in explaining the effect of coinsurance across divisional investment opportunities, producing an overall negative impact on the marginal value of cash.

Chapter 3, "Coinsurance across Divisional Investment Opportunities and Corporate Mergers" is a joint work with Dr. Zhenxu Tong. Using event study techniques, we examine the market's response to changes in the coinsurance across divisional investment opportunities induced by mergers. We find that the coinsurance across divisional investment opportunities is negatively associated with abnormal announcement returns and post-merger operating performance. We demonstrate that poorly-governed firms are more likely to engage in mergers when they expect a higher post-merger coinsurance across divisional investment opportunities, thereby destroying the firm value.

Chapter 2 and Chapter 3, as is the case with most empirical papers in the conglomerate literature, investigate the value consequences of diversification from the perspective of shareholders. Nonetheless, it is equally important to learn how bondholders perceive the economic impacts of diversification because bond financing accounts for a substantial proportion of external financing in firms' balance sheet. Moreover, no firm can isolate itself from its rivals; thus, investigating the implications of product market competition on the cost of debt financing for diversified firms is important to understand the costs and benefits of diversification.

Chapter 4, "Corporate Diversification and the Cost of Debt: The Role of Product Market Competition", is a single-authored essay. Researchers have identified a negative link between diversification and the cost of borrowing. I examine whether product

market competition affects the negative relationship between diversification and the cost of borrowing. I demonstrate that bondholders are aware of the interactions between competition and the potential benefits and costs of diversification, and respond accordingly. I find that product market competition amplifies the negative relationship between diversification and the cost of borrowing. And the impact of competition on the "diversification-cost of borrowing" relationship is stronger in firms that are financially constrained or engage in efficient cross-divisional transfers. However, the impact of competition is not significant in diversified firms with a high number of multimarket contacts.

Chapter 2 and Chapter 3 contribute to the literature on diversification by identifying an inefficient link between the coinsurance across divisional investment opportunities and the firm value because coinsurance can be associated with agency problems. Early researchers focused on the positive effect of coinsurance in cash flows and investment opportunities, from the perspective of alleviating financial constraints; however, the nature of investment opportunity implies that coinsurance in investment opportunities can also interact with a firm's resource allocation policy, leading to value creation driven by efficient internal capital markets or value destruction driven by agency problems. Therefore, we contribute to the "diversification discount" debate by revealing negative value consequences of the coinsurance across divisional investment opportunities. Chapter 2 uses cross-sectional studies, and investigates the link between the effect of coinsurance in investment opportunities and corporate cash holdings. Chapter 3 employs an event study approach to examine the stock market response to the change in coinsurance across divisional investment opportunities. Chapter 3 also contributes to a relatively under-explored area: the implication of diversification on corporate takeovers. Unlike the well-documented "diversification discount" in cross-sectional studies, evidence on the market's response to diversifying mergers is much

less and mixed. Chapter 3 contributes to the field by providing a new piece of evidence that diversification induces negative merger outcomes through coinsurance across divisional investment opportunities. Chapter 4 contributes to a growing body of research on the cost of debt financing for diversified firms. The impact of product market competition on the cost of borrowing for diversified firms has not been examined before. This chapter reveals that product market competition can moderate the relationship between diversification and cost of borrowing through different channels. Chapter 4 adds to the debate over the value consequences of diversification from the perspective of bond investors, as well as to the under-explored area of the multimarket contacts in diversified firms.

The rest of the thesis is structured as follows: Chapter 2, Chapter 3 and Chapter 4 are the empirical studies, and Chapter 5 discusses the limitations and future work, and concludes the chapters.

Chapter 2

Coinsurance across Divisional Investment Opportunities and the Value of Cash Holdings

2.1 Introduction

Coinsurance across divisional cash flows has been well examined in the literature on corporate diversification. The concept of 'coinsurance' comes from Lewellen (1971), who demonstrates that the aggregation of imperfect correlated segment cash flows reduces a conglomerate's default risk, thereby increasing the firm's debt capacity. Dimitrov and Tice (2006) document that, during recessions, conglomerate segments relying on banks suffer a lower drop in the growth rate of both inventory and sales than rival single-segment firms which are also relying on banks. They therefore conclude that diversification facilitates better access to external financing. Tong (2012) finds that coinsurance of cash flows allows diversified firms to obtain more credit lines.

However, coinsurance is not confined to imperfect correlations across divisional cash flows. Since normally the investment opportunities in the different divisions of a conglomerate do not arrive simultaneously, this creates another type of coinsurance that stems from the imperfect correlation across divisional investment opportunities. To our knowledge, this is an under-researched area, and there is little evidence in the literature on how corporate diversification can affect the firm value through coinsurance across divisional investment opportunities.

In this chapter, we examine how coinsurance across divisional investment opportunities affects the value of corporate cash holdings. We select corporate cash holdings as our research setting for a number of reasons. First, cash holdings are particularly vulnerable to managerial expropriation, and thus are closely associated with agency problems (Jensen, 1986; Pinkowitz et al., 2006). Myers and Rajan (1998) suggest that greater asset liquidity allows managers to misappropriate assets for their own benefit. Tong (2011) reveals that the value of cash is lower in conglomerates owing to agency problems. Secondly, cash holdings facilitate a comparative analysis between conglomerates and stand-alone firms. The cash holdings built up by a segment of a conglomerate are substantially similar to the cash holdings accrued in a stand-alone firm. This can alleviate the concern over comparability between conglomerate segments and focused firms in the literature on diversification (e.g., Campa and Kedia, 2002; Graham et al., 2002). Thirdly, corporate cash holdings account for a considerable part of a firm's total assets. Bates et al. (2009) demonstrate that cash balances climbed from 10.5% to 23.2% of book assets from 1980 to 2006 in US firms. This indicates that corporate diversification can influence the firm value greatly through cash holdings.

To study the relationship between coinsurance across divisional investment opportunities and the value of cash holdings, we propose three hypotheses based on financial constraints, the efficient internal capital market, and agency problems. First, the financial constraints hypothesis suggests that coinsurance across divisional investment opportunities reduces the value of cash in financially constrained firms because the imperfect correlation across the segment investment opportunities reduces the amount of resources needed at some point to finance all investment opportunities. Secondly, the efficient internal capital market hypothesis suggests that coinsurance across divisional investment opportunities increases the value of cash for financially constrained firms because the imperfectly-correlated investment opportu-nities across

segments reduce the opportunity costs of the efficient transfers of the resources in the internal capital market. Thirdly, the agency problem hypothesis predicts that coinsurance across divisional investment opportunities reduces the value of cash because the imperfect correlation across segment investment opportunities magnifies the losses created by inefficient cross-subsidization in a multi-segment firm.

Our sample consists of 10,510 US firms, with 77,090 firm-year observations from 1986 to 2010. In line with Duchin (2010), we construct a measure of coinsurance across divisional investment opportunities. We examine the impact of coinsurance across divisional investment opportunities on the value of cash based on the empirical model in Faulkender and Wang (2006). This methodology evaluates the marginal value of cash by investigating how the firm value changes with an alteration in the firm's cash holdings.

We find that, overall, coinsurance across divisional investment opportunities reduces the value of corporate cash holdings for diversified firms by 21 cents, compared with stand-alone firms. We split the sample into two groups, based on firms' financial status, and discover that coinsurance across divisional investment opportunities reduces the value of cash for both financially constrained and less-constrained firms. We examine the impact of corporate governance, and find that coinsurance across divisional investment opportunities is associated with a lower value of cash in poorly-governed firms. We use the methodology employed by Rajan et al. (2000), and construct a measure of the efficiency of internal transfers. We find that coinsurance across divisional investment opportunities reduces the value of cash in conglomerates that engage in cross-subsidization, but increases the value of cash in conglomerates that have an efficient internal capital market. We also examine the impact of economic recessions, and find a positive impact of coinsurance across divisional investment opportunities on the value of cash during recessions. For a robustness check, we use a

difference proxy for unexpected changes in cash holdings. Additionally, we employ the fixed effect estimation and Heckman's (1979) two-stage estimation to address the potential endogeneity of diversification. We continue to find similar results.

Our results support the hypothesis that coinsurance across divisional investment opportunities reduces the value of cash owing to agency problems, and reduces the value of cash for financially constrained firms, but it increases the value of cash through the efficient internal capital market. We conclude that the results are consistent with all of our three hypotheses, and that we disclose a specific channel through which corporate diversification can have value consequences.

This study contributes to the literature by identifying a dark side of coinsurance across divisional investment opportunities owing to agency problems. Coinsurance across divisional investment opportunities is an under-researched area in the literature. To our knowledge, only Duchin (2010) examines how coinsurance across divisional investment opportunities affects the level of corporate cash holdings. He focuses on the positive effect of investment-opportunity coinsurance from the perspective of alleviating financial constraints and reducing the precautionary demand for cash. This study differs from Duchin's (2010) paper in that we identify an inefficient link between diversification and corporate liquidity through coinsurance across divisional investment opportunities.

Moreover, we add to the literature by extending the research on the coinsurance effect associated with corporate diversification. While previous papers have focused on coinsurance across divisional cash flows, we concentrate on coinsurance across divisional investment opportunities. The mechanism is different between these two types of coinsurance regarding how they can have value consequences. Previous papers in the literature suggest that coinsurance across divisional cash flows can affect the firm value through financial constraints (e.g., Lewellen, 1971; Dimitrov and Tice, 2006) and

through limited liability (e.g., Leland, 2007). However, investment opportunities can also interact with a firm's resource allocation policy, leading to value creation driven by efficient internal capital market transfers or value destruction driven by agency problems. Therefore, the coinsurance across divisional investment opportunities can affect the firm value through financial constraints, the efficient internal capital markets, and agency problems. The difference in the mechanism between these two types of coinsurance implies that we disclose a negative value consequence of the coinsurance across divisional investment opportunities, and this has not been documented in the literature.

More broadly, our study adds to the debate over the costs and benefits of corporate diversification. The debate has focused on two crucial issues: first, whether corporate diversification causes a 'diversification discount' (e.g., Berger and Ofek, 1995; Lang and Stulz, 1994; Campa and Kedia, 2002; Graham et al., 2002). Secondly, what are the channels through which the internal capital market can affect the firm value (e.g., Shin and Stulz, 1998; Rajan et al., 2000; Stein, 1997; Khanna and Tice, 2001; Hoechle et al., 2012). This study contributes to this literature by providing a new piece of evidence on how corporate diversification affects the firm value through coinsurance across divisional investment opportunities.

The study is structured as follows: Section 2.2 proposes the hypotheses, Section 2.3 describes the data and the empirical methodology, Section 2.4 presents the results regarding the relationship between coinsurance across divisional investment opportunities and the value of corporate cash holdings, and Section 2.5 concludes the essay.

2.2 Hypotheses

In this section, we propose three hypotheses on how coinsurance across divisional investment opportunities can affect the value of corporate cash holdings.

2.2.1 The Financial Constraints Hypothesis

Cash holdings are essential for financially constrained firms when external financing is costly in an imperfect capital market. Diversification can influence the firms' cash value through an imperfect correlation across segment investment opportunities. When investment opportunities across divisions are more correlated with each other, diversified firms are more likely to encounter multiple simultaneous investment opportunities in different segments. If the firm cannot generate sufficient internal cash flows or tap external financing, it has to abandon some positive NPV investment projects. This idea is in the spirit of Duchin (2010), who argues that the imperfect correlation across divisional investment opportunities decreases the precautionary motive for saving cash, and thus relaxes a firm's financial constraints. Since the value of cash increases with financial constraints (e.g., Myers and Majluf, 1984; Faulkender and Wang, 2006), we expect that coinsurance across divisional investment opportunities reduces the value of cash. Therefore, we have the following hypothesis:

Hypothesis 1: Coinsurance across divisional investment opportunities reduces the value of cash for financially constrained firms.

2.2.2 The Efficient Internal Capital Market Hypothesis

Stein (1997) formalizes the argument that when a diversified firm is financially constrained and cannot finance all investment opportunities, the conglomerates' headquarters, which have information that is superior to that available to outside investors, can do a better job of project selection by redirecting internal resources to segments with better prospects through the internal capital market. We argue that the cross-segment correlation in investment opportunities affects a diversified firm's resource allocation decisions and therefore affects the opportunity costs of the internal funds. A lower (higher) coinsurance across divisional investment opportunities is associated with higher (lower) opportunity costs. This can impact the value of cash.

For example, consider a financially constrained conglomerate with two segments: A and B. On the one hand, suppose there is a perfect correlation across the investment opportunities in the two segments. When good investment opportunities arise in Segment A, good investment opportunities also arise in Segment B, at the same time. Let us assume that the investment opportunities in Segment A are better than the ones in Segment B. According to Stein (1997), the headquarters would move the resources from Segment B to Segment A. This implies that the investment projects in Segment B are abandoned. This corresponds to the situation of higher opportunity costs.

On the other hand, suppose there is an imperfect correlation across the investment opportunities in the two segments (A and B). This implies that the investment opportunities in the two segments will not always occur simultaneously. Then, it is possible that, when good investment opportunities arise in Segment A, Segment B has low or zero investment opportunities, at the same time. Similarly, the headquarters would shift resources away from Segment B towards Segment A. This corresponds to the situation of lower opportunity costs, because the resources, had they been kept in Segment B, would not have generated high returns, since there were no good investment opportunities in the original segment.

Taken together, coinsurance across divisional investment opportunities increases the efficiency of inter-segment transfers by reducing the opportunity costs of internal funds, and shareholders will raise the value of cash for multi-segment firms. Thus, we propose the following hypothesis:

Hypothesis 2: Coinsurance across divisional investment opportunities increases the value of cash through an efficient internal capital market for financially constrained firms.

2.2.3 The Agency Problem Hypothesis

Another strand in the literature on diversification suggests that allocation in conglomerates is not efficient, and diversification reduces firm value owing to inefficient cross-subsidization, with weaker segments being funded by the resources transferred from stronger segments.

For example, Rajan et al. (2000) postulate that a manager of weaker segments can engage in rent-seeking behavior to share the surplus generated by stronger segments. Accordingly, stronger segments tend to make 'defensive' investments so that the profits are lower but harder to poach by weaker segments, leading to overall underperformance. As a suboptimal solution, senior management will distribute internal resources in a "socialism" way and allocate to weaker segments more capital than is required. The mechanism is such that with more equal capital budget, divisional managers will obtain more benefit from efficient investment in their own divisions than rent-seeking. In this situation, capital allocation deviates from optimal decisions and is thus inefficient.

Scharfstein and Stein (2000) assume that there are two levels of agency problems. In the first level, senior management are agents themselves and act in their own interest rather than making the shareholders' interest the priority. In the second level, divisional managers are also agents. Managers of weaker segments focus on their outside opportunities and engage in rent-seeking behavior, applying pressure on the senior management to offer attractive compensation to retain or incentivize them. Since the senior managers are agents themselves and prefer to save the cash for private benefits, they tend to refrain from offering attractive compensation to the managers of weaker divisions in the form of cash and, instead, the senior management may choose to shift the internal funds away from stronger divisions towards weaker divisions during the budgeting process, leading to an overall inefficiency allocation of internal resources.

These agency theories on the dark side of the internal capital market explain why capital allocation in diversified firms can be systematically inefficient. Based on agency theories, we argue that coinsurance across divisional investment opportunities magnifies the losses caused by cross-subsidization in diversified firms. Lower (higher) coinsurance across divisional investment opportunities is associated with fewer (or more) losses. This can affect the value of cash.

For example, consider a diversified firm with two segments A and B. Suppose there is a perfect correlation across the investment opportunities in the two segments. When Segment A has low investment opportunities, Segment B also has low investment opportunities, at the same time. Let us assume that the investment opportunities in Segment A are even lower than the ones in Segment B. According to theories on the dark side of the internal capital market, resources will be shifted away from Segment B towards Segment A. This corresponds to the situation of fewer losses, because Segment B is also in a poor state.

On the other hand, suppose there is an imperfect correlation across the investment opportunities in the two segments A and B. This implies that the investment opportunities in the two segments will not always occur simultaneously. Then, it is possible that, when Segment A has low investment opportunities, Segment B, at the same time, has high investment opportunities. Similarly, the resources will be transferred from Segment B to Segment A. However, this corresponds to a situation of greater losses because the high investment opportunities in Segment B are not financed owing to inefficient cross-subsidization.

This analysis suggests that coinsurance across divisional investment opportunities amplifies the losses from "corporate socialism", thereby aggravating agency problems. Thus, if agency problems are negatively associated with the value of cash holdings, we

expect that coinsurance across divisional investment opportunities can have great implication on the value of corporate cash holdings as well.

The agency costs of cash holdings have been extensively discussed in the literature on corporate liquidity. Theoretically, Jensen and Meckling's (1976) influential paper on agency costs suggests that managers who have discretion over internal resources can directly expropriate wealth from shareholders. Jensen (1986) argues that free cash flows are associated with great agency costs. Accumulation of excess cash reserves, combined with managers' empire-building preferences, can lead to arbitrary overinvestment decisions that are usually value reducing. Myers and Rajan (1998) posits that liquid assets are transferable and anonymous, and therefore facilitate the expropriation of assets by management for private benefits at lower costs. Cash holdings, being the most liquid asset of internal resources, can be more easily poached by management with less scrutiny. The analysis suggests that agency problems have negative implications on cash holdings. A dollar may not be worth a dollar if shareholders expect it to be wasted. Empirically, there is sufficient evidence that associates agency costs with cash holdings. Dittmar and Mahrt-Smith (2007) find that the marginal value of cash holdings is significantly lower in poorly-governed firms. Harford (1999) and Harford et al. (2008) show that cash-rich firms and firms with poor shareholder rights are more likely to attempt value-reducing acquisitions. These findings suggest that agency motives represent an important cost of cash holdings.

Since the coinsurance across divisional investment opportunities can be associated with agency costs in conglomerates, we expect that the coinsurance in investment opportunities will also negatively affect the marginal value of cash in diversified firms as investors anticipate such mismanagement of cash holdings. Therefore, we have the following hypothesis:

Hypothesis 3: Coinsurance across divisional investment opportunities can be associated with agency problems and thus reduces the marginal value of cash.

2.2.4 Summary of Hypotheses

The following table summarizes our three hypotheses:

The impact of the coinsurance across divisional investment opportunities on the value of cash		
Signs of predictions:	Less Constrained	Constrained
Financial constraints	0	–
Efficient internal capital market	0	+
Agency problems	–	–
Predictions on marginal value of cash:	Less Constrained	Constrained
Financial constraints	=1	>1
Efficient internal capital market	=1	>1
Agency problems	<1	<1

A '+' ('–') sign corresponds to a positive (negative) association between coinsurance across divisional investment opportunities and the value of cash holdings. A '0' sign suggests that coinsurance in investment opportunities does not affect the value of cash. We also summarize the predictions of the marginal value of cash accordingly. The financial constraints hypothesis suggests that the marginal value of cash is above $1 because cash is more important for firms facing costly external financing. The efficient internal capital market hypothesis predicts that the marginal value of cash is above $1 because cash holdings are more productive when they are managed more carefully. The agency problem hypothesis predicts that the marginal value of cash is below $1 owing to the poor use of internal funds.

2.3 Data and Empirical Methodology

In this section, we describe the data and the empirical methodology.

2.3.1 Data

We use the Compustat Segment file to collect segment-level data, including segment assets and sales and the industry of each segment (at 3-digit SIC level). We retrieve firm-level data from the Compustat Industrial Annual file. We use CRSP to collect data on stocks. We gather business cycle data from the website of the National Bureau of Economic Research (NBER) and the real gross domestic product data from the website of the Federal Reserve Bank. The sample period spans the period from 1986 to 2010. We merge the data collected and drop firms with missing data. We follow the diversification literature (e.g., Berger and Ofek, 1995) and employ the following screen criteria: We exclude firm-year observations, if a firm's assets are less than $5 million. We remove firms and segments that operate in the financial industry (SIC code 6000-6999). We require that the difference between the sum of segment sales from the Compustat Segment file and the firm's total annual sales from the Compustat Industrial Annual file does not exceed 1%. A firm with more than one business segment at the three-digit SIC code level is classified as a diversified firm. We winsorize the data to reduce the impact of outliers. Our final sample consists of 77,090 firm-year observations for 10,510 firms, of which 17,367 (59,723) firm-year observations belong to diversified (focused) firms.

2.3.2 Methodology

2.3.2.1 Coinsurance across Divisional Investment Opportunities

In line with Duchin (2010), we construct a measure of coinsurance across divisional investment opportunities. The measure quantifies the reduction in investment opportunity volatility caused by the imperfect correlation in investment opportunities across segments. We use Tobin's Q (book asset + market value of common equity – deferred taxes) / (0.9 ×book asset + 0.1 × market value of common equity) as a proxy for

investment opportunities. We employ the average Tobin's Q of focused firms in an industry as a measure of industry-level investment opportunities. This measure is then utilized as a measure of the investment opportunities of a conglomerate's segment operating in the same 3-digit SIC code industry. Next, we estimate industry-level investment opportunities volatility, which is computed as the standard deviation of industry-level investment opportunities over a period rolling from year *t-10* to *t-1*. A diversified firm can be regarded as a portfolio of assets, with each division being equivalent to one unique asset in the portfolio. Thus, the volatility of investment opportunities in a conglomerate, denoted as $\sigma(Q)_t$ in fiscal year t is defined as follows:

$$\sigma(Q)_t = \sqrt{\sum_{i=1}^{N}\sum_{j=1}^{N} w_i w_j \rho(Q)_{i,j}\, \sigma(Q)_{i,t}\sigma(Q)_{j,t}} \qquad (1)$$

where N is the number of segments in a diversified firm.

$\sigma(Q)_{i,t}$ $(\sigma(Q)_{j,t})$ is the volatility of investment opportunities of industry *i* (industry *j)*. We use the average series over the prior ten years [t-10, t-1] to calculate the rolling volatilities for year t.

$\rho(Q)_{i,j}$ is the correlation between the investment opportunities in industry i and industry j.

w_i (w_j) is the weighting of segment i (segment j) in a diversified firm, which is the ratio of the segment's assets to the total assets of the firm.

The measure of coinsurance across divisional investment opportunities, denoted as *Coinsurance_Q*, is computed as the difference between the volatility $\sigma(Q)_t$ in equation (1) and a 'no-diversification' volatility by assuming a correlation of 1 (perfect correlation) across investment opportunities in all divisions.

$$Coinsurance\_Q_t = \sqrt{\sum_{i=1}^{N}\sum_{j=1}^{N} w_i w_j 1\, \sigma(Q)_{i,t}\, \sigma(Q)_{j,t}} - \sigma(Q)_t \qquad (2)$$

The variable captures the reduction in the volatility of investment opportunities owing to the coinsurance effect. By construction, the variable *Coinsurance_Q* is zero for stand-alone firms, and positive for conglomerates. A higher value of *Coinsurance_Q*

indicates a higher coinsurance (or lower inter-segment correlation) across divisional investment opportunities.

2.3.2.2 Coinsurance across Divisional Cash Flows

We also construct a measure of coinsurance across divisional cash and include it in our regression analysis as a control variable. The cash flow coinsurance stems from the imperfect correlation across divisional cash flows. We define cash flows by earnings minus interest and taxes. The industry-level cash flow volatility in a diversified firm, denoted as $\sigma(CF)_t$, in fiscal year *t*, is defined as follows:

$$\sigma(CF)_t = \sqrt{\sum_{i=1}^{N}\sum_{j=1}^{N} w_i w_j \rho(CF)_{i,j}\,\sigma(CF)_{i,t}\sigma(CF)_{j,t}} \qquad (3)$$

where *N* is the number of segments in a diversified firm.

$\sigma(CF)_{i,t}$ ($\sigma(CF)_{j,t}$) is the volatility of cash flows of industry *i* (industry *j)*. We use the average series over the prior ten years [t-10, t-1] to calculate the rolling volatilities for year t.

$\rho(CF)_{i,j}$ is the correlation between the cash flows in industry i and industry j.

w_i (w_j) is the weighting of segment i (segment j) in a diversified firm, which is the ratio of the segment's assets to the total assets of the firm.

The coinsurance across divisional cash flows is computed as the difference between $\sigma(CF)_t$ in equation (3) and a 'no-diversification' volatility by assuming a correlation of 1 (perfect correlation) across all segment cash flows.

$$Coinsurance\_CF_t = \sqrt{\sum_{i=1}^{N}\sum_{j=1}^{N} w_i w_j 1\,\sigma(CF)_{i,t}\,\sigma(CF)_{j,t}} - \sigma(CF)_t \qquad (4)$$

The variable represents the reduction in the cash flow volatility owing to the coinsurance effect. The measure is always positive for conglomerates, and zero for stand-alone firms. A higher value of *Coinsurance_CF* indicates a higher cash flow coinsurance effect.

2.3.2.3 The Marginal Value of Corporate Cash Holdings

We utilize the method based on the work by Faulkender and Wang (2006) to examine the impact of coinsurance across divisional investment opportunities on the marginal value of cash. This method is widely used in cash holdings studies (e.g., Dittmar and Mahrt-Smith, 2007; Denis and Sibilkov, 2010; Tong, 2011; Chi and Su, 2015). Specifically, we use the following equation:

$$
\begin{aligned}
R_{i,t} - RB_{i,t} = {} & a + b_1 \frac{\Delta Cash_{i,t}}{MV_{i,t-1}} + b_2 \left[Coinsurance\_Q_{i,t} \times \frac{\Delta Cash_{i,t}}{MV_{i,t-1}} \right] \\
& + b_3 Coinsurance\_Q_{i,t} + b_4 \left[Coinsurance\_CF_{i,t} \times \frac{\Delta Cash_{i,t}}{MV_{i,t-1}} \right] \\
& + b_5 Coinsurance\_CF_{i,t} + b_6 \frac{\Delta Earnings_{i,t}}{MV_{i,t-1}} + b_7 \frac{\Delta NetAsset_{i,t}}{MV_{i,t-1}} + b_8 \frac{\Delta R\&D_{i,t}}{MV_{i,t-1}} \\
& + b_9 \frac{\Delta InterestExpenses_{i,t}}{MV_{i,t-1}} + b_{10} \frac{\Delta Dividends_{i,t}}{MV_{i,t-1}} + b_{11} \frac{Cash_{i,t-1}}{MV_{i,t-1}} + b_{12} Leverage_{i,t} \\
& + b_{13} \left[\frac{Cash_{i,t-1}}{MV_{i,t-1}} \times \frac{\Delta Cash_{i,t}}{MV_{i,t-1}} \right] + b_{14} \left[Leverage_{i,t} \times \frac{\Delta Cash_{i,t}}{MV_{i,t-1}} \right] \\
& + b_{15} \frac{NetFinancing_{i,t}}{MV_{i,t-1}} + \varepsilon_{i,t}
\end{aligned}
\tag{5}
$$

where $\Delta X_{i,t}$ represents the change in the features of firm *i* during fiscal year *t*. $R_{i,t}$ is firm *i*'s stock return during fiscal year *t*. $RB_{i,t}$ is the return of the 25 size-and-B/M benchmark portfolio based on Fama and French (1993) during fiscal year *t*. $MV_{i,t}$ is the market value of equity (close price × shares outstanding). *Coinsurance_Q* and *Coinsurance_CF* are the constructed measure of the coinsurance across divisional investment opportunities and cash flows. We also control a number of firm-specific characteristics, including changes in *Cash* (cash and marketable securities), *Net Assets* (total assets − cash holdings), *Earnings* (earnings before extraordinary items), *R&D* (research and development expenses), *Interest Expenses*, *Dividends*, *Leverage* (debt/ total assets), and *Net Financing* (equity issued – repurchases + debt issued – debt redemptions). In line with Faulkender and Wang (2006), we also include two interaction terms in the regressions: $\Delta Cash \times Cash_{t-1}$ and $\Delta Cash \times Leverage$. The former captures the effect of

changes in the marginal value of cash for different levels of cash holdings, and the latter captures the effect of leverage on the marginal value of cash.

This model is, in spirit, similar to a long-term event study that assesses the impact of the event and unexpected changes in cash holdings on firm *i*'s excess returns over the one-year event window. The dependent variable, firm *i*'s cumulative excess return, is computed as the difference between the firm's stock return and its benchmark return over fiscal year *t*. The breakpoints for the 25 Fama-French size-and-B/M benchmark portfolio and the portfolio's monthly returns are collected from Professor Kenneth R. French's webpage.[1] For a given fiscal year *t*, firm *i*'s stock is assigned into one of the 25 portfolios based on the firm's size and B/M ratio rank. The benchmark return is the annual cumulative returns of the corresponding 25 Fama-French size-and-B/M portfolio.

Following Faulkender and Wang (2006), the variation in cash holdings over the fiscal year *t* is used as a proxy for unexpected changes in cash. Since all the independent variables (except leverage) on the right-hand side are divided by the lagged market value of equity, the specification allows us to estimate changes in stock value associated with a one-dollar change in firm characteristics, such as cash holdings. Thus, coefficient b_1 on the change in cash holdings $\Delta Cash$ represents the marginal value of cash.

To determine the impact of coinsurance across divisional investment opportunities, we construct an interaction term $\Delta Cash \times Coinsurance\_Q$. We also construct an interaction term $\Delta Cash \times Coinsurance\_CF$ to control the effect of coinsurance across divisional cash flows. We also control *Coinsurance_Q* and *Coinsurance_CF* in the model. The coefficient b_2 on interaction term $\Delta Cash \times Coinsurance\_Q$ represents the overall impact of coinsurance across divisional investment opportunities on the marginal value of cash. To understand the channels through which coinsurance across divisional investment opportunities impacts the value of cash, we divide the entire

[1]We thank Professor Kenneth R. French for providing the data.

sample into subsamples based on the level of financial constraints, efficiency of internal transfers, and corporate governance, and examine the coefficients on the interaction term $\Delta Cash \times Coinsurance\_Q$ across the subsamples.

2.4 Empirical Results

In this section, we present our empirical findings. We begin by reporting the overall impact of coinsurance across divisional investment opportunities on the value of cash. We then divide the sample into two groups based on whether a firm is financially constrained or less-constrained. Next, we examine the value consequence of coinsurance across divisional investment opportunities for well-governed and poorly-governed firms. We then examine the impact of the efficiency of internal transfers and economic recessions. Later, we conduct robustness checks.

2.4.1 Summary Statistics

Table 2.1 describes the univariate statistics. We report the summary statistics of the coinsurance effects in diversified firms. The coinsurance in cash flows and investment opportunities are zero for stand-alone firms. The mean of coinsurance across divisional investment opportunities, *Coinsurance_Q*, in diversified firms is 0.0338, and the mean of the firm-level volatility of investment opportunities in diversified firms, denoted as *Industry Q Volatility*, is 0.2497. Since the coinsurance measure quantifies the reduction in investment opportunity volatility owing to the imperfect cross-divisional correlation across investment opportunities, the coinsurance across divisional investment opportunities reduces the volatility in investment opportunity by 13.5% (0.0338/0.2497). These findings are similar to the evidence provided by Duchin (2010).

We find that the excess return over an average fiscal year in the sample has a mean of 2.78% and a median of −0.30%, consistent with the stylized fact that abnormal stock returns are positively skewed. The cash holdings have a median of 9.14% and a far

larger mean of 19.24%, which indicates that the cash holdings distribution is skewed to the right. On the other hand, the changes in cash have a median and a mean near zero, indicating a relatively symmetric distribution. Overall, the statistics are consistent with findings by Faulkender and Wang (2006).

2.4.2 The Value of Cash Holdings

First, we estimate the marginal value of cash holdings for the entire sample. In Table 2.2, we present our results. In Panel A, Column 1, the coefficients on the independent variables represents the value change in excess return for a one-dollar change in the corresponding variables. Therefore, the impact of an additional dollar in cash holdings on a firm's equity value is reflected in the coefficients on the variable $\Delta Cash$ and the interaction terms $\Delta Cash \times Cash_{t-1}$ and $\Delta Cash \times Leverage$. In our sample, an average firm has lagged cash holdings of 19.24%, and a leverage ratio of 22.99%. Thus, the marginal value of cash for an average firm with a mean level of cash and a mean leverage ratio is \$1.00 (= \$1.163 + (–0.308 × 19.24%) + (–0.439 × 22.99%). We conduct the F-test to test if the estimated value of cash is significantly different from the value of 1. Table 2.2 Panel B presents the marginal value of cash and the p-value from the F-test as reported in the brackets. We find that the estimated value of cash for an average firm in the whole sample is not significantly different from the value of 1 (p-value = 0.75).

In Panel A, Column 2, we examine the relationship between coinsurance across divisional investment opportunities and the value of cash. The coefficient on the interaction term $\Delta Cash \times Coinsurance\_Q$ is significant and negative, suggesting that the equity shareholders respond negatively to the coinsurance across divisional investment opportunities. We also calculate the marginal value for focused firms and conglomerates, respectively.

The marginal value of cash for single-segment firms is reflected in the coefficients on three terms: $\Delta Cash$, $\Delta Cash \times Cash_{t-1,}$ and $\Delta Cash \times Leverage$. In our sample, the marginal value of an additional one dollar in cash is \$1.08 (= \$1.249 + (–0.250 × 19.24%) + (–0.526 × 22.99%)) for stand-alone firms. The p-value is 0.01 from the F-test, suggesting that the estimated value of 1.08 is significantly different from the value of 1.

The marginal value of cash for conglomerates is reflected in the coefficients on five terms: $\Delta Cash$, $\Delta Cash \times Cash_{t-1,}$ $\Delta Cash \times Leverage$, $\Delta Cash \times Coinsurance\_Q$ and $\Delta Cash \times Coinsurance\_CF$. We find that the marginal value of an additional one dollar in cash for multi-segment firms is \$0.87 (= \$1.249 + (–6.892 × 0.0338) + (3.003 × 0.0080) + (–0.250 × 19.24%) + (–0.526 × 22.99%)). The p-value is 0.01 from the F-test, suggesting that the estimated value of 0.87 is significantly different from the value of 1.

Taken together, evidence indicates that an additional one dollar in conglomerates is evaluated as being worth 21 cents less than an additional one dollar in stand-alone firms. The negative coefficient on the interaction term $\Delta Cash \times Coinsurance\_Q$ suggests a negative impact of coinsurance across divisional investment opportunities on the firm value, thus supporting the financial constraints hypothesis and the agency hypothesis. Given that the marginal value of cash in multi-segment firms is \$0.87 and the estimated value of 0.87 is significantly different from the value of 1, it is consistent with the agency hypothesis.

2.4.3 Financial Constraints

In this section, we split our sample into two groups based on a firm's financial status. We compare the coefficients on the interaction term $\Delta Cash \times Coinsurance\_Q$ across the subsamples to study if coinsurance across divisional investment opportunities influences the firm value differently in financially constrained and less-constrained firms. We use two criteria to determine the level of financial constraints.

(i) *Pay-out ratio*: High pay-out ratio signals that a firm has easy access to internal financing to cover its investment needs, and firms with low pay-out ratios tend to be more financially constrained (Fazzari et al., 1988). Thus, we use the pay-out ratio as our first measure of financial constraints. We define pay-out ratio as the ratio of total dividends plus stock repurchases to book assets. For a given fiscal year *t*, we sort firms based on their pay-out ratios in year *t-1*, and a firm is classified as financially constrained (less constrained) if it has a pay-out ratio smaller (bigger or equal to) than the mean of the sample distribution per fiscal year.

(ii) *SA index*: Hadlock and Pierce (2010) show that firm size and age are powerful predictors of a firm's financial strength. Young and small firms are usually more financially constrained in comparison to mature ones. We therefore follow Hann et al. (2013) and Chi and Su (2016) and use the SA index[2] as our second measure of financial constraints. A higher SA index suggests that the firm is more financially constrained. We sort the observations into two subsamples using the median as a cutoff. We calculate the firm-year SA index and classify a firm as financially constrained (less constrained) if the firm has an above (equal to or below) median SA index in the sample distribution.

Table 2.3 Panel A provides the coefficient estimates of equation (5) separately for constrained and less-constrained firms, and Panel B presents the marginal value of cash holdings. Using both criteria for financial constraints, the coefficients on the interaction term $\Delta Cash \times Coinsurance\_Q$ are negative and significant across the subsamples, which suggests that, as the level of investment-opportunity coinsurance increases, the value of an extra dollar in cash declines in both financially constrained and less-constrained firms. This finding is consistent with the agency hypothesis, which predicts

[2] The SA index calculated as $(-0.737 \times \text{Assets} + 0.043 \times \text{Assets}^2 - 0.040 \times \text{Age})$, where Assets is the natural log of inflation-adjusted book assets that is capped at $4.5 billion, and Age is the number of years a firm is listed with a non-missing stock price on Compustat and is capped at 37 years.

that coinsurance across divisional investment opportunities reduces the value of cash in conglomerates, regardless of their financial strengths.

Within the subsample of less-constrained firms, we find that the marginal value of cash in stand-alone firms is not significantly different from one. On the other hand, an extra dollar in cash for conglomerates is evaluated at $0.83 ($0.79), based on the pay-out ratio (SA Index) criteria. And the estimated values, 0.83 and 0.79, are significantly different from the value of 1 (p-value = 0.01). Evidence indicates that equity investors are concerned over the mismanagement of funds, so they reduce the valuation of extra cash in multi-segment firms. This evidence supports the agency hypothesis.

Within the subsample of financially constrained firms, we report that the marginal value of cash is significantly larger than one in stand-alone firms, indicating that excess cash is valuable for financially-distressed firms. As for the multi-segment firms, although the coefficients on the interaction term $\Delta Cash \times Coinsurance\_Q$ are significantly negative at higher than 1%, the marginal value of an extra dollar in cash is found to be $0.91 ($0.92) using the pay-out ratio (SA Index) criteria. However, the estimated values, 0.91 and 0.92, are not significantly different from the value of (p-value = 0.29 and 0.15, respectively).

Our financial constraints hypothesis predicts that the marginal value of cash is greater than $1, while our agency problem hypothesis predicts that the marginal value of cash is smaller than $1. This indicates that, apart from corporate governance, the association between coinsurance across divisional investment opportunities and the marginal value of cash is sensitive to a firm's financial strength. The fact that cash holdings are more valuable for financially constrained firms is well-documented in the literature on cash holdings (e.g., Faulkender and Wang, 2006; Denis and Sibilkov, 2010). Therefore, it is possible that the positive impact of financial constraints on the value of cash offset the negative impact of agency problems on the value of cash, and

thus the estimated value of cash in financially constrained conglomerates is not significantly different from the value of 1.

2.4.4 Corporate Governance

In this section, we conduct further analysis to investigate how the value of cash in conglomerates is influenced by agency problems. We predict that the negative impact of coinsurance across divisional investment opportunities only exists in poorly-governed firms. We employ two measures of corporate governance:

1. The Gompers, Ishii and Metrick's (2003) G-index is based on charter provisions in a firm. It counts the number of charter provisions that restrict shareholder rights and strengthen takeover defenses; and thus, a higher G-index indicates greater managerial power and more agency costs. Therefore, a high G-index corresponds to poor corporate governance. We collect the G-index data from the "Investor Responsibility Research Centre" (IRRC) database. As the data are available for a subset of the firms in Compustat for every two years from 1990 to 2006, our sample size is reduced to 11,385 firm-year observations.

2. The presence of blockholders. A blockholder is a large shareholder who owns at least 5% or more of a firm's common stock. Shleifer and Vishny (1986) argue that block holders with substantial stakes and voting control rights have the incentives to monitor and pressure the management and therefore improve corporate governance.

We assign a firm to the "good governance" group, if the firm's G-index is in the bottom quartile of our sample distribution (G-index <7),[3] or if the firm has at least one blockholder. We assign the rest of the firms to the "poor governance" group. We next run equation (5) separately for the two groups. Table 2.4 presents the coefficient estimates.

[3] This indicates fewer restrictions on shareholder rights.

In the subsample of good governance, we find that the coefficients on the interaction term $\Delta Cash \times Coinsurance\_Q$ are not significant, using both criteria for corporate governance. This suggests that governance mechanisms, such as takeover market and big shareholders, help mitigate agency problems in diversified firms.

In the subsample of poor governance, the coefficients on the interaction term $\Delta Cash \times Coinsurance\_Q$ are both negative and significant at higher than 1%. For example, in Panel A, Column 2, the coefficient on the interaction term $\Delta Cash \times Coinsurance\_Q$ is –6.268. Since the mean value of coinsurance across divisional investment opportunities in our sample is 0.0358 in diversified firms and 0 in single-segment firms, it implies that an average single-segment firm will lose about 21 cents (–6.268*0.0358) in the marginal value of cash, when it chooses to diversify. Given that the marginal value of cash of an average focused firm in the entire sample is $1.08, it suggests a 19.4% drop in the value of cash owing to the agency problems associated with coinsurance across divisional investment opportunities.

Table 2.4, Panel B, shows the marginal value of cash. Within the 'good governance' subsamples, the estimated value of cash is higher than $1 and significant in both stand-alone firms and conglomerates, suggesting that shareholders put a high value on cash holdings in well-governed firms, irrespective of the firm's organizational structure. On the other hand, within the 'bad governance' subsamples, the marginal value of cash in single-segment firms falls slightly below $1. The marginal value of cash in multi-segment firms falls further to as low as $0.66 (£0.79) under the G-index (block holders) and the estimated values, 0.66 and 0.79, are significantly different from the value of 1, with p-value = 0.01 for both numbers. Evidence suggests a large discount in the marginal value of cash, owing to coinsurance across divisional investment opportunities. Taken together, these findings support the agency problem hypothesis.

2.4.5 Financial Constraints and Corporate Governance

In this section, we first partition the entire sample into two groups depending on whether they are financially constrained or less-constrained. We then further divide each of the two groups depending on whether they are well-governed or poorly-governed. We repeat the regression analysis separately for these four subsamples. We expect that the negative effect of coinsurance across divisional investment opportunities prevails in poorly-governed firms within both financially constrained and less-constrained firms. We provide the results in Table 2.5A-2.5D.

In Table 2.5A, we split the entire sample into four subgroups based on the pay-out ratio and G-index. In Column 1-2, within the less-constrained and well-governed subsample, the coefficient on $\Delta Cash \times Coinsurance\_Q$ is –2.553 (p-value = 0.50). The marginal value of cash in single-segment firms is \$1.08 (p-value = 0.48), while the marginal value of diversified firms is \$1.01 (p-value = 0.93). In Column 3-4, within the less-constrained and poorly-governed subsample, the coefficient on $\Delta Cash \times Coinsurance\_Q$ is –4.505 (p-value = 0.01). The marginal value of cash in single-segment firms is \$0.73 (p-value = 0.01). The marginal value of cash in diversified firms is \$0.54 (p-value=0.01). The results indicate that coinsurance across divisional investment opportunities has a negative (zero) impact on the value of cash in the poorly-governed (well-governed) and less-constrained firms.

In Column 5-6, within the financially constrained and well-governed subsample, the coefficient on $\Delta Cash \times Coinsurance\_Q$ is –8.598 (p-value = 0.62). The marginal value of cash in single-segment firms is \$1.82 (p-value = 0.01), while the marginal value of diversified firms is \$1.49 (p-value = 0.01). In Column 7-8, within the financially constrained and poorly-governed subgroup, the coefficient on $\Delta Cash \times Coinsurance\_Q$ is –10.253 (p-value = 0.02). In Panel B, the marginal value of cash in single-segment firms is \$0.93 (p-value = 0.47), while the marginal value of cash in

diversified firms is $0.63 (p-value = 0.08). The results suggest that coinsurance across divisional investment opportunities also decreases the value of cash in financially constrained firms that are poorly-governed. It is noteworthy that, in financially constrained firms, the value of cash is $1.49 in well-governed firms, while the value is $0.63 in poorly-governed firms. This implies that if we do not split the constrained firm sample by the level of governance, the overall value of cash for financially constrained firms can be close to $1, and this echoes the earlier findings in Table 2.2 that the estimated value of cash is not significantly different from the value of 1 for financially constrained conglomerates. Taken together, evidence suggests the agency problem hypothesis dominates the financial constraints and the efficient internal capital market hypothesis in explaining the effect of the coinsurance across divisional investment opportunities on the marginal value of cash.

In Table 2.5B, we divide the financially constrained and less-constrained firms based on the presence of blockholders. We continue to find that agency problems prevail in diversified firms that are poorly-governed, regardless of the firms' financial strength. In Table 2.5C-2.5D, we use SA index to partition firms into financially constrained and less-constrained firms, and find similar results. Overall, we find strong evidence that coinsurance across divisional investment opportunities reduces the value of cash for both the financially constrained and less-constrained firms, which supports the agency hypothesis.

2.4.6 Efficiency of Internal Transfers

The findings so far indicate that coinsurance across divisional investment opportunities leads to agency problems. In this section, we test whether coinsurance in investment opportunities is associated with cross-subsidizations through the internal capital market.

First, in line with Rajan et al. (2000), we compute a measure of cross-divisional transfers. The measure is widely used in the literature on diversification as a proxy for inter-segment transfers (e.g., Duchin, 2010; Tong, 2012; Duchin and Sosyura, 2013). The internal transfers are calculated as follows:

$$\frac{I_j}{Asset_j} - \frac{I_j^{ss}}{Asset_j^{ss}} - \sum_{j=1}^{N} w_j \left(\frac{I_j}{Asset_j} - \frac{I_j^{ss}}{Asset_j^{ss}} \right) \quad (6)$$

where j =1 represents segment j, ss is single-segment firms, I_j is capital expenditure, w_j is segment j's proportion of the firm's total assets, $Asset_j$ is the book value of segment j, and $\frac{I_j}{Asset_j}$ represents the investments a business segment makes in a diversified firm. $\frac{I_j^{ss}}{Asset_j^{ss}}$ is the asset-weighted average capital expenditure-to-asset ratio, using only single-segment firms in segment j. This represents the investments a business segment in a diversified firm would have made, had it been a stand-alone firm. The difference between $\frac{I_j}{Asset_j}$ and $\frac{I_j^{ss}}{Asset_j^{ss}}$ is referred to as the 'industry-adjusted investment ratio' in Rajan et al. (2000). Additionally, $\sum_{j=1}^{N} w_j \left(\frac{I_j}{Asset_j} - \frac{I_j^{ss}}{Asset_j^{ss}} \right)$ is the segment-asset weighted 'industry-adjusted investment ratio' of the diversified firm. As suggested by Rajan et al. (2000), subtracting $\sum_{j=1}^{N} w_j \left(\frac{I_j}{Asset_j} - \frac{I_j^{ss}}{Asset_j^{ss}} \right)$ addresses the fact that diversified firms, generally, have more funds than single-segments because the former have a lower cost of capital.

After computing the level of internal transfers in a diversified firm, we continue to differentiate between inefficient and efficient transfers. We follow the method used by Duchin (2010). We first compute the asset-weighted average of the investment

opportunities in a diversified firm.[4] We then assign a business segment to a 'high-productivity' ('low-productivity') segment group, if the segment's industry-level Tobin's Q is higher (lower) than the conglomerate's asset weighted-average Tobin's Q. For each firm, we sum the internal transfers allocated to 'high-productivity' and 'low-productivity' segments. We define two more variables: *Inefficient (Efficient) Transfers* is the sum of the transfers made to low (high) productivity divisions.[5] We then construct two three-way interaction terms: *ΔCash* × *Coinsurance_Q* × *Inefficient Transfers* and *ΔCash Coinsurance_Q* × *Efficient Transfers*, and we include them in equation (5). The coefficients on these two three-way interaction terms capture the impact of coinsurance in investment opportunities on the marginal value of cash through efficient (inefficient) internal transfers.

Table 2.6 presents the results. Panel A describes the summary statistics of efficient and inefficient transfers in diversified firms. On average, the magnitude of efficient transfers is very similar to that of inefficient transfers. We provide the regression results in Panel B. The coefficient on the interaction term *ΔCash* × *Coinsurance_Q* × *Inefficient Transfers* is −1.412 (p-value = 0.01), which indicates that coinsurance across divisional investment opportunities reduces the marginal value of cash in conglomerates that inefficiently make transfers to low-productivity divisions, which is consistent with the agency hypothesis. In contrast, the coefficient on the interaction term *ΔCash* × *Coinsurance_Q* × *Efficient Transfers* is 0.810 (p-value = 0.08), which suggests that coinsurance across divisional investment opportunities increases the marginal value of cash in conglomerates that efficiently transfer funds to high-productivity divisions. This evidence supports the efficient internal capital market hypothesis that coinsurance across divisional investment opportunities can be value-enhancing for diversified firms

[4] As mentioned before in Section 2.3.2.1, we use the average Tobin's Q across all single-segment firms in an industry as a measure of investment opportunities in the corresponding segment in a diversified firm.
[5] A diversified firm can (i) make efficient transfers only, (ii) make inefficient transfers only, or (iii) make both efficient and efficient transfers.

with an efficient inter-segment allocation policy. This corroborates the "smarter money effect" of internal capital markets (Stein, 2003).

Panel C of Table 2.6 presents the estimated marginal value of cash. We find that the estimated value of cash for single-segment firms is not significantly different from the value of 1, while the estimated value of cash for conglomerates is \$0.80 and is significantly different from the value of 1. This implies that, collectively, the dark side of coinsurance across divisional investment opportunities dominates the bright side of coinsurance across divisional investment opportunities, which supports the agency hypothesis.

In Table 2.7, we use the "value added" measure developed by Rajan et al. (2000) as an alternative proxy for the efficiency of internal transfers. It is calculated as follows:

$$\frac{\sum_{j=1}^{N} Asset_j (q_j - \bar{q}) \left(\frac{I_j}{Asset_j} - \frac{I_j^{ss}}{Asset_j^{ss}} - \sum_{j=1}^{N} w_j \left(\frac{I_j}{Asset_j} - \frac{I_j^{ss}}{Asset_j^{ss}} \right) \right)}{TotalAsset} \tag{7}$$

where $\bar{q}$ is the asset-weighted average of segment *Tobin's q* for the firm, and q_j is the asset-weighted *Tobin's q* using single-segment firms only in segment *j*. This variable measures the overall efficiency of the firm's inter-segment allocation policy. A higher value of the "value added" measure indicates greater efficiency of internal transfers. The measure is zero for focused firms. We next split the diversified firms into two subsamples based on whether the "value added" measure is greater or smaller than zero. We then compare the diversified firm subsamples separately with single-segment firms.

In Panel A of Table 2.7, the coefficient on *ΔCash* × *Coinsurance*_Q is –2.212 (p-value = 0.01) within the subsample of inefficient transfers (value added by allocation < 0), while the coefficient on *ΔCash* × *Coinsurance*_Q is insignificant within the subsample of efficient transfers (value added by allocation > 0). In Panel B, the marginal value of cash for diversified firms is \$0.85 (p-value = 0.01) within in the subsample of inefficient transfers, and \$1.03 (p-value = 0.04) within the subsample of

efficient transfers. Taken together, the findings are consistent with the agency hypothesis and the efficient internal capital market hypothesis, which suggests that the coinsurance across divisional investment opportunities is a double-edged sword that can either create or destroy the firm value.

2.4.7 Economic Recessions

Economic recession increases frictions in the capital market where firms face more severe credit rationing (Bernanke and Gertler, 1995). Several studies show evidence that diversified firms are less vulnerable to financial shocks than single-segment firms because the coinsurance effect alleviates financial constraints or because the internal capital market becomes more efficient in economic downturns (e.g., Dimitrov and Tice, 2006; Kuppuswamy and Villalonga, 2010; Gopalan and Xie, 2011). Therefore, we expect that the impact of coinsurance in investment opportunities on the marginal value of cash in economic recessions is more pronounced in financially constrained firms and firms with efficient internal capital markets. In this section, we investigate which channel dominates the value consequences of coinsurance across divisional investment opportunities during economic recessions.

We obtain business cycle data from the website of the National Bureau of Economic Research (NBER). We then construct a dummy variable *Recession*, which takes the value of 1, if more than two months in a firm's fiscal year are classified as being in a recession period, and zero otherwise. We add three terms, *Recession*, $\Delta Cash \times Recession$ *and* $\Delta Cash \times Coinsurance\_Q \times Recession$ to equation (5) and repeat the regression analysis. We are interested in the coefficient on the interaction term $\Delta Cash \times Coinsurance\_Q \times Recession$, which represents the difference in the impact of coinsurance across divisional investment opportunities on the marginal value of cash between recession periods and non-recession periods.

Panel A of Table 2.8 presents the regression results. The coefficient on the interaction term $\Delta Cash \times Coinsurance\_Q \times Recession$ is 4.131 (p-value = 0.01), which suggests that diversified firms tend to allocate internal capital efficiently during economic recessions; therefore, we find a positive association between coinsurance across divisional investment opportunities and the value of cash. Panel B reports the marginal value of cash for stand-alone firms and conglomerates during recession and non-recession periods. We find that the marginal value of cash for diversified firms is \$1.26 (p-value = 0.01) during recessions and \$0.83 (p-value = 0.01) during non-recession periods. This implies that coinsurance across divisional investment opportunities is value-creating because the internal capital allocation becomes more efficient in economic downturns, which is consistent with the efficient internal capital market hypothesis.

2.5 Robustness Check

2.5.1 Alternative Measure of the Unexpected Change in Cash

So far, we use the realized change in cash holdings over a fiscal year to proxy for the unexpected changes in cash holdings. The underlying assumption is that the expected level of cash does not change during the fiscal year. In this section, we use an alternative measure to proxy for the unexpected change in cash to capture the time trend in cash. Following Faulkender and Wang (2006) and Tong (2011), we calculate a "net change in cash holdings", which is the difference between the realized change in cash and the average change in cash in the corresponding 25 Fama-French size and B/M benchmark portfolio during the same fiscal year.

We repeat the analysis for the entire sample in Table 2.9A. In Panel A, the coefficient on the interaction term $\Delta Cash \times Coinsurance\_Q$ is –5.594 (p-value = 0.01), which indicates that coinsurance across divisional investment opportunities decreases

the marginal value of cash for diversified firms. In Panel B, we find that an extra one dollar in cash is valued at $1.06 ($0.83) for stand-alone firms (conglomerates), which is consistent with the agency hypothesis. Table 2.9B reports the regression results using the "net change in cash" separately for constrained and less constrained firms. We find that the coefficients on the interaction term $\Delta Cash \times Coinsurance\_Q$ are significant and negative within both financially constrained and less-constrained subsamples, which suggests that agency problems dominates in diversified firms, regardless of their financial strength. In Table 2.9C, we examine the impact of corporate governance. We find a negative (no) association between coinsurance across divisional investment opportunities and the marginal value of cash in poorly (well) governed firms. Overall, evidence corroborates our earlier findings and is consistent with the agency hypothesis.

2.5.2 About Endogeneity

As noted by Campa and Kedia (2002) and Villalonga (2004b), the diversification decision is not random, and a firm can endogenously choose to diversify. Therefore, in this section, we use Heckman's (1979) two-stage estimation and fixed effect estimation to mitigate the potential endogeneity of diversification.

First, we use Heckman's (1979) two-stage estimation to address the self-selection issue. In the first stage, we employ a probit model which predicts the probability of a firm's diversification decision. The dependent variable is 1 for multi-segment firms and zero for stand-alone firms. Campa and Kedia (2002) argue that a firm's diversification decision is affected by a number of factors, including firm-specific characteristics (size, EBIT, capital expenditures, whether the firm is in the S&P index, whether the firm is listed on AMEX, NYSE, or NASDAQ, and whether the firm is founded abroad), industry characteristics (the fraction of all conglomerates in the industry, the fraction of industry sales made by conglomerates, the number of mergers and acquisitions announcement in the fiscal year, the transaction value of these mergers and acquisitions),

and macroeconomic variables (GDP, the number of months in a year that is identified as in a recession). Table 2.10 presents the coefficient estimates from the probit regression. We also calculate the inverse Mills ratio (denoted as *Lambda*) in the probit regression and include it in the second stage analysis as an additional variable.

Secondly, we use two-way fixed effect estimation to address the omitted variables issue. We employ year fixed effects and firm fixed effects in the regression to eliminate time invariant unobservable factors and to capture time series trends. In order to run the fixed effect regression, we drop the firms that have only one observation. This reduces our sample size to 75,705 firm-year observations.

In Table 2.11, we report the coefficient estimates from the second stage of Heckman's two-stage model and the two-way fixed effect model for the entire sample. In Panel A, the coefficients on the interaction term $\Delta Cash \times Coinsurance\_Q$ are both negative and significant using both econometric methods. In Panel B, the marginal values of cash for diversified firms (stand-alone firms) is \$0.85 (\$1.08) using Heckman's two-stage model, and the marginal values of cash for diversified firms (stand-alone firms) is \$0.73 (\$1.05) using the two-way fixed effect model. Evidence is consistent with prior findings that coinsurance across divisional investment opportunities reduces the value of cash owing to agency problems.

Table 2.12A shows the regression results for financially constrained and less-constrained firms, based on Heckman's two-stage estimation. Using both criteria for financial constraints, the coefficients on the interaction term $\Delta Cash \times Coinsurance\_Q$ are negative and significant across the subsamples, which indicates that the investment-opportunity coinsurance decreases the value of cash in both financially constrained and less-constrained firms. We find that the marginal value of cash of less-constrained conglomerates is at \$0.79 (\$0.83) using the pay-out ratio (SA Index) criteria, with a p-value of 0.01. The value of cash of financially constrained conglomerates is \$0.98

($0.92) using the pay-out ratio (SA Index) criteria. The estimated values, 0.98 and 0.92, are not significantly different from the value of 1. This implies that the positive impact of financial constraints offsets the negative impact of agency problems in financially constrained conglomerates. Table 2.12B reports the results for financially constrained and less-constrained firms, based on the two-way fixed effect estimation, and we find consistent results.

In Table 2.13A, we test the impact of corporate governance using Heckman's two-stage estimation. We find that the coefficients on the interaction term $\Delta Cash \times Coinsurance\_Q$ are only negative and significant in the 'poor governance' subsamples, and the marginal value of cash in multi-segment firms is as low as $0.69 ($0.78), based on the G-index (blockholders) governance measure, which suggests that coinsurance across divisional investment opportunities has a negative (zero) impact on the value of cash in poorly (well) governed firms. Table 2.13B presents the results for constrained and less-constrained firms, based on the two-way fixed effect estimation. We continue to find consistent evidence. Taken together, the results corroborate our early findings and support the agency hypothesis after addressing the potential endogeneity concern.

2.6 Conclusion

In this chapter, we examine the impact of coinsurance across divisional investment opportunities on the value of corporate cash holdings. We develop three hypotheses based on financial constraints, the efficient internal capital market and agency problems. We construct a measure of coinsurance based on the imperfect correlation across divisional investment opportunities. We employ Faulkender and Wang's (2006) methodology, and find that the marginal value of cash in conglomerates (stand-alone firms) is $0.87 ($1.08), which indicates that an additional one dollar in conglomerates is valued at 21 cents less than in stand-alone firms.

We find that the agency channel dominates the financial constraints channel and the efficient internal capital market channel in explaining the impact of coinsurance across divisional investment opportunities on the marginal value of cash, resulting in an overall lower valuation of cash holdings. We find that coinsurance across divisional investment opportunities reduces the value of cash in both financially constrained and less-constrained firms, but the positive impact of financial constraints can offset the negative impact of agency problems in financially constrained firms. We find that coinsurance across divisional investment opportunities is associated with a lower value of cash in poorly-governed firms. We find evidence that the coinsurance across divisional investment opportunities reduces the value of cash through inefficient cross-subsidization, but increases the value of cash through the efficient internal capital market. We document a positive impact of coinsurance across divisional investment opportunities on the value of cash in economic recessions, which suggests improved efficiency of internal transfers in recessions. We use an alternative measure of the unexpected change in cash holdings and employ Heckman's two-stage model and two-way fixed effects estimation to address potential endogeneity, and we continue to find similar evidence.

Our results suggest that coinsurance across divisional investment opportunities is a double-edged sword. It decreases the value of cash in poorly governed firms, and reduces the value of cash in financially constrained firms, but increases the value of cash in firms with an efficient internal capital market. Additionally, we disclose a specific channel through which the coinsurance across divisional investment opportunities can have value consequences.

Table 2.1 Summary Statistics

This table provides the summary statistics. This sample consists of 10,510 firms with 77,090 firm-year observations over the period 1986-2010. *Excess Return* is a firm's annual stock return over fiscal year *t* minus Fama and French (1993) 25 size-and-B/M benchmark portfolio return over the same period. *Coinsurance_Q* is coinsurance across divisional investment opportunities. It is computed as the difference between the volatility of segment-level investment opportunities in a conglomerate and the volatility that assumes a correlation of 1 between all segment-level investment opportunities in the conglomerate. Segment-level investment opportunities is the average Tobin's Q of single-segment firms in a 3-digit SIC code industry over a prior 10-year period (see text for more details). *Industry Q Volatility* is the volatility that assumes a correlation of 1 between all segment-level investment opportunities. *Coinsurance_CF* is coinsurance across divisional cash flows. It is computed as the difference between the volatility of segment-level cash flows in a conglomerate and the volatility that assumes a correlation of 1 between all segment-level cash flows in the conglomerate. Segment-level cash flows is the average cash flows of single-segment firms in a 3-digit SIC code industry over a prior 10-year period (see text for more details). *Industry Cash Flow Volatility* is the volatility that assumes a correlation of 1 between all segment-level cash flows. *ΔCash* is the one-year change in cash holdings, standardized by the lagged market value of equity. *ΔEarnings* is the one-year change in earnings before extraordinary items, standardized by the lagged market value of equity. *ΔNet Assets* is the one-year change of total assets minus cash holdings, standardized by the lagged market value of equity. *ΔR&D* is the one-year change of research and development expenses, standardized by the lagged market value of equity. *ΔInterest Expenses* is the one-year change in interest expenses, standardized by the lagged market value of equity. *ΔDividends* is the one-year change in dividends, standardized by the lagged market value of equity. *Cash* is cash plus marketable securities, standardized by the lagged market value of equity. *Leverage* is the ratio of debt to total assets. *Net Financing* is the new equity issues minus repurchases plus new debt issues minus debt redemption, standardized by the lagged market value of equity.

Variable	N	Mean	Median	25th Percentile	75th Percentile	Std. Dev.
Excess Return	77,090	0.0278	-0.0030	-0.2843	0.2893	0.5970
Coinsurance_Q (Diversified firms only)	17,367	0.0338	0.0227	0.0092	0.0468	0.0358
Industry Q Volatility (Diversified firms only)	17,367	0.2497	0.2275	0.1636	0.3078	0.1339
Coinsurance_CF (Diversified firms only)	17,367	0.0080	0.0057	0.0023	0.0112	0.0083
Industry Cash Flow Volatility (Diversified firms only)	17,367	0.0482	0.0414	0.0290	0.0596	0.0344
ΔCash	77,090	0.0111	0.0011	-0.0321	0.0402	0.1544
ΔEarnings	77,090	-0.0017	0.0075	-0.0313	0.0439	2.4742
ΔNet Asset	77,090	0.0687	0.0437	-0.0348	0.1700	0.5263
ΔR&*D*	77,090	0.0003	0.0000	0.0000	0.0024	0.0294
ΔInterest Expenses	77,090	0.0017	0.0000	-0.0023	0.0050	0.0327
ΔDividends	77,090	0.0000	0.0000	0.0000	0.0000	0.0090
$Cash_{t-1}$	77,090	0.1924	0.0914	0.0304	0.2183	0.7320
Leverage	77,090	0.2299	0.1937	0.0293	0.3605	0.2165
Net Financing	77,090	0.0450	0.0015	-0.0288	0.0696	0.2546

Table 2.2 Coinsurance across Divisional Investment Opportunities and the Value of Cash

This table tests the relationship between coinsurance across divisional investment opportunities and the value of corporate cash holdings. Panel A shows the regression results. The dependent variable *Excess Return* is a firm's annual stock return over fiscal year *t* minus Fama and French (1993) 25 size-and-B/M benchmark portfolio return over the same period. *ΔCash* is the one-year change in cash holdings. *Coinsurance_Q* is coinsurance across divisional investment opportunities. *Coinsurance_CF* is coinsurance across divisional cash flows (see Table 2.1 and text for more details). *ΔEarnings* is the one-year change in earnings before extraordinary items. *ΔNet Assets* is the one-year change of total assets minus cash holdings. *ΔR&D* is the one-year change of research and development expenses. *ΔInterest Expenses* is the one-year change in interest expenses. *ΔDividends* is the one-year change in dividends. *Cash* is cash plus marketable securities. *Leverage* is the ratio of debt to total assets. *Net Financing* is the new equity issues minus repurchases plus new debt issues minus debt redemption. All variables except *Excess Return, Coinsurance_Q, Coinsurance_CF a*nd *Leverage* are standardized by the lagged market value of equity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

Panel A: Regressions

	Excess Return	
	(1)	(2)
Intercept	-0.025***	-0.017***
	(0.01)	(0.01)
ΔCash	1.163***	1.249***
	(0.01)	(0.01)
ΔCash × Coinsurance_Q		-6.892***
		(0.01)
Coinsurance_Q		-0.151
		(0.24)
ΔCash × Coinsurance_CF		3.003
		(0.60)
Coinsurance_CF		0.312
		(0.57)
ΔEarnings	0.008***	0.009***
	(0.01)	(0.01)
ΔNet Assets	0.414***	0.409***
	(0.01)	(0.01)
ΔR&D	-0.760***	-0.959***
	(0.01)	(0.01)
ΔInterest Expenses	-1.479***	-1.536***
	(0.01)	(0.01)
ΔDividends	1.701***	1.696***
	(0.01)	(0.01)
$Cash_{t-1}$	0.264***	0.270***
	(0.01)	(0.01)
Leverage	-0.185***	-0.194***
	(0.01)	(0.01)
ΔCash × $Cash_{t-1}$	-0.308***	-0.250***
	(0.01)	(0.01)
ΔCash × Leverage	-0.439***	-0.526***
	(0.01)	(0.01)
Net Financing	-0.064***	-0.034***
	(0.01)	(0.01)
Observations	77,090	77,090
Adjusted R^2	0.12	0.12

Panel B: The Value of Cash

This panel shows the marginal value of $1 calculated based on the estimates in Panel A. We conduct the F-test on the null hypothesis that the marginal value of $1 is one. The p-value is reported in the parentheses.

	The Marginal Value of $1
Entire Sample	$1.00 (0.75)
Single-segment Firms	$1.08 (0.01)***
Diversified Firms	$0.87 (0.01) ***

Table 2.3 Coinsurance across Divisional Investment Opportunities and the Value of Cash: Financial Constraints

This table examines the relationship between coinsurance across divisional investment opportunities and the value of cash for less-constrained and constrained firms. Panel A shows the regression results. We divide the sample into constrained and less-constrained groups based on two measures of financial constraints: *Payout Ratio* and *SA index* (see text for more details). The dependent variable *Excess Return* is a firm's annual stock return over fiscal year *t* minus Fama and French (1993) 25 size-and-B/M benchmark portfolio return over the same period. *ΔCash* is the one-year change in cash holdings. *Coinsurance_Q* is coinsurance across divisional investment opportunities. *Coinsurance_CF* is coinsurance across divisional cash flows (see Table 2.1 and text for more details). *ΔEarnings* is the one-year change in earnings before extraordinary items. *ΔNet Assets* is the one-year change of total assets minus cash holdings. *ΔR&D* is the one-year change of research and development expenses. *ΔInterest Expenses* is the one-year change in interest expenses. *ΔDividends* is the one-year change in dividends. *Cash* is cash plus marketable securities. *Leverage* is the ratio of debt to total assets. *Net Financing* is the new equity issues minus repurchases plus new debt issues minus debt redemption. All variables except *Excess Return*, *Coinsurance_Q*, *Coinsurance_CF a*nd *Leverage* are standardized by the lagged market value of equity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

Panel A. Regressions

	Excess Return			
	Payout Ratio		SA Index	
	Less Constrained	Constrained	Less Constrained	Constrained
	(1)	(2)	(3)	(4)
Intercept	-0.026***	-0.029***	0.023***	-0.085***
	(0.01)	(0.01)	(0.01)	(0.01)
ΔCash	1.158***	1.393***	1.116***	1.263***
	(0.01)	(0.01)	(0.01)	(0.01)
ΔCash × Coinsurance_Q	-1.279***	-8.747***	-5.105***	-5.856***
	(0.01)	(0.01)	(0.01)	(0.01)
Coinsurance_Q	-0.084	-0.054	-0.037	-0.399
	(0.45)	(0.83)	(0.77)	(0.11)
ΔCash × Coinsurance_CF	-10.167	1.834	-1.229	1.472
	(0.15)	(0.92)	(0.62)	(0.72)
Coinsurance_CF	0.607	0.034	-0.729	1.158
	(0.20)	(0.97)	(0.16)	(0.29)
ΔEarnings	0.342***	0.006***	0.008***	0.113***
	(0.01)	(0.01)	(0.01)	(0.01)
ΔNet Assets	0.290***	0.435***	0.327***	0.441***
	(0.01)	(0.01)	(0.01)	(0.01)
ΔR&D	0.097	-0.828***	-0.782***	-0.529***
	(0.38)	(0.01)	(0.01)	(0.01)
ΔInterest Expenses	-1.526***	-1.414***	-1.577***	-1.572***
	(0.01)	(0.01)	(0.01)	(0.01)
ΔDividends	2.536***	0.025	1.029***	2.282***
	(0.01)	(0.96)	(0.01)	(0.01)
$Cash_{t-1}$	0.194***	0.344***	0.100***	0.473***
	(0.01)	(0.01)	(0.01)	(0.01)
Leverage	-0.117***	-0.195***	-0.137***	-0.159***
	(0.01)	(0.01)	(0.01)	(0.01)
ΔCash × $Cash_{t-1}$	-0.042***	-0.411***	0.027***	-0.029***
	(0.01)	(0.01)	(0.01)	(0.01)
ΔCash × Leverage	-0.160***	-0.543***	-0.630***	-0.667***
	(0.01)	(0.01)	(0.01)	(0.01)
Net Financing	-0.076***	-0.051***	-0.098***	0.029**
	(0.01)	(0.01)	(0.01)	(0.03)
Observations	36,862	40,228	38,545	38,545
Adjusted R^2	0.12	0.14	0.10	0.14

Panel B: The Value of Cash

This panel shows the marginal value of $1 calculated based on the estimates in Panel A. We conduct the F-test on the null hypothesis that the marginal value of $1 is one, with p-value reported in the parentheses.

	The Marginal Value of $1			
	Payout Ratio		SA Index	
	Less Constrained	Constrained	Less Constrained	Constrained
Single-segment Firms	$0.96 (0.12)	$1.19*** (0.01)	$0.97 (0.20)	$1.10*** (0.01)
Diversified Firms	$0.83*** (0.01)	$0.91 (0.29)	$0.79*** (0.01)	$0.92 (0.15)

Table 2.4 Coinsurance across Divisional Investment Opportunities and the Value of Cash: Corporate Governance

This table examines how corporate governance affects the relationship between coinsurance across divisional investment opportunities and the value of cash. Panel A shows the regression results. We divide the sample into two subsamples based on a firm's level of corporate governance. We use two criteria of corporate governance: *G-index* constructed by Gompers et al. (2003) and the presence of *Blockholders* (see text for more details). The dependent variable *Excess Return* is a firm's annual stock return over fiscal year *t* minus Fama and French (1993) 25 size-and-B/M benchmark portfolio return over the same period. *ΔCash* is the one-year change in cash holdings. *Coinsurance_Q* is coinsurance across divisional investment opportunities. *Coinsurance_CF* is coinsurance across divisional cash flows (see Table 2.1 and text for more details). *ΔEarnings* is the one-year change in earnings before extraordinary items. *ΔNet Assets* is the one-year change of total assets minus cash holdings. *ΔR&D* is the one-year change of research and development expenses. *ΔInterest Expenses* is the one-year change in interest expenses. *ΔDividends* is the one-year change in dividends. *Cash* is cash plus marketable securities. *Leverage* is the ratio of debt to total assets. *Net Financing* is the new equity issues minus repurchases plus new debt issues minus debt redemption. All variables except *Excess Return, Coinsurance_Q, Coinsurance_CF a*nd *Leverage* are standardized by the lagged market value of equity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

Panel A. Regressions

	Excess Return			
	G-index		Block Holders	
	Good Governance	Poor Governance	Good Governance	Poor Governance
	(1)	(2)	(3)	(4)
Intercept	-0.008	0.005	-0.015***	-0.017***
	(0.53)	(0.55)	(0.01)	(0.01)
ΔCash	1.355***	1.202***	1.424***	1.113***
	(0.01)	(0.01)	(0.01)	(0.01)
ΔCash × Coinsurance_Q	-2.479	-6.268***	-0.540	-4.277***
	(0.71)	(0.01)	(0.44)	(0.01)
Coinsurance_Q	-0.620	0.185	-0.187	0.104
	(0.13)	(0.32)	(0.19)	(0.69)
ΔCash × Coinsurance_CF	-9.480	-3.924	-3.161*	-1.431
	(0.69)	(0.62)	(0.08)	(0.55)
Coinsurance_CF	0.549	-0.984	0.398	0.391
	(0.79)	(0.25)	(0.52)	(0.72)
ΔEarnings	0.359***	0.415***	0.006***	0.020***
	(0.01)	(0.01)	(0.01)	(0.01)
ΔNet Assets	0.151***	0.158***	0.211***	0.164***
	(0.01)	(0.01)	(0.01)	(0.01)
ΔR&D	0.143	0.086	-0.776***	-0.781***
	(0.71)	(0.71)	(0.01)	(0.01)
ΔInterest Expenses	-2.370***	-2.990***	-2.014***	-1.485***
	(0.01)	(0.01)	(0.01)	(0.01)
ΔDividends	1.598	-0.032	1.311***	2.914***
	(0.13)	(0.96)	(0.01)	(0.01)
$Cash_{t-1}$	0.186***	0.136***	0.328***	0.241***
	(0.01)	(0.01)	(0.01)	(0.01)
Leverage	-0.035	-0.108***	-0.146***	-0.190***
	(0.36)	(0.01)	(0.01)	(0.01)
ΔCash × $Cash_{t-1}$	-0.189	-0.330***	-0.328***	-0.200***
	(0.28)	(0.01)	(0.01)	(0.01)
ΔCash × Leverage	0.183	-1.043***	-0.571***	-0.549***
	(0.63)	(0.01)	(0.01)	(0.01)
Net Financing	-0.113**	-0.094***	-0.046***	0.074***
	(0.04)	(0.01)	(0.01)	(0.01)
Observations	3,677	7,708	50,811	26,279
Adjusted R^2	0.10	0.13	0.13	0.10

Panel B: The Value of Cash

This panel shows the marginal value of $1 calculated based on the estimates in Panel A. We conduct the F-test on the null hypothesis that the marginal value of $1 is one, with p-value reported in the parentheses.

	The Marginal Value of $1			
	G-Index		Block Holders	
	Good Governance	Poor Governance	Good Governance	Poor Governance
Single-segment Firms	$1.36*** (0.01)	$0.90* (0.06)	$1.23*** (0.01)	$0.94* (0.07)
Diversified Firms	$1.20 ** (0.02)	$0.66*** (0.01)	$1.19*** (0.01)	$0.79 *** (0.01)

Table 2.5A Coinsurance across Divisional Investment Opportunities and the Value of Cash: Financial Constraints and Corporate Governance – Regression analysis based on Pay-out Ratio and G-index

This table tests how corporate governance affects the relationship between coinsurance across divisional investment opportunities and the value of corporate cash holdings for less-constrained and constrained firms. Panel A report the regression results. Financial constraints are measured based on *Pay-out Ratio* (see text for more details). We use *G*-index constructed by Gompers et al. (2003) as a measure for corporate governance (see text for more details) The dependent variable *Excess Return* is a firm's annual stock return over fiscal year *t* minus Fama and French (1993) 25 size-and-B/M benchmark portfolio return over the same period. *ΔCash* is the one-year change in cash holdings. *Coinsurance_Q* is coinsurance across divisional investment opportunities. *Coinsurance_CF* is coinsurance across divisional cash flows (see Table 2.1 and text for more details). *ΔEarnings* is the one-year change in earnings before extraordinary items. *ΔNet Assets* is the one-year change of total assets minus cash holdings. *ΔR&D* is the one-year change of research and development expenses. *ΔInterest Expenses* is the one-year change in interest expenses. *ΔDividends* is the one-year change in dividends. *Cash* is cash plus marketable securities. *Leverage* is the ratio of debt to total assets. *Net Financing* is the new equity issues minus repurchases plus new debt issues minus debt redemption. All variables except *Excess Return, Coinsurance_Q, Coinsurance_CF a*nd *Leverage* are standardized by the lagged market value of equity. The sample period is between 1990 and 2006. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

Panel A: Regression Results Based on Pay-out Ratio and G-index

	Excess Return							
	Less Constrained				Constrained			
	Good Governance		Poor Governance		Good Governance		Poor Governance	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	0.002*	(0.09)	0.007	(0.43)	-0.032	(0.23)	0.014	(0.44)
ΔCash	1.437***	(0.01)	1.153***	(0.01)	1.891***	(0.01)	1.166***	(0.01)
ΔCash × Coinsurance_Q	-2.553	(0.50)	-4.505***	(0.01)	-8.598	(0.62)	-10.253**	(0.02)
Coinsurance_Q	-0.353	(0.28)	0.155	(0.35)	-0.280	(0.82)	0.923	(0.16)
ΔCash × Coinsurance_CF	1.462	(0.93)	-4.868	(0.59)	-5.327	(0.96)	5.980	(0.84)
Coinsurance_CF	1.186	(0.50)	-1.096	(0.17)	-1.915	(0.70)	-1.484	(0.60)
ΔEarnings	0.478***	(0.01)	0.448***	(0.01)	0.162***	(0.01)	0.302***	(0.01)
ΔNet Assets	0.168***	(0.01)	0.119***	(0.01)	0.217***	(0.01)	0.213***	(0.01)
ΔR&D	0.168	(0.74)	-0.439	(0.16)	0.053	(0.91)	0.011	(0.98)
ΔInterest Expenses	-4.221***	(0.01)	-2.771***	(0.01)	-1.555***	(0.01)	-2.764***	(0.01)
ΔDividends	2.798***	(0.01)	0.956*	(0.08)	-0.530	(0.82)	-2.458	(0.12)
$Cash_{t-1}$	0.168***	(0.01)	0.089***	(0.01)	0.425***	(0.01)	0.139***	(0.01)
Leverage	-0.041	(0.32)	-0.111***	(0.01)	-0.033	(0.61)	-0.135***	(0.01)
ΔCash × $Cash_{t-1}$	-0.960	(0.14)	-0.584***	(0.01)	0.031	(0.13)	-0.201	(0.13)
ΔCash × Leverage	-0.757	(0.11)	-1.358***	(0.01)	-0.329	(0.23)	-0.869***	(0.01)
Net Financing	-0.051	(0.41)	-0.077**	(0.02)	-0.205**	(0.02)	-0.120**	(0.04)
Observations	2,510		5,924		1,167		1,784	
Adjusted R^2	0.09		0.08		0.15		0.16	

Panel B: The Value of Cash

This panel shows the marginal value of $1 calculated based on the estimates in Panel A. We conduct the F-test on the null hypothesis that the marginal value of $1 is one. The p-value is reported in the parentheses.

	The Marginal Value of $1							
	Less Constrained				Constrained			
	Good Governance G-Index<7		Poor Governance G-Index≥7		Good Governance G-Index<7		Poor Governance G-Index≥7	
Single-segment Firms	1.08	(0.48)	0.73***	(0.01)	1.82***	(0.01)	0.93	(0.47)
Diversified Firms	1.01	(0.93)	0.54***	(0.01)	1.49**	(0.05)	0.63*	(0.08)

Table 2.5B Coinsurance across Divisional Investment Opportunities and the Value of Cash: Financial Constraints and Corporate Governance – Regression analysis based on Pay-out Ratio and the Presence of Block Holders

This table tests how corporate governance affects the relationship between coinsurance across divisional investment opportunities and the value of corporate cash holdings for less-constrained and constrained firms. Panel A report the regression results. Financial constraints are measured based on *Pay-out Ratio* (see text for more details). We use the presence of block holders as a measure for corporate governance (see text for more details) The dependent variable *Excess Return* is a firm's annual stock return over fiscal year *t* minus Fama and French (1993) 25 size-and-B/M benchmark portfolio return over the same period. *ΔCash* is the one-year change in cash holdings. *Coinsurance_Q* is coinsurance across divisional investment opportunities. *Coinsurance_CF* is coinsurance across divisional cash flows (see Table 2.1 and text for more details). *ΔEarnings* is the one-year change in earnings before extraordinary items. *ΔNet Assets* is the one-year change of total assets minus cash holdings. *ΔR&D* is the one-year change of research and development expenses. *ΔInterest Expenses* is the one-year change in interest expenses. *ΔDividends* is the one-year change in dividends. *Cash* is cash plus marketable securities. *Leverage* is the ratio of debt to total assets. *Net Financing* is the new equity issues minus repurchases plus new debt issues minus debt redemption. All variables except *Excess Return, Coinsurance_Q, Coinsurance_CF a*nd *Leverage* are standardized by the lagged market value of equity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

Panel A: Regression Results Based on Pay-out Ratio and the Presence Of Blockholders

	Excess Return							
	Less Constrained				Constrained			
	Good Governance		Poor Governance		Good Governance		Poor Governance	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	-0.032***	(0.01)	-0.021**	(0.02)	0.005	(0.44)	-0.029***	(0.01)
ΔCash	1.495***	(0.01)	1.149***	(0.01)	1.379***	(0.01)	1.032***	(0.01)
ΔCash × Coinsurance_Q	0.037	(0.98)	-7.310**	(0.05)	-0.825	(0.53)	-7.882***	(0.01)
Coinsurance_Q	-0.062	(0.63)	-0.124	(0.65)	-0.280	(0.42)	0.070	(0.87)
ΔCash × Coinsurance_CF	-4.255	(0.63)	1.591	(0.38)	-0.674	(0.81)	3.258	(0.55)
Coinsurance_CF	0.441	(0.45)	0.631	(0.57)	0.445	(0.75)	0.322	(0.86)
ΔEarnings	0.473***	(0.01)	0.245***	(0.01)	0.005***	(0.01)	0.023***	(0.01)
ΔNet Assets	0.127***	(0.01)	0.125***	(0.01)	0.218***	(0.01)	0.167***	(0.01)
ΔR&D	0.270*	(0.07)	-0.136	(0.52)	-0.941***	(0.01)	-0.709***	(0.01)
ΔInterest Expenses	-2.211***	(0.01)	-1.162***	(0.01)	-1.984***	(0.01)	-1.491***	(0.01)
ΔDividends	2.393***	(0.01)	3.434***	(0.01)	-0.732	(0.22)	1.593*	(0.08)
$Cash_{t-1}$	0.252***	(0.01)	0.172***	(0.01)	0.344***	(0.01)	0.297***	(0.01)
Leverage	-0.085***	(0.01)	-0.119***	(0.01)	-0.192***	(0.01)	-0.205***	(0.01)
ΔCash × $Cash_{t-1}$	-2.265***	(0.01)	-0.319***	(0.01)	-0.343***	(0.01)	-0.201***	(0.01)
ΔCash × Leverage	-0.087	(0.37)	-0.864***	(0.01)	0.023	(0.41)	-0.122***	(0.01)
Net Financing	-0.025	(0.12)	0.014	(0.59)	-0.044**	(0.02)	0.092***	(0.01)
Observations	26,735		10,127		24,076		16,152	
Adjusted R^2	0.12		0.10		0.14		0.11	

Panel B: The Value of Cash

This panel shows the marginal value of $1 calculated based on the estimates in Panel A. We conduct the F-test on the null hypothesis that the marginal value of $1 is one, with p-value reported in the parentheses.

	The Marginal Value of $1							
	Less Constrained				Constrained			
	Good Governance		Poor Governance		Good Governance		Poor Governance	
Single-segment Firms	1.06	(0.11)	0.89**	(0.03)	1.32***	(0.01)	0.96	(0.34)
Diversified Firms	1.02	(0.68)	0.66***	(0.01)	1.28***	(0.01)	0.73***	(0.01)

Table 2.5C Coinsurance across Divisional Investment Opportunities and the Value of Cash: Financial Constraints and Corporate Governance – Regression analysis based on SA Index and G-index

This table tests how corporate governance affects the relationship between coinsurance across divisional investment opportunities and the value of corporate cash holdings for less-constrained and constrained firms. Panel A report the regression results. Financial constraints are measured based on SA Index (see text for more details). We use *G*-index constructed by Gompers et al. (2003) as a measure for corporate governance (see text for more details) The dependent variable *Excess Return* is a firm's annual stock return over fiscal year *t* minus Fama and French (1993) 25 size-and-B/M benchmark portfolio return over the same period. *ΔCash* is the one-year change in cash holdings. *Coinsurance_Q* is coinsurance across divisional investment opportunities. *Coinsurance_CF* is coinsurance across divisional cash flows (see Table 2.1 and text for more details). *ΔEarnings* is the one-year change in earnings before extraordinary items. *ΔNet Assets* is the one-year change of total assets minus cash holdings. *ΔR&D* is the one-year change of research and development expenses. *ΔInterest Expenses* is the one-year change in interest expenses. *ΔDividends* is the one-year change in dividends. *Cash* is cash plus marketable securities. *Leverage* is the ratio of debt to total assets. *Net Financing* is the new equity issues minus repurchases plus new debt issues minus debt redemption. All variables except *Excess Return*, *Coinsurance_Q*, *Coinsurance_CF a*nd *Leverage* are standardized by the lagged market value of equity. The sample period is between 1990 and 2006. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

Panel A: Regression Results Based on SA Index and G-index

	Excess Return							
	Less Constrained				Constrained			
	Good Governance		Poor Governance		Good Governance		Poor Governance	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	0.019	(0.27)	0.011	(0.35)	-0.042***	(0.01)	-0.025**	(0.03)
ΔCash	1.459***	(0.01)	1.519***	(0.01)	1.575***	(0.01)	1.227***	(0.01)
ΔCash × Coinsurance_Q	-8.191	(0.14)	-8.087***	(0.01)	-7.008	(0.12)	-10.575***	(0.01)
Coinsurance_Q	-0.144	(0.71)	0.168	(0.40)	-0.686	(0.31)	0.144	(0.68)
ΔCash × Coinsurance_CF	-10.333	(0.84)	1.110	(0.97)	-10.699	(0.61)	7.456	(0.71)
Coinsurance_CF	-0.875	(0.69)	-1.769*	(0.09)	2.309	(0.42)	-0.091	(0.95)
ΔEarnings	0.568***	(0.01)	0.675***	(0.01)	0.265***	(0.01)	0.416***	(0.01)
ΔNet Assets	0.171***	(0.01)	0.178***	(0.01)	0.192***	(0.01)	0.122***	(0.01)
ΔR&D	1.652***	(0.01)	-0.118	(0.75)	0.111	(0.80)	-0.075	(0.80)
ΔInterest Expenses	-4.181***	(0.01)	-3.892***	(0.01)	-1.977***	(0.01)	-2.275***	(0.01)
ΔDividends	1.524	(0.21)	-0.904	(0.22)	2.497	(0.08)	0.429	(0.62)
$Cash_{t-1}$	0.056	(0.40)	0.280***	(0.01)	0.291***	(0.01)	0.245***	(0.01)
Leverage	-0.092	(0.08)	-0.125***	(0.01)	0.005	(0.91)	-0.071**	(0.03)
ΔCash × $Cash_{t-1}$	-1.058***	(0.01)	-2.419***	(0.01)	-0.142	(0.50)	-0.591***	(0.01)
ΔCash × Leverage	-0.395	(0.48)	-1.020***	(0.01)	-0.271	(0.52)	-0.826***	(0.01)
Net Financing	-0.227***	(0.01)	-0.091**	(0.02)	-0.075	(0.25)	-0.060	(0.17)
Observations	1,552		4,141		2,125		3,567	
Adjusted R^2	0.12		0.16		0.11		0.12	

Panel B: The Value of Cash

This panel shows the marginal value of $1 calculated based on the estimates in Panel A. We conduct the F-test on the null hypothesis that the marginal value of $1 is one, with p-value reported in the parentheses.

	The Marginal Value of $1							
	Less Constrained				Constrained			
	Good Governance		Poor Governance		Good Governance		Poor Governance	
Single-segment Firms	1.17	(0.20)	0.84***	(0.01)	1.51***	(0.01)	$0.93	(0.35)
Diversified Firms	1.03	(0.83)	0.73***	(0.01)	1.45***	(0.01)	$0.80***	(0.01)

Table 2.5D Coinsurance across Divisional Investment Opportunities and the Value of Cash: Financial Constraints and Corporate Governance – Regression analysis based on SA Index and the Presence of Block Holders

This table tests how corporate governance affects the relationship between coinsurance across divisional investment opportunities and the value of cash for less-constrained and constrained firms. Panel A report the regression results. Financial constraints are measured based on SA Index (see text for more details). We use the presence of block holders as a measure for corporate governance (see text for more details) The dependent variable *Excess Return* is a firm's annual stock return over fiscal year *t* minus Fama and French (1993) 25 size-and-B/M benchmark portfolio return over the same period. *ΔCash* is the one-year change in cash holdings. *Coinsurance_Q* is coinsurance across divisional investment opportunities. *Coinsurance_CF* is coinsurance across divisional cash flows (see Table 2.1 and text for more details). *ΔEarnings* is the one-year change in earnings before extraordinary items. *ΔNet Assets* is the one-year change of total assets minus cash holdings. *ΔR&D* is the one-year change of research and development expenses. *ΔInterest Expenses* is the one-year change in interest expenses. *ΔDividends* is the one-year change in dividends. *Cash* is cash plus marketable securities. *Leverage* is the ratio of debt to total assets. *Net Financing* is the new equity issues minus repurchases plus new debt issues minus debt redemption. All variables except *Excess Return, Coinsurance_Q, Coinsurance_CF a*nd *Leverage* are standardized by the lagged market value of equity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

Panel A: Regression Results Based on SA Index and the Presence of Block Holders

	Excess Return							
	Less Constrained				Constrained			
	Good Governance		Poor Governance		Good Governance		Poor Governance	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	-0.027***	(0.01)	0.026***	(0.01)	-0.034***	(0.01)	-0.047***	(0.01)
ΔCash	1.178***	(0.01)	0.942***	(0.01)	1.564***	(0.01)	1.074***	(0.01)
ΔCash × Coinsurance_Q	-1.544	(0.26)	-6.843***	(0.01)	-1.507	(0.41)	-6.743***	(0.01)
Coinsurance_Q	-0.064	(0.65)	-0.005	(0.99)	-0.835**	(0.02)	0.472	(0.27)
ΔCash × Coinsurance_CF	-2.051	(0.66)	4.423	(0.22)	0.167	(0.96)	3.159	(0.24)
Coinsurance_CF	-0.378	(0.53)	-0.189	(0.85)	1.892	(0.23)	1.621	(0.39)
ΔEarnings	0.004***	(0.01)	1.425***	(0.01)	0.038***	(0.01)	0.021***	(0.01)
ΔNet Assets	0.334***	(0.01)	0.003	(0.12)	0.004***	(0.01)	0.020***	(0.01)
ΔR&D	-1.117***	(0.01)	0.133	(0.26)	-0.198***	(0.01)	-0.083***	(0.01)
ΔInterest Expenses	-1.899***	(0.01)	0.006	(0.51)	-0.017	(0.48)	-0.043	(0.14)
ΔDividends	0.931***	(0.01)	-0.017	(0.78)	0.185***	(0.01)	0.017	(0.70)
$Cash_{t-1}$	0.562***	(0.01)	0.149***	(0.01)	0.387***	(0.01)	0.326***	(0.01)
Leverage	-0.080***	(0.01)	-0.216***	(0.01)	-0.231***	(0.01)	-0.150***	(0.01)
ΔCash × $Cash_{t-1}$	-0.010***	(0.01)	-0.233***	(0.01)	-0.827***	(0.01)	-0.276***	(0.01)
ΔCash × Leverage	-0.626***	(0.01)	-0.300***	(0.01)	-0.462***	(0.01)	0.001	(0.97)
Net Financing	-0.098***	(0.01)	0.003	(0.63)	0.005	(0.58)	0.004	(0.51)
Observations	29,468		9,077		21,343		17,202	
Adjusted R^2	0.11		0.14		0.11		0.08	

Panel B: The Value of Cash

This panel shows the marginal value of $1 calculated based on the estimates in Panel A. We conduct the F-test on the null hypothesis that the marginal value of $1 is one, with p-value reported in the parentheses.

	The Marginal Value of $1							
	Less Constrained				Constrained			
	Good Governance		Poor Governance		Good Governance		Poor Governance	
Single-segment Firms	$1.03	(0.13)	0.83***	(0.01)	$1.30***	(0.01)	$1.02	(0.51)
Diversified Firms	$0.96	(0.22)	0.64***	(0.01)	$1.25***	(0.01)	$0.82***	(0.01)

Table 2.6 Coinsurance across Divisional Investment Opportunities and the Value of Cash: Efficient and Inefficient Internal Transfers

This table tests how coinsurance across divisional investment opportunities affects the value of cash through efficient (or inefficient) internal transfers. Panel A shows the univariate statistics of *Inefficient Transfers* and *Efficient Transfers* for diversified firms. *Inefficient (Efficient) Transfers* is the sum of the transfers made to low (high) productivity divisions in a diversified firm. Transfers are measured as in Rajan et al. (2000):

$$\frac{I_j}{Asset_j} - \frac{I_j^{ss}}{Asset_j^{ss}} - \sum_{j=1}^{N} w_j \left(\frac{I_j}{Asset_j} - \frac{I_j^{ss}}{Asset_j^{ss}} \right)$$

where j =1 represents segment j, ss is single-segment firms, I_j is capital expenditure, w_j is segment j's proportion of the firm's total assets, $Asset_j$ is the book value of segment j. We follow Duchin (2010) and sum the internal transfers distributed to 'high-productivity' and 'low-productivity' segments, where a segment is classified as high (low) productivity if its average industry Tobin's Q is higher (lower) than the firm weighted Tobin's Q (see text for more details). Panel B shows the regression results. The dependent variable *Excess Return* is a firm's annual stock return over fiscal year t minus Fama and French (1993) 25 size-and-B/M benchmark portfolio return over the same period. *ΔCash* is the one-year change in cash holdings. *Coinsurance_Q* is coinsurance across divisional investment opportunities. *Coinsurance_CF* is coinsurance across divisional cash flows (see Table 2.1 and text for more details). *ΔEarnings* is the one-year change in earnings before extraordinary items. *ΔNet Assets* is the one-year change of total assets minus cash holdings. *ΔR&D* is the one-year change of research and development expenses. *ΔInterest Expenses* is the one-year change in interest expenses. *ΔDividends* is the one-year change in dividends. *Cash* is cash plus marketable securities. *Leverage* is the ratio of debt to total assets. *Net Financing* is the new equity issues minus repurchases plus new debt issues minus debt redemption. All variables except *Excess Return, Coinsurance_Q, Coinsurance_CF a*nd *Leverage* are standardized by the lagged market value of equity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

Panel A: Univariate Statistics

Variable	Mean	Median	25th Percentile	75th Percentile	Std. Dev.	N
Ineffcient Transfers	0.0325	0.0030	0.0000	0.0222	0.1158	17,367
Efficient Transfers	0.0382	0.0029	0.0000	0.0236	0.1354	17,367

Panel B: Regressions

	Excess Return	
Intercept	-0.049***	(0.01)
ΔCash	1.266***	(0.01)
ΔCash × Coinsurance_Q	-4.789	(0.13)
ΔCash × Coinsurance_Q × Inefficient Transfers × 100	-1.412***	(0.01)
ΔCash × Coinsurance_Q × Efficient Transfers × 100	0.810*	(0.08)
ΔCash × Inefficient Transfers	-0.183*	(0.09)
ΔCash × Efficient Transfers	-0.439	(0.13)
Coinsurance_Q	0.036	(0.79)
ΔCash × Coinsurance_CF	-0.596	(0.19)
Coinsurance_CF	0.383	(0.47)
Inefficient Transfers	0.051	(0.18)
Efficient Transfers	-0.005	(0.88)
ΔEarnings	0.007***	(0.01)
ΔNet Assets	0.413***	(0.01)
ΔR&D	-0.864***	(0.01)
ΔInterest Expenses	-1.585***	(0.01)
ΔDividends	1.717***	(0.01)
$Cash_{t-1}$	0.415***	(0.01)
Leverage	-0.166***	(0.01)
ΔCash × $Cash_{t-1}$	-0.779***	(0.01)
ΔCash × Leverage	-0.424***	(0.01)
Net Financing	-0.056***	(0.01)
Observations	77,090	
Adjusted R^2	0.11	

Panel C: The Value of Cash

This panel shows the marginal value of $1 calculated based on the estimates in Panel B. We conduct the F-test on the null hypothesis that the marginal value of $1 is one, with p-value reported in the parentheses.

	The Marginal Value of $1	
Single-segment Firms	$1.02	(0.12)
Diversified Firms	$0.80**	(0.04)

Table 2.7 Coinsurance across Divisional Investment Opportunities and the Value of Cash: Overall Efficiency of Internal Transfers

This table examines how the efficiency of internal transfers affects the relationship between coinsurance across divisional investment opportunities and the value of cash. The regressions are estimated separately for the 'Value added by allocation≤ 0' subsample and the 'Value added by allocation≥ 0' subsample. The 'Value added by allocation≤ 0' subsample consists of single-segment firms and diversified firms whose overall efficiency of internal transfers is negative. The 'Value added by allocation≥ 0' subsample consists of single-segment firms and diversified firms whose overall efficiency of internal transfers is positive. The overall efficiency of the cross-divisional transfers is measured by the 'value added', developed by Rajan et al. (2000) as

$$\frac{\sum_{j=1}^{N} Asset_j (q_j - \bar{q}) \left(\frac{I_j}{Asset_j} - \frac{I_j^{ss}}{Asset_j^{ss}} - \sum_{j=1}^{N} w_j \left(\frac{I_j}{Asset_j} - \frac{I_j^{ss}}{Asset_j^{ss}} \right) \right)}{TotalAsset}$$

where $Asset_j$ is the book value of segment j, q_j is the asset-weighted *Tobin's q* using single-segment firms only in segment j, $\bar{q}$ is the asset-weighted average of segment *Tobin's q* for the firm, I_j is capital expenditure, *ss* is single-segment firms, w_j is segment j's proportion of the firm's total assets (see text for more details). Panel A shows the regression results. The dependent variable *Excess Return* is a firm's annual stock return over fiscal year *t* minus Fama and French (1993) 25 size-and-B/M benchmark portfolio return over the same period. *ΔCash* is the one-year change in cash holdings. *Coinsurance_Q* is coinsurance across divisional investment opportunities. *Coinsurance_CF* is coinsurance across divisional cash flows (see Table 2.1 and text for more details). *ΔEarnings* is the one-year change in earnings before extraordinary items. *ΔNet Assets* is the one-year change of total assets minus cash holdings. *ΔR&D* is the one-year change of research and development expenses. *ΔInterest Expenses* is the one-year change in interest expenses. *ΔDividends* is the one-year change in dividends. *Cash* is cash plus marketable securities. *Leverage* is the ratio of debt to total assets. *Net Financing* is the new equity issues minus repurchases plus new debt issues minus debt redemption. All variables except *Excess Return*, *Coinsurance_Q*, *Coinsurance_CF a*nd *Leverage* are standardized by the lagged market value of equity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

Panel A. Regressions

	Excess Return			
	Value added by allocation≤ 0		Value added by allocation≥0	
Intercept	-0.059***	(0.01)	-0.059***	(0.01)
ΔCash	1.331***	(0.01)	1.408***	(0.01)
ΔCash × Coinsurance_Q	-2.212***	(0.01)	-0.474	(0.53)
Coinsurance_Q	-0.063	(0.70)	-0.140	(0.45)
ΔCash × Coinsurance_CF	-9.809	(0.14)	0.621	(0.78)
Coinsurance_CF	0.146	(0.84)	-0.043	(0.95)
ΔEarnings	0.007***	(0.01)	0.024***	(0.01)
ΔNet Assets	0.416***	(0.01)	0.416***	(0.01)
ΔR&D	-1.001***	(0.01)	-0.957***	(0.01)
ΔInterest Expenses	-1.662***	(0.01)	-1.729***	(0.01)
ΔDividends	1.803***	(0.01)	1.864***	(0.01)
$Cash_{t-1}$	0.518***	(0.01)	0.491***	(0.01)
Leverage	-0.158***	(0.01)	-0.168***	(0.01)
ΔCash × $Cash_{t-1}$	-1.210***	(0.01)	-1.588***	(0.01)
ΔCash × Leverage	-0.452***	(0.01)	-0.300***	(0.01)
Net Financing	-0.052***	(0.01)	-0.031***	(0.01)
Observations	71,084		68,624	
Adjusted R^2	0.12		0.12	

Panel B: The Value of Cash

This panel shows the marginal value of $1 calculated based on the estimates in Panel A. We conduct the F-test on the null hypothesis that the marginal value of $1 is one, with p-value reported in the parentheses.

	The Marginal Value of $1			
	Value added by transfers ≤ 0		Value added by transfers ≥ 0	
Single-segment Firms	$1.00	(0.85)	$1.05***	(0.01)
Diversified Firms	$0.85***	(0.01)	$1.03**	(0.04)

Table 2.8 Coinsurance across Divisional Investment Opportunities and the Value of Cash: Economic Recessions

This table examines how the economic recessions affect the relationship between coinsurance across divisional investment opportunities and the value of cash. Panel A shows the regressions results. The dependent variable *Excess Return* is a firm's annual stock return over fiscal year *t* minus Fama and French (1993) 25 size-and-B/M benchmark portfolio return over the same period. *ΔCash* is the one-year change in cash holdings. *Coinsurance_Q* is coinsurance across divisional investment opportunities. *Coinsurance_CF* is coinsurance across divisional cash flows (see Table 2.1 and text for more details). *ΔEarnings* is the one-year change in earnings before extraordinary items. *ΔNet Assets* is the one-year change of total assets minus cash holdings. *ΔR&D* is the one-year change of research and development expenses. *ΔInterest Expenses* is the one-year change in interest expenses. *ΔDividends* is the one-year change in dividends. *Cash* is cash plus marketable securities. *Leverage* is the ratio of debt to total assets. *Net Financing* is the new equity issues minus repurchases plus new debt issues minus debt redemption. All variables except *Excess Return, Coinsurance_Q, Coinsurance_CF a*nd *Leverage* are standardized by the lagged market value of equity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

Panel A: Regressions

	Excess Return	
	Coef.	*p*-value
Intercept	-0.033***	(0.01)
ΔCash	1.250***	(0.01)
ΔCash × Coinsurance_Q	-7.345***	(0.01)
Coinsurance_Q	-0.127	(0.32)
ΔCash × Coinsurance_Q × Recession	4.131***	(0.01)
ΔCash × Recession	0.291***	(0.01)
Recession	0.078***	(0.01)
ΔCash × Coinsurance_CF	0.208	(0.97)
Coinsurance_CF	0.192	(0.73)
ΔEarnings	0.009***	(0.01)
ΔNet Assets	0.421***	(0.01)
ΔR&D	-0.927***	(0.01)
ΔInterest Expenses	-1.549***	(0.01)
ΔDividends	1.773***	(0.01)
$Cash_{t-1}$	0.283***	(0.01)
Leverage	-0.191***	(0.01)
ΔCash × $Cash_{t-1}$	-0.283***	(0.01)
ΔCash × Leverage	-0.518***	(0.01)
Net Financing	-0.034***	(0.01)
Observations	77,090	
Adjusted R^2	0.12	

Panel B: The Value of Cash

This panel shows the marginal value of $1 calculated based on the estimates in Panel A. We conduct the F-test on the null hypothesis that the marginal value of $1 is one. The p-value is reported in the parentheses.

	The Marginal Value of $1	
Single-segment Firms _ Not in Recession	$1.08***	(0.01)
Single-segment Firms _ In Recession	$1.37***	(0.01)
Diversified Firms _ Not in Recession	$0.83***	(0.01)
Diversified Firms _ In Recession	$1.26***	(0.01)

Table 2.9A Coinsurance across Divisional Investment Opportunities and the Value of Cash -- Alternative Measure of the Unexpected Change in Cash Holdings

This table shows the relationship between coinsurance across divisional investment opportunities and the value of corporate cash holdings using an alternative measure of the unexpected change in cash holdings. Panel A shows the regressions. The dependent variable *Excess Return* is a firm's annual stock return over fiscal year *t* minus Fama and French (1993) 25 size-and-B/M benchmark portfolio return over the same period. *ΔNet Cash* is the realized change in cash holdings minus the average change in cash holdings in the corresponding benchmark portfolio over the same period. *Coinsurance_Q* is coinsurance across divisional investment opportunities. *Coinsurance_CF* is coinsurance across divisional cash flows (see Table 2.1 and text for more details). *ΔEarnings* is the one-year change in earnings before extraordinary items. *ΔNet Assets* is the one-year change of total assets minus cash holdings. *ΔR&D* is the one-year change of research and development expenses. *ΔInterest Expenses* is the one-year change in interest expenses. *ΔDividends* is the one-year change in dividends. *Cash* is cash plus marketable securities. *Leverage* is the ratio of debt to total assets. *Net Financing* is the new equity issues minus repurchases plus new debt issues minus debt redemption. All variables except *Excess Return*, *Coinsurance_Q*, *Coinsurance_CF a*nd *Leverage* are standardized by the lagged market value of equity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

Panel A: Regressions

	Excess Return			
	Coef.	p-value	Coef.	p-value
Intercept	-0.014***	(0.01)	-0.001	(0.77)
ΔNet Cash	1.188***	(0.01)	1.230***	(0.01)
ΔNet Cash × Coinsurance_Q			-5.594***	(0.01)
Coinsurance_Q			-0.219*	(0.09)
ΔNet Cash × Coinsurance_CF			-4.417	(0.42)
Coinsurance_CF			0.322	(0.57)
ΔEarnings	0.008***	(0.01)	0.009***	(0.01)
ΔNet Assets	0.413***	(0.01)	0.407***	(0.01)
ΔR&D	-0.695***	(0.01)	-0.880***	(0.01)
ΔInterest Expenses	-1.534***	(0.01)	-1.579***	(0.01)
ΔDividends	1.744***	(0.01)	1.741***	(0.01)
$Cash_{t-1}$	0.308***	(0.01)	0.297***	(0.01)
Leverage	-0.193***	(0.01)	-0.209***	(0.01)
ΔNet Cash × $Cash_{t-1}$	-0.438***	(0.01)	-0.282***	(0.01)
ΔNet Cash × Leverage	-0.458***	(0.01)	-0.522***	(0.01)
Net Financing	-0.043***	(0.01)	-0.007	(0.43)
Observations	77,090		77,090	
Adjusted R^2	0.12		0.11	

Panel B: The Value of Cash

This panel shows the marginal value of $1 calculated based on the estimates in Panel A. We conduct the F-test on the null hypothesis that the marginal value of $1 is one, with p-value reported in the parentheses.

	The Marginal Value of $1			
Entire Sample	$1.00	(0.92)		
Single-segment Firms			$1.06***	(0.01)
Diversified Firms			$0.83***	(0.01)

Table 2.9B Coinsurance across Divisional Investment Opportunities and the Value of Cash: Financial Constraints
-- Alternative Measure of the Unexpected Change in Cash Holdings

This table examines the relationship between coinsurance across divisional investment opportunities and the value of cash for less-constrained and constrained firms. Panel A shows the regression results. We divide the sample into financially constrained and less-constrained groups based on two measure of financial constraints: *Payout Ratio* and *SA Index* (see text for more details). The dependent variable *Excess Return* is a firm's annual stock return over fiscal year *t* minus Fama and French (1993) 25 size-and-B/M benchmark portfolio return over the same period. *ΔNet Cash* is the realized change in cash holdings minus the average change in cash holdings in the corresponding benchmark portfolio over the same period. *Coinsurance_Q* is coinsurance across divisional investment opportunities. *Coinsurance_CF* is coinsurance across divisional cash flows (see Table 2.1 and text for more details). *ΔEarnings* is the one-year change in earnings before extraordinary items. *ΔNet Assets* is the one-year change of total assets minus cash holdings. *ΔR&D* is the one-year change of research and development expenses. *ΔInterest Expenses* is the one-year change in interest expenses. *ΔDividends* is the one-year change in dividends. *Cash* is cash plus marketable securities. *Leverage* is the ratio of debt to total assets. *Net Financing* is the new equity issues minus repurchases plus new debt issues minus debt redemption. All variables except *Excess Return, Coinsurance_Q, Coinsurance_CF a*nd *Leverage* are standardized by the lagged market value of equity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

Panel A: Regressions

	Excess Return							
	Payout Ratio				SA Index			
	Less constrained		Constrained		Less Constrained		Constrained	
Intercept	-0.016***	(0.01)	-0.007	(0.20)	0.007	(0.11)	-0.060***	(0.01)
ΔNet Cash	1.012***	(0.01)	1.395***	(0.01)	1.274***	(0.01)	1.390***	(0.01)
ΔNet Cash × Coinsurance_Q	-3.963***	(0.01)	-6.218***	(0.01)	-5.508***	(0.01)	-6.636***	(0.01)
Coinsurance_Q	-0.128	(0.27)	-0.292	(0.26)	-0.171	(0.16)	-0.531**	(0.04)
ΔNet Cash × Coinsurance_CF	0.748**	(0.04)	-0.803	(0.87)	-2.610	(0.38)	0.506	(0.36)
Coinsurance_CF	0.602	(0.23)	0.432	(0.70)	-0.615	(0.23)	1.467	(0.22)
ΔEarnings	0.368***	(0.01)	0.007***	(0.01)	0.004***	(0.01)	0.122***	(0.01)
ΔNet Assets	0.284***	(0.01)	0.425***	(0.01)	0.326***	(0.01)	0.433***	(0.01)
ΔR&D	0.145	(0.21)	-0.917***	(0.01)	-0.807***	(0.01)	-0.607***	(0.01)
ΔInterest Expenses	-1.602***	(0.01)	-1.543***	(0.01)	-1.652***	(0.01)	-1.654***	(0.01)
ΔDividends	2.641***	(0.01)	0.086	(0.86)	1.277***	(0.01)	2.448***	(0.01)
$Cash_{t-1}$	0.231***	(0.01)	0.400***	(0.01)	0.434***	(0.01)	0.421***	(0.01)
Leverage	-0.115***	(0.01)	-0.222***	(0.01)	-0.149***	(0.01)	-0.185***	(0.01)
ΔNet Cash × $Cash_{t-1}$	-0.300***	(0.01)	-0.486***	(0.01)	-1.319***	(0.01)	-0.562***	(0.01)
ΔNet Cash × Leverage	0.019	(0.60)	-0.581***	(0.01)	-0.045***	(0.01)	-0.567***	(0.01)
Net Financing	-0.058***	(0.01)	0.009	(0.48)	-0.084***	(0.01)	0.072***	(0.01)
Observations	36,862		40,228		38,545		38,545	
Adjusted R^2	0.11		0.13		0.10		0.14	

Panel B: The Value of Cash

This panel shows the marginal value of $1 calculated based on the estimates in Panel A. We conduct the F-test on the null hypothesis that the marginal value of $1 is one, with p-value reported in the parentheses.

	The marginal value of $1							
	Payout Ratio				SA Index			
	Less Constrained		Constrained		Less Constrained		Constrained	
Single-segment Firms	$0.96	(0.17)	$1.17***	(0.01)	$1.02	(0.35)	$1.16***	(0.01)
Diversified Firms	$0.83***	(0.01)	$0.95	(0.42)	$0.81***	(0.01)	$0.94	(0.38)

Table 2.9C Coinsurance across Divisional Investment Opportunities and the Value of Cash: Corporate Governance
-- Alternative Measure of the Unexpected Change in Cash Holdings

This table examines how corporate governance affects the relationship between coinsurance across divisional investment opportunities and the value of cash. Panel A shows the regression results. We divide the sample into two subsamples based on a firm's level of corporate governance. We use two criteria of corporate governance: *G-index* constructed by Gompers et al. (2003) and the presence of *Blockholders* (see text for more details). The dependent variable *Excess Return* is a firm's annual stock return over fiscal year *t* minus Fama and French (1993) 25 size-and-B/M benchmark portfolio return over the same period. *ΔNet Cash* is the realized change in cash holdings minus the average change in cash holdings in the corresponding benchmark portfolio over the same period. *Coinsurance_Q* is coinsurance across divisional investment opportunities. *Coinsurance_CF* is coinsurance across divisional cash flows (see Table 2.1 and text for more details). *ΔEarnings* is the one-year change in earnings before extraordinary items. *ΔNet Assets* is the one-year change of total assets minus cash holdings. *ΔR&D* is the one-year change of research and development expenses. *ΔInterest Expenses* is the one-year change in interest expenses. *ΔDividends* is the one-year change in dividends. *Cash* is cash plus marketable securities. *Leverage* is the ratio of debt to total assets. *Net Financing* is the new equity issues minus repurchases plus new debt issues minus debt redemption. All variables except *Excess Return, Coinsurance_Q, Coinsurance_CF a*nd *Leverage* are standardized by the lagged market value of equity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

Panel A: Regressions

	Excess Return			
	G-index		Block Holders	
	Good Governance	Poor Governance	Good Governance	Poor Governance
Intercept	0.026**	0.021***	0.005	-0.031***
	(0.05)	(0.01)	(0.18)	(0.01)
ΔNet Cash	1.206***	1.054***	1.309***	1.171***
	(0.01)	(0.01)	(0.01)	(0.01)
ΔNet Cash × Coinsurance_Q	-1.377	-3.573*	-1.140	-4.202***
	(0.83)	(0.08)	(0.11)	(0.01)
Coinsurance_Q	-0.653	0.124	-0.198	0.107
	(0.14)	(0.50)	(0.17)	(0.68)
ΔNet Cash × Coinsurance_CF	-15.307	-5.694	-1.594	-3.419
	(0.52)	(0.45)	(0.39)	(0.15)
Coinsurance_CF	0.166	-1.088	0.537	0.362
	(0.94)	(0.21)	(0.39)	(0.74)
ΔEarnings	0.386***	0.433***	0.006***	0.016***
	(0.01)	(0.01)	(0.01)	(0.01)
ΔNet Assets	0.131***	0.150***	0.206***	0.166***
	(0.01)	(0.01)	(0.01)	(0.01)
ΔR&D	0.086	0.188	-0.698***	-0.654***
	(0.82)	(0.42)	(0.01)	(0.01)
ΔInterest Expenses	-2.383***	-2.942***	-2.075***	-1.504***
	(0.01)	(0.01)	(0.01)	(0.01)
ΔDividends	1.920*	0.185	1.360***	2.941***
	(0.07)	(0.75)	(0.01)	(0.01)
$Cash_{t-1}$	0.140***	0.186***	0.333***	0.348***
	(0.01)	(0.01)	(0.01)	(0.01)
Leverage	-0.041	-0.129***	-0.163***	-0.182***
	(0.29)	(0.01)	(0.01)	(0.01)
ΔNet Cash × $Cash_{t-1}$	-0.212	-0.575***	-0.376***	-0.370***
	(0.48)	(0.01)	(0.01)	(0.01)
ΔNet Cash × Leverage	0.413	-0.714***	-0.553***	-0.501***
	(0.31)	(0.01)	(0.01)	(0.01)
Net Financing	-0.064	-0.076***	-0.017	0.080***
	(0.24)	(0.01)	(0.17)	(0.01)
Observations	3,677	7,708	50,811	26,279
Adjusted R^2	0.09	0.12	0.11	0.10

Panel B: The Value of Cash

This panel shows the marginal value of $1 calculated based on the estimates in Panel A. We conduct the F-test on the null hypothesis that the marginal value of $1 is one, with p-value reported in the parentheses.

	The Marginal Value of $1			
	G-Index		Block Holders	
	Good Governance	Poor Governance	Good Governance	Poor Governance
Single-segment Firms	$1.26** (0.02)	$0.78*** (0.01)	$1.11*** (0.01)	$0.99 (0.66)
Diversified Firms	$1.09 (0.56)	$0.62*** (0.01)	$1.06** (0.02)	$0.82*** (0.01)

Table 2.10 Coinsurance across Divisional Investment Opportunities and the Value of Cash: Probit Regression

This table shows the probit regression. The dependent variable is 1 if a firm is a diversified firm and 0 if a firm is a single-segment firm. *Size* is the logarithm of assets. *EBIT* is the ratio of earnings before interests and taxes to sales. *Capital Expenditures* is the ratio of capital expenditures to sales. *S&P* is a dummy variable that is 1 if a firm is in one of the main S&P indices, and 0 otherwise. *PNDIV* is the fraction of all the firms in the industry that are diversified firms. *PSDIV* is the fraction of industry sales accounted for by diversified firms. *MNUM* is the number of announced mergers and acquisitions in the year. *MVOL* is the US dollar value of these mergers and acquisitions. *GDP* is the Gross Domestic Product. *GDP Growth* is the growth rate of Gross Domestic Product. *Contraction is* the number of months in the year the economy was in a recession. *MAJOREX* is a dummy that is 1 if the firm is listed on NASDAQ, NYSE, or AMEX, and 0 otherwise. *Foreign* is a dummy that is 1 if the firm is incorporated outside the United States, and 0 otherwise. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	Coef.	*p*-value
Intercept	-4.286***	(0.01)
Size	0.072***	(0.01)
$Size_{t-1}$	0.127***	(0.01)
$Size_{t-2}$	-0.071***	(0.01)
EBIT	0.000	(0.83)
$EBIT_{t-1}$	0.006***	(0.01)
$EBIT_{t-2}$	-0.001	(0.61)
Capital Expenditures	0.000	(0.86)
Capital $Expenditures_{t-1}$	0.010***	(0.01)
Capital $Expenditures_{t-2}$	-0.099***	(0.01)
S&P	0.343***	(0.01)
PNDIV	3.238***	(0.01)
PSDIV	0.123***	(0.01)
MVOL	0.000***	(0.01)
MNUM	0.000	(0.30)
GDP_{t-1}	1.592***	(0.01)
GDP Growth	1.424**	(0.03)
Contraction	-0.001	(0.84)
$Contraction_{t-1}$	0.002	(0.45)
MAJOREX	-0.040***	(0.01)
Foreign	-0.096***	(0.01)
Observations	77,090	
Pseudo R^2	0.24	

Table 2.11 Coinsurance across Divisional Investment Opportunities and the Value of Cash: Heckman's Two-Stage Estimation and Fixed Effect Estimation

This table shows the regressions using two economic methods. Panel A shows the regression results. Column 1 shows the second stage of the Heckman's two-stage estimation. Column 2 shows the two-way fixed effect regression. The dependent variable is the *Excess Return*, defined as a firm's stock return over fiscal year t−1 to t minus the firm's benchmark return over the same period. The benchmark return is the return a benchmark portfolio, which is one of the 25 Fama and French portfolios formed on size and book-to-market ratio. *ΔCash* is the one-year change in cash holdings. *Coinsurance_Q* is coinsurance across divisional investment opportunities. *Coinsurance_CF* is coinsurance across divisional cash flows (see Table 2.1 and text for more details). *ΔEarnings* is the one-year change in earnings before extraordinary items. *ΔNet Assets* is the one-year change of total assets minus cash holdings. *ΔR&D* is the one-year change of research and development expenses. *ΔInterest Expenses* is the one-year change in interest expenses. *ΔDividends* is the one-year change in dividends. *Cash* is cash plus marketable securities. *Leverage* is the ratio of debt to total assets. *Net Financing* is the new equity issues minus repurchases plus new debt issues minus debt redemption. All variables except *Excess Return, Coinsurance_Q, Coinsurance_CF a*nd *Leverage* are standardized by the lagged market value of equity. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

Panel A: Regressions - Heckman's Two-Stage Estimation and Fixed Effect Estimation

	Excess Return			
	Heckman's two-stage estimation Second stage		Fixed effect estimation (firm and year fixed effects not reported)	
	Coef.	*p*-value	Coef.	*p*-value
	(1)	(2)	(3)	(4)
Intercept	-0.018***	(0.01)		
ΔCash	1.257***	(0.01)	1.138***	(0.01)
ΔCash × Coinsurance_Q	-6.924***	(0.01)	-12.284***	(0.01)
Coinsurance_Q	-0.141	(0.28)	-0.117	(0.41)
ΔCash × Coinsurance_CF	2.780	(0.63)	12.006	(0.12)
Coinsurance_CF	0.345	(0.55)	-1.098*	(0.09)
ΔEarnings	0.009***	(0.01)	0.362***	(0.01)
ΔNet Assets	0.411***	(0.01)	0.280***	(0.01)
ΔR&D	-0.960***	(0.01)	-0.280***	(0.01)
ΔInterest Expenses	-1.538***	(0.01)	-1.398***	(0.01)
ΔDividends	1.694***	(0.01)	1.138***	(0.01)
$Cash_{t-1}$	0.270***	(0.01)	0.824***	(0.01)
Leverage	-0.192***	(0.01)	-0.275***	(0.01)
ΔCash × $Cash_{t-1}$	-0.253***	(0.01)	-0.449***	(0.01)
ΔCash × Leverage	-0.529***	(0.01)	-0.063***	(0.01)
Net Financing	-0.036***	(0.01)	0.067***	(0.01)
Lambda	-0.001	(0.85)		
Observations	77,090		75,705	
Adjusted R^2	0.12		0.17	

Panel B: The Value of Cash

This panel shows the marginal value of $1 calculated based on the estimates in Panel A. We conduct the F-test on the null hypothesis that the marginal value of $1 is one, with p-value reported in the parentheses.

	The Marginal Value of $1			
	Heckman's two-stage estimation		Fixed effect estimation	
Single-segment Firms	$1.08***	(0.01)	$1.05***	(0.01)
Diversified Firms	$0.85***	(0.01)	$0.73***	(0.01)

Table 2.12A Coinsurance across Divisional Investment Opportunities and the Value of Cash: Financial Constraints – Heckman's Two-Stage Estimation

This table provides results from the second stage of the Heckman's (1979) two-stage regressions estimating the effect of coinsurance across divisional investment opportunities on the value of cash for less-constrained and constrained firms. Panel A shows the regression results. We divide the sample into financially constrained and less-constrained groups based on two measures of financial constraints: *Payout Ratio* and *SA Index* (see text for more details). The dependent variable *Excess Return* is a firm's annual stock return over fiscal year *t* minus Fama and French (1993) 25 size-and-B/M benchmark portfolio return over the same period. *ΔCash* is the one-year change in cash holdings. *Coinsurance_Q* is coinsurance across divisional investment opportunities. *Coinsurance_CF* is coinsurance across divisional cash flows (see Table 2.1 and text for more details). *ΔEarnings* is the one-year change in earnings before extraordinary items. *ΔNet Assets* is the one-year change of total assets minus cash holdings. *ΔR&D* is the one-year change of research and development expenses. *ΔInterest Expenses* is the one-year change in interest expenses. *ΔDividends* is the one-year change in dividends. *Cash* is cash plus marketable securities. *Leverage* is the ratio of debt to total assets. *Net Financing* is the new equity issues minus repurchases plus new debt issues minus debt redemption. All variables except *Excess Return*, *Coinsurance_Q*, *Coinsurance_CF a*nd *Leverage* are standardized by the lagged market value of equity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

Panel A: Regressions – Heckman's Two-Stage Estimation

	Excess Return							
	Payout Ratio				SA Index			
	Less Constrained		Constrained		Less Constrained		Constrained	
	Coef.	*p*-value	Coef.	*p*-value	Coef.	*p*-value	Coef.	*p*-value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	-0.026***	(0.01)	-0.030***	(0.01)	0.021***	(0.01)	-0.086***	(0.01)
ΔCash	1.173***	(0.01)	1.405***	(0.01)	1.155***	(0.01)	1.270***	(0.01)
ΔCash × Coinsurance_Q	-1.246***	(0.01)	-8.717***	(0.01)	-5.182***	(0.01)	-5.798***	(0.01)
Coinsurance_Q	-0.050	(0.66)	-0.058	(0.82)	-0.002	(0.99)	-0.452*	(0.08)
ΔCash × Coinsurance_CF	-7.928	(0.26)	0.771	(0.97)	0.328	(0.89)	1.107	(0.79)
Coinsurance_CF	0.769	(0.12)	-0.021	(0.98)	-0.653	(0.22)	0.800	(0.50)
ΔEarnings	0.344***	(0.01)	0.006***	(0.01)	0.008***	(0.01)	0.114***	(0.01)
ΔNet Assets	0.289***	(0.01)	0.438***	(0.01)	0.329***	(0.01)	0.443***	(0.01)
ΔR&D	0.084	(0.45)	-0.831***	(0.01)	-0.781***	(0.01)	-0.539***	(0.01)
ΔInterest Expenses	-1.540***	(0.01)	-1.413***	(0.01)	-1.601***	(0.01)	-1.575***	(0.01)
ΔDividends	2.551***	(0.01)	0.026	(0.95)	1.041***	(0.01)	2.301***	(0.01)
$Cash_{t-1}$	0.198***	(0.01)	0.343***	(0.01)	0.111***	(0.01)	0.472***	(0.01)
Leverage	-0.117***	(0.01)	-0.192***	(0.01)	-0.136***	(0.01)	-0.155***	(0.01)
ΔCash × $Cash_{t-1}$	-0.220***	(0.01)	-0.411***	(0.01)	0.042***	(0.01)	-0.028***	(0.01)
ΔCash × Leverage	-0.725***	(0.01)	-0.553***	(0.01)	-0.677***	(0.01)	-0.667***	(0.01)
Net Financing	-0.073***	(0.01)	-0.053***	(0.01)	-0.097***	(0.01)	0.025*	(0.06)
Lambda	-0.005	(0.22)	0.001	(0.84)	-0.003	(0.39)	0.006	(0.36)
Observations	36,862		40,228		38,545		38,545	
Adjusted R2	0.16		0.14		0.10		0.14	

Panel B: The Value of Cash

This panel shows the marginal value of $1 calculated based on the estimates in Panel A. We conduct the F-test on the null hypothesis that the marginal value of $1 is one, with p-value reported in the parentheses.

	The Marginal Value of $1							
	Payout Ratio				SA Index			
	Less Constrained		Constrained		Less Constrained		Constrained	
Single-segment Firms	$0.99	(0.37)	$1.10***	(0.01)	$1.00	(0.78)	$1.11***	(0.01)
Diversified Firms	$0.79***	(0.01)	$0.98	(0.48)	$0.83***	(0.01)	$0.92	(0.18)

Table 2.12B Coinsurance across Divisional Investment Opportunities and the Value of Cash: Financial Constraints – Fixed Effect Estimation

This table provides results from the two-way firm and year fixed effect regressions estimating the effect of coinsurance across divisional investment opportunities on the value of cash for less-constrained and constrained firms. Panel A shows the regression results. We divide the sample into financially constrained and less-constrained groups based on two measures of financial constraints: *Payout Ratio* and *SA Index* (see text for more details). The dependent variable *Excess Return* is a firm's annual stock return over fiscal year *t* minus Fama and French (1993) 25 size-and-B/M benchmark portfolio return over the same period. *ΔCash* is the one-year change in cash holdings. *Coinsurance_Q* is coinsurance across divisional investment opportunities. *Coinsurance_CF* is coinsurance across divisional cash flows (see Table 2.1 and text for more details). *ΔEarnings* is the one-year change in earnings before extraordinary items. *ΔNet Assets* is the one-year change of total assets minus cash holdings. *ΔR&D* is the one-year change of research and development expenses. *ΔInterest Expenses* is the one-year change in interest expenses. *ΔDividends* is the one-year change in dividends. *Cash* is cash plus marketable securities. *Leverage* is the ratio of debt to total assets. *Net Financing* is the new equity issues minus repurchases plus new debt issues minus debt redemption. All variables except *Excess Return, Coinsurance_Q, Coinsurance_CF a*nd *Leverage* are standardized by the lagged market value of equity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

Panel A: Regressions – Fixed Effect Estimation

	Excess Return							
	Payout Ratio				SA Index			
	Less Constrained		Constrained		Less Constrained		Constrained	
	Coef.	*p*-value	Coef.	*p*-value	Coef.	*p*-value	Coef.	*p*-value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ΔCash	1.043***	(0.01)	1.210***	(0.01)	1.072***	(0.01)	1.184***	(0.01)
ΔCash × Coinsurance_Q	-2.821***	(0.01)	-4.170***	(0.01)	-3.203***	(0.01)	-4.658***	(0.01)
Coinsurance_Q	-0.053	(0.70)	-0.151	(0.60)	0.019	(0.89)	-0.241	(0.45)
ΔCash × Coinsurance_CF	1.116***	(0.01)	2.767**	(0.02)	-1.695	(0.35)	1.753***	(0.01)
Coinsurance_CF	-1.117*	(0.07)	-0.327	(0.80)	-1.132*	(0.06)	-0.210	(0.88)
ΔEarnings	0.457***	(0.01)	0.331***	(0.01)	0.372***	(0.01)	0.353***	(0.01)
ΔNet Assets	0.251***	(0.01)	0.305***	(0.01)	0.253***	(0.01)	0.312***	(0.01)
ΔR&D	0.142	(0.22)	-0.418***	(0.01)	-0.021	(0.86)	-0.378***	(0.01)
ΔInterest Expenses	-1.479***	(0.01)	-1.376***	(0.01)	-1.423***	(0.01)	-1.414***	(0.01)
ΔDividends	2.105***	(0.01)	-0.871*	(0.08)	0.783***	(0.01)	2.031***	(0.01)
$Cash_{t-1}$	0.679***	(0.01)	0.905***	(0.01)	0.579***	(0.01)	1.015***	(0.01)
Leverage	-0.257***	(0.01)	-0.272***	(0.01)	-0.267***	(0.01)	-0.265***	(0.01)
ΔCash × $Cash_{t-1}$	-0.324***	(0.01)	-0.467***	(0.01)	-0.404***	(0.01)	-0.435***	(0.01)
ΔCash × Leverage	0.051***	(0.01)	-0.121***	(0.01)	0.017**	(0.04)	-0.159***	(0.01)
Net Financing	-0.043***	(0.01)	0.106***	(0.01)	-0.044***	(0.01)	0.173***	(0.01)
Observations	36,491		39,214		38,394		37,311	
Adjusted R2	0.15		0.19		0.16		0.18	

Panel B: The Value of Cash

This panel shows the marginal value of $1 calculated based on the estimates in Panel A. We conduct the F-test on the null hypothesis that the marginal value of $1 is one, with p-value reported in the parentheses.

	The Marginal Value of $1							
	Payout Ratio				SA Index			
	Less Constrained		Constrained		Less Constrained		Constrained	
Single-segment Firms	$0.97	(0.21)	$1.10***	(0.01)	$1.00	(0.95)	$1.13***	(0.01)
Diversified Firms	$0.86***	(0.01)	$0.98	(0.48)	$0.88***	(0.01)	$0.99	(0.89)

Table 2.13A Coinsurance across Divisional Investment Opportunities and the Value of Cash: Corporate Governance -- Heckman's Two-Stage Estimation

This table provides results from the second stage of the Heckman's (1979) two-stage regressions estimating the effect of coinsurance across divisional investment opportunities on the value of cash for well-governed and poorly-governed firms. Panel A shows the regression results. We divide the sample into two subsamples based on a firm's level of corporate governance. We use two criteria of corporate governance: *G-index* constructed by Gompers et al. (2003) and the presence of *Blockholders* (see text for more details). The dependent variable *Excess Return* is a firm's annual stock return over fiscal year *t* minus Fama and French (1993) 25 size-and-B/M benchmark portfolio return over the same period. *ΔCash* is the one-year change in cash holdings. *Coinsurance_Q* is coinsurance across divisional investment opportunities. *Coinsurance_CF* is coinsurance across divisional cash flows (see Table 2.1 and text for more details). *ΔEarnings* is the one-year change in earnings before extraordinary items. *ΔNet Assets* is the one-year change of total assets minus cash holdings. *ΔR&D* is the one-year change of research and development expenses. *ΔInterest Expenses* is the one-year change in interest expenses. *ΔDividends* is the one-year change in dividends. *Cash* is cash plus marketable securities. *Leverage* is the ratio of debt to total assets. *Net Financing* is the new equity issues minus repurchases plus new debt issues minus debt redemption. All variables except *Excess Return, Coinsurance_Q, Coinsurance_CF a*nd *Leverage* are standardized by the lagged market value of equity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

Panel A: Regressions – Heckman's Two-Stage Estimation

	Excess Return							
	G-index				Block Holders			
	Good Governance		Poor Governance		Good Governance		Poor Governance	
	Coef.	*p*-value	Coef.	*p*-value	Coef.	*p*-value	Coef.	*p*-value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	-0.027**	(0.04)	-0.002	(0.75)	-0.029***	(0.01)	-0.035***	(0.01)
ΔCash	1.495***	(0.01)	1.148***	(0.01)	1.454***	(0.01)	1.036***	(0.01)
ΔCash × Coinsurance_Q	-2.140	(0.75)	-5.758***	(0.01)	-0.533	(0.45)	-4.030***	(0.01)
Coinsurance_Q	-0.633	(0.13)	0.196	(0.30)	-0.172	(0.24)	-0.029	(0.92)
ΔCash × Coinsurance_CF	0.950	(0.97)	-2.970	(0.71)	-3.027	(0.10)	-1.539	(0.52)
Coinsurance_CF	1.324	(0.53)	-0.660	(0.46)	0.559	(0.38)	-0.429	(0.71)
ΔEarnings	0.332***	(0.01)	0.422***	(0.01)	0.006***	(0.01)	0.020***	(0.01)
ΔNet Assets	0.420***	(0.01)	0.277***	(0.01)	0.444***	(0.01)	0.383***	(0.01)
ΔR&D	-0.198	(0.60)	-0.101	(0.66)	-0.976***	(0.01)	-0.958***	(0.01)
ΔInterest Expenses	-2.079***	(0.01)	-2.667***	(0.01)	-1.788***	(0.01)	-1.462***	(0.01)
ΔDividends	1.411	(0.18)	0.118	(0.84)	1.160***	(0.01)	2.665***	(0.01)
$Cash_{t-1}$	0.184***	(0.01)	0.144***	(0.01)	0.331***	(0.01)	0.246***	(0.01)
Leverage	-0.031	(0.37)	-0.111***	(0.01)	-0.155***	(0.01)	-0.155***	(0.01)
ΔCash × $Cash_{t-1}$	0.023	(0.19)	-0.248***	(0.01)	-0.346***	(0.01)	-0.171***	(0.01)
ΔCash × Leverage	-0.226	(0.24)	-0.933***	(0.01)	-0.409***	(0.01)	-0.336***	(0.01)
Net Financing	-0.264***	(0.01)	-0.119***	(0.01)	-0.104***	(0.01)	0.047***	(0.01)
Lambda	-0.013	(0.34)	-0.007	(0.29)	-0.004	(0.32)	0.011	(0.14)
Observations	3,677		7,708		50,811		26,279	
Adjusted R2	0.11		0.13		0.14		0.10	

Panel B: The Value of Cash

This panel shows the marginal value of $1 calculated based on the estimates in Panel A. We conduct the F-test on the null hypothesis that the marginal value of $1 is one, with p-value reported in the parentheses.

	The Marginal Value of $1							
	G-index				Block Holders			
	Good Governance		Poor Governance		Good Governance		Poor Governance	
Single-segment Firms	$1.45***	(0.01)	$0.89**	(0.03)	$1.30***	(0.01)	$0.92***	(0.01)
Diversified Firms	$1.38**	(0.03)	$0.69***	(0.01)	$1.25***	(0.01)	$0.78***	(0.01)

Table 2.13B Coinsurance across Divisional Investment Opportunities and the Value of Cash: Corporate Governance -- Fixed Effect Estimation

This table provides results from the two-way firm and year fixed effect regressions estimating the effect of coinsurance across divisional investment opportunities on the value of cash for well-governed and poorly-governed firms. Panel A shows the regression results. We divide the sample into two subsamples based on a firm's level of corporate governance. We use two criteria of corporate governance: *G-index* constructed by Gompers et al. (2003) and the presence of *Blockholders* (see text for more details). The dependent variable *Excess Return* is a firm's annual stock return over fiscal year *t* minus Fama and French (1993) 25 size-and-B/M benchmark portfolio return over the same period. *ΔCash* is the one-year change in cash holdings. *Coinsurance_Q* is coinsurance across divisional investment opportunities. *Coinsurance_CF* is coinsurance across divisional cash flows (see Table 2.1 and text for more details). *ΔEarnings* is the one-year change in earnings before extraordinary items. *ΔNet Assets* is the one-year change of total assets minus cash holdings. *ΔR&D* is the one-year change of research and development expenses. *ΔInterest Expenses* is the one-year change in interest expenses. *ΔDividends* is the one-year change in dividends. *Cash* is cash plus marketable securities. *Leverage* is the ratio of debt to total assets. *Net Financing* is the new equity issues minus repurchases plus new debt issues minus debt redemption. All variables except *Excess Return, Coinsurance_Q, Coinsurance_CF a*nd *Leverage* are standardized by the lagged market value of equity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

Panel A: Regressions – Fixed Effect Estimation

	Excess Return							
	G-index				Block Holders			
	Good Governance		Poor Governance		Good Governance		Poor Governance	
	Coef.	*p*-value	Coef.	*p*-value	Coef.	*p*-value	Coef.	*p*-value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ΔCash	1.479***	(0.01)	1.148***	(0.01)	1.229***	(0.01)	0.969***	(0.01)
ΔCash × Coinsurance_Q	-3.155	(0.28)	-4.477**	(0.03)	-0.713	(0.15)	-3.198***	(0.01)
Coinsurance_Q	-0.428	(0.39)	0.207	(0.29)	-0.028	(0.86)	-0.067	(0.81)
ΔCash × Coinsurance_CF	-2.564	(0.89)	-7.264	(0.24)	0.941	(0.65)	1.142	(0.10)
Coinsurance_CF	-0.659	(0.81)	-1.752*	(0.06)	-0.829	(0.26)	-1.437	(0.23)
ΔEarnings	0.442***	(0.01)	0.438***	(0.01)	0.453***	(0.01)	0.283***	(0.01)
ΔNet Assets	0.378***	(0.01)	0.209***	(0.01)	0.295***	(0.01)	0.267***	(0.01)
ΔR&D	-0.001	(1.00)	-0.076	(0.72)	-0.130	(0.15)	-0.419***	(0.01)
ΔInterest Expenses	-2.789***	(0.01)	-2.107***	(0.01)	-1.715***	(0.01)	-1.173***	(0.01)
ΔDividends	0.692	(0.50)	-0.317	(0.54)	0.688***	(0.01)	2.033***	(0.01)
$Cash_{t-1}$	0.581***	(0.01)	0.564***	(0.01)	0.820***	(0.01)	0.828***	(0.01)
Leverage	-0.160***	(0.01)	-0.202***	(0.01)	-0.284***	(0.01)	-0.261***	(0.01)
ΔCash × $Cash_{t-1}$	-0.259***	(0.01)	-0.348***	(0.01)	-0.502***	(0.01)	-0.348***	(0.01)
ΔCash × Leverage	-0.087	(0.69)	-0.717***	(0.01)	-0.062***	(0.01)	-0.072***	(0.01)
Net Financing	-0.200***	(0.01)	-0.068***	(0.01)	0.032***	(0.01)	0.118***	(0.01)
Observations	3,673		7,697		49,999		25,706	
Adjusted R2	0.14		0.16		0.19		0.16	

Panel B: The Value of Cash

This panel shows the marginal value of $1 calculated based on the estimates in Panel A. We conduct the F-test on the null hypothesis that the marginal value of $1 is one, with p-value reported in the parentheses.

	The Marginal Value of $1							
	G-index				Block Holders			
	Good Governance		Poor Governance		Good Governance		Poor Governance	
Single-segment Firms	$1.41***	(0.01)	$0.92*	(0.07)	$1.12***	(0.01)	$0.89***	(0.01)
Diversified Firms	$1.28**	(0.03)	$0.71***	(0.01)	$1.11***	(0.01)	$0.79***	(0.01)

Chapter 3

Coinsurance across Divisional Investment Opportunities and Corporate Mergers

3.1 Introduction

It is conventionally understood in the literature on corporate diversification that, if there is an imperfect correlation among segment cash flows in a diversified firm, the coinsurance among segment cash flows reduces cash flow volatility, leading to a lower risk of financial distress and a higher debt capacity (Lewellen, 1971). This is labelled as the 'more-money' effect of corporate diversification (Stein, 2003). Several empirical papers (e.g., Dimitrov and Tice, 2006; Tong, 2012) have investigated coinsurance across divisional cash flows, showing that the 'more-money' effect of diversification relieves financial burdens on diversified firms.

However, the coinsurance associated with corporate diversification is not limited to the imperfect correlation across divisional cash flows. In fact, the uncertainty surrounding segment investment opportunities creates another type of coinsurance through which corporate diversification can have significant impacts. To our knowledge, this is an under-researched area, and only a few studies in the literature have investigated how the coinsurance across divisional investment opportunities impacts the firm value.

In this chapter, we examine the effect of coinsurance across divisional investment opportunities on the announcement returns and the operating performance of diversifying mergers. We have chosen mergers as our research setting for a reason. A large body of research on the "diversification discount" employs cross-sectional studies to compare diversified firms with single-segment ones. However, both the methodology and the "diversification discount" have triggered extensive debate. Some researchers argue that the "diversification discount" is rather a result of self-selection – firms trading with a discount might be more likely to diversify (Campa and Kedia, 2002; Villalonga, 2004b). As proposed by a number of other researchers, the measurement of the "diversification discount" is flawed, given faulty data or improper measurement techniques (Graham et al., 2002; Villalonga, 2004a; Custodio, 2014). In recognition of the issues associated with the cross-sectional analysis of the "diversification discount", we use event study approaches to investigate how the equity market investors respond to firms' diversification announcement. As explained by Akbulut and Matsusaka (2010), event study approaches have not been adequately emphasized in research on diversification, but they nicely complement cross-sectional studies. The announcement returns indicate the change in the firm value perceived by the market, in response to the change in the degree of coinsurance caused by a merger. The effect of the coinsurance across divisional investment opportunities is tested directly, and in isolation from many other impacts. Therefore, diversifying mergers provide a unique framework which addresses endogeneity concerns and measurement biases.

We conjecture three channels through which coinsurance across divisional investment opportunities can impact merger outcomes. First, we hypothesize that the coinsurance across divisional investment opportunities has a positive effect on mergers outcomes for financially-constrained corporations, because the imperfect correlation among segment investment opportunities decreases the financing needs at some point.

Secondly, the coinsurance across divisional investment opportunities has a positive effect on mergers outcomes for financially constrained firms, because imperfectly-correlated segment investment opportunities reduce the opportunity costs of efficient transfers in the internal capital market. Thirdly, the coinsurance across divisional investment opportunities has a negative effect on the outcomes of diversifying mergers, because the inter-segment correlations in investment opportunities amplify the losses owing to agency problems.

We test these hypotheses using a sample of 1,349 merger deals during the period from 1986 to 2010. Following Duchin (2010), we construct a direct measure of coinsurance based on the cross-divisional correlations in investment opportunities. We find that the coinsurance across divisional investment opportunities leads to a reduction of 0.30% in announcement returns, and 1.53% in post-merger operating performance. We document a positive (zero) relationship between the coinsurance across divisional investment opportunities and the probability of firms attempting mergers when they are poorly (well) governed. We find that acquirers, on average, pay $6.1 million more in premiums for an increase in coinsurance among segment investment opportunities after the merger. We demonstrate that coinsurance across divisional investment opportunities decreases the firm value in both financially constrained and less-constrained firms. We find that the level of efficiency of internal transfers is not associated with coinsurance across divisional investment opportunities. We show that good corporate governance mitigates the negative impact of coinsurance across divisional investment opportunities. Our results are robust after addressing the potential endogeneity concerns. Taken together, evidence suggests that coinsurance across divisional investment opportunities has a negative impact on merger outcomes, owing to agency problems.

This study contributes to the literature on diversification by identifying an inefficient link between coinsurance across divisional investment opportunities and the

merger outcomes. The impact of coinsurance across divisional investment opportunities has received far less attention in the literature. Duchin (2010) is the first empirical paper that explicitly studies the relationship between the coinsurance across divisional investment opportunities and corporate liquidity. According to him, multi-segment firms can maintain less cash than single-segment ones due to coinsurance across divisional investment opportunities. He focuses on the positive effect of the coinsurance among cash flows and investment opportunities from the perspective of alleviating financial constraints; however, the nature of investment opportunity implies that coinsurance across divisional investment opportunities can interact with a firm's resource allocation policy. Therefore, coinsurance in investment opportunities can be associated with either the internal capital markets or agency problems through which diversifying mergers can generate positive or negative synergies. This study thus differs from previous ones, in that we reveal an agency problem-related, inefficient link between the coinsurance across divisional investment opportunities and the diversifying merger outcomes. In broader terms, we add a new piece of evidence to the "diversification discount" argument (e.g., Lang and Stulz, 1994; Berger and Ofek, 1995).

This study also contributes, in two ways, to a relatively under-explored terrain of the impact of diversification on corporate takeovers. First, evidence on the announcement returns and operating performance of diversifying mergers is mixed. A number of studies document that stock markets react positively to corporate diversification (e.g., Hubbard and Palia, 1999; Matsusaka, 1993; Ghosh, 2001; Akbulut and Matsusaka, 2010), while some others reveal negative value consequences of diversifying mergers (e.g., Morck et al., 1990; Maquieira et al., 1998; Martynova and Renneboog, 2007). Additionally, several research studies demonstrate insignificant changes in announcement returns or post-merger operating performance (e.g., Kaplan

and Weisbach, 1992; Switzer, 1996; Linn and Switzer, 2001; Sharma and Ho, 2002). We add to the corporate takeover literature by showing that coinsurance across divisional investment opportunities has negative implications for diversifying mergers. Secondly, in previous studies, mergers are classified as diversifying, if two merging parties operate in different industries, defined on a basis of a 2-digit SIC code level (Matsusaka, 1993; Hubbard and Palia, 1999; Martynova and Renneboog, 2007), a 3-digit SIC code level (Kaplan and Weisbach, 1992; Akbulut and Matsusaka, 2010), or a 4-digit SIC code level (Morck et al., 1990). However, this approach is simply based on SIC code only, and provides a rough proxy for diversification; it does not capture the importance of business segments or how closely these industries are related to each other. Duchin's (2010) coinsurance measure used in this study incorporates the weightings of each segment, the number of business divisions and the cross-divisional correlation. We, therefore, complement existing research by providing evidence on the value consequence of diversifying mergers based on a relatively more precise measurement that captures the change in the degree of coinsurance.

The rest of this chapter is structured as follows: Section 3.2 proposes the hypotheses, Section 3.3 explains the data and empirical methodology, Section 3.4 presents the empirical findings, and Section 3.5 concludes the chapter.

3.2 Hypotheses

In this section, we propose three hypotheses about the relationship between coinsurance across divisional investment opportunities and merger outcomes.

3.2.1 The Financial Constraints Hypothesis

The coinsurance effect of cash flows, first introduced by Lewellen (1971), suggests that a diversifying merger can reduce default risk and increase debt capacity if two merging parties have imperfect correlations among the segment cash flows. Duchin

(2010) argues that coinsurance across divisional investment opportunities also influences a firm's financial status in the presence of capital market frictions. The same reasoning applies to diversifying mergers as well. After a merger, a higher coinsurance (less correlated) across divisional investment opportunities implies that the merged firm has lower chances of seeing several simultaneous investment opportunities across business segments. This analysis suggests that coinsurance across divisional investment opportunities can relax a firm's financial constraints through a merger. Our first hypothesis is thus:

Hypothesis 1: Coinsurance across divisional investment opportunities positively influences merger outcomes for financially constrained firms.

3.2.2 The Efficient Internal Capital Market Hypothesis

Internal capital markets add value when diversified firms have limited access to external financing. Stein (1997) suggests that conglomerates' headquarters with superior information about segment investment prospects than outside investors can "pick the winner" (Stein, 2003), by shifting funds away from segments with limited opportunities to ones with better prospects. We argue that coinsurance across divisional investment opportunities between two merging parties can influence the new firm's resource allocation decisions, which can consequently impact the opportunity cost of internal funds. If a merger activity increases the degree of coinsurance across divisional investment opportunities, for a given number of investment opportunities in different industries, the merged firm is less likely to encounter those investment opportunities in more than one segment simultaneously; consequently, the firm, if financially constrained, abandons less positive NPV projects. This implies a lower opportunity cost of internal funds. Our second hypothesis is thus:

Hypothesis 2: Coinsurance across divisional investment opportunities positively influences merger outcomes for financially constrained firms with efficient internal capital markets.

3.2.3 The Agency Problem Hypothesis

According to the literature on the dark side of the internal capital market (Rajan et al., 2000; Scharfstein and Stein, 2000), diversification can be value-reducing, when the firm engages in inefficient cross-subsidization, shifting funds away from stronger segments towards weaker ones. When coinsurance across divisional investment opportunities is low (investment opportunities are more correlated), segment investment opportunities are more likely to arrive simultaneously. A firm engaging in cross-subsidization may redistribute resources from a segment with high-return projects to another with low-return ones. In this case, the firm's loss from the high-return projects is partially offset by the gains from the low-return ones. On the other hand, if coinsurance across divisional investment opportunities is high, there might be a situation where the firm may use the resources from a segment with high-return projects in support of another without any investment opportunities. In this case, the firm can lose all possible gains from the high-return projects. The analysis above indicates that the firm value can decline with the degree of coinsurance across divisional investment opportunities owing to agency problems. Therefore, if shareholders are concerned with such agency-type cross-subsidization, they will respond negatively to a diversifying merger announcement if the merger induces a higher coinsurance across divisional investment opportunities. Our third hypothesis is thus:

Hypothesis 3: Coinsurance across divisional investment opportunities can be associated with agency problems and negatively influences merger outcomes.

3.2.4 Summary of Hypotheses

The following table offers a summary of the three hypotheses.

The Impact of Coinsurance across Divisional Investment Opportunities On Mergers Outcomes		
Signs of predictions:	Less Constrained	Constrained
Financial constraints	0	+
Efficient internal capital market	0	+
Agency problems	–	–

This table describes the predictions of our hypotheses. A plus (minus) sign indicates a positive (negative) impact of coinsurance across divisional investment opportunities on merger outcomes. A zero sign suggests that there is no connection between coinsurance across divisional investment opportunities and merger outcomes.

3.3 Data and Empirical Methodology

3.3.1 Data

Multiple data sources are used to obtain information on merger activities, companies and governance levels. We identify all US mergers during the period from 1986 to 2010 from the Mergers and Acquisitions Database in Thomson One Banker. We exclude privatizations, exchange offers and repurchases, spinoffs, self-tenders, recapitalizations and LBOs. We use the Compustat Segment file to collect segment-level data, including segment assets and sales and the industry of each segment (at a 3-digit SIC level). We retrieve firm-level data from the Compustat Industrial Annual file. We use CRSP to collect data on stock. The cumulative abnormal returns, CARs, are collected from Eventus.

We apply the following screening criteria: The mergers involve US firms and are completed. The sample firms are publicly-listed with daily stock returns available in CRSP. The acquirer owns 100% of the targets' shares after the merger. We then match the merger data with the Compustat Segment file, the Compustat Industrial Annual file and the Eventus file, excluding deals with incomplete data. In order to calculate the

cross-divisional correlation in investment opportunities, we require that both the acquirer and the target have segment-level data and valid SIC industry classifications from the Compustat Segment file. Based on the literature on diversification (Berger and Ofek, 1995; Duchin, 2010), we exclude firms in the financial sector and firms with financial segments (SIC code 6000 to 6999). We require that the difference between the annual sales from the Compustat Industrial Annual file and the total segment sales in a firm from the Compustat Segment file is within 1%. We winsorize the data to reduce the impact of outliers. The matching and screening procedure yields a final sample of 1,349 mergers announced between 1986 and 2010.

3.3.2 Methodology

3.3.2.1 The Measure of Coinsurance

In line with Duchin (2010), we construct a measure to capture the degree of coinsurance in investment opportunities across various divisions. The measure quantifies the reduction in the volatility of investment opportunity owing to the imperfect correlation in divisional investment opportunities. We use Tobin's Q (book asset + market value of common equity– common equity – deferred taxes) / (0.9 × book asset + 0.1 × market value of common equity) as a proxy for investment opportunities. We use the average Tobin's Q of single-segment firms in an industry to proxy for industry-level investment opportunities which are then used as a proxy for the investment opportunities of conglomerate segments operating in the same 3-digit SIC code industry.

The firm-level inter-segment investment opportunity volatility within a diversified firm in fiscal year *t*, denoted as $\sigma(Q)_t$, is computed as follows:

$$\sigma(Q)_t = \sqrt{\sum_{i=1}^{N}\sum_{j=1}^{N} w_i w_j \rho(Q)_{i,j}\,\sigma(Q)_{i,t}\sigma(Q)_{j,t}} \qquad (1)$$

where N is the number of segments in a diversified firm.

$\sigma(Q)_{i,t}$ $(\sigma(Q)_{j,t})$ is the volatility of investment opportunities of industry *i* (industry *j)*. We use the average series over prior ten years [t-10, t-1] to calculate the rolling volatilities for year t.

$\rho(Q)_{i,j}$ is the correlation between the investment opportunities in industry i and industry j.

w_i (w_j) is the weighting of segment i (segment j) in a diversified firm, which is the ratio of the segment's assets to the total asset of the firm.

The coinsurance across segment investment opportunities, denoted as $Coinsurance\_Q_t$, is calculated as the difference between the volatility in the equation (1) and a "no-diversification" measure of volatility, assuming a correlation of one (perfect correlation) among segment investment opportunities.

$$Coinsurance\_Q_t = \sqrt{\sum_{i=1}^{N}\sum_{j=1}^{N} w_i w_j 1\, \sigma(Q)_{i,t}\, \sigma(Q)_{j,t}} - \sigma(Q)_t \qquad (2)$$

The measure captures the reduction in the volatility of investment opportunities owing to the imperfectly-correlated divisional investment opportunities. It is positive for diversified firms and zero for single-segment firms. A higher value of $Coinsurance\_Q_t$ indicates a higher level of coinsurance effect and a higher degree of diversification.

We also compute the coinsurance in cash flows. It captures the coinsurance effect stemming from the imperfect correlation among divisional cash flows. Cash flow is defined as earnings less interest and taxes.

The volatility of cash flows in a diversified firm, denoted as $\sigma(CF)_t$, in fiscal year t, is defined as follows:

$$\sigma(CF)_t = \sqrt{\sum_{i=1}^{N}\sum_{j=1}^{N} w_i w_j \rho(CF)_{i,j}\, \sigma(CF)_{i,t} \sigma(CF)_{j,t}} \qquad (3)$$

where N is the number of segments in a diversified firm.

$\sigma(CF)_{i,t}$ $(\sigma(CF)_{j,t})$ is the volatility of cash flows of industry *i* (industry *j)*. We use the average series over prior ten years [t-10, t-1] to calculate the rolling volatilities for year t.

$\rho(CF)_{i,j}$ is the correlation between the cash flows in industry i and industry j.

w_i (w_j) is the weighting of segment i (segment j) in a diversified firm, which is the ratio of the segment's assets to the total asset of the firm.

The coinsurance across segment cash flows, denoted as $Coinsurance\_CF_t$, is calculated as the difference between the volatility in the equation (3) and a "no-diversification" measure of volatility that assumes a correlation of one (perfect correlation) among cash flows in all segments.

$$Coinsurance\_CF_t = \sqrt{\sum_{i=1}^{N}\sum_{j=1}^{N} w_i w_j 1\sigma(CF)_{i,t}\sigma(CF)_{j,t}} - \sigma(CF)_t \qquad (4)$$

The variable quantifies the decrease in the cash flow volatility owing to the imperfectly-correlated divisional cash flows. It is positive for diversified firms and zero for single-segment firms. A higher value of $Coinsurance\_CF_t$ indicates a higher level of coinsurance in cash flows.

3.2.2.2 The Change in the Coinsurance after a Merger

In order to directly examine the impact of the coinsurance across divisional investment opportunities on merger outcomes, we estimate the change in the coinsurance induced by the merger. Using equation (2), we first calculate the coinsurance across divisional investment opportunities of the acquirer at the end of the fiscal year before the announcement date. The action of merging the acquirer with the target can be regarded as adding a new portfolio of assets (segments of the target) to the original portfolio (segments of the acquirer). Therefore, we can calculate a post-merger coinsurance of the merged firm, using both merging parties' data. The change in the level of coinsurance across divisional investment opportunities through the merger is thus defined as follows:

$$\Delta Coinsurance\_Q_{i,t} = Coinsurance\_Q_{i,t\text{-}1}^{A\_and\_T} - Coinsurance\_Q_{i,t\text{-}1}^{A} \qquad (5)$$

where $Coinsurance\_Q_{i,t-1}^{A\_and\_T}$ is the coinsurance across divisional investment opportunities of the merged firm using both the *acquirer* firm and the *target* firm data at year *t-1*.

$Coinsurance\_Q_{i,t-1}^{A}$ is the coinsurance across divisional investment opportunities of the acquiring firm using the *acquirer* data only at year *t-1*.

In this study, we also include a measure of the change in the coinsurance across divisional cash flows, caused by the merger, as a control variable. It is calculated in a similar way:

$$\Delta Coinsurance\_CF_{i,t} = Coinsurance\_CF_{i,t-1}^{A\_and\_T} - Coinsurance\_CF_{i,t-1}^{A} \quad (6)$$

where $Coinsurance\_CF_{i,t-1}^{A\_and\_T}$ is the coinsurance across divisional cash flows of the merged firm using both the *acquirer* firm and the *target* firm data at year *t-1*.

$Coinsurance\_CF_{i,t-1}^{A}$ is the coinsurance across divisional cash flows of the acquiring firm using the *acquirer* data only at year *t-1*.

The value of these two variables is zero, if the merger involves two single-segmented firms in the same industry (at 3-digit SIC code level). The value of these variables can be either positive or negative in other scenarios. A positive value of the change in the coinsurance value indicates a reduction in the correlation among segment investment opportunities or cash flows, caused by a merger.

3.3.2.3 Event Study and Control Variables

In line with previous literature, we conduct an event study based on Brown and Warner's (1985) methodology. We define a merger announcement as the event. The abnormal returns of the acquiring firm are evaluated, using a market model with a 220-day period ending 20 days before the event date. The abnormal returns are computed as follows:

$$AR_{it} = R_{it} - E(R_{it}) \quad (7)$$

Where AR_{it} is the abnormal return, R_{it} is an actual daily return and $E(R_{it})$ is an expected market return calculated from CRSP daily prices. The cumulative abnormal returns (*CARs*) over an event window, centered on the announcement date, are computed as the sum of the estimated abnormal returns:

$$CAR_i(\tau_1,\tau_2) = \sum_{t=\tau_1}^{\tau_2} AR_{it} \quad (8)$$

In this study, we use the event windows of 3-days (-1, +1) and 11-days (-5, +5), respectively.

We employ the following estimation to examine the impact of coinsurance across divisional investment opportunities on the cumulative abnormal returns of the acquiring firm.

$$CAR_i(\tau_1,\tau_2) = a + b_1 \Delta Coinsurance\_Q_i + \sum_{i=1}^{N} c_i X_i + \eta_j + \mu_t + \varepsilon_i \quad (9)$$

where $\Delta Coinsurance\_Q_i$ is the change in the coinsurance level induced by a merger, and X_i is a set of firm and deal characteristics at the end of the fiscal year before the merger announcement. η_j and μ_t are the industry and year fixed effects. In line with previous studies (Asquith et al., 1983; Chang, 1998; Harford, 1999; Moeller et al., 2004; Maciasa and Pirinskyb, 2015), we control a number of factors that determine the acquirers' announcement returns, including the firm size (ln(book value of asset)), market-to-book ratio, leverage (book value of / assets), cash flows (income before extraordinary items / total asset), capital expenditure (capital expenditures / total asset), R&D expenditure (research and development expenses / total asset), dividends (dividends / total asset), intangibility (intangible assets / total assets), acquirer price run-up (the cumulative stock price return of the bidder over the six months before the announcement month), prior acquisition experience (a dummy variable that equals 1 if a corporation has conducted any mergers and acquisitions within the past three years and zero otherwise), relative transaction value (deal amount to acquirer's market value of equity), method of payment, competition status and deal attitude.

We make our predictions for the relationship between the control variables and the acquirer returns. Moeller et al. (2004) reveal a stylized fact that acquisitions made by

large acquirers are valued significantly less than the ones made by small acquirers, we therefore expect that the abnormal return decreases with bidder size. Since acquirers may accumulate expertise and build skills from past transactions, the announcement return of a merger conducted by an acquirer with acquisition experience is like to be positive. According to the pecking order theory of Myers and Majluf (1984), the market interprets a merger financed by stock as signals of overpricing of the bidder's securities; we thus expect a stock-financed merger to yield lower returns than a cash-financed merger. We also expect the acquirer abnormal returns to decrease with the number of bidders for a target and the level of hostility. Based on the Q theory of Lang et al. (1989), high market-to-book ratio suggests good investment opportunities and better usage of target assets, therefore acquirers with high M/B ratio should generate high announcement returns. On the other hand, Dong et al. (2002) argues that high M/B ratio signals overvaluation of an acquirer's stock, thus a merger conducted by a high-valued acquirer should generate low returns. So the prediction regarding M/B ratio is ambiguous. Similarly, purchase of larger targets may point at managerial motives (Shleifer and Vishny, 1989) or potential for greater synergy stemming from economies of scale (Morck et al., 1990). Moeller et al. (2004) find that the coefficients on relative size are negative for big firms and positive for small firms. So the prediction regarding relative size is also ambiguous.

Table 3.1 provides descriptive statistics. Our final sample consists of 1,349 merger deals; in 635 out of 1,349 deals, the merged firm experiences a change in the degree of coinsurance, caused by the merger. In the entire sample, the mean of $\Delta Coinsurance\_Q$ is 0.0042, approximately 3 times higher than that of $\Delta Coinsurance\_CF$, which suggests that the magnitude of the changes in the coinsurance across divisional investment opportunities is significantly greater than those in the coinsurance across divisional cash flows.

3.4 Empirical Results

In this section, we introduce the empirical results. We first examine the impact of coinsurance across divisional investment opportunities on acquirers' returns and the post-merger operating performance. Next, we investigate how coinsurance across divisional investment opportunities affects the probability of a firm becoming an acquirer. We then examine the link between merger premiums and coinsurance across divisional investment opportunities. We further split the sample by financial constraints. We then examine the impact of efficiency of internal transfers. We also split the sample by levels of corporate governance. Finally, we employ the Heckman's two-stage estimation as a robustness check.

3.4.1 Acquirer Cumulative Abnormal Returns

Although acquirer returns (as compared to combined returns) do not reflect the overall valuation of a merger by shareholders, they can signal the agency motives underlying mergers (Akbulut and Matsusaka, 2010). As Morck et al. (1990) notice, if the stock market responds negatively to a merger announcement, it is not difficult to assume that the merger deal is driven by managerial objectives instead of value-maximizing decisions. Therefore, we use acquirers' returns in our analysis. In Table 3.2, we provide estimates from regressions to test the relationship between the coinsurance across divisional investment opportunities and acquirers' abnormal announcement returns. The dependent variables are the acquirers' eleven-day and three-day CARs.

We find that the coefficients on the variable $\Delta Coinsurance\_Q$ are negative and significant at higher than 1%, which suggests that a higher coinsurance across divisional investment opportunities is negatively associated with the acquirers' announcement returns. In our sample, the coinsurance across divisional investment opportunities

increases by 0.0042, on average, after mergers; it corresponds to a reduction of 0.30%[6] in the acquirers' eleven-day CARs, and 0.44% in three-day CARs. Given that the market capitalization of the average acquirer in our sample is £8.4 billion, the reduction means a drop of $25.2(37.0) million in the firm value based on the eleven-day (three-day) CARs. The coefficients on the variable *ΔCoinsurance_CF* are positive and significant, which is consistent with the cash flow coinsurance hypothesis in Lewellen (1971) that a lower correlation among segment cash flows is value-enhancing for diversified firms.

It is noteworthy that this evidence is not inconsistent with the findings reached by Duchin (2010). In his paper, a higher coinsurance across divisional investment opportunities reduces the level of cash holdings. Our findings suggest that coinsurance across divisional investment opportunities can lead to inefficiency from other perspectives of a firm's decisions (for example, resource allocation policy), not from its cash policy. Evidence in Table 3.2 supports our agency problem hypothesis, that the impact of coinsurance across divisional investment opportunities is value-reducing in diversifying mergers.

The estimated coefficients on control variables are consistent with those reported in earlier studies (e.g., Moeller et al., 2004; Dong et al., 2006; Wang and Xie, 2009). Specifically, we observe that mergers financed with cash produce higher announcement returns, whereas mergers conducted by large acquirers and financed with stock produce lower announcement returns.

3.4.2 Changes in Operating Performance

We have provided evidence that shareholders respond negatively to an increase in the coinsurance across divisional investment opportunities after a merger, which is

[6] 30 basis points=(–0.713*0.0042);44 basis points=(–1.050*0.0042)

consistent with the agency hypothesis. We now examine how coinsurance across divisional investment opportunities affects the changes in operating performance over pre-merger and post-merger periods of the combined firm.

In line with Wang and Xie (2008), we use return on assets (ROA), computed as the operating incomes divided by total assets, as a measure of operating performance. According the literature on corporate takeover, acquirers usually experience a period of high operating performance before a merger activity (Morck et al., 1990). However, the acquirers' superior performance gradually declines following merger announcements as a result of mean reversion in performance (Lie 2005). Barber and Lyon (1996) argue that performance comparison can be misleading without controlling for abnormal pre-merger performance of sample firms. Therefore, to ensure that the change in operating performance is caused by a merger alone, we match each acquirer and each target in our sample with a non-merging control firm to filter out the effects of industry trend and mean reversion.

We employ two methodologies to construct control samples. First, following Bena and Li (2013), we choose control firms based on industry, size, and book-to-market (B/M) ratios. This approach is similar to that of Barber and Lyon (1996). Specifically, for each acquirer and each target in our sample, we select their matching firms from other firms in the same 3-digit SIC industry. We require that the matching firms were not involved in any mergers or acquisitions over the past three years before the transaction date. From the resulting pool of firms, we choose the firms whose size and B/M ratio in year *t-1* are the closest to that of our sample firms.

Secondly, we form the control sample based on a propensity score matching approach (Rosenbaum and Rubin, 1983). This methodology enables us to select control firms that were not involved in mergers or acquisitions, but are very comparable to the acquirers or targets in our sample. We first run a probit-model to predict the

probabilities of firms becoming acquirers, using both acquiring firms and non-merging firms for each fiscal year over the sample period. We present the regression estimates in Table 3.3 Panel A. The dependent variable is an indicator variable equal to 1 for an acquiring firm and zero otherwise. In line with previous studies (Asquith et al., 1983; Harford, 1999; Huang et al., 2014), we incorporate variables controlling the determinants of merger likelihood, including size, market-to-book ratio, leverage, non-cash working capital (net working capital excluding cash / asset), cash holdings (cash and cash equivalent holdings / assets), sales' growth (prior 3-year average sales' growth), prior acquisition experience, average abnormal stock returns (market adjusted abnormal return over the past year), and P/E ratio (stock price over EPS).

In Table 3.3 Panel B, we run a probit-model for the probabilities of a firm becoming a target for each fiscal year. The dependent variable is an indicator variable which takes the value of 1 for target firms and zero otherwise. We control a number of firm and deal features that have been used by researchers as the determinants of the probability of being acquired (Palepu, 1986; Cremers et al., 2009; Edmans et al., 2012; Macias and Pirinsky, 2015). The variables include size, market-to-book ratio, leverage, cash holdings, ROA, intangibility, R&D expenses, market share (a firm's sales to the total sales reported by firms in the same SIC 3-digit industry), sales' growth, potential target availability (number of firms in the industry), average abnormal stock returns, firm age (number of years since premier appearance in Compustat) and HHISIC3 (the Herfindahl index of the sales reported by all firms in the 3-digit SIC industry). As the propensity score matching methodology involves more variables, we lose some observations due to missing data and the sample size decreases to 1,190.

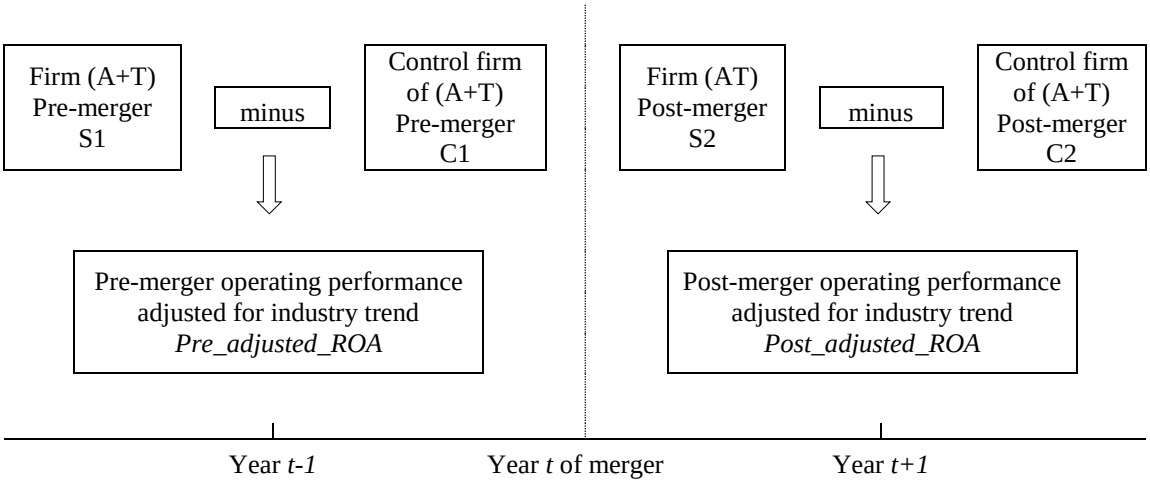
The propensity scores indicate how closely a non-merging firm can be matched to the sample firm, given the set of observed characteristics. We require that the control firm was not involved in any mergers or acquisitions over the past three years before the

transaction date. Each sample firm is then matched to the control firm with the closest propensity score of becoming an acquirer (or a target) to the sample firms.

Next, we calculate the changes in the operating performance of the merged firm from the pre-merger fiscal year *t-1* to the post-merger year *t+1*. Figure 1 describes the calculation process.

Figure 3.1

Methodology to Measure the Change in Operating Performance



In year *t-1*, the weighted average ROA of the acquirer and the target "A+T" (S1), minus the weighted average ROA of the control firms (C1), with the weights being the book value of assets for the two merging parties, is defined as the pre-merger operating performance adjusted for industry trend, *Pre_adjusted_ROA*.

In year *t+1*, the ROA of the merged firm "AT" (S2), minus the weighted average ROA of the control firms (C2), with the same weighting scheme as in year *t-1*, is defined as the post-merger operating performance adjusted for industry trend, *Post_adjusted_ROA*.

The changes in the operating performance of the merged firm, denoted as *ΔAdjusted_ROA*, are defined as the difference between *Pre_adjusted_ROA* and *Post_adjusted_ROA*.

We then estimate the regression of the *change* in the operating performance of the merged firm on the *change* in the coinsurance across divisional investment opportunities after a merger and other control variables as those in Table 3.2. A number of factors affecting abnormal returns are also found be determinants of post-merger performance. For example, since takeover activities conducted by highly leveraged firms are more closely scrutinized, value-reducing mergers are less likely to be approved ex-ante. Mergers of larger targets relative to the acquirers can be associated with both empire building (Shleifer and Vishny, 1989) and value-maximizing motives (Morck et al., 1998). Moreover, post-merger integration is harder to achieve for larger targets. As such, the impact of relative size on post-merger operating performance is unclear. Mergers financed by cash are more likely to result in better operating performance than the ones financed by equity (Moeller and Schlingemann, 2004; Ghosh, 2001). Costly hostile bids can be a signal potential for high synergy, and hence hostile takeovers may bring about performance improvement (Burkart and Panunzi, 2006).

Table 3.4 presents the regression results. We demonstrate that the coefficients on *ΔCoinsurance_Q* are negative and significant; using different matching schemes, suggesting that the impact of coinsurance across divisional investment opportunities is negatively associated with the post-merger operating performance. The results are also economically meaningful; they indicate that a rise in the coinsurance across divisional investment opportunities, induced by an average merger, reduces return-on-assets ratios by 1.53% (1.26%)[7]. The findings corroborate evidence in Table 3.2, thus supporting our agency problem hypothesis that coinsurance across divisional investment opportunities is value-reducing.

[7] 1.53%=3.634*0.0042; 1.26%=2.995*0.0042

3.4.3 The Probability of Becoming an Acquirer

Evidence so far is consistent with the agency problem hypothesis that the coinsurance across divisional investment opportunities is associated with agency problems and thus reduces firm value. Therefore, it is conceivable that a poorly-governed firm is more likely to make merger decisions when it can anticipate a higher coinsurance across divisional investment opportunities after the merger. We test the conjecture in this section. Specifically, we investigate whether the impact of the coinsurance across segment investment opportunities on firms' merger likelihood is stronger in poorly-governed firms. We construct two proxies for corporate governance:

(i) The presence of blockholders (e.g., Cremers and Nair, 2005). Blockholders are defined as shareholders who own at least 5% of a company's common stocks. Shleifer and Vishny (1986) argue that blockholders with substantial stakes and voting control rights have the incentives to monitor and pressure the management and hence improve corporate governance.

(ii) The Gompers, Ishii and Metrick's (2003) G-index. The G-index counts the number of charter provisions that restricts shareholder rights and strengthen takeover defenses. A higher G-index suggests greater managerial power and hence is associated with more agency costs. Therefore, a high G-index corresponds to poor corporate governance. We collect the G-index data from the "Investor Responsibility Research Centre" (IRRC) database. As the data is available for a subset of the firms in Compustat for every two years from 1990 to 2006, the size of the sample based on G-index is smaller than the one based on blockholders.

A firm is classified as poorly-governed, if it has a G-index =>7,[8] or if it does not have any blockholder. We construct a dummy variable, *Bad_Governance*, which takes the value of 1 if the firm is poorly-governed, and zero otherwise.

[8] These are the firms with more restrictions on shareholder rights.

We include the dummy variable *Bad_Governance* in the probit regression as in Table 3.3 Panel A. The dependent variable is a dummy variable which takes the value of 1 for acquiring firms, and zero for the control firms. For each acquiring firm, we select up to five control firms in the fiscal year preceding the announcement date. We first collect all non-merging firms operating in the same three-digit SIC industry as the acquirer. We also match control firms with the acquiring firms by the same governance level. We then choose the firms whose size and B/M ratios in year *t-1* are closest to those of the acquiring firms. We also require that the control firms were not involved in any mergers or acquisitions over the past three years before the announcement date. We then split the entire sample into three sub-samples, based on whether the merged firm will experience an increase, no-change or a decrease in the coinsurance across divisional investment opportunities after the merger.

Table 3.5 presents the estimated coefficients of the probit regression. We find that the coefficients on *Bad_Governance* are positive and significant only in the "Δ*Coinsurance_Q*>0' sub-samples. The coefficients are insignificant in the other two sub-samples. This suggests that poorly-governed firms have a higher tendency to make merger decisions, if the merger can leads to an increase in the coinsurance across divisional investment opportunities. In other words, the higher the coinsurance across divisional investment opportunities, the more likely that a poorly-governed firm engages in a merger. It strongly indicates that the coinsurance across divisional investment opportunities is related to agency motives.

3.4.4 Merger Premiums

If the impact of coinsurance across divisional investment opportunities is negatively associated with merger outcomes owing to agency problems, the shareholders of target firms might be concerned over such agency-type inefficiency. Therefore, we conjecture that acquiring firms are required to pay higher merger premiums, in response to a rise in

the coinsurance across divisional investment opportunities induced by the merger. In Table 3.6, we estimate the regression of coinsurance across divisional investment opportunities on merger premiums. The dependent variable in column 1 (2) is 1 subtracted from the ratio of the final offer price to the targets' stock price one day (one week) before the announcement date. In line with previous literature (e.g., Betton et al., 2008; Bargeron et al., 2008; Huang et al., 2014), we control acquirer and target characteristics, including size, market-to-book ratio, leverage, non-cash working capital, run-up, Amihud (2002) liquidity measure (ln[1+ average daily ratio of absolute return to firms' dollar trading volume over the fiscal year]), and sales' growth. We also include a number of deal features: the relative transaction value and dummy variables for stock offers, cash offers, competing offers, hostile deals and tender offers.

In Table 3.6, we find that coefficients on the variable $\Delta Coinsurance\_Q$ are positive and significant at higher than 5%. The change in coinsurance across divisional investment opportunities on average increases the one-day (one-week) premium by 0.57% (0.65%), which corresponds to an extra $6.1 (6.9) million cost based on the mean deal value of $1.07 billion. It suggests that shareholders are concerned over the increase in coinsurance across divisional investment opportunities after a merger, which is consistent with our agency problem hypothesis that coinsurance across segment investment opportunities is value-reducing. The coefficients on the other control variables are, generally, qualitatively consistent with previous studies (Schwert, 2000; Officer, 2003; Moeller et al., 2004; Masulis et al., 2007; Betton et al., 2008). Specifically, merger premiums are higher in competing offers, hostile offers and tender offers.

3.4.5 Financial Constraints

In this section, we test the financial constraint hypothesis. We construct two measurements of financial constraints as follows:

(i) *Payout ratio*: According to Fazzari et al. (1988), a firm paying high dividends is more likely to obtain access to internal financing, and is therefore less constrained. Thus we use the payout ratio as our first measure of financial constraints. We define payout ratio as the ratio of total dividends plus stock repurchases to book assets. A firm is classified as financially constrained (less-constrained) if the firm has a payout ratio smaller (bigger or equal) the mean of the sample distribution.

(ii) *SA index*: We use the Hadlock and Pierce (2010) size and age index as our second measure of financial constraints (Hann et al., 2013; Chi and Su, 2016). Size and age are found closely and negatively related to financial constraints. We first calculate the firm-year SA index. A higher SA index value indicates that the firm is more financially constrained. We then classify a firm as financially constrained (less-constrained) if the firm has an above (equal to or below) median SA index in the sample distribution.

We then define a dummy variable, *Constrained*, which equals 1 for financially constrained firms, and zero otherwise. We then construct an interaction term, *ΔCoinsurance_Q* × *Constrained*, to examine whether coinsurance across divisional investment opportunities affects the merger outcomes of financially constrained and less-constrained firms differently. Table 3.7 presents the coefficient estimates from the regressions of the acquirers' eleven-day and three-day cumulative abnormal returns on coinsurance across divisional investment opportunities. The coefficients on the variable *ΔCoinsurance_Q* remain negative and significant. However, the coefficients on *ΔCoinsurance_Q* × *Constrained* are not significant and are much smaller than the ones on *ΔCoinsurance_Q*. For example, based on Column 1, for a financially constrained acquirer, coinsurance across divisional investment opportunities corresponds to a reduction of 0.65% (0.0042 × [(–1.387) + (–0.166)]) in the firm's eleven days CARs. For a less-constrained acquirer, coinsurance across divisional investment opportunities

corresponds to a reduction of 0.58% in the eleven days CARs. Since the coefficient on the interaction term *ΔCoinsurance_Q* × *Constrained* only has a p-value of 0.60, it means that the estimated drops are not significantly different from each other. Overall, evidence suggests that coinsurance across divisional investment opportunities does not affect financially constrained or less-constrained firms differently, and the negative effect of coinsurance across segment investment opportunities prevails in both financially constrained and less-constrained firms.

Table 3.8 provides the results from the regressions of the post-merger operating performance. The results are consistent when using both measures of financial constraints, employing industry, size and B/M ratio matching or the propensity score matching methodology. The coefficients on *ΔCoinsurance_Q* are significantly negative across samples, while the coefficients on *ΔCoinsurance_Q* × *Constrained* are smaller than the ones on *ΔCoinsurance_Q* and not significant, which indicates that the effect of coinsurance across divisional investment opportunities on the post-merger operating performance is negative, regardless of the firms' financial status, which supports the agency problem hypothesis.

3.4.6 Efficiency of Internal Transfers

In this section, we test the efficient internal capital hypothesis. Specifically, we examine if coinsurance across divisional investment opportunities influences merger outcomes differently between acquirers with an efficient internal capital market and the ones without an efficient internal capital market.

First, we compute the cross-divisional transfers within a firm:

$$\frac{I_j}{Asset_j} - \frac{I_j^{ss}}{Asset_j^{ss}} - \sum_{j=1}^{N} w_j \left(\frac{I_j}{Asset_j} - \frac{I_j^{ss}}{Asset_j^{ss}} \right) \tag{5}$$

where j is segment j, ss represents single-segment firms, I_j is capital expenditure, $Asset_j$ is the segment j's asset, w_j is segment j's asset divided by firm total asset, and $\frac{I_j^{ss}}{Asset_j^{ss}}$ is the asset-weighted average capital expenditure-to-asset ratio using only single-segment firms in segment j. Next, we compute the efficiency of internal transfers. The measure is developed by Rajan et al. (2000) and is computed as follows:

$$\frac{\sum_{j=1}^{N} Asset_j (q_j - \bar{q}) \left(\frac{I_j}{Asset_j} - \frac{I_j^{ss}}{Asset_j^{ss}} - \sum_{j=1}^{N} w_j \left(\frac{I_j}{Asset_j} - \frac{I_j^{ss}}{Asset_j^{ss}} \right) \right)}{TotalAsset} \quad (6)$$

where $\bar{q}$ is the asset-weighted average of segment Tobin's Q, q_j is the asset-weighted Tobin's Q ratio using only single-segment firms in segment j. Rajan et al. (2000) refer to this variable as "relative *value added by allocation*". It can be interpreted as the overall value created by the inter-segment transfers made by a diversified firm. A higher value of the measure suggests greater efficiency of internal transfers. It can be either positive or negative for diversified firms. It is zero for single-segment firms.

We then construct an interaction term, *ΔCoinsurance_Q × Efficiency of Internal Transfers*, to examine whether coinsurance across divisional investment opportunities affects the announcement returns and operating performance differently for acquirers with varying levels of internal efficiency. If coinsurance across divisional investment opportunities creates value through an efficient internal capital market, the coefficient on the interaction term *ΔCoinsurance_Q × Efficiency of Internal Transfers* should be positive.

Table 3.9 presents the results from the regressions of the acquirers' eleven-day and three-day cumulative abnormal returns. Based on the eleven-day CARs, we find that the coefficient on the variable *ΔCoinsurance_Q* is negative and significant, while the coefficients on the interaction term *ΔCoinsurance_Q × Efficiency of Internal Transfers* is not significant. Based on the three-day CARs, the coefficient on *ΔCoinsurance_Q* is

significantly negative; moreover, the coefficient on *ΔCoinsurance_Q* × *Efficiency of Internal Transfers* is positive with p-value equal to 0.06. It suggests that as the efficiency of internal allocation improves, investors may perceive coinsurance across divisional investment opportunities as value-enhancing through the internal capital market. However, the positive impact of internal capital market does not totally offset the dark side the agency problems, the overall effect of coinsurance across divisional investment opportunities is still negative.

Table 3.10 provides the results from the regressions on the post-merger operating performance. The results are consistent when we employ the industry, size and B/M ratio matching or the propensity score matching methodology. The coefficients on *ΔCoinsurance_Q* are significantly negative across samples, but the coefficients on *ΔCoinsurance_Q* × *Efficiency of Internal Transfers* are not significant. This indicates that the efficiency of the internal capital market in an acquiring firm does not positively affect the relationship between the investment-opportunity coinsurance and operating performance. Taken together, we do not find strong evidence that supports the efficient internal capital market hypothesis. We still find that agency problem hypothesis dominates the other two hypotheses in explaining how coinsurance across divisional investment opportunities can influence merger outcomes.

3.4.7 Corporate Governance

We have provided evidence that the impact of coinsurance across divisional investment opportunities is negatively associated with the firm value. In this section, we investigate the influence of corporate governance. It is reasonable to expect that the negative impact of coinsurance across divisional investment opportunities is mitigated in well-governed firms.

We use G-index and the presence of blockholders to proxy for the level of corporate governance. A firm is classified as a well-governed firm, if its G-index is

smaller than 7, or if it has at least one blockholder. We then divide the sample into two sub-samples, depending on whether the firm is well-governed or poorly-governed.

Table 3.11A and 3.11B[9] present the estimated coefficients from the regression of the acquirers' cumulative abnormal returns on coinsurance across divisional investment opportunities. We find that the coefficients on *ΔCoinsurance_Q* are only negative and significant within the "Bad Governance" sub-samples. For example, in column 1 of Table 3.11A, the higher coinsurance across divisional investment opportunities after a merger, on average, cuts the acquirer's eleven-day CARs by 2.5% (–6.055*0.0042), corresponding to a $214 million drop in the market value for an average acquirer in our sample. It suggests that poorly-governed firms suffer great losses as investors are concerned over the agency problems underlying the coinsurance across divisional investment opportunities. In firms with better corporate governance, coinsurance does not affect the firm value.

Table 3.12A and 3.12B presents the results from the regressions of the post-merger operating performance on coinsurance across divisional investment opportunities. The coefficients on the variable *ΔCoinsurance_Q* are only negative and significant in the "Bad Governance" sub-samples, which suggest that the negative impact of coinsurance across divisional investment opportunities is associated with agency problems. The coefficients on *ΔCoinsurance_Q* are not significant in "Good Governance" sub-samples, which indicates that coinsurance across divisional investment opportunities does not reduce value in well-governed firms. Collectively, the results support our agency problem hypothesis.

[9] The IRRC data are only available for a relative small number of firms, so the size of our sample, based on G-index, decreases to 358.

3.5 About Endogeneity

As argued by Li and Prabhala (2007), firms do not randomly make strategic decisions. In this study, our sample is based on actual completed merger deals. To mitigate the potential endogeneity concern that a firm may self-choose to make merger decisions, we exploit the Heckman's (1979) two-stage model. In the first stage, we run a probit-model to predict the merger likelihood. The specification is the same as in Table 3.3 Panel A. We calculate the Inverse Mills ratio, denoted as *Lambda*, based on the probit-model. In the second stage, we include the Inverse Mills ratio as an additional variable in our regressions of the firms' announcement returns and operating performance.

Tables 3.13 and 3.14 present the estimated coefficients of the second stage regressions of the Heckman's two-stage estimation. We continue to find that the coefficients on *ΔCoinsurance_Q* are negative and significant across the samples, which suggest that the coinsurance across divisional investment opportunities reduces announcement returns and post-merger operating performance. Evidence is consistent with the findings in Table 3.2 and Table 3.4, which further supports the agency problem hypothesis after controlling the potential endogeneity problems.

3.6 Conclusion

In this chapter, we examine the impact of the coinsurance across divisional investment opportunities on corporate mergers. We develop three hypotheses, based on financial constraints, the efficient internal capital market and the agency problems. We find that the effect of coinsurance across divisional investment opportunities is negatively associated with abnormal announcement returns and post-merger operating performance. A poorly-governed firm is more likely to engage in a merger, when it can expect a higher coinsurance across divisional investment opportunities after the merger. We demonstrate that the coinsurance across divisional investment opportunities is

value-reducing in both financially constrained and less-constrained firms. We do not find evidence suggesting that coinsurance across divisional investment opportunities can create value through the efficient internal capital market. The negative effect of coinsurance across divisional investment opportunities is mitigated when firms have better corporate governance. We find similar results when we employ the Heckman's two-stage model to address endogeneity concerns. Our results are consistent with the interpretation that coinsurance across divisional investment opportunities is negatively associated with merger outcomes. The findings support our agency hypothesis, and we disclose a specific channel through which corporate diversification has a negative value consequence.

Table 3.1 Summary Statistics

This table provides the summary statistics. The sample consists of 1,349 completed US mergers between 1986 and 2010. *CARs (-1, +1)* and *CARs (-5, +5)* are the three-day and eleven-day cumulative abnormal returns centered on the announcement date respectively. *PREM1D* is the ratio of the final offer price to the target stock price one day prior to the original announcement date minus one. *PREM1W* is the ratio of the final offer price to the target stock price one week prior to the original announcement date minus one. *Coinsurance_Q* is coinsurance across divisional investment opportunities. It is computed as the difference between the volatility of segment-level investment opportunities in a conglomerate and the volatility that assumes a correlation of 1 between all segment-level investment opportunities in the conglomerate. Segment-level investment opportunities is the average Tobin's Q of single-segment firms in a 3-digit SIC code industry over a prior 10-year period (see text for more details). *Coinsurance_CF* is coinsurance across divisional cash flows. It is computed as the difference between the volatility of segment-level cash flows in a conglomerate and the volatility that assumes a correlation of 1 between all segment-level cash flows in the conglomerate. Segment-level cash flows is the average cash flows of single-segment firms in a 3-digit SIC code industry over a prior 10-year period (see text for more details). *ΔCoinsurance_Q* is the change in coinsurance across divisional investment opportunities induced by a merger. *ΔCoinsurance_CF* is the change in coinsurance across divisional cash flows induced by a merger. *Asset* is log of total assets. *Market-to-book* is market value of the firm (total asset – book value of equity + market value of equity) divided by total asset. *Leverage* is the ratio of debt to total assets. *Cash Flow* is income before extraordinary items divided by total asset. *Capital expenditure is* capital expenditures divided by total asset. *R&D expenditure* is research and development expenses divided by total asset. *Dividends* is the ratio of dividends to total asset. *Intangibility* is intangible assets divided by total assets. *Run-up* is the cumulative stock price return of the bidder over the six months before the announcement month. *Cash holdings* is the ratio of cash plus marketable securities to total asset. *Noncash Working Capital* is net working capital excluding cash and cash equivalents divided by total assets. *Relative transaction value* is ratio of deal value to acquirer market value of equity. The following dummy variables take the value of one - if the deals are financed 100% in cash (*Cash deal*); if the deals are financed 100% in stock (*Stock deal*); if a deal has more than one bidders (*Competing offer*); if the deal attitude is unfriendly (*Hostile*). All firm characteristics are measured at the fiscal year-end prior to the merger announcement date.

Variable	N	Mean	Median	25th Percentile	75th Percentile	Std. Dev.
CARs (-1,+1)	1,349	-0.0128	-0.0101	-0.0723	0.0450	0.1102
CARs (-5,+5)	1,349	-0.0117	-0.0091	-0.0514	0.0246	0.0797
PREM1D	1,237	0.3651	0.2800	0.1300	0.5000	0.4642
PREM1W	1,235	0.4168	0.3400	0.1700	0.5800	0.4515
ΔCoinsurance_Q	1,349	0.0042	0.0000	0.0000	0.0024	0.0132
ΔCoinsurance_CF	1,349	0.0011	0.0000	0.0000	0.0005	0.0031
Acquirer assets	1,349	20.5860	20.5581	19.2279	15.5569	26.3424
Acquirer market-to-book	1,349	2.4709	1.8097	1.3129	0.3541	13.4288
Acquirer leverage	1,349	0.1808	0.1511	0.0232	0.0000	0.7311
Acquirer cash flow	1,349	0.0287	0.0524	0.0159	-0.6806	0.4333
Acquirer capital expenditure	1,349	0.0678	0.0480	0.0265	0.0000	0.8850
Acquirer R&D expenditure	1,349	0.0517	0.0115	0.0000	0.0000	0.4427
Acquirer dividends	1,349	0.0119	0.0000	0.0000	0.0000	0.1151
Acquirer intangibility	1,349	0.1199	0.0364	0.0000	0.0000	0.8567
Acquirer run-up	1,349	0.1393	0.1127	-0.0375	-1.7362	3.3126
Acquirer cash holdings	1,349	0.1825	0.0976	0.0247	0.0000	0.9243
Acquirer noncash working capital	1,349	0.0735	0.0577	-0.0231	-0.5540	0.6390
Relative transaction value	1,349	0.2969	0.1500	0.0486	0.0002	2.0422
Cash deal	1,349	0.2706	0.0000	0.0000	0.0000	1.0000
Stock deal	1,349	0.3996	0.0000	0.0000	0.0000	1.0000
Competing offer	1,349	0.0586	0.0000	0.0000	0.0000	1.0000
Hostile	1,349	0.0133	0.0000	0.0000	0.0000	1.0000

Table 3.2 Regressions Analysis of Acquirer Returns

This table reports coefficient estimates of the regression to test the relationship between coinsurance across divisional investment opportunities and acquirers' abnormal announcement returns. The dependent variables are the eleven-day (-5, +5) and three-day (-1, +1) cumulative abnormal returns centered on the announcement date. *ΔCoinsurance_Q* is the change in coinsurance across divisional investment opportunities induced by a merger. *ΔCoinsurance_CF* is the change in coinsurance across divisional cash flows induced by a merger (see text for more details). *Asset* is log of total assets. *Market-to-book* is market value of the firm (total asset – book value of equity + market value of equity) divided by total asset. *Leverage* is the ratio of debt to total assets. *Cash Flow* is income before extraordinary items divided by total asset. *Capital expenditure is* capital expenditures divided by total asset. *R&D expenditure* is research and development expenses divided by total asset. *Dividends* is the ratio of dividends to total asset. *Intangibility* is intangible assets divided by total assets. *Run-up* is the cumulative stock price return of the bidder over the six months before the announcement month. *Relative transaction value* is ratio of deal value to acquirer market value of equity. The following dummy variables take the value of one - if a firm makes any mergers within the past three years (*Prior acquisition experience*) before deal announcement; if the deals are financed 100% in cash (*Cash deal*); if the deals are financed 100% in stock (*Stock deal*); if a deal has more than one bidders (*Competing offer*); if the deal attitude is unfriendly (*Hostile*). All firm characteristics are measured at the fiscal year-end prior to the merger announcement date. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	CAR	
	(-5,+5)	(-1,+1)
Intercept	0.116	0.064
	(0.24)	(0.49)
ΔCoinsurance_Q	-0.713***	-1.050***
	(0.01)	(0.01)
ΔCoinsurance_CF	2.236***	2.220***
	(0.01)	(0.01)
Acquirer assets	-0.006***	-0.005***
	(0.01)	(0.01)
Acquirer market-to-book	-0.003**	-0.010***
	(0.04)	(0.01)
Acquirer leverage	0.015	0.009
	(0.39)	(0.60)
Acquirer cash flow	-0.014	-0.028
	(0.48)	(0.15)
Acquirer capital expenditure	0.021	0.019
	(0.61)	(0.62)
Acquirer R&D expenditure	-0.016	-0.066
	(0.71)	(0.12)
Acquirer dividends	0.055	0.148
	(0.68)	(0.25)
Acquirer intangibility	-0.022	-0.008
	(0.22)	(0.65)
Acquirer run-up	-0.021***	-0.014**
	(0.01)	(0.04)
Relative transaction value	-0.017***	-0.027***
	(0.01)	(0.01)
Acquirer prior acquisition experience	-0.001	0.002
	(0.87)	(0.74)
Cash deal	0.013**	0.015**
	(0.05)	(0.02)
Stock deal	-0.015**	-0.020***
	(0.02)	(0.01)
Competing offer	-0.016	-0.012
	(0.15)	(0.25)
Hostile	-0.018	0.005
	(0.42)	(0.81)
Year & Industry Fixed Effects	Yes	Yes
Observations	1,349	1,349
Adjusted R^2	0.04	0.09

Table 3.3 Probability of Being an Acquirer or a Target

Panel A reports the coefficient estimates from logit regressions on the probability of being an acquirer. Panel B reports the coefficient estimates from logit regressions on the probability of being a target *Asset* is log of total assets. *Market-to-book* is market value of the firm (total asset – book value of equity + market value of equity) over total asset. *Leverage* is the ratio of debt to total assets. *Cash holdings* is cash and cash equivalent holdings over total assets. *Noncash Working Capital* is net working capital excluding cash and cash equivalents over total assets. *Sales Growth* is the average of $(Sales_t\_Sales_{t-1})/ Sales_{t-1}$ within past three years prior to the merger. *Avg. Abnormal Return* is average daily market-model abnormal return over $year_{t-1}$.The market model parameters are estimated using the daily returns from $year_{t-2}$. *Price-to-Earnings* is the stock price over earnings per share at the beginning of each fiscal year. *R&D expenses* is research and development expenses to asset. *Asset Turnover* is sales to asset. *Intangibility* is intangible assets to total assets. *ROA* is EBIT to the book value of total asset. *Market share* is a firm's sales to the total sales in the same SIC 3-digit industry. *HHISIC3* is Herfindahl index of all firms' sales within the firm's primary three-digit SIC. *Firm Age* is the number of years since the firm's first report in Compustat. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

Panel A: Probability of Becoming an Acquirer

	P [becoming an acquirer]	
	Coef.	Pr > ChiSq
Intercept	-4.499***	(0.01)
Acquirer assets	0.133***	(0.01)
Acquirer Market-to-Book	0.088***	(0.01)
Acquirer leverage	-0.402***	(0.01)
Acquirer cash holdings	0.133***	(0.01)
Acquirer noncash working capital	0.270***	(0.01)
Acquirer sales growth	0.108***	(0.01)
Acquirer avg. abnormal returns	0.615***	(0.01)
Acquirer Price-to-Earnings	7.647***	(0.01)
Year & Industry Fixed Effects	Yes	
No. of Observations	128,420	
Pseudo R2	0.16	

Panel B: Probability of Becoming a Target

	P [becoming a target]	
	Coef.	Pr > ChiSq
Intercept	-2.365***	(0.01)
Target assets	0.003	(0.56)
Target Market-to-Book	-0.047***	(0.01)
Target leverage	1.008***	(0.01)
Target cash holdings	0.108**	(0.04)
Target R&D expenses	0.126***	(0.01)
Target asset turnover	0.055***	(0.01)
Target intangibility	0.009	(0.89)
Target ROA	0.050***	(0.01)
Target market share	-0.558***	(0.01)
Target sales growth	0.015	(0.23)
Target avg. abnormal returns	-1.431	(0.23)
Number of firms in industry	0.000***	(0.01)
HHISIC3	-0.064	(0.45)
Target firm age	-0.001	(0.29)
Year & Industry Fixed Effects	Yes	
No. of Observations	123,671	
Pseudo R2	0.04	

Table 3.4 Changes in Operating Performance

This table reports the coefficient estimates from the regression to test the relationship between post-merger operating performances and coinsurance across divisional investment opportunities. In specification (1), sample firms are matched with control firms based on industry, size, and B/M ratio. In specification (2), sample firms are matched with control firms using a propensity score matching approach (see text for more details). The dependent variable, ΔAdjusted_ROA, is the change in the merged firm's performance adjusted ROA from the fiscal year prior to the merger announcement to the fiscal year subsequent to the merger announcement. ROA is the ratio of operating incomes to the book value of total asset. The merged firm's performance adjusted ROA is its ROA minus the control firm's ROA (see text for more details). *ΔCoinsurance_Q* is the change in coinsurance across divisional investment opportunities induced by a merger. *ΔCoinsurance_CF* is the change in coinsurance across divisional cash flows induced by a merger (see text for more details). *Asset* is log of total assets. *Market-to-book* is market value of the firm (total asset – book value of equity + market value of equity) divided by total asset. *Leverage* is the ratio of debt to total assets. *Cash Flow* is income before extraordinary items divided by total asset. *Capital expenditure is* capital expenditures divided by total asset. *R&D expenditure* is research and development expenses divided by total asset. *Dividends* is the ratio of dividends to total asset. *Intangibility* is intangible assets divided by total assets. *Run-up* is the cumulative stock price return of the bidder over the six months before the announcement month. *Relative transaction value* is ratio of deal value to acquirer market value of equity. The following dummy variables take the value of one - if a firm makes any mergers within the past three years (*Prior acquisition experience*) before deal announcement; if the deals are financed 100% in cash (*Cash deal*); if the deals are financed 100% in stock (*Stock deal*); if a deal has more than one bidders (*Competing offer*); if the deal attitude is unfriendly (*Hostile*). All firm characteristics are measured at the fiscal year-end prior to the merger announcement date. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The p-value is reported in the parentheses. The sample period is between 1986 and 2010. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	ΔAdjusted_ROA			
	Industry-,Size-,B/M Matching (1)		Propensity Score Matching (2)	
	Coef.	p-value	Coef.	p-value
Intercept	-0.710***	(0.01)	-0.040	(0.79)
ΔCoinsurance_Q	-3.634***	(0.01)	-2.995**	(0.03)
ΔCoinsurance_CF	4.211**	(0.02)	9.423***	(0.01)
Acquirer assets	0.001	(0.87)	0.009	(0.11)
Acquirer market-to-book	-0.012***	(0.01)	0.003	(0.19)
Acquirer leverage	-0.063	(0.16)	0.016	(0.48)
Acquirer cash flow	-0.007	(0.86)	0.032	(0.17)
Acquirer capital expenditure	0.057	(0.44)	-0.046	(0.39)
Acquirer R&D expenditure	0.291***	(0.01)	-0.122**	(0.03)
Acquirer dividends	0.244	(0.11)	-0.072	(0.27)
Acquirer intangibility	-0.020	(0.54)	0.023	(0.31)
Acquirer run-up	0.015	(0.44)	0.035	(0.04)
Relative transaction value	-0.035***	(0.01)	0.025***	(0.01)
Acquirer prior acquisition experience	0.001	(0.90)	-0.006	(0.40)
Cash deal	0.004	(0.78)	-0.006	(0.52)
Stock deal	-0.013	(0.25)	-0.002	(0.82)
Competing offer	0.012	(0.57)	-0.009	(0.51)
Hostile	-0.027	(0.51)	0.022	(0.40)
Year & Industry Fixed Effects	Yes		Yes	
Observations	1,349		1,190	
Adjusted R^2	0.08		0.07	

Table 3.5 The Probability of Becoming an Acquirer

This table examines whether a poorly-governed firm is more likely to engage in a merger if the firm can expect an increase in the coinsurance across divisional investment opportunities after the merger. The dependent variable takes the value of 1 for the acquiring firms and zero for the control firms. We split the entire sample into three subgroups based on whether the acquirer can expect an increase, no-change or a decrease in coinsurance across divisional investment opportunities after a merger. *ΔCoinsurance_Q* is the change in coinsurance across divisional investment opportunities induced by a merger. *ΔCoinsurance_CF* is the change in coinsurance across divisional cash flows induced by a merger (see text for more details). *Bad_governance* is a dummy variable that takes the value of 1 for poorly-governed firms, and zero otherwise. We use two measures of corporate governance: the presence of *Blockholders* and the *G-index* proposed by Gompers et al. (2003). A firm is classified as poorly-governed, if it has a G-index =>7, or if it does not have any blockholder. *Asset* is log of total assets. *Market-to-book* is market value of the firm (total asset – book value of equity + market value of equity) over total asset. *Leverage* is the ratio of debt to total assets. *Cash holdings* is cash and cash equivalent holdings over total assets. *Noncash Working Capital* is net working capital excluding cash and cash equivalents divided by total assets. *Sales Growth* is the average of $(Sales_t\_Sales_{t-1})/ Sales_{t-1}$ within past three years prior to the merger. *Avg. Abnormal Return* is average daily market-model abnormal return over $year_{t-1}$.The market model parameters are estimated using the daily returns from $year_{t-2}$. *Price-to-Earnings* is the stock price over earnings per share at the beginning of each fiscal year. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The p-value is reported in the parentheses. The sample period is between 1986 and 2010. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

Panel A. Governance measured by the presence of blockholders

	Probability of becoming an acquirer					
	ΔCoinsurance_Q >0		ΔCoinsurance_Q=0		ΔCoinsurance_Q<0	
	Coef.	Pr > ChiSq	Coef.	Pr > ChiSq	Coef.	Pr > ChiSq
Intercept	-5.223***	(0.01)	-3.999***	(0.01)	-5.834***	(0.01)
Bad_Governance	0.240***	(0.01)	0.068	(0.21)	0.169	(0.22)
Assets	0.185***	(0.01)	0.143***	(0.01)	0.229***	(0.01)
Market-to-Book	0.092***	(0.01)	0.222***	(0.01)	-0.008	(0.86)
Leverage	-0.059	(0.75)	-0.096	(0.49)	-0.004	(0.99)
Cash holdings	0.439**	(0.04)	0.075	(0.60)	-0.568	(0.30)
Noncash working capital	0.746***	(0.01)	0.268	(0.15)	0.891**	(0.03)
Sales growth	0.204***	(0.01)	0.447***	(0.01)	0.301*	(0.07)
Avg. abnormal returns	13.148	(0.17)	-4.887	(0.73)	15.404	(0.41)
Price-to-Earnings	0.000	(0.39)	0.000	(0.69)	0.001	(0.48)
Year & Industry Fixed Effects	Yes		Yes		Yes	
No. of Observations	2,760		4,138		799	
No. of Merged Firm Observations	493		714		142	
No. of Control Firm Observations	2,267		3,424		657	
Pseudo R^2	0.08		0.06		0.05	

Panel B. Governance measured by G_Index

	Probability of becoming an acquirer					
	ΔCoinsurance_Q >0		ΔCoinsurance_Q=0		ΔCoinsurance_Q<0	
	Coef.	Pr > ChiSq	Coef.	Pr > ChiSq	Coef.	Pr > ChiSq
Intercept	-11.384***	(0.01)	-5.234***	(0.01)	-14.738***	(0.01)
Bad_Governance	0.241*	(0.06)	0.033	(0.78)	-0.255	(0.41)
Assets	0.508***	(0.01)	0.208***	(0.01)	0.663***	(0.01)
Market-to-Book	0.056	(0.26)	0.074**	(0.03)	-0.087	(0.37)
Leverage	-0.872*	(0.09)	-0.521	(0.16)	-2.329**	(0.03)
Cash holdings	-0.158	(0.74)	0.272	(0.40)	-5.589***	(0.01)
Net working capital	0.975**	(0.04)	0.300	(0.46)	3.762***	(0.01)
Sales growth	0.778**	(0.02)	0.474***	(0.01)	-0.070	(0.95)
Avg. abnormal returns	7.012	(0.86)	-38.886*	(0.07)	73.527	(0.35)
Price-to-Earnings	0.000	(0.90)	-0.001	(0.43)	-0.002	(0.55)
Year & Industry Fixed Effects	Yes		Yes		Yes	
No. of Observations	592		820		191	
No. of Merged Firm Observations	133		177		48	
No. of Control Firm Observations	459		643		143	
Pseudo R^2	0.16		0.11		0.40	

Table 3.6 Regressions Analysis of Premiums

This table examines the relationship between coinsurance across divisional investment opportunities and merger premiums. The dependent variable in specification 1(2) is the ratio of the final offer price to the target stock price one day (one week) prior to the original announcement date minus one. *ΔCoinsurance_Q* is the change in coinsurance across divisional investment opportunities induced by a merger. *ΔCoinsurance_CF* is the change in coinsurance across divisional cash flows induced by a merger (see text for more details). *Asset* is logarithm of total assets. *Market-to-book* is market value of the firm (total asset – book value of equity + market value of equity) over total asset. *Leverage* is the ratio of debt to total assets. *Noncash Working Capital* is net working capital excluding cash and cash equivalents over total assets. *Run-up* is the cumulative stock price return of the firm over the six months before the announcement month. *Amihud Liquidity* is the illiquidity measure in Amihud (2002), defined as the natural logarithm of one plus the average ratio of the daily absolute return to dollar trading volume for the firm over the fiscal year. *Sales Growth* is the average of $(Sales_t\_Sales_{t-1})/ Sales_{t-1}$ within past three years prior to the merger. *Relative transaction value* is deal value to acquirer market value of equity. The following dummy variables take the value of one - if the deals are financed 100% in cash (*Cash deal*); if the deals are financed 100% in stock (*Stock deal*); if a deal has more than one bidders (*Competing offer*); if the deal attitude is unfriendly (*Hostile*); if the deal is a tender offer *(Tender offer)*. All firm characteristics are measured at the fiscal year-end prior to the merger announcement date. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The p-value is reported in the parentheses. The sample period is between 1986 and 2010. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	Premiums			
	(1)		(2)	
	Coef.	p-value	Coef.	p-value
Intercept	0.694**	(0.02)	0.886***	(0.01)
ΔCoinsurance_Q	1.352**	(0.04)	1.552**	(0.04)
ΔCoinsurance_CF	-5.662**	(0.03)	-5.906**	(0.04)
Acquirer Characteristics				
Acquirer assets	0.014*	(0.06)	0.035***	(0.01)
Acquirer market-to-book	0.008***	(0.01)	0.011***	(0.01)
Acquirer leverage	0.008	(0.88)	0.020	(0.70)
Acquirer noncash working capital	-0.015	(0.81)	0.023	(0.75)
Acquirer run-up	-0.017	(0.69)	0.008	(0.92)
Acquirer Amihud liquidity	-0.038	(0.64)	-0.055	(0.53)
Acquirer sales growth	0.011*	(0.07)	0.008	(0.23)
Target Characteristics				
Target assets	-0.011	(0.12)	-0.044***	(0.01)
Target market-to-book	-0.011***	(0.01)	-0.015***	(0.01)
Target noncash working capital	0.092**	(0.05)	0.055	(0.28)
Target run-up	-0.069***	(0.01)	-0.122***	(0.01)
Target Amihud liquidity	0.029***	(0.01)	0.038***	(0.01)
Target sales growth	0.013	(0.49)	-0.006	(0.40)
Deal Characteristics				
Relative transaction value	0.030	(0.18)	0.383**	(0.02)
Cash deal	-0.007	(0.75)	0.008	(0.73)
Stock deal	-0.011	(0.55)	-0.024	(0.26)
Competing offer	0.112***	(0.01)	0.148***	(0.01)
Hostile	0.191***	(0.01)	0.182***	(0.01)
Tender offer	0.028	(0.20)	0.041*	(0.08)
Year & Industry Fixed Effects	Yes		Yes	
Observations	1, 237		1,235	
Adjusted R^2	0.07		0.10	

Table 3.7 Regressions Analysis of Acquirer Returns and Financial Constraints

This table examines whether coinsurance across divisional investment opportunities affects the acquirer returns for constrained and less-constrained firms differently. The dependent variables are the eleven-day (-5, +5) and three-day (-1, +1) cumulative abnormal returns centered on the announcement date respectively. *ΔCoinsurance_Q* is the change in coinsurance across divisional investment opportunities induced by a merger. *ΔCoinsurance_CF* is the change in coinsurance across divisional cash flows induced by a merger (see text for more details). *Constrained* is a dummy variable that equals 1if the firm is financially constrained and zero otherwise. Financial constraints are measured based on *Payout Ratio* and *SA Index* (see text for more details). *Asset* is log of total assets. *Market-to-book* is market value of the firm (total asset – book value of equity + market value of equity) divided by total asset. *Leverage* is the ratio of debt to total assets. *Cash Flow* is income before extraordinary items divided by total asset. *Capital expenditure is* capital expenditures divided by total asset. *R&D expenditure* is research and development expenses divided by total asset. *Dividends* is the ratio of dividends to total asset. *Intangibility* is intangible assets divided by total assets. *Run-up* is the cumulative stock price return of the bidder over the six months before the announcement month. *Relative transaction value* is ratio of deal value to acquirer market value of equity. The following dummy variables take the value of one - if a firm makes any mergers within the past three years (*Prior acquisition experience*) before deal announcement; if the deals are financed 100% in cash (*Cash deal*); if the deals are financed 100% in stock (*Stock deal*); if a deal has more than one bidders (*Competing offer*); if the deal attitude is unfriendly (*Hostile*). All firm characteristics are measured at the fiscal year-end prior to the merger announcement date. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The p-value is reported in the parentheses. The sample period is between 1986 and 2010. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	CARs							
	(-5,+5)				(-1,+1)			
	SA Index (1)		Payout Ratio (2)		SA Index (3)		Payout Ratio (4)	
	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value
Intercept	0.147	(0.25)	0.174	(0.17)	0.087	(0.38)	0.094	(0.33)
ΔCoinsurance_Q	-1.387***	(0.01)	-1.196***	(0.01)	-1.371***	(0.01)	-0.800**	(0.02)
ΔCoinsurance_Q * Constrained	-0.166	(0.60)	0.295	(0.33)	0.081	(0.73)	0.203	(0.36)
Constrained	0.004	(0.64)	-0.012	(0.16)	-0.004	(0.56)	-0.007	(0.30)
ΔCoinsurance_CF	2.965***	(0.01)	2.460**	(0.04)	1.839**	(0.04)	2.037**	(0.02)
Acquirer assets	-0.006**	(0.02)	-0.007***	(0.01)	-0.006***	(0.01)	-0.005***	(0.01)
Acquirer market-to-book	-0.010***	(0.01)	-0.009***	(0.01)	-0.005***	(0.01)	-0.010***	(0.01)
Acquirer leverage	0.031	(0.16)	0.035	(0.12)	0.007	(0.70)	0.010	(0.55)
Acquirer cash flow	-0.002	(0.93)	-0.008	(0.77)	-0.039**	(0.04)	-0.035*	(0.08)
Acquirer capital expenditure	0.021	(0.68)	0.027	(0.60)	0.010	(0.80)	0.013	(0.74)
Acquirer R&D expenditure	0.009	(0.87)	0.011	(0.84)	-0.086	(0.04)	-0.075*	(0.08)
Acquirer dividends	0.121	(0.48)	0.030	(0.87)	0.111	(0.39)	0.098	(0.49)
Acquirer intangibility	-0.020	(0.39)	-0.019	(0.40)	-0.011	(0.54)	-0.009	(0.60)
Acquirer run-up	-0.045***	(0.01)	-0.046***	(0.01)	-0.011	(0.12)	-0.014**	(0.04)
Relative transaction value	-0.035***	(0.01)	-0.027***	(0.01)	-0.033***	(0.01)	-0.032***	(0.01)
Acquirer prior acquisition experience	-0.002	(0.75)	-0.002	(0.82)	0.002	(0.67)	0.002	(0.74)
Cash deal	0.016*	(0.06)	0.016*	(0.07)	0.014**	(0.03)	0.014**	(0.04)
Stock deal	-0.017**	(0.03)	-0.016**	(0.04)	-0.019***	(0.01)	-0.020***	(0.01)
Competing offer	-0.021	(0.13)	-0.022	(0.12)	-0.011	(0.30)	-0.011	(0.29)
Hostile	-0.009	(0.74)	-0.011	(0.68)	0.007	(0.73)	0.007	(0.76)
Year & Industry Fixed Effects	Yes		Yes		Yes		Yes	
Observations	1,349		1, 349		1, 349		1, 349	
Adjusted R^2	0.05		0.05		0.08		0.08	

Table 3.8 Changes in Operating Performance and Financial Constraints

This table examines whether coinsurance across divisional investment opportunities affects the post-merger operating performance for constrained and less-constrained firms differently. In specification (1) and (2), sample firms are matched with control firms based on industry, size and B/M ratio. In specification (3) and (4), sample firms are matched with control firms using a propensity score matching approach (see text for more details). The dependent variable, ΔAdjusted_ROA, is the change in the merged firm's performance adjusted ROA from the fiscal year prior to the merger announcement to the fiscal year subsequent to the merger announcement. ROA is the ratio of operating incomes to the book value of total asset. The merged firm's performance adjusted ROA is its ROA minus the control firm's ROA (see text for more details). *ΔCoinsurance_Q* is the change in coinsurance across divisional investment opportunities induced by a merger. *ΔCoinsurance_CF* is the change in coinsurance across divisional cash flows induced by a merger (see text for more details). *Constrained* is a dummy variable that equals 1 if the firm is financially constrained and zero otherwise. Financial constraints are measured based on *Payout Ratio* and *SA Index* (see text for more details). *Asset* is log of total assets. *Market-to-book* is market value of the firm (total asset – book value of equity + market value of equity) divided by total asset. *Leverage* is the ratio of debt to total assets. *Cash Flow* is income before extraordinary items divided by total asset. *Capital expenditure is* capital expenditures divided by total asset. *R&D expenditure* is research and development expenses divided by total asset. *Dividends* is the ratio of dividends to total asset. *Intangibility* is intangible assets divided by total assets. *Run-up* is the cumulative stock price return of the bidder over the six months before the announcement month. *Relative transaction value* is ratio of deal value to acquirer market value of equity. The following dummy variables take the value of one - if a firm makes any mergers within the past three years (*Prior acquisition experience*) before deal announcement; if the deals are financed 100% in cash (*Cash deal*); if the deals are financed 100% in stock (*Stock deal*); if a deal has more than one bidders (*Competing offer*); if the deal attitude is unfriendly (*Hostile*). All firm characteristics are measured at the fiscal year-end prior to the merger announcement date. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The p-value is reported in the parentheses. The sample period is between 1986 and 2010. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	ΔAdjusted_ROA							
	Industry-, Size-, B/M Matching				Propensity Score Matching			
	SA Index		Payout Ratio		SA Index		Payout Ratio	
	(1)		(2)		(3)		(4)	
	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value
Intercept	-0.679***	(0.01)	-0.756***	(0.01)	0.243*	(0.08)	0.237*	(0.08)
ΔCoinsurance_Q	-3.536***	(0.01)	-2.285***	(0.01)	-2.906*	(0.06)	-3.346**	(0.04)
ΔCoinsurance_Q * Constrained	0.584	(0.20)	1.010	(0.11)	-0.126	(0.69)	0.278	(0.43)
Constrained	-0.012	(0.34)	0.009	(0.45)	0.003	(0.80)	0.006	(0.49)
ΔCoinsurance_CF	3.484**	(0.05)	8.749	(0.06)	14.893**	(0.02)	11.652*	(0.09)
Acquirer assets	0.000	(0.92)	0.002	(0.45)	-0.002	(0.54)	-0.002	(0.49)
Acquirer market-to-book	-0.010***	(0.01)	-0.009***	(0.01)	0.004**	(0.05)	0.003**	(0.02)
Acquirer leverage	-0.033	(0.30)	-0.040	(0.22)	0.021	(0.40)	0.023	(0.38)
Acquirer cash flow	-0.021	(0.61)	-0.009	(0.83)	0.043*	(0.09)	0.050**	(0.04)
Acquirer capital expenditure	0.066	(0.37)	0.058	(0.44)	-0.044	(0.45)	-0.041	(0.49)
Acquirer R&D expenditure	0.287	(0.01)	0.286***	(0.01)	-0.147**	(0.02)	-0.084	(0.12)
Acquirer dividends	0.197	(0.20)	0.316**	(0.04)	-0.082	(0.27)	-0.069	(0.36)
Acquirer intangibility	-0.021	(0.53)	-0.022	(0.51)	0.028	(0.28)	0.035	(0.17)
Acquirer run-up	0.019	(0.36)	-0.011	(0.48)	0.037**	(0.04)	0.039**	(0.04)
Relative transaction value	-0.034***	(0.01)	-0.027**	(0.02)	0.023***	(0.01)	0.022**	(0.02)
Acquirer prior acquisition experience	0.000	(0.99)	0.000	(0.97)	-0.006	(0.51)	-0.007	(0.44)
Cash deal	0.003	(0.82)	0.004	(0.77)	-0.004	(0.65)	-0.004	(0.70)
Stock deal	-0.013	(0.25)	-0.015	(0.19)	-0.003	(0.75)	-0.003	(0.73)
Competing offer	0.009	(0.67)	0.008	(0.69)	-0.011	(0.48)	-0.013	(0.42)
Hostile	-0.027	(0.50)	-0.027	(0.51)	0.026	(0.39)	0.028	(0.36)
Year & Industry Fixed Effects	Yes		Yes		Yes		Yes	
Observations	1,349		1,349		1,190		1,190	
Adjusted R^2	0.08		0.08		0.07		0.07	

Table 3.9 Regressions Analysis of Acquirer Returns and Efficiency of Internal Transfers

This table examines whether the efficiency of internal transfers affects the relationship between coinsurance across divisional investment opportunities and acquirer returns. The dependent variables are the eleven-day (-5, +5) and three-day (-1, +1) cumulative abnormal returns centered on the announcement date respectively. *Efficiency of Internal Transfers* is measure developed by Rajan et al. (2000) to estimate the overall efficiency of the cross-divisional transfers, the measure is defined as:

$$\frac{\sum_{j=1}^{N} Asset_j (q_j - \bar{q}) \left(\frac{I_j}{Asset_j} - \frac{I_j^{ss}}{Asset_j^{ss}} - \sum_{j=1}^{N} w_j \left(\frac{I_j}{Asset_j} - \frac{I_j^{ss}}{Asset_j^{ss}} \right) \right)}{TotalAsset}$$

where $Asset_j$ is the book value of segment j, q_j is the asset-weighted *Tobin's q* using single-segment firms only in segment j, $\bar{q}$ is the asset-weighted average of segment *Tobin's q* for the firm, I_j is capital expenditure, *ss* is single-segment firms, w_j is segment j's proportion of the firm's total assets (see text for more details). *ΔCoinsurance_Q* is the change in coinsurance across divisional investment opportunities induced by a merger. *ΔCoinsurance_CF* is the change in coinsurance across divisional cash flows induced by a merger (see text for more details). *Asset* is log of total assets. *Market-to-book* is market value of the firm (total asset – book value of equity + market value of equity) divided by total asset. *Leverage* is the ratio of debt to total assets. *Cash Flow* is income before extraordinary items divided by total asset. *Capital expenditure is* capital expenditures divided by total asset. *R&D expenditure* is research and development expenses divided by total asset. *Dividends* is the ratio of dividends to total asset. *Intangibility* is intangible assets divided by total assets. *Run-up* is the cumulative stock price return of the bidder over the six months before the announcement month. *Relative transaction value* is ratio of deal value to acquirer market value of equity. The following dummy variables take the value of one - if a firm makes any mergers within the past three years (*Prior acquisition experience*) before deal announcement; if the deals are financed 100% in cash (*Cash deal*); if the deals are financed 100% in stock (*Stock deal*); if a deal has more than one bidders (*Competing offer*); if the deal attitude is unfriendly (*Hostile*). All firm characteristics are measured at the fiscal year-end prior to the merger announcement date. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The p-value is reported in the parentheses. The sample period is between 1986 and 2010. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	CARs			
	(-5,+5)		(-1,+1)	
	Coef.	p-value	Coef.	p-value
Intercept	0.162	(0.20)	0.071	(0.46)
ΔCoinsurance_Q	-0.919***	(0.01)	-0.685**	(0.04)
ΔCoinsurance_Q * Efficiency of Internal Transfers *100	0.578	(0.12)	0.669*	(0.06)
Efficiency of Internal Transfers	-0.270	(0.71)	0.182	(0.75)
ΔCoinsurance_CF	2.551**	(0.03)	2.094**	(0.02)
Acquirer assets	-0.007***	(0.01)	-0.005***	(0.01)
Acquirer market-to-book	-0.009***	(0.01)	-0.005***	(0.01)
Acquirer leverage	0.028	(0.21)	0.005	(0.79)
Acquirer cash flow	-0.004	(0.87)	-0.039**	(0.04)
Acquirer capital expenditure	0.023	(0.65)	0.005	(0.89)
Acquirer R&D expenditure	0.009	(0.87)	-0.088**	(0.04)
Acquirer dividends	0.103	(0.55)	0.113	(0.38)
Acquirer intangibility	-0.020	(0.38)	-0.012	(0.49)
Acquirer run-up	-0.046***	(0.01)	-0.012	(0.10)
Relative transaction value	-0.035***	(0.01)	-0.033***	(0.01)
Acquirer prior acquisition experience	-0.002	(0.80)	0.003	(0.66)
Cash deal	0.016*	(0.07)	0.014**	(0.03)
Stock deal	-0.017**	(0.04)	-0.019***	(0.01)
Competing offer	-0.021	(0.14)	-0.010	(0.37)
Hostile	-0.009	(0.74)	0.007	(0.75)
Year & Industry Fixed Effects	Yes		Yes	
Observations	1,349		1, 349	
Adjusted R^2	0.05		0.09	

Table 3.10 Changes in Operating Performance and Efficiency of Internal Transfers

This table examines whether the efficiency of internal transfers affects the relationship between coinsurance across divisional investment opportunities and operating performance. Sample firms are matched with control firms based on industry, size and B/M ratio or the propensity score matching approach (see text for more details). The dependent variable, ΔAdjusted_ROA, is the change in the merged firm's performance adjusted ROA from the fiscal year prior to the merger announcement to the fiscal year subsequent to the merger announcement. ROA is the ratio of operating incomes to the book value of total asset. The merged firm's performance adjusted ROA is its ROA minus the control firm's ROA (see text for more details). *Efficiency of Internal Transfers* is measure developed by Rajan et al. (2000) to estimate the overall efficiency of the cross-divisional transfers, the measure is defined as:

$$\frac{\sum_{j=1}^{N} Asset_j (q_j - \bar{q}) \left(\frac{I_j}{Asset_j} - \frac{I_j^{ss}}{Asset_j^{ss}} - \sum_{j=1}^{N} w_j \left(\frac{I_j}{Asset_j} - \frac{I_j^{ss}}{Asset_j^{ss}} \right) \right)}{TotalAsset}$$

where $Asset_j$ is the book value of segment *j*, q_j is the asset-weighted *Tobin's q* using single-segment firms only in segment *j*, $\bar{q}$ is the asset-weighted average of segment *Tobin's q* for the firm, I_j is capital expenditure, *ss* is single-segment firms, w_j is segment *j*'s proportion of the firm's total assets (see text for more details). *ΔCoinsurance_Q* is the change in coinsurance across divisional investment opportunities induced by a merger. *ΔCoinsurance_CF* is the change in coinsurance across divisional cash flows induced by a merger (see text for more details). *Asset* is log of total assets. *Market-to-book* is market value of the firm (total asset – book value of equity + market value of equity) divided by total asset. *Leverage* is the ratio of debt to total assets. *Cash Flow* is income before extraordinary items divided by total asset. *Capital expenditure is* capital expenditures divided by total asset. *R&D expenditure* is research and development expenses divided by total asset. *Dividends* is the ratio of dividends to total asset. *Intangibility* is intangible assets divided by total assets. *Run-up* is the cumulative stock price return of the bidder over the six months before the announcement month. *Relative transaction value* is ratio of deal value to acquirer market value of equity. The following dummy variables take the value of one - if a firm makes any mergers within the past three years (*Prior acquisition experience*) before deal announcement; if the deals are financed 100% in cash (*Cash deal*); if the deals are financed 100% in stock (*Stock deal*); if a deal has more than one bidders (*Competing offer*); if the deal attitude is unfriendly (*Hostile*). All firm characteristics are measured at the fiscal year-end prior to the merger announcement date. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The p-value is reported in the parentheses. The sample period is between 1986 and 2010. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *.

	ΔAdjusted_ROA			
	Industry-, Size-, B/M Matching		Propensity Score Matching	
	Coef.	p-value	Coef.	p-value
Intercept	-0.733***	(0.01)	0.250*	(0.06)
ΔCoinsurance_Q	-2.980**	(0.02)	-3.049*	(0.06)
ΔCoinsurance_Q * Efficiency of Internal Transfers *100	-0.326	(0.55)	-0.079	(0.84)
Efficiency of Internal Transfers	0.775	(0.46)	0.654	(0.49)
ΔCoinsurance_CF	3.963**	(0.02)	13.944**	(0.02)
Acquirer assets	0.002	(0.68)	-0.002	(0.41)
Acquirer market-to-book	-0.010***	(0.01)	0.004**	(0.04)
Acquirer leverage	-0.035	(0.27)	0.021	(0.40)
Acquirer cash flow	-0.019	(0.64)	0.043*	(0.09)
Acquirer capital expenditure	0.061	(0.41)	-0.044	(0.46)
Acquirer R&D expenditure	0.284***	(0.01)	-0.145**	(0.02)
Acquirer dividends	0.235	(0.12)	-0.084	(0.25)
Acquirer intangibility	-0.021	(0.51)	0.028	(0.27)
Acquirer run-up	0.018	(0.37)	0.037**	(0.05)
Relative transaction value	-0.032***	(0.01)	0.023***	(0.01)
Acquirer prior acquisition experience	0.000	(0.97)	-0.006	(0.51)
Cash deal	0.004	(0.78)	-0.004	(0.66)
Stock deal	-0.014	(0.21)	-0.003	(0.75)
Competing offer	0.010	(0.61)	-0.012	(0.45)
Hostile	-0.030	(0.45)	0.026	(0.38)
Year & Industry Fixed Effects	Yes		Yes	
Observations	1,349		1, 190	
Adjusted R^2	0.08		0.07	

Table 3.11A Acquirer Returns and Corporate Governance: Regression Analysis based on CARs (-5, +5)

This table reports how corporate governance affects the relationship between coinsurance across divisional investment opportunities and acquirer returns. The dependent variable, CARs (-5, +5), is the eleven-day cumulative abnormal returns centered on the announcement date. *ΔCoinsurance_Q* is the change in coinsurance across divisional investment opportunities induced by a merger. *ΔCoinsurance_CF* is the change in coinsurance across divisional cash flows induced by a merger (see text for more details). *Good_governance* is a dummy variable that equals 1 if the firm is well governed and zero otherwise. We use two measures of corporate governance: the presence of *Blockholders* and the *G-index* proposed by Gompers et al. (2003). A firm is classified as poorly-governed, if it has a G-index <7, or if it has at least blockholder. *Asset* is log of total assets. *Market-to-book* is market value of the firm (total asset – book value of equity + market value of equity) divided by total asset. *Leverage* is the ratio of debt to total assets. *Cash Flow* is income before extraordinary items divided by total asset. *Capital expenditure is* capital expenditures divided by total asset. *R&D expenditure* is research and development expenses divided by total asset. *Dividends* is the ratio of dividends to total asset. *Intangibility* is intangible assets divided by total assets. *Run-up* is the cumulative stock price return of the bidder over the six months before the announcement month. *Relative transaction value* is ratio of deal value to acquirer market value of equity. The following dummy variables take the value of one - if a firm makes any mergers within the past three years (*Prior acquisition experience*) before deal announcement; if the deals are financed 100% in cash (*Cash deal*); if the deals are financed 100% in stock (*Stock deal*); if a deal has more than one bidders (*Competing offer*); if the deal attitude is unfriendly (*Hostile*). All firm characteristics are measured at the fiscal year-end prior to the merger announcement date. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The p-value is reported in the parentheses. The sample period is between 1986 and 2010. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	CARs (-5,+5)							
	Blockholders				G_Index			
	Bad Governance (1)		Good Governance (2)		Bad Governance (3)		Good Governance (4)	
	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value
Intercept	0.223***	(0.16)	0.143***	(0.22)	0.068***	(0.59)	0.606**	(0.05)
ΔCoinsurance_Q	-6.055**	(0.02)	-0.464	(0.24)	-3.068**	(0.04)	3.041	(0.27)
ΔCoinsurance_CF	1.860	(0.36)	1.880	(0.18)	5.151	(0.54)	-14.629	(0.63)
Acquirer assets	-0.009*	(0.07)	-0.006***	(0.01)	-0.003	(0.53)	-0.023	(0.14)
Acquirer market-to-book	-0.006	(0.21)	-0.005***	(0.01)	-0.004	(0.32)	-0.028***	(0.01)
Acquirer leverage	0.008	(0.87)	0.022	(0.37)	0.030	(0.53)	0.530**	(0.02)
Acquirer cash flow	-0.018	(0.75)	-0.020	(0.49)	-0.036	(0.61)	0.466***	(0.01)
Acquirer capital expenditure	0.099	(0.29)	-0.045	(0.48)	0.091	(0.56)	-0.565	(0.19)
Acquirer R&D expenditure	-0.036	(0.78)	0.001	(0.99)	0.130	(0.26)	1.017**	(0.05)
Acquirer dividends	0.113	(0.75)	0.156	(0.42)	-0.309	(0.40)	1.237	(0.24)
Acquirer intangibility	-0.054	(0.31)	-0.023	(0.35)	-0.023	(0.57)	-0.661**	(0.02)
Acquirer run-up	-0.038	(0.12)	-0.028**	(0.04)	-0.007	(0.79)	0.001	(0.98)
Relative transaction value	-0.030**	(0.05)	-0.033***	(0.01)	-0.043*	(0.06)	-0.102	(0.45)
Acquirer prior acquisition experience	0.026	(0.61)	-0.007	(0.34)	0.002	(0.88)	0.063	(0.10)
Cash deal	0.022	(0.34)	0.017*	(0.06)	0.026*	(0.06)	-0.031	(0.47)
Stock deal	-0.009	(0.60)	-0.013	(0.14)	-0.017	(0.24)	0.035	(0.45)
Competing offer	-0.034	(0.35)	-0.018	(0.20)	0.005	(0.82)	-0.070	(0.44)
Hostile	-0.009	(0.92)	-0.012	(0.66)	0.023	(0.54)	0.005	(0.98)
Year & Industry Fixed Effects	Yes		Yes		Yes		Yes	
Observations	387		962		292		66	
Adjusted R^2	0.05		0.05		0.05		0.05	

Table 3.11B Acquirer Returns and Corporate Governance: Regression Analysis based on CARs (-1, +1)

This table reports how corporate governance affects the relationship between coinsurance across divisional investment opportunities and acquirer returns. The dependent variable, CARs (-1, +1), is the three-day cumulative abnormal returns centered on the announcement date. *ΔCoinsurance_Q* is the change in coinsurance across divisional investment opportunities induced by a merger. *ΔCoinsurance_CF* is the change in coinsurance across divisional cash flows induced by a merger (see text for more details). *Good_governance* is a dummy variable that equals 1 if the firm is well governed and zero otherwise. We use two measures of corporate governance: the presence of *Blockholders* and the *G-index* proposed by Gompers et al. (2003). A firm is classified as poorly-governed, if it has a G-index <7, or if it has at least blockholder. *Asset* is log of total assets. *Market-to-book* is market value of the firm (total asset – book value of equity + market value of equity) divided by total asset. *Leverage* is the ratio of debt to total assets. *Cash Flow* is income before extraordinary items divided by total asset. *Capital expenditure is* capital expenditures divided by total asset. *R&D expenditure* is research and development expenses divided by total asset. *Dividends* is the ratio of dividends to total asset. *Intangibility* is intangible assets divided by total assets. *Run-up* is the cumulative stock price return of the bidder over the six months before the announcement month. *Relative transaction value* is ratio of deal value to acquirer market value of equity. The following dummy variables take the value of one - if a firm makes any mergers within the past three years (*Prior acquisition experience*) before deal announcement; if the deals are financed 100% in cash (*Cash deal*); if the deals are financed 100% in stock (*Stock deal*); if a deal has more than one bidders (*Competing offer*); if the deal attitude is unfriendly (*Hostile*). All firm characteristics are measured at the fiscal year-end prior to the merger announcement date. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The p-value is reported in the parentheses. The sample period is between 1986 and 2010. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	CARs (-1,+1)							
	Blockholders				G_Index			
	Bad Governance (1)		Good Governance (2)		Bad Governance (3)		Good Governance (4)	
	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value
Intercept	0.066	(0.43)	0.028	(0.68)	-0.100	(0.24)	0.340	(0.32)
ΔCoinsurance_Q	-2.061*	(0.08)	-0.902	(0.39)	-1.945*	(0.08)	0.033	(0.99)
ΔCoinsurance_CF	0.898	(0.39)	0.647	(0.33)	6.535	(0.45)	9.734	(0.76)
Acquirer assets	-0.003	(0.34)	-0.004***	(0.01)	0.001	(0.72)	-0.009	(0.58)
Acquirer market-to-book	-0.008***	(0.01)	-0.002**	(0.02)	0.001	(0.83)	-0.027**	(0.02)
Acquirer leverage	0.002	(0.95)	0.005	(0.74)	0.068**	(0.03)	-0.196	(0.43)
Acquirer cash flow	-0.007	(0.81)	0.003	(0.87)	0.020	(0.67)	0.185	(0.22)
Acquirer capital expenditure	0.037	(0.46)	-0.029	(0.43)	-0.007	(0.95)	0.381	(0.42)
Acquirer R&D expenditure	0.059	(0.39)	-0.053	(0.12)	0.031	(0.69)	0.277	(0.61)
Acquirer dividends	-0.157	(0.40)	0.248**	(0.03)	0.096	(0.70)	-1.546	(0.21)
Acquirer intangibility	-0.030	(0.30)	0.008	(0.59)	0.002	(0.94)	0.111	(0.71)
Acquirer run-up	-0.001	(0.96)	-0.003	(0.65)	0.014	(0.39)	0.052	(0.32)
Relative transaction value	-0.015*	(0.06)	-0.033***	(0.01)	-0.056***	(0.01)	-0.077	(0.58)
Acquirer prior acquisition experience	0.034	(0.21)	-0.001	(0.78)	0.005	(0.55)	0.000	(0.98)
Cash deal	0.027**	(0.03)	0.011**	(0.03)	0.013	(0.16)	0.022	(0.64)
Stock deal	-0.009	(0.36)	-0.015***	(0.01)	-0.012	(0.22)	0.064	(0.24)
Competing offer	-0.026	(0.19)	0.003	(0.76)	0.024**	(0.08)	0.012	(0.90)
Hostile	-0.028	(0.52)	0.010	(0.53)	0.022	(0.39)	0.358	(0.17)
Year & Industry Fixed Effects	Yes		Yes		Yes		Yes	
Observations	387		962		292		66	
Adjusted R^2	0.11		0.11		0.15		0.05	

Table 3.12A Changes in Operating Performance and Corporate Governance: Regression Analysis using Industry-, Size-, and B/M Matching Approach

This table reports how corporate governance affects the relationship between coinsurance across divisional investment opportunities and post-merger operating performances. Sample firms are matched with control firms based on industry, size and B/M ratio. (see text for more details). The dependent variable, ΔAdjusted_ROA, is the change in the merged firm's performance adjusted ROA from the fiscal year prior to the merger announcement to the fiscal year subsequent to the merger announcement. ROA is the ratio of operating incomes to the book value of total asset. The merged firm's performance adjusted ROA is its ROA minus the control firm's ROA (see text for more details). *ΔCoinsurance_Q* is the change in coinsurance across divisional investment opportunities induced by a merger. *ΔCoinsurance_CF* is the change in coinsurance across divisional cash flows induced by a merger (see text for more details). *Good_governance* is a dummy variable that equals 1 if the firm is well governed and zero otherwise. We use two measures of corporate governance: the presence of *Blockholders* and the *G-index* proposed by Gompers et al. (2003). A firm is classified as poorly-governed, if it has a G-index <7, or if it has at least blockholder. *Asset* is log of total assets. *Market-to-book* is market value of the firm (total asset – book value of equity + market value of equity) divided by total asset. *Leverage* is the ratio of debt to total assets. *Cash Flow* is income before extraordinary items divided by total asset. *Capital expenditure is* capital expenditures divided by total asset. *R&D expenditure* is research and development expenses divided by total asset. *Dividends* is the ratio of dividends to total asset. *Intangibility* is intangible assets divided by total assets. *Run-up* is the cumulative stock price return of the bidder over the six months before the announcement month. *Relative transaction value* is ratio of deal value to acquirer market value of equity. The following dummy variables take the value of one - if a firm makes any mergers within the past three years (*Prior acquisition experience*) before deal announcement; if the deals are financed 100% in cash (*Cash deal*); if the deals are financed 100% in stock (*Stock deal*); if a deal has more than one bidders (*Competing offer*); if the deal attitude is unfriendly (*Hostile*). All firm characteristics are measured at the fiscal year-end prior to the merger announcement date. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The p-value is reported in the parentheses. The sample period is between 1986 and 2010. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	ΔAdj_ROA							
	Blockholders				G_Index			
	Bad Governance (1)		Good Governance (2)		Bad Governance (3)		Good Governance (4)	
	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value
Intercept	-0.015	(0.95)	-0.521***	(0.01)	0.024	(0.90)	1.460***	(0.01)
ΔCoinsurance_Q	-5.915**	(0.07)	-0.598	(0.19)	-3.412**	(0.04)	-5.831	(0.47)
ΔCoinsurance_CF	8.630	(0.22)	2.180	(0.51)	19.678	(0.13)	8.906	(0.48)
Acquirer assets	0.005	(0.60)	-0.005	(0.39)	0.001	(0.85)	-0.079***	(0.01)
Acquirer market-to-book	-0.008	(0.15)	-0.004***	(0.01)	0.028***	(0.01)	-0.012	(0.34)
Acquirer leverage	-0.045	(0.56)	-0.024	(0.52)	0.065	(0.35)	0.794**	(0.05)
Acquirer cash flow	-0.356***	(0.01)	0.045	(0.36)	-0.229**	(0.03)	0.175	(0.51)
Acquirer capital expenditure	0.048	(0.76)	0.062	(0.53)	0.059	(0.80)	0.725	(0.26)
Acquirer R&D expenditure	0.548***	(0.01)	0.225***	(0.01)	0.059	(0.73)	1.342*	(0.07)
Acquirer dividends	0.598	(0.22)	0.091	(0.58)	-0.128	(0.81)	1.551	(0.36)
Acquirer intangibility	-0.050	(0.55)	-0.015	(0.69)	0.023	(0.70)	-0.903*	(0.06)
Acquirer run-up	0.041	(0.54)	0.022	(0.51)	-0.040	(0.30)	-0.032	(0.64)
Relative transaction value	-0.013	(0.59)	-0.056***	(0.01)	-0.098***	(0.01)	-0.211	(0.28)
Acquirer prior acquisition experience	-0.046	(0.56)	0.005	(0.69)	-0.008	(0.62)	0.139***	(0.01)
Cash deal	-0.009	(0.80)	0.002	(0.89)	-0.003	(0.87)	-0.020	(0.76)
Stock deal	-0.026	(0.37)	-0.013	(0.33)	-0.013	(0.51)	0.055	(0.46)
Competing offer	0.038	(0.51)	0.005	(0.81)	-0.006	(0.85)	0.055	(0.71)
Hostile	-0.047	(0.72)	-0.011	(0.80)	0.005	(0.93)	0.042	(0.91)
Year & Industry Fixed Effects	Yes		Yes		Yes		Yes	
Observations	387		962		292		66	
Adjusted R^2	0.09		0.08		0.13		0.08	

Table 3.12B Changes in Operating Performance and Corporate Governance: Regression Analysis using Propensity Score Matching Approach

This table examines how corporate governance affects the relationship between coinsurance across divisional investment opportunities and post-merger operating performances. Sample firms are matched with control firms using a propensity score matching approach (see text for more details). The dependent variable, ΔAdjusted_ROA, is the change in the merged firm's performance adjusted ROA from the fiscal year prior to the merger announcement to the fiscal year subsequent to the merger announcement. ROA is the ratio of operating incomes to the book value of total asset. The merged firm's performance adjusted ROA is its ROA minus the control firm's ROA (see text for more details). *ΔCoinsurance_Q* is the change in coinsurance across divisional investment opportunities induced by a merger. *ΔCoinsurance_CF* is the change in coinsurance across divisional cash flows induced by a merger (see text for more details). *Good_governance* is a dummy variable that equals 1 if the firm is well governed and zero otherwise. We use two measures of corporate governance: the presence of *Blockholders* and the *G-index* proposed by Gompers et al. (2003). A firm is classified as poorly-governed, if it has a G-index <7, or if it has at least blockholder. *Asset* is log of total assets. *Market-to-book* is market value of the firm (total asset – book value of equity + market value of equity) divided by total asset. *Leverage* is the ratio of debt to total assets. *Cash Flow* is income before extraordinary items divided by total asset. *Capital expenditure is* capital expenditures divided by total asset. *R&D expenditure* is research and development expenses divided by total asset. *Dividends* is the ratio of dividends to total asset. *Intangibility* is intangible assets divided by total assets. *Run-up* is the cumulative stock price return of the bidder over the six months before the announcement month. *Relative transaction value* is ratio of deal value to acquirer market value of equity. The following dummy variables take the value of one - if a firm makes any mergers within the past three years (*Prior acquisition experience*) before deal announcement; if the deals are financed 100% in cash (*Cash deal*); if the deals are financed 100% in stock (*Stock deal*); if a deal has more than one bidders (*Competing offer*); if the deal attitude is unfriendly (*Hostile*). All firm characteristics are measured at the fiscal year-end prior to the merger announcement date. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The p-value is reported in the parentheses. The sample period is between 1986 and 2010. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	ΔAdj_ROA							
	Blockholders				G_Index			
	Bad Governance (1)		Good Governance (2)		Bad Governance (3)		Good Governance (4)	
	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value
Intercept	0.100	(0.73)	0.192	(0.46)	0.528	(0.28)	0.317	(0.83)
ΔCoinsurance_Q	-2.200***	(0.01)	0.653	(0.25)	-7.992*	(0.09)	-7.292	(0.24)
ΔCoinsurance_CF	3.887	(0.33)	-1.353	(0.61)	3.417	(0.49)	5.602	(0.67)
Acquirer assets	0.004	(0.71)	0.006	(0.48)	-0.030	(0.18)	-0.006	(0.93)
Acquirer market-to-book	0.006	(0.34)	0.004	(0.13)	-0.022**	(0.05)	0.002	(0.91)
Acquirer leverage	-0.005	(0.96)	0.073	(0.19)	-0.093	(0.41)	-0.253	(0.59)
Acquirer cash flow	0.089	(0.19)	-0.006	(0.92)	0.247	(0.13)	0.178	(0.54)
Acquirer capital expenditure	-0.061	(0.71)	-0.080	(0.55)	0.061	(0.86)	0.220	(0.68)
Acquirer R&D expenditure	-0.381	(0.03)	-0.134	(0.21)	0.042	(0.87)	0.451	(0.63)
Acquirer dividends	-0.695	(0.18)	-0.061	(0.62)	-0.116	(0.88)	0.182	(0.94)
Acquirer intangibility	0.036	(0.70)	0.011	(0.82)	0.094	(0.28)	0.255	(0.64)
Acquirer run-up	0.035	(0.38)	0.150***	(0.01)	0.146***	(0.01)	-0.070	(0.50)
Relative transaction value	0.029	(0.24)	0.054***	(0.01)	0.035	(0.47)	0.164	(0.51)
Acquirer prior acquisition experience	0.029	(0.73)	-0.015	(0.35)	-0.039	(0.12)	-0.121	(0.12)
Cash deal	0.036	(0.35)	-0.023	(0.22)	-0.031	(0.32)	-0.045	(0.68)
Stock deal	0.061**	(0.05)	-0.012	(0.49)	0.039	(0.21)	-0.096	(0.41)
Competing offer	0.051	(0.42)	-0.005	(0.86)	0.055	(0.22)	0.212	(0.54)
Hostile	0.177	(0.18)	0.003	(0.95)	-0.007	(0.93)	-0.427	(0.27)
Year & Industry Fixed Effects	Yes		Yes		Yes		Yes	
Observations	340		850		268		60	
Adjusted R^2	0.07		0.09		0.09		0.06	

Table 3.13 Heckman's Two-stage Estimation: Regression Analysis of Acquirer Returns

This table reports the coefficient estimates from the second-stage regressions of Heckman's two-stage estimation approach. The dependent variables are the eleven-day (-5, +5) and three-day (-1, +1) cumulative abnormal returns centered on the announcement date respectively. *ΔCoinsurance_Q* is the change in coinsurance across divisional investment opportunities induced by a merger. *ΔCoinsurance_CF* is the change in coinsurance across divisional cash flows induced by a merger (see text for more details). *Asset* is log of total assets. *Market-to-book* is market value of the firm (total asset – book value of equity + market value of equity) divided by total asset. *Leverage* is the ratio of debt to total assets. *Cash Flow* is income before extraordinary items divided by total asset. *Capital expenditure is* capital expenditures divided by total asset. *R&D expenditure* is research and development expenses divided by total asset. *Dividends* is the ratio of dividends to total asset. *Intangibility* is intangible assets divided by total assets. *Run-up* is the cumulative stock price return of the bidder over the six months before the announcement month. *Relative transaction value* is ratio of deal value to acquirer market value of equity. *Lambda* is the inverse Mills ratio obtained from the probit estimates in Table 3.3 Panel A. The following dummy variables take the value of one - if a firm makes any mergers within the past three years (*Prior acquisition experience*) before deal announcement; if the deals are financed 100% in cash (*Cash deal*); if the deals are financed 100% in stock (*Stock deal*); if a deal has more than one bidders (*Competing offer*); if the deal attitude is unfriendly (*Hostile*). All firm characteristics are measured at the fiscal year-end prior to the merger announcement date. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The p-value is reported in the parentheses. The sample period is between 1986 and 2010. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	CAR			
	(-5,+5)		(-1,+1)	
	Coef.	p-value	Coef.	p-value
Intercept	-0.099	(0.60)	-0.182	(0.22)
ΔCoinsurance_Q	-0.713***	(0.01)	-1.062***	(0.01)
ΔCoinsurance_CF	2.102**	(0.04)	2.182***	(0.01)
Acquirer assets	0.000	(0.96)	0.001	(0.66)
Acquirer market-to-book	0.001	(0.85)	-0.002	(0.65)
Acquirer leverage	-0.001	(0.98)	-0.012	(0.52)
Acquirer cash flow	-0.007	(0.76)	-0.031	(0.12)
Acquirer capital expenditure	0.012	(0.79)	0.016	(0.67)
Acquirer R&D expenditure	-0.017	(0.73)	-0.081*	(0.06)
Acquirer dividends	0.057	(0.70)	0.116	(0.37)
Acquirer intangibility	-0.026	(0.20)	-0.011	(0.52)
Acquirer run-up	-0.016*	(0.08)	-0.008	(0.28)
Relative transaction value	-0.024***	(0.01)	-0.028***	(0.01)
Acquirer prior acquisition experience	0.030	(0.14)	0.033**	(0.03)
Cash deal	0.017**	(0.03)	0.015**	(0.02)
Stock deal	-0.016**	(0.03)	-0.020***	(0.01)
Competing offer	-0.018	(0.14)	-0.011	(0.27)
Hostile	-0.013	(0.59)	0.007	(0.76)
Lambda	0.064	(0.10)	0.062**	(0.03)
Year & Industry Fixed Effects	Yes		Yes	
Observations	1, 349		1, 349	
Adjusted R^2	0.04		0.09	

Table 3.14 Heckman's Two-stage Estimation: Regression Analysis of Operating Performance

This table reports the coefficient estimates from the second-stage regressions of Heckman's two-stage estimation approach. In specification (1), sample firms are matched with control firms based on industry, size, and B/M ratio. In specification (2), sample firms are matched with control firms using a propensity score matching approach (see text for more details). The dependent variable, ΔAdjusted_ROA, is the change in the merged firm's performance adjusted ROA from the fiscal year prior to the merger announcement to the fiscal year subsequent to the merger announcement. ROA is the ratio of operating incomes to the book value of total asset. The merged firm's performance adjusted ROA is its ROA minus the control firm's ROA (see text for more details). *ΔCoinsurance_Q* is the change in coinsurance across divisional investment opportunities induced by a merger. *ΔCoinsurance_CF* is the change in coinsurance across divisional cash flows induced by a merger (see text for more details).*Asset* is log of total assets. *Market-to-book* is market value of the firm (total asset – book value of equity + market value of equity) divided by total asset. *Leverage* is the ratio of debt to total assets. *Cash Flow* is income before extraordinary items divided by total asset. *Capital expenditure is* capital expenditures divided by total asset. *R&D expenditure* is research and development expenses divided by total asset. *Dividends* is the ratio of dividends to total asset. *Intangibility* is intangible assets divided by total assets. *Run-up* is the cumulative stock price return of the bidder over the six months before the announcement month. *Relative transaction value* is ratio of deal value to acquirer market value of equity. The following dummy variables take the value of one - if a firm makes any mergers within the past three years (*Prior acquisition experience*) before deal announcement; if the deals are financed 100% in cash (*Cash deal*); if the deals are financed 100% in stock (*Stock deal*); if a deal has more than one bidders (*Competing offer*); if the deal attitude is unfriendly (*Hostile*). All firm characteristics are measured at the fiscal year-end prior to the merger announcement date. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The p-value is reported in the parentheses. The sample period is between 1986 and 2010. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	ΔAdjusted_ROA			
	Industry-,Size-,and B/M Matching (1)		Propensity Score Matching (2)	
	Coef.	p-value	Coef.	p-value
Intercept	-0.607**	(0.03)	0.247	(0.28)
ΔCoinsurance_Q	-3.602***	(0.01)	-2.993**	(0.04)
ΔCoinsurance_CF	4.149**	(0.02)	8.695***	(0.01)
Acquirer assets	-0.002	(0.77)	-0.003	(0.52)
Acquirer market-to-book	-0.013***	(0.01)	0.001	(0.79)
Acquirer leverage	-0.051	(0.30)	0.029	(0.29)
Acquirer cash flow	-0.011	(0.80)	0.049**	(0.04)
Acquirer capital expenditure	0.057	(0.44)	-0.048	(0.38)
Acquirer R&D expenditure	0.289***	(0.01)	-0.129**	(0.03)
Acquirer dividends	0.242	(0.12)	-0.073	(0.28)
Acquirer intangibility	-0.020	(0.54)	0.027	(0.26)
Acquirer run-up	0.014	(0.47)	0.038**	(0.03)
Relative transaction value	-0.035***	(0.01)	0.019**	(0.02)
Acquirer prior acquisition experience	-0.010	(0.68)	-0.016	(0.54)
Cash deal	0.003	(0.80)	-0.006	(0.50)
Stock deal	-0.013	(0.25)	-0.003	(0.71)
Competing offer	0.011	(0.59)	-0.007	(0.62)
Hostile	-0.028	(0.49)	0.024	(0.38)
Lambda	-0.023	(0.60)	-0.023	(0.63)
Year & Industry Fixed Effects	Yes		Yes	
Observations	1,349		1,190	
Adjusted R^2	0.08		0.06	

Chapter 4

Corporate Diversification and the Cost of Debt: The Role of Product Market Competition

4.1 Introduction

A firm's organizational form has important implications for its ability to obtain external financing. Researchers have, both theoretically and empirically, established a negative link between corporate diversification and cost of debt financing. As first argued by Lewellen (1971), the aggregation of imperfectly correlated earnings across segments creates coinsurance that decreases cash flow volatility and relaxes a firm's financial status. Recent studies (Hann et al., 2013; Aivazian et al., 2015) show evidence that coinsurance reduces the cost of debt financing for diversified firms. However, the impact of product market competition on the cost of debt financing for diversified firms has remained unclear. The competitive landscape fundamentally affects a firm's operating strategies and shapes its business environment. Since diversified firms are systematically different from single-segment firms (Campa and Kedia, 2002; Graham et al., 2002), the product market competition is likely to influence diversified firms and single-segment firms differently, and consequently, affect the 'diversification-cost of debt financing' relationship. In this chapter we aim to examine the empirical impact of product market competition on the association between diversification and the cost of borrowing. In particular, we study whether product market competition amplifies or reduces the difference in bond spreads between diversified firms and their single-

segment rivals, we also examine the mechanisms through which product market competition can affect the cost-reduction benefit of diversification.

In this study, we focus on bonds in the primary debt market and use bond yield spreads over comparable treasury securities as our proxy for the cost of debt. We use at-issue yield spread of bond offerings rather than the all-in-drawn spread of bank loans over LIBOR. We do so because the bond issuing-market is reported to be more liquid than the secondary market, which enhances price discovery. In two related studies, Chou et al. (2014) and France et al. (2016) argue that at-issue bond yield spread captures the cost of debt financing more accurately. According to Bao et al. (2011), illiquidity in the secondary market is the most important factor in the pricing decisions of debt securities and the liquidity premium component explains a sizable part of the volatility in bond spreads. Therefore, we choose publicly offered debt over private debt placements to mitigate the pricing influence of secondary market illiquidity.

We identify three mechanisms through which product market competition can affect the relationship between diversification and the cost of debt financing. First, as firms are more vulnerable when competition intensifies, the coinsurance effect hypothesis (Lewellen, 1971) suggests that diversification helps to reduce the default risk for diversified firms by pooling complementary resources among segments. Moreover, coinsurance enables conglomerates to redistribute resources away from one segment to another and facilitate predatory pricing in the latter segment, thereby increasing market power (Villalonga, 2000). Thus, the coinsurance effect hypothesis predicts that the negative association between diversification and the cost of borrowing is stronger for firms facing greater competition. Second, diversified firms have the ability to transfer internal funds to the most promising segment (Stein, 1997; Matsusaka and Nanda, 2002; Mathews and Robinson, 2008). If competition reshapes an industry, a diversified firm can shift resources away from a declining segment towards stronger segments,

depending on whether the intensifying competition undermines industry profitability or signals new investment opportunities. Since this form of "winner picking" is likely to be ex post efficient, we hypothesize that the product market competition amplifies the cost-reduction benefit of diversification for firms with efficient internal capital markets. Third, Tirole (1988) and Bernheim and Whinston (1990) argue that diversification can create value in concentrated markets where a diversified firm can tacitly collude with its diversified rivals who compete with the former in multiple industries, thereby earning extra rents. Since tacit collusion loses its effectiveness when there are more players in the market, we hypothesize that intensifying competition mitigates the cost-reduction benefit of diversification for firms with relatively more multimarket contacts. Taken together, the discussions above suggest that product market competition can affect the relationship between corporate diversification and cost of debt financing through different channels, and hence, the net effect of competition is an empirical question.

In this study we use a sample of 4,339 public bonds issued from 1986 to 2010. We find strong evidence that the negative relationship between corporate diversification and the cost of borrowing is stronger for firms in competitive industries. Following Valta (2012), we construct several proxies for the product market competition using the Herfindahl Hirschman Index in three-digit SIC code industries. Our results show that the average borrowing cost of diversified firms operating in competitive (less-competitive) industries is 60.8 (16.3) basis points lower than that of their single-segment rivals. In the sample, this effect corresponds to cost savings of $1,264,640 ($339,040) per bond per year for an average firm. We find similar results when we use alternative measures of diversification. To alleviate the endogeneity concern of product market competition, we employ a quasi-natural experiment based on tariff rates. We use unexpected reductions of industry-level import tariff rates as an exogenous change in firms' competitive environment. Unexpected tariff rate cuts lower barriers to

international trade, leading to rising penetration of foreign rivals and intensifying competition in domestic industries (Bernard et al., 2006). Using a large panel of tariff data for the manufacturing sector in the US, which spans from 1986-2005, we conduct difference-in-difference tests that specifically examine the bond spreads of diversified firms in the affected industries. We find that the difference in borrowing costs between diversified firms and single-segment firms is much bigger in industries experiencing large tariff cuts. We next replace the diversification proxies with a direct measure of coinsurance based on the firms' cross-divisional cash flows (Duchin 2010). We split the sample into two groups based on their financial strength and find that the impact of competition on the diversification-cost of borrowing is stronger in financially constrained firms. Following Rajan et al. (2000), we construct a measure of the efficiency of internal transfers and find that product market competition affects the 'diversification-cost of borrowing' relationship only in diversified firms who have an efficient internal capital market. We also compute the multimarket contacts of diversified firms and find that the diversification benefit disappears in diversified firms that have a high level of multimarket contacts. We use instrumental variables estimation and Heckman's (1979) two-stage estimation to address the potential endogeneity of diversification and find similar results.

Our findings imply that bondholders are aware of the different characteristics in a diversified firm (e.g., financial constraints, efficiency of internal transfers and number of multimarket contacts), and respond accordingly to changes in the firm's competitive environment. We find that product market competition increases the cost-reduction benefits of diversification in financially constrained firms and firms with efficient internal capital markets, but reduces the diversification benefit in firms with a high level of multimarket contact.

This study contributes to a growing body of research on the cost of debt financing for diversified firms. While there is a plethora of evidence on the relationship between diversification and shareholder value,[10] there is limited evidence regarding the value consequences of diversification from the bondholders' perspective except three recent papers. Hann et al. (2013) document a lower cost of capital for diversified firms because the coinsurance effect helps reduce the systematic risk. Aivazian et al. (2015) show that diversification lowers the cost of bank loans primarily through the coinsurance channel. Franco et al. (2016) document a greater diversification benefit in reducing bond yields when firms provide high-quality segment disclosures. Our study complements this strand of literature by investigating whether and how product market competition affects the relationship between diversification and the cost of borrowing.

Secondly, our study adds to the debate on the costs and benefits of corporate diversification. Despite the substantial empirical literature in corporate diversification, there is still no consensus on its overall effect. Early studies suggest a loss in shareholder value due to diversification (e.g., Lang and Stulz, 1994; Berger and Ofek, 1995), generally referred to as the "diversification discount" by researchers. More recent studies throw doubt on the "diversification discount" (e.g., Campa and Kedia, 2002; Graham et al., 2002) and argue for a diversification premium (Hadlock et al., 2001; Villalonga, 2004a; Dimitrov and Tice, 2006; Tate and Yang, 2015; Anjos and Fracassi, 2015). Our evidence indicates that diversified firms have a lower cost of borrowing than single-segment firms, and the difference is even larger as competition intensifies. Therefore, we add to the debate over the value consequences of diversification from the perspective of bond investors.

Thirdly, we contribute to an under-explored area of the conglomerate literature: the multimarket contacts in diversified firms. Yu and Cannella Jr. (2013) point out that

[10] For an excellent review, see Martin and Sayark (2003).

"diversification and multimarket competition are theoretically inseparable". Although the multimarket competition and corporate diversification has been extensively studied independently, the interaction between these two is "significantly underexplored" (p.98). Their argument highlights the need to link the research of multimarket competition to the diversification studies. Hughes and Oughton (1993) find that multimarket contacts increases profitability using a sample of UK diversified firms in manufacturing sectors. Li and Greenwood (2004) use the Canadian insurance industry data and find that diversification can lead to superior performance through multimarket competition under certain conditions. However, to our knowledge, the empirical evidence on the integrative effects of multimarket contacts and cross-industry diversification is still scarce. This study adds to this area by showing that product market competition can undermine the tacit collusion in conglomerates with multimarket contacts, thereby decreasing the cost-reduction benefit of diversification in the bond market.

The remainder of this chapter is structured as follows: Section 2 develops the hypotheses. Section 3 describes the data and empirical methodology. Section 4 reports our main findings. Section 5 addresses the endogeneity concern of product market competition. Section 6 investigates the channels through which product market competition affects the relationship between corporate diversification and the cost of debt financing. Section 7 addresses the potential endogeneity of corporate diversification and Section 8 concludes the chapter.

4.2 Hypotheses

In this section, we identify three channels through which product market competition can amplify or reduce the cost-reduction benefit of corporate diversification.

4.2.1 The Coinsurance Effect Hypothesis

Diversification matters when the external capital market is not frictionless. As first pointed out by Lewellen (1971), the aggregation of imperfectly correlated segment cash flows reduces the overall cash flow volatility in a diversified firm, leading to a lower probability of defaulting and higher debt capacity. This is recognized as the "coinsurance effect." Hann et al. (2013) corroborates the coinsurance hypothesis by documenting a lower cost of capital for diversified firms because coinsurance helps avoid deadweight losses from financial distress. Valta (2012) argues that product market competition increases a firm's default risk by reducing profits (Tirole, 2006), increasing cash flow volatility (Gaspar and Massa, 2006; Irvine and Pontiff, 2009), intensifying predation risk by rival firms (Bolton and Scharfstein, 1990; Froot et al., 1993), and affecting a firm's liquidation value (Benmelech et al., 2005; Ortiz-Molina and Phillips, 2014).

Taken together, we argue that creditors are sensitive to competitive risks and will value the benefit of the coinsurance effect of diversification in different industry environments. Friction in the market for external finance is likely to worsen in more competitive industries. Expenses will rise substantially as firms spend a significant amount on marketing and research. Profits fall and cash flows become more volatile. Such competitive pressures will disproportionately affect the stand-alone firms who rely more on the external financial market. In contrast, diversified firms have easy access to internal financing because they can pool their complementary resources. Since coinsurance brings forth additional debt capacity, diversified firms are less subject to credit rationing in the external capital market. Therefore, diversified firms are better off than single-segment firms when the product market competition increases. Moreover, coinsurance helps exercise market power because a diversified firm can employ the funds in one segment to facilitate predatory pricing in another, thereby strengthening

itself against its single-segment rivals. Increased market power deters potential competitors, reduces the cash flow volatility driven by intense competition, and consequently mitigates future earning uncertainty. Less uncertainty implies less monitoring costs for bondholders and hence a lower cost of borrowing. Thus, coinsurance provides competitive advantages for diversified firms, and the cost-reduction benefit is greater in more competitive industries. We therefore present our first hypothesis as follows.

H1: The coinsurance hypothesis predicts that the negative association between diversification and the cost of debt is stronger for firms facing greater product market competition. And the effect is more pronounced in financially constrained firms.

4.2.2 The Efficient Internal Capital Market Hypothesis

Researchers have proposed that the diversified firms' headquarters, who have superior information than outside investors, can exercise decision control over capital allocation and promote investment efficiency by distributing internal resources to segments with better growth prospects (e.g., Gertner et al., 1994; Stein, 1997; Maksimovic and Phillips, 2002; Matsusaka and Nanda, 2002). The ability of diversified firms to shift capital internally can be highly beneficial in tough competitive environments. If intensifying competition leads to a drop in profitability and investment opportunities in one segment in a conglomerate, the firm can redistribute resources to less-competitive segments where the returns are higher through the internal capital market. On the other hand, if intensifying competition signals greater profit potential in an industry, the relevant segment can obtain additional funds internally and effectively compete against or drive out rival firms by investing more in R&D or advertising, and consequently increase its market share and business profits. In either case, the conglomerate can engage in 'winner picking' through the internal capital market. Single-segment firms, in contrast, lack alternative investment opportunities or internal

financing when competition intensifies, and hence, are more vulnerable to changes in business conditions than diversified firms. Since diversified firms are able to respond more flexibly through internal capital markets when competition intensifies, they are expected to have lower default risks and hence lower cost of debt financing then single-segment firms in these situations. Moreover, the precondition for a diversified firm to benefit from an internal capital market is that the transfers of funds are efficient. Just a clustering of stand-alone firms operating on their own does not lead to the diversification benefit. Therefore, we propose our second hypothesis.

H2: The efficient internal capital market hypothesis predicts that the negative association between diversification and the cost of debt is stronger for firms facing greater product market competition. And the effect is more pronounced in firms with efficient internal capital markets.

4.2.3 The Multimarket Contact Hypothesis

When at least two companies are in direct competition with one another across several markets, this situation is referred to as multi-market contact (MMC) competition. This can lead to a phenomenon called “mutual forbearance” (Edwards, 1955). It implies that rivalry is reduced because a multimarket firm is less likely to use aggressive tactics when it assumes that its rivals can attack back in the market where the firm initiates the attacks, in the core market of the firm, or even in all of the markets shared by both firms (Gimeno, 1999).

Bernheim and Whinston (1990) develop the formal models that link multi-market contact to tacit collusion (mutual forbearance). They demonstrate that a price reduction by one company may lead to a market wide price war in MMC competition, thus there are high incentives towards tacit collusion in such situations. Hughes and Oughton (1993) extend the MMC analysis to diversified firms and propose that the more industries shared by two conglomerates, the higher the likelihood of tacit collusion, thus

the greater potential for profitability. Tirole (1988) suggest that it is easier to maintain tacit collusion in markets with a small number of players.

Therefore, we argue that diversification is value-enhancing in concentrated industries where multi-market contacts facilitate tacit collusion. However, as more players compete in the market and competition intensifies, tacit collusion fails and economic profits decline. As creditors are rational, the negative effect of the failure of tacit collusion should be reflected in the pricing of bonds issued by diversified firms facing intense competition. Therefore, we propose our third hypothesis.

H3: The multimarket contacts hypothesis predicts that the product market competition undermines tacit collusion among diversified firms and hence can offset the negative association between corporate diversification and the cost of debt when product market competition intensifies. And the effect is more pronounced in firms with more multimarket contacts.

4.3 Data and Empirical Methodology

4.3.1 Data

We begin our sample selection process by collecting data on nonconvertible and fixed rate bonds issued by US firms between 1986 to 2010 from the Securities Data Company (SDC) New Issue database via Thomson One Banker. The database provides information on bond characteristics including issue date, issue size, yield to maturity, coupon and credit ratings. This database has been widely used by researchers to study the cost of debt (Jiang 2008; Chou et al. 2014; Lamoureux and Nejadmalayeri 2015). We use the Compustat Segment file to collect a firm's segment information, including the total number of segments, assets and sales per segment, and industry at the 3-digit SIC code level. We use the Compustat Industrial Annual file to collect firm-level financial information such as book assets, sales, market-to-book ratios, tangibles, and

leverage. We merge the bond data, Compustat Segment data, and Compustat Industrial Annual data to create our bond sample. Next we collect industry concentration ratios (at 3-digit SIC code level) from the Hoberg-Phillips data library.[11] We then combine our bond sample with the industry for each industry and year.

We apply the following sample selection criteria: (1) we drop bonds with missing information on borrower ID (CUSIP), bond pricing, maturity and issuing size. (2) We require that the data be available for each firm in the Compustat Industry Annual file. (3) To measure firm diversification, we require that each firm have non-missing segment industry SIC code, sales and assets in the Compustat Segment file and Compustat Industrial Annual file. (4) Following the diversification literature (e.g., Berger and Ofek, 1995; Duchin, 2010), we exclude firms in the financial sector and firms with financial segments (SIC code between 6000 and 6999). (5) We require that the difference between the total segment sales in a firm from the Compustat Segment file and the annual sales of a firm from the Compustat Industrial Annual file is within 1%. We winsorize the data to exclude outliers. The matching and screening procedure yields a final sample of 4,339 bonds issued from 1986 to 2010. Of the 4,339 bonds issued, 2,118 were made by diversified firms.

4.3.2 Variables and Descriptive Statistics

4.3.2.1 Dependent Variable

The dependent variable in this study is the yield spread of a firm's newly issued bond. It is collectively priced by the creditors and represents the risk premiums that firms are required to pay. The yield spread has been used as a measure of the cost of debt by a number of researchers (e.g., Sengupta 1998, Shi 2003; Jiang 2008; Crabtree and Maher, 2009). It is the difference between a bond's yield to maturity at the time of

[11] We thank Gordon Phillips and Gerard Hoberg for providing access to their product market datasets.

issuance and a Treasury yield with equivalent maturity. Treasury yields are the interest rates paid for treasury securities issued by the US government with varying maturities of up to 30 years. Treasury securities are a low-risk investment option and are widely used as benchmark bonds because they are guaranteed by "the full faith and credit of the U.S. government" (the basics of treasury securities, 2016). The US Treasury publishes the Treasury yields on its website. Following Cremers et al. (2009), we collect the offered yields of treasury securities issued with maturities of 1 to 30 years from the H15 release in the U.S Federal Reserve Board website. We linearly interpolate the offered yields of treasury securities issued within a term of 30 years. We use the 30-year Treasury benchmark if a treasury bond was issued with a term over 30 years. The yield spreads in our sample are expressed in percentage form.

4.3.2.2 Proxies for Corporate Diversification

Following the diversification literature (e.g., Berger and Ofek, 1995; Mansi and Reeb 2002; Aivazian et al., 2015; Franco et al., 2016), we construct three proxies for corporate diversification. First, we define a dummy variable, *DIV3*, which equals 1 if a corporation operates in multiple industry segments (at three-digit SIC code level) in a fiscal year and zero otherwise. Our second measure, *NUMSEG*, counts the number of three-digit SIC code industry segments disclosed by a firm. Our third measure, *SALESHINDEX*, is a modified Herfindahl index using segment sales data. It is defined as: $SALESHINDEX_{it} = 1 - \sum_{j=1}^{N} S_{jit}^2$, where *N* is the number of 3-digit SIC segments of firm *i* in fiscal year *t* and S_{jit} is the ratio of sales in segment *j* to total sales. *SALESHINDEX* equals less than 1 for conglomerates and 0 for stand-alone firms. A higher value of *SALESHINDEX* implies a higher dispersion of sales across different segments and hence indicates a higher level of corporate diversification.

4.3.2.3 Proxies for Product Market Competition

In this study, we construct proxies for the product market competition using the Herfindahl Hirschman Index (HHI). The HHI is well-founded in the theory of industrial organization (Tirole, 1988) and widely used by researchers as a proxy for the intensity of industry competition (Mackay and Phillips, 2005; Giroud and Mueller, 2010; Fresard, 2010). The HHI measures the degree of industry concentration. It is calculated as the sum of squared market shares of each firm in an industry. The market share of each firm is the proportion of sales made by the firm. A lower value of HHI indicates stronger competition.

Specifically, we construct four proxies for the intensity of product market competition. First, we follow Valta (2012) and use the industry level (3-digit SIC code) "fitted Herfindahl Hirschman Index" proposed by Hoberg and Phillips (2010a). The fitted HHI is the predicted value of industry concentration calculated from three databases: manufacturing HHI data from the Department of Commerce; employee data from the Bureau of Labor Statistics and Compustat public-firm-only HHI data.[12] This index includes both private and public firms. The fitted HHI data is collected from the Hoberg and Phillips library website.[13] The firm-level HHI for a diversified company is the weighted average of the segment HHI in the firm, with weights being the proportion of sales made by a segment. To allow for an intuitive interpretation, we categorize the industries by the degree of competition. We create a dummy variable *Competition (Fitted HHI)*, which takes the value of 1 for firms with a HHI in the lowest tercile, and zero otherwise. As a second proxy, we first calculate the sales-weighted HHI for each industry using Compustat data. We then define a dummy variable, *Competition*

[12] The Compustat based HHI only covers public firms. The Department of Commerce Herfindahl data cover both public and private firms but only in the manufacturing industries. The BLS data cover number of employees per firm in both public and private firms in all industries. Therefore, the combination of the three databases is necessary to get a broader HHI that captures both public and private firms in all industries. Hoberg and Phillips (2010a) describe the construction of the fitted HHI.

[13] We thank Gerard Hoberg and Gordon Phillips for providing the data.

(Compustat), which takes the value of 1 for firms with a Compustat based HHI in the lowest tercile, and zero otherwise. We also use the continuous version of the *fitted HHI* as our third proxy for competition. Our fourth proxy is the *C4-Index (Compustat)*, which is defined as the proportion of sales made by the four biggest firms in the industry.

4.3.2.4 Descriptive Statistics

Table 4.1 reports the summary statistics. Panel A of Table 4.1 provides the descriptive statistics for the set of firm-specific characteristics of bond issuers in the sample. The average borrowers have an asset size of $8.52 billion, a market-to-book ratio of 1.74, and leverage of 0.34. Overall, the sample is consistent with the earlier empirical evidence in related studies (Chou et al., 2014; Franco et al., 2016).

Panel B of Table 4.1 reports the descriptive statistics of bond-specific characteristics. The yield spread over LIBOR of the average bond in our sample is 1.88%, with an average maturity of 12.28 years and issue size of $207.82 million. The average credit score for the bonds is 11, equivalent to a "BBB-" rating assigned by Standard and Poor's. The statistics of the bonds in our sample are comparable to the findings in related studies (Qiu and Yu, 2009; Chou et al., 2014; Franco et al., 2016).

Panel C of Table 4.1 reports the summary statistics for the measures of corporate diversification. About 49% of the sample bonds are issued by diversified firms. An average bond issuer in the sample has two business divisions and a modified sales-based Herfindahl index of 0.21. The sample is consistent with the evidence reported by Aivazian et al. (2015) and Franco et al. (2016).

Panel D of Table 4.1 describes the proxies for the intensity of the product market competition. The average borrower in the sample has a fitted HHI of 0.062, a Compustat-based HHI of 0.15 and a Compustat-based C4-Index of 0.14. The evidence

here is comparable to the evidence presented by Hoberg and Phillips (2010a) and Valta (2012).

4.3.2.5 Empirical Methodology

To investigate the impact of product market competition on the cost of borrowing for diversified firms, we follow Qiu and Yu (2009) and Chou et al. (2014) and utilize the following model:

$$\begin{aligned} y_{i,t} = {} & \alpha + \beta_1 Competition_{i,t-1} + \beta_2 Diversification_{i,t-1} \\ & + \beta_3 Competiton_{i,t-1} \times Diversification_{i,t-1} + \beta_4 X_{i,t-1} \\ & + \beta_5 B_{i,t} + \eta_j + \mu_t + \varepsilon_{i,t} \end{aligned} \quad (1)$$

Subscripts *i* and *t* indicate the borrower and the year of bond issuance. The dependent variable $y_{i,t}$ denotes the bond spread of firm *i* in year *t*, measured in percentage terms. The variable $Competition_{i,t-1}$ stands for the measure of product market competition. The variable $Diversification_{i,t-1}$ stands for measure of corporate diversification. The vector $X_{i,t-1}$ controls for and firm-specific features, $B_{i,t}$ controls for bond-specific features, and μ_t and η_j are the year and industry fixed effects respectively. We focus on the interaction term *Competition* × *Diversification*. The coefficient on this interaction term indicates the difference in the impact of competition on the cost of borrowing between single-segment firms and diversified firms. In other words, it suggests how the product market competition affects the relationship between corporate diversification and the cost of borrowing.

Following the earlier research (Klock et al., 2005; Qiu and Yu, 2009), we include several firm-specific characteristic variables that are well-documented determinants of yield spreads. We measure firm specific variables at the end of the fiscal year preceding bond issuance. We use the logarithm of the firm's book asset, denoted as *Log(Asset)*, to capture the firm size. Bigger firms are more likely to obtain more favorable contract terms given that they are less risky. Therefore, firm size is expected to be negatively

related to bond spread. We use Market-to-book to capture a firm's growth opportunities. It is computed as the market value of the firm (book asset –book value of equity + market value of equity) divided by the total assets. High-growth firms are usually more vulnerable to a deterioration of public finance, thus we expect market-to-book ratios to be positively related to bond spread. On the other hand, if high market-to-book ratios indicate greater earning potential, as noted by Fama and French (1995), it should have a negative association with bond spread. *Leverage* is the sum of current and long-term liabilities divided by total assets. Highly leveraged firms generally have higher default risk and, consequently, higher borrowing costs. *Profitability* is the ratio of EBITDA to total assets. High profitability suggests lower default risk and hence a lower yield spread. We follow Qiu and Yu (2009) and define *firm risk* as the volatility of annual operating cash flows (income before extraordinary items plus depreciation and amortization divided by total assets) in the five years prior to bond issuance. *Firm risk* represents earnings risk and is positively associated with bond spread. We also use *Tangibility* (net value of property, plant and equipment divided by total assets) to control for the potential collateral value and the liquidation value in case of a default. More tangible assets indicate a lower cost of debt.

We also include several bond-specific characteristics in our models. *Log (bond maturity*) is the logarithm of years to maturity. Merton (1974) states that the effect of maturity on yield spreads can be ambiguous, depending on the firm risk. Flannery (1986) suggests that bonds with a longer maturity are expected to have a higher default risk, and hence higher borrowing costs. On the other hand, Helwege and Turner (1999) suggest that yield spreads can decrease with maturity because firms with lower risks tend to issue longer term bonds. Since our sample is a pool of bonds of varying credit quality, the impact of bond maturity on yield spread is inconclusive. *Bond size* is total amount of proceeds (in millions) received from the issue. A larger issue size indicates a

heavier debt burden, a higher default risk and hence higher yield spreads. On the other hand, Sengupta (1998) suggests that yield spreads decline with issue size because bonds with larger issue amounts tend to be more liquid. Therefore, the sign of the coefficient on *bond size* is ambiguous. *Rating* is defined as the numerical S&P credit rating of the bond issuer. Ederington et al. (1987) and Ziebart and Reiter (1992) propose that credit ratings convey extra information about a firm's default risk that is not captured by publically available information. We follow Qiu and Yu (2009) and translate the credit ratings into a numerical score,[14] where lower values represent higher credit quality. As such, the variable *Rating* is expected to be positively associated with the yield spread.

4.4 Empirical Results

4.4.1 Preliminary Evidence

We begin our analyses by estimating two OLS models that relate the bond spreads to our proxies for corporate diversification and product market competition separately. Table 4.2 reports the coefficients of the regression on the relationship between diversification and the cost of borrowing. We find that the coefficients on our proxies for diversification are all significant and negative. The economic magnitude is nontrivial. For example, column 1 indicates that the average bond spread of conglomerates is 16.2 basis points lower than single-segment firms. Column 2 suggests that one additional 3-digit SIC segment in a firm decreases the borrowing cost by 7.8 basis points. Column 3 implies that diversification reduces the borrowing costs of an average firm in the sample by 39.6 basis points when the Herfindahl index based on segment sales moves from 0 to 1. The results are consistent with three related papers (Hann el al., 2013; Aivazian et al, 2015; Franco et al., 2016).

[14] The conversion scheme is as follows: 1-AAA+, 2-AAA, 3-AA+, 4-AA, 5-AA–, 6-A+, 7-A, 8-A–, 9-BBB+, 10-BBB, 11-BBB–, 12-BB+,13-BB, 14-BB–, 15-B+,16-B, 17-B–, 18-CCC+,19-CCC, 20-CCC–, 21-CC, 22-C, and 23-D.

Table 4.3 shows estimates from the regressions studying the effect of product market competition on the cost of borrowing. We construct four proxies for the intensity of competition. We find that competition increases the cost of debt financing. For example, column 1 indicates that the average bond spread for firms facing intense competition (fitted HHI in the lowest tercile) is 15.6 basis points higher than firms operating in less-competitive sectors. Column 2 reports similar results using the Compustat based HHI. In columns 3 and 4, we use two continuous measures of industry concentration, *Fitted HHI* and *C4-Index (Compustat)*, in our regressions. Higher values imply greater market concentration in the industry and hence less competition. The coefficient on the *C4-Index (Compustat)* is insignificant. However, the coefficient on *Fitted HHI* is significantly negative, indicating that firms operating in more concentrated (less-competitive) industries obtain cheaper financing. Overall, we show that competition is positively related to the cost of borrowing, which is consistent with the evidence in Valta (2012).

4.4.2 Differences in Bond Spreads: Partitions Based on Competition

In this section we examine whether the intensity of competition affects the relationship between diversification and bond spread differently. We initially conduct a univariate analysis that partitions the entire bond sample into two subsamples. Firms are categorized into a competitive (less-competitive) industry group if their fitted HHI are in (above) the lowest tercile of the sample distribution. We further divide the subsamples by a firm's degree of diversification based on three criteria: 1) single-segment firms and diversified firms; 2) single-segment firms, diversified firms reporting two or three divisions and diversified firms reporting more than three divisions; 3) single-segment firms, diversified firms with a sales-based Herfindahl index between 0 and 0.46, and diversified firms with a sales-based Herfindahl index between 0.46 and 1.

We use the median of the segment numbers (=3) and the median of sales-based Herfindahl index (=0.46) as the cut-off points for diversified firms.

Table 4.4 presents the univariate analysis. First, in both competitive and less-competitive groups, the bond spreads monotonically decrease with a firm's degree of diversification, consistent with conglomerates having cheaper financing. More importantly, we observe that the negative effect of diversification on the cost of debt financing is much stronger for firms operating in competitive industries. For example, according to the "*Diversification Indicator (DIV3)*" panel, corporate diversification reduces the cost of borrowing by 103.5 (34.6) basis points in competitive (less-competitive) industries. Second, within the subsample of competitive industries, we find that a higher degree of diversification leads to further reductions in the cost of borrowing. For example, in column 6 of the "*Number of Industry Segments (NUMSEG)*" panel, the difference in yield spread between a focused firm and a conglomerate reporting two or three segments is 87.3 basis points, and the difference increases to 140.3 (87.3+53.0) basis points when the conglomerate expands into new industries and becomes more diversified. Both differences are statistically significant at 5% or lower based on a t-test. We find similar results in the "*Industrial Herfindahl Index (SALESHINDEX).*" In contrast, within the subsample of less-competitive industries, we do not find strong evidence suggesting that the cost-reduction benefit of diversification increases with the degree of diversification. Taken together, the findings indicate that diversification has greater implications for diversified firms operating in competitive markets.

4.4.3 Baseline Empirical Results

We next study the role of competition by estimating equation (1). In Table 4.5A we report the coefficient estimates using the proxy for competition based on the fitted HHI developed by Hoberg and Phillips (2010a). We define a dummy variable *Competition*

(Fitted HHI) as equal to 1 if a firm is operating in competitive industries (fitted HHI value in the lowest tercile of sample distribution), and zero otherwise. We then interact the dummy variable with our three diversification measures. We find that the coefficients on the interaction terms are significant and negative in all specifications, suggesting that the negative association between corporate diversification and the cost of borrowing is stronger for firms operating in competitive industries. For example, in column 1 of Table 4.5A, the coefficient on *DIV3 × Competition (Fitted HHI)* indicates that diversification reduces the average bond spread by 16.3 basis points for conglomerates in less-competitive industries. In contrast, diversification reduces the spread by 60.8 (16.3+44.5) basis points for diversified firms in competitive industries. Given that the average bond spread in our sample is 1.8844% and average bond size is $208 million, the coefficient indicates a 32.3% reduction in average bond spreads. In cash terms, it corresponds to a cost saving of $1,264,640 for the average diversified firm in competitive industries.

In Table 4.5B, we employ the Compustat-based HHI as another proxy for competition. We define a dummy variable, *Competition (Compustat)*, that takes the value of 1 for firms operating in competitive sectors (Compustat-based HHI in the lowest tercile), and zero otherwise. The results in Table 4.5B are similar to the ones in Table 4.5A, supporting the theory that product market competition increases the cost-reduction benefit of corporate diversification.

In Table 4.5C, we use the fitted HHI in the regression analysis. The fitted HHI is a continuous value and it increases with industry concentration (less competition), and hence, the coefficients on the interaction terms between the diversification measures and *fitted HHI* are positive. For example, in Table 4.5C column 1, the coefficient on the *DIV3 × Fitted HHI* is 3.564, suggesting that a one standard deviation decrease in fitted HHI (more competition) leads to an additional reduction of 10 basis points in the cost of

borrowing for diversified firms, suggesting that firms operating in less concentrated (more competitive) industries benefit more from being diversified, which corroborates the prior findings.

Finally, in Table 4.5D we utilize the C4-Index calculated from Compustat data. The coefficients on the interaction terms between the diversification measures and *C4-Index (Compustat)* are all positive and significant, which is consistent with the evidence in Table 4.5C. Overall, we show that the negative effect of diversification on the cost of borrowing is stronger for firms facing intense competition.

4.5 Endogeneity of Product Market Competition

4.5.1 A Quasi-Experiment: Import Tariff Cuts

To alleviate the concern that firms are able to endogenously shift the competitive environment of an industry, we follow Valta (2012) and examine how bond spreads for diversified firms respond to an unanticipated reduction of import tariff rates. As widely discussed in the literature on trade barriers (Tybout, 2003), the competitive landscape of industries has undergone major changes as a result of trade openness and economic liberalization. Over the past dozens of years, the US government has gradually lowered trade barriers by substantially reducing trade costs, a large portion of which are import tariffs on a wide range of products (Andersen and Van Wincoop, 2004). Bernard et al (2006) demonstrate that diminishing trade barriers substantially intensify competition from foreign competitors. Therefore, import tariff cuts represent exogenous shocks to the competitive environment of a domestic industry which results in increased competitive pressure in domestic firms. A number of papers have used tariff reduction as a quasi-experiment to study the implications of product market competition (e.g.,

Fresard, 2010; Bernard et al., 2011; Valta, 2012; Alimov, 2014; Fresard and Valta, 2016).

We adopt the method used by Fresard (2010) in utilizing a series of large unexpected import tariff reductions at industry level. The US employs the "Harmonized System (HS)" established by "World Customs Organization (WCO)" as the basis for their "import and export classification systems", where each product imported to the US is assigned a 10-digit number HS code (Harmonized system, 2016). Early researchers (Feenstra, 1996; Feenstra et al., 2002; Pierce and Schott, 2009; Schott, 2010) have gradually compile the import data and link tables that convert the HS code into 4-digit SIC code covering a period from 1974 to 2005. Based on the prior work above, Fresard and Valta (2016) compile the industry-year tariff data at the 4-digit SIC code level. They compute the tariff rates as the ratio of total customs duties to the Free-on-Board (FOB) cost of imported products. We obtain the tariff rates data from Laurent Fresard and Philip Valta's webpage.[15] The dataset covers 508 manufacturing industries for the period from 1974 to 2005, 133 of which are matched to Compustat. Since the tariff rates data is compiled at 4-digit SIC industry level, we re-construct our proxies for diversification at the 4-digit SIC industry level.

The tariff data only includes manufacturing industries, so we restrict our study to those industries and require that all the segments of a firm are classified as manufacturing industries (SIC code 2000-3999). Next, for each industry, we compare the annual tariff change to the average change in tariff rates over the period from 1986 to 2005. Following Fresard (2010), Valta (2012), Fresard and Valta (2016), we define a large tariff cut as a reduction exceeding three times the mean absolute change experienced by the industry in the time series data. Since there was a change in the coding system for import products in 1989, we neglect the tariff changes between 1988

[15] We thank Laurent Fresard and Philip Valta for providing the data.

and 1989, as suggested by Fresard (2010). To ensure that the observed cut is not a transitory anomaly, we exclude tariff cuts that are offset with an equally large raise in rates over the following three year period. For a diversified firm, if at least one of its segments underwent a tariff cut in a given year, the firm is considered to have experienced a tariff cut in the corresponding year. We next merge the tariff data with our bond sample. After merging the tariff dataset with our bond sample, we are left with 1,414 observations from 1986 to 2005. There are 8 years in our sample identified as a tariff cut year. The cuts do not cluster in any specific year. About 2.33% of the observations in the sample are identified to have experienced a tariff cut event, the ratio is similar to that in Fresard (2010). Fresard (2010) also demonstrates that tariff reductions are associated with a sharp rise in imports in the affected industries, which justifies the validity of using tariff cuts as a shock to the competitive environment.

4.5.2 Tariff Rate Cuts and Cost of Debt for Diversified Firms

To examine the impact of large tariff cuts on the relationship between corporate diversification and the cost of borrowing, we follow Fresard (2010) and Swanburg (2014) and utilize the following difference in difference estimation:

$$\begin{aligned} y_{i,t} = {} & \alpha + \beta_1 TariffCut_{j,t-1} + \beta_2 Diversification_{i,t-1} \\ & + \beta_3 TariffCut_{j,t-1} \times Diversification_{i,t-1} + \beta_4 X_{i,t-1} \\ & + \beta_5 B_{i,t} + \eta_j + \mu_t + \varepsilon_{i,j,t} \end{aligned} \quad (2)$$

Subscripts i is the firm, j is the industry and t is the year of bond issue. $y_{i,t}$ represents the yield spreads of bonds issued by firm i; and *Diversification* stands for proxies for corporate diversification. We re-construct our proxies for diversification at the 4-digit SIC industry level. *Tariff Cut* is a dummy variable equal to 1 if the industry j underwent a tariff cut in year *t-1*, and zero otherwise. The vector $X_{i,t-1}$ and $B_{i,t}$ represents firm- and bond-specific characteristics. We also include industry fixed effects

(η_j) and year fixed effects (μ_t). Our focus is the coefficient on the interaction term, *Tariff Cut* × *Diversification*, β_3, which indicates the effect of diversification on the cost of borrowing in times of unexpectedly intensified competition.

We show the regression results in Table 4.6A. We find that coefficients on the interaction term *Tariff Cut* × *Diversification* are all negative and significant at 5% or lower. For instance, column 2 suggests that, in times of sudden tariff cuts, the gap in yield spreads between a single-segment firm and a diversified firm widens by 56.2 basis points with the diversified firm expanding into one more industry. This is consistent with our earlier findings, supporting that the negative impact of diversification on the cost of borrowing is stronger for firms facing increased competition.

In Table 4.6B and 4.6C, we conduct robustness checks using an alternative definition for tariff cuts. In Table 4.6B (4.6C), *Tariff Cut* is a dummy variable equal to 1 if the tariff reduction in a given year is three (two) times larger than the median tariff reduction in the same industry during the sample period. In both tables, we find that the coefficients on the interaction terms between diversification and tariff cuts are significant and negative when we use a dummy variable (*DIV4)* to proxy for diversification, or when we use the sales-based Herfindahl index *(SALESHINDEX)* to proxy for diversification. Overall, after addressing the potential endogeneity of competition in a quasi-experimental setting, we continue to find evidence that the negative relationship between diversification and the cost of borrowing is stronger for firms facing intense competition.

4.6 Possible Channels

Our findings suggest that product market competition increases the cost-reduction benefit of diversification. We then conduct a closer examination of the channels through which competition can affect the relationship between diversification and the cost of

borrowing. Specifically, we test the coinsurance effect hypothesis, the efficient internal capital market hypothesis and the multimarket contact hypothesis. We examine whether the effect of competition depends the firm's financial strength, the efficiency of internal transfers, and the level of multimarket contacts.

4.6.1 The Coinsurance Channel

In this section, we test our first hypothesis that the cost of debt financing will be more negatively associated with diversification when competition intensifies because coinsurance facilitates diversified firms to mitigate financial market frictions and create comparative advantage over single-segment firms. Since the benefit of the coinsurance derives from the firm's cross-segment cash flow correlations, we replaced our proxies for corporate diversification with a direct measure of the coinsurance effect on cash flows in the equation.

We construct our measure of the coinsurance effect in cash flows using Duchin's (2010) method. The measure quantifies the reduction in cash flow volatility due to the coinsurance effect. We define cash flow as earnings less interest and taxes, divided by total assets. For each 3-digit code industry, we use the median cash flows of all single-segment firms as the industry cash flow. We then estimate the industry cash flows volatility, defined as the standard deviation of industry cash flows over the sample period rolling from year t-10 to t-1. We require a minimum of five years of non-missing observations within the rolling window. This reduces our sample size from 4,339 to 4,290. Next we estimate the cash flow correlation across all 3-digit SIC code industries. The firm-level inter-segment cash flow volatility of a diversified firm in fiscal year t, denoted by $\sigma(CF)_t$, is computed as follows:

$$\sigma(CF)_t = \sqrt{\sum_{i=1}^{N}\sum_{j=1}^{N} w_i w_j \rho(CF)_{i,j}\,\sigma(CF)_{i,t}\sigma(CF)_{j,t}} \qquad (3)$$

where N is the number of segments in a diversified firm.

$\sigma(CF)_{i,t}$ ($\sigma(CF)_{j,t}$) is the volatility of cash flows of industry i (industry j). We use the average series over the prior ten years [t-10, t-1] to calculate the rolling volatilities for year t.

$\rho(CF)_{i,j}$ is the correlation between the cash flows in industry i and industry j.

w_i (w_j) is the weighting of segment i (segment j) in a diversified firm, which is the ratio of the segment's assets to the total assets of the firm.

The coinsurance across segment cash flows, denoted $COIN\_CF_t$, is calculated as the difference between the volatility in equation (3) and a hypothetical measure of volatility that assumes a correlation of one (perfect correlation) among the cash flows in all segments.

$$COIN\_CF_t = \sqrt{\sum_{i=1}^{N}\sum_{j=1}^{N} w_i w_j 1\,\sigma(CF)_{i,t}\,\sigma(CF)_{j,t}} - \sigma(CF)_t \qquad (4)$$

The variable measures the reduction in cash flow volatility due to the imperfectly correlated divisional cash flows. The variable is positive for diversified firms and zero for single-segment firms. A higher value of $Coinsurance\_CF_t$ indicates a stronger coinsurance effect in cash flows.

Modigliani and Miller (1958) state that the value of a firm is unaffected by how it is financed in a frictionless capital market. Less financially constrained firms can rely on the external capital market without incurring deadweight losses from credit rationing and hence, the degree of diversification will not be a concern. On the other hand, coinsurance help increase debt capacity, thus it would be valuable to financially constrained firms. This suggests that the coinsurance effect of cash flows should stronger for firms with costly external financing. Therefore, if coinsurance generates a larger cost-reduction benefit for diversified firms facing greater competition, we should expect a stronger effect in financially constrained firms.

To examine this conjecture, we split our sample and repeat the regression analysis separately for financially constrained and less-constrained firms. We employ four measures of financial constraints as follows.

1. *SA index*: Hadlock and Pierce (2010) show that size and age are powerful predictors of a firm's financial strength. Young and small firms are generally more financially constrained than mature ones. Therefore, we use the SA index[16] as our first measure of financial constraints. The higher the SA index, the more constrained the firm. We calculate the firm-year SA index and classify a firm as financially constrained (less constrained) if the firm has an above (equal to or below) median SA index in the sample distribution.

2. *WW index*: Whited and Wu (2006) develop the WW index to measure financial constraints. Firms that are small, grow slowly, generate less cash flow and use more equity financing tend to have higher WW indices. For a given firm, we computed the WW index[17] for each fiscal year and categorize it into the financially constrained (less-constrained) group if they have an above (equal to or below) median WW index in the sample distribution.

3. *Pay-out ratios:* Fazzari et al. (1988) suggest that financially constrained firms tend to pay lower dividends to shareholders. We calculate the pay-out ratios as the sum of the dividends and stock repurchases divided by the total assets to proxy for financial

[16] The SA index calculated as $(-0.737 \times \text{Assets} + 0.043 \times \text{Assets}^2 - 0.040 \times \text{Age})$, where Assets is the natural log of inflation-adjusted book assets that is capped at $4.5 billion, and Age is the number of years a firm is listed with a non-missing stock price on Compustat and is capped at 37 years.

[17] The WW index is calculated as $(0.091 \times \text{Cash Flow} - 0.062 \times \text{Dividend Dummy} + 0.021 \times \text{Long Term Debt} - 0.044 \times \text{Size} + 0.102 \times \text{Industry Sales Growth} - 0.035 \times \text{Firm Sales Growth})$. Cash Flow is defined as (operating income plus depreciation) / beginning-of-year book assets. The Dividend Dummy is a variable indicating positive preferred or common dividends. Long Term Debt is calculated as (book value of long term debt) / current book assets. Size is calculated as the log of inflation adjusted assets. Industry sales growth is defined as the most recent annual percentage change in inflation-adjusted three-digit industry sales. Firm sales growth is the firm's most recent annual percentage change in inflation-adjusted sales.

constraints. We assign a firm to the financially constrained (less-constrained) group if its pay-out ratio is less (more) than the mean pay-out ratio in the sample distribution.

4. *Investment-grade vs speculative-grade rating*: Based on a CFO survey aiming to investigate firms' liquidity management during the 2008 financial crisis, Campello et al. (2010) find that credit ratings are the most representative measure of financial constraints. Thus, we use credit ratings as our fourth measure of financial constraints. Following Hann et al. (2013), we categorize a firm as financially constrained or less-constrained based on whether the firm's S&P credit rating is below BBB (speculative-grade) or BBB and above (investment-grade).

We present our results in Table 4.7A-4.7D. First, we find that the coinsurance effect in cash flows reduces the borrowing cost for diversified firms within the financially constrained subsamples. For example, in column 5 and 6 of Table 4.7A, a one-standard deviation increase in the coinsurance effect in cash flows leads to a 8.93 (18.8) basis point reduction in the cost of debt for less-financially-constrained (constrained) firms. Second, and more relevant to our study, we show that the coefficients on the interaction term *COIN_CF* × *Competition* are significant and negative (positive for the competition measures using continuous version of HHI) only in the subsamples of financially constrained firms, indicating that competition affects the relationship between corporate diversification and bond spread for financially constrained firms. Moreover, there is a notable pattern worth mentioning. Across the constrained subsamples, the coefficients on *COIN_CF* are either insignificant or very small compared to the coefficients on *COIN_CF* × *Competition*, indicating that a large portion of the coinsurance benefit goes to the diversified firms that operate in competitive industries. For example, in column 8 of Table 4.7B, the coinsurance effect is absent (not significant) for financially constrained conglomerates operating in less-competitive industries, in contrast, a one standard deviation increase in the coinsurance

effect corresponds to a 32.7 basis point reduction in the cost of borrowing for financially constrained conglomerates operating in competitive industries. This translates into an annual cost saving of $680,160 for an average firm in our sample. In Table 4.7C and 4.7D, we find consistent and more pronounced results when we use the continuous version of HHI as proxies for product market competition. Overall, the findings above support our coinsurance hypothesis.

4.6.2 The Efficiency Internal Capital Market Channel

In this subsection, we examine whether an efficient internal capital market facilitates further reduction in borrowing costs for diversified firms facing greater product market competition in comparison to their single-segment rivals.

Since the efficiency of inter-segment transfers within a diversified firm cannot be observed directly, we follow Rajan et al. (2000) and construct a proxy for the efficiency of inter-segment transfers. First, we compute the cross-divisional transfers within a diversified firm:

$$\frac{I_j}{Asset_j} - \frac{I_j^{ss}}{Asset_j^{ss}} - \sum_{j=1}^{N} w_j \left(\frac{I_j}{Asset_j} - \frac{I_j^{ss}}{Asset_j^{ss}} \right) \tag{5}$$

where j is segment j, ss represents single-segment firms, I_j is capital expenditure, $Asset_j$ is the segment j's asset, w_j is segment j's asset divided by firm total asset, and $\frac{I_j^{ss}}{Asset_j^{ss}}$ is the asset-weighted average capital expenditure-to-asset ratio using only single-segment firms in segment j.

Next, we compute the efficiency of internal transfers. The measure is developed by Rajan et al. (2000) and is computed as follows:

$$\frac{\sum_{j=1}^{N} Asset_j (q_j - \bar{q}) \left(\frac{I_j}{Asset_j} - \frac{I_j^{ss}}{Asset_j^{ss}} - \sum_{j=1}^{N} w_j \left(\frac{I_j}{Asset_j} - \frac{I_j^{ss}}{Asset_j^{ss}} \right) \right)}{TotalAsset} \tag{6}$$

where $\bar{q}$ is the asset-weighted average of segment Tobin's Q, q_j is the asset-weighted Tobin's Q ratio using only single-segment firms in segment *j*. The variable is referred to as the "relative *value added by allocation*" by Rajan et al. (2000) because it indicates the overall value created by the internal allocation policy of a diversified firm. A higher value of the measure suggests greater efficiency of internal transfers made by a diversified firm. The measure is zero for single-segment firms.

Next we split the diversified firm sample into two subsamples based on the efficiency measure. We assign a diversified firm to the inefficient (efficient) subsample if the firm has a negative (positive) efficiency value. We then compare them separately with the single-segment firms. Table 4.8A-4.8D reports the regression results. We find that, within the subsamples of inefficient-transfers, none of the coefficients on the interaction term *Diversification* × *Competition* are significant, except in column 1 of Table 4.8A. In contrast, within the subsamples of efficient-transfers, the coefficients on the interaction term *Diversification* × *Competition* are all significant and negative (positive for the competition measures using a continuous version of HHI), except in column 4 of Table 4.8D. Taken together, the evidence suggests that the ability to efficiently distribute resources across divisions is a necessary condition for product market competition to affect the negative diversification-cost of borrowing relationship. Without an efficient allocation policy, conglomerates in competitive industries do not benefit more from diversification than their single-segment rivals. Moreover, across the subsamples of efficient transfers, the coefficients on Diversification are either insignificant or much smaller than the coefficients on *Diversification* × *Competition*, indicating that a large portion of the efficient ICM benefit goes to the diversified firms that operate in competitive industries. For example, in column 2 of Table 4.8B, the diversification effect is absent (not significant) for efficient conglomerates operating in less-competitive industries, in contrast, the diversification effect leads to a 52.1 basis

point reduction in the cost of borrowing for efficient conglomerates operating in competitive industries. It implies that in competitive industries, an efficient ICM brings about an annual cost saving of $1,083,680 for an average firm in our sample. Overall, the findings support our efficient internal capital market hypothesis.

4.6.3 The Multimarket Contact Channel

So far, we do not find evidence suggesting that product market competition can mitigate the cost-reduction benefit of diversification. However, in the regressions using the number of business segments as a diversification proxy, the coefficients on the interaction term *NUMSEG* × *Competition* are not always significant (see Table 4.5C column 2; Table 4.6A-4.6C column 2; Table 4.8D column 4). Intuitively, as the number of business segments increase, a diversified firm is more likely encounter the same rival in more than one industry, thus the possibility of tacit collusion increases. As argued in section 4.2.3, a higher level of product market competition may undermine tacit collusion. Therefore, if the negative impact of multimarket contact offsets the positive impact of coinsurance and efficient internal capital markets, the coefficients on the interaction term *NUMSEG* × *Competition* may be insignificant. Thus, in this section, we investigate whether multimarket contacts undermine the cost-reduction benefits for diversified firms facing greater product market competition.

We follow prior literature (e.g., Gimeno and Woo, 1999; Gimeno and Jeong, 2001; Dominguez et al., 2016) and construct a simple count measure of multimarket contacts for each firm-year as follows:

$$Average\,MMC_{i,t} = \frac{1}{No.\,of\ \ j}\sum_{j \neq i} MMC_{ij,t} \tag{7}$$

where MMC_{ij} is the number of industries where firm *i* and its multimarket rival *j* meet each other in fiscal year *t*, and *No. of j* is the total number of rival firms that meet firm *i* in at least two industries. For instance, if a diversified firm is competing with two rivals

and meets the first in two industries and the second in three industries in a fiscal year, the measure of multimarket contact would be 2.5 ([2+3]/2). By construction, the minimum value of MMC is two for a diversified firm that has multimarket rivals. We report the descriptive statistics in Table 4.1 Panel A. In our sample, 2,118 bonds were issued by diversified firms, 65.5% (1,388/2,118) of which were issued by those having at least one multimarket rival.

Researchers have argued that there is a MMC threshold above which tacit collusion can be effective (e.g., Baum and Korn, 1999; Haveman and Nonnemaker, 2000; Fuentelsaz and Gómez, 2006). When the MMC is small, retaliatory attacks are not yet significant enough to deter multimarket rivals from acting aggressively. After reaching a certain point of MMC, competitive interconnections become strategically important and facilitate tacit collusion. Therefore, we expect that, among the diversified firms that have multimarket contacts, the negative impact of product market competition is more likely to be found in the diversified firms that have a high value of MMC.

Thus, we split the sample of multimarket firms into two groups based on the value of MMC. We assign a diversified firm into the high (low) MMC group if the firm has a MMC above (equal to or below) the median value of MMC in the sample. We then compare them separately with the single-segment firms. Table 4.9A-4.9D provide the results.

We find that the coefficients of the interaction term *Diversification* × *Competition* are significant and negative (positive for the competition measures using continuous version of HHI) only in the subsamples of low MMC. For example, column 4 of Table 4.9A indicates that, for diversified firms with a low value of MMC (a situation where there is low possibility for tacit collision), with the diversified firm operating in one more segment, the gap in yield spreads between a single-segment firm and a diversified firm widens by 17.2 basis points when competition intensifies. In contrast, based on

column 3 of Table 4.9A, for diversified firms with a high value of MMC (high possibility for tacit collision), the diversification benefit disappears, implying that as competition intensifies, the negative effect of multimarket contacts (tacit collusion falls apart in the presence of intense competition) offsets the positive effect of coinsurance and efficient internal capital markets. Consequently, diversified firms no longer obtain cheaper financing than their single-segment rivals. We find similar results in Table 4.9C-4.9D. Overall, the evidence supports our multimarket contact hypothesis.

4.7 Robustness Check

In section 4.5 we addressed the endogeneity of product market competition. However, another concern in our regression specification is the endogeneity of diversification, that unobservable factors may affect both the diversification decision and the cost of borrowing. Although the diversification measures, *NUMSEG* and *SALESHINDEX*, capture the degree of diversification and partially mitigate the concern, in this section we implement two additional robustness tests to address the endogeneity concern.

4.7.1 Instrumental Variables Estimation

We initially use the two-stage instrumental variable estimation. Following Campa and Kedia (2002) and Aivazian et al. (2015), we use *PNDIV* and *PSDIV* as exogenous variables to predict the probability that a firm choose to engage in diversification. *PNDIV* is the fraction of the number of firms that are diversified in the same 3-digit SIC industry (excluding the sample firms). *PSDIV* is the fraction of sales made by diversified firms in the same industry (excluding sample firms). These two variables capture the attractiveness of an industry to diversified firms and are widely used by researchers to generate the instrument for diversification (see Dimitrov and Tice, 2006; Hann et al., 2013). Since we exclude sample firms from the computation, these two

variables are less likely to be correlated with unobservable factors that might be related to both diversification and the cost of borrowing. In implementing the IV process, we first regress the diversification proxy *DIV3*, which is a dummy variable, on *PNDIV* and *PSDIV* together with other control variables in equation (1). The predicted probability of diversification is the generated instrument. We report the coefficient estimates of the first-stage regressions in column 1-4 of Table 4.10. We show that the coefficients of *PNDIV* and *PSDIV* are both positive and significant. In the next stage, we follow Dimitrov and Tice (2006) and combine the instruments for *DIV3* with Competition measures and use them to generate the instrumental variables for *DIV3* × *Competition*. We then repeat our estimation of equation (1) using the instrumented proxies. We report the second-stage regression results in Column 1-4 of Table 4.11A. We observe that the coefficients on the instrumented variables *DIV3* × *Competition* are similar to the early results reported in column 1 of Table 4.5A-4.5D and statistically significant.

Franco et al. (2013) state that *PNDIV* and *PSDIV* qualify as instruments as long as the characteristics of the industries appealing to diversified firms (e.g., industry credit risk) do not affect the borrowing costs of individual firms. To address this concern, we follow Franco et al. (2013) and use a modified version of *PNDIV* and *PSDIV*. We re-calculate these two variables using diversified firms who have a leverage ratio less than 5% or at least an "A-" S&P credit rating. The diversification propensity of firms with very low credit risk is unlikely to be correlated with bond spreads, and hence, is a valid instrument. Column 5-8 of Table 4.10 reports the results of the first-stage regression results. We show that the coefficients on *PNDIV_Modified* and *PSDIV_Modified* remain positive and significant. We repeat the second-stage IV analysis using the modified instruments and report the results in Table 4.11B Column 1-4. We continue to find that the coefficients of *DIV3* × *Competition* are significantly negative (positive for the competition measures using continuous version of HHI).

4.7.2 Heckman's (1979) Two-Stage Estimation

We employ Heckman's (1979) two-stage model to address self-selection. First, as in the first-stage analysis of the instrumental variable process, we run a probit model for the likelihood that a firm may decide to diversify. We calculate the inverse Mills ratio (*Lambda)* from the probit regression and include it in the second-stage estimation as an additional explanatory variable. We present the coefficient estimates of the second-stage regressions in column 5-8 of Table 4.11A and Table 4.11B. We find that the coefficients on the interaction term *DIV3* × *Competition* are similar to the prior findings in this study, both qualitatively and quantitatively. For example, column 6 of Table 4.11A indicates that the product market competition widens the gap in yield spreads between single-segment firms and diversified firms from 36.5 basis points to 79.3 (0.365+0.428) basis points. Overall, the evidence corroborates our main findings after controlling for endogeneity.

4.8 Conclusion

This chapter examines the impact of product market competition on the association between diversification and the cost of borrowing. We formulate three hypotheses based on the coinsurance effect, the efficient internal capital markets and the multimarket contacts in diversified firms. We find that the negative association between diversification and the cost of debt financing is stronger when there are high levels of product market competition. We exploit a quasi-experiment by using the tariff rate cuts as exogenous shocks to the competitive environment. We show that our findings are unlikely to be driven by endogenous competition strategies. We find that the impact of competition on the diversification-cost of borrowing relationship is stronger in firms that are financially constrained or make efficient cross-divisional transfers. However, the impact of competition is mitigated in diversified firms with relatively more multimarket contacts. Our results indicate that the cost-reducing effect of coinsurance

and efficient internal capital markets dominate the cost-increasing effect of multimarket contacts. We use instrumental variables estimation and Heckman's (1979) two-stage estimation to address the potential endogeneity of diversification and continue to find consistent results. This study provides unique evidence that product market competition affects the relationship between diversification and the cost of borrowing. In particular, we show that bondholders take into consideration how the competitive landscape of an industry interacts with the potential benefits and costs of diversification and how such interactions ultimately affect the cost of borrowing for diversified firms. Although intense competition may undermines the benefit of multimarket contacts in some cases, overall, the negative association between diversification and the cost of debt financing is stronger when product market competition intensifies.

Table 4.1 Descriptive Statistics

This table provides the summary statistics. This sample consists of 4,339 bonds issued by US firms from 1986 to 2010. *Asset* is book value of total assets (in billions). *Market-to-book* is market value of the firm (total asset – book value of equity + market value of equity) divided by total asset. *Leverage* is the ratio of debt to total assets. *Profitability* is the ratio of EBITDA to total assets. *Firm risk* is the standard deviation of annual cash flows from operations (income before extraordinary items plus depreciation and amortization, normalized by total assets) over the past five years prior to bond issuance. *Tangibility* is the ratio of property, plant and equipments (net) to total assets. *COIN_CF* is the cash-flow coinsurance measure, constructed following Duchin (2010). *Efficiency of transfers* is the overall efficiency of internal transfer of a diversified firm, constructed following Rajan et al. (2000). *MMC* is the average number of industries shared by a diversified firm and its multimarket rivals (see text for more details). *Bond spread* is defined as the yield to maturity of the corporate bond minus the yield to maturity of a Treasury security of similar maturity, expressed in percentage terms. *Maturity* is the bond's maturity in years. *Issue proceeds* is total amount of proceeds (in millions) received from the issue. *Rating* is the numerical S&P credit rating of the bond issue, where smaller numbers mean higher credit quality. *DIV3* is a dummy variable equal to 1 if a firm operates in more than one 3-digit SIC code industry, and zero otherwise. *NUMSEG* is the number of 3-digit SIC code segments reported in Compustat Segment database. *SALESHINDEX* is one minus the sum of the squares of each segment sales (at 3-digit SIC code level) over the firm's total sales. *Fitted HHI* is Herfindahl-Hirschman Index at 3-digit SIC code level from Hoberg and Phillips (2010a). It is a measure of industry concentration that covers private and public firms in all industries by combing Compustat data with Herfindahl data from the Commerce Department and employee data from the Bureau of Labor Statistics (BLS). *Competition (Fitted HHI)* is a dummy variable equal to 1 if the Herfindahl-Hirschman Index from Hoberg and Phillips (2010a) is in the lowest terciles of the sample distribution, and zero otherwise. *Compustat HHI* is sales-weighted Herfindahl-Hirschman for each industry using Compustat data only. *Competition (Compustat)* is a dummy variable equal to 1 if the Herfindahl-Hirschman Index computed based on Compustat data is in the lowest terciles of the sample distribution, and zero otherwise. *C4-Index (Compustat)* is the sum of the market shares of the four largest firms in an industry based on Compustat data. For a diversified firm, the firm level HHI is the sales weighted average of all business segment HHI (at 3-digit SIC code level).

Panel A: Firm Characteristics

	N	Mean	Median	Std. Dev.	25th Percentile	75th Percentile
Asset (in billions)	4339	8.5174	3.6217	13.1924	1.2024	10.1616
Market-to-Book	4339	1.7420	1.4748	0.8824	1.2070	1.9506
Leverage	4339	0.3414	0.3241	0.1714	0.2286	0.4232
Profitability	4339	0.1504	0.1498	0.0691	0.1104	0.1898
Firm risk	4339	0.0312	0.0213	0.0357	0.0115	0.0347
Tangibility	4339	0.4457	0.4138	0.2381	0.2628	0.6337
COIN_CF × 100	4290	0.4390	0.0000	0.7321	0.0000	0.6249
Efficiency of transfers (diversified firms)	2118	-0.0016	-0.0006	0.0096	-0.0036	0.0006
MMC (firms having multimarket contacts)	1388	2.0556	2.0000	0.0998	2.0000	2.0972

Panel B: Bond Characteristics

	N	Mean	Median	Std. Dev.	25th Percentile	75th Percentile
Bond spread (in %)	4339	1.8844	1.4100	1.8709	0.6452	2.7113
Maturity years	4339	12.2789	10.1400	10.4476	7.0900	12.1600
Issue proceeds (in millions)	4339	207.8167	149.9250	219.0001	86.6850	250.0000
Rating	4339	11.0565	10.0000	5.4144	7.0000	15.0000

Panel C: Proxies for Corporate Diversification

	N	Mean	Median	Std. Dev.	25th Percentile	75th Percentile
DIV3	4339	0.4881	0.0000	0.4999	0.0000	1.0000
NUMSEG	4339	1.9811	1.0000	1.2614	1.0000	3.0000
SALESHINDEX	4339	0.2127	0.0000	0.2591	0.0000	0.4529

Panel D: Proxies for Product Market Competition

	N	Mean	Median	Std. Dev.	25th Percentile	75th Percentile
Fitted HHI	4339	0.0623	0.0581	0.0279	0.0465	0.0727
Competition (Fitted HHI)	4339	0.3300	0.0000	0.4703	0.0000	1.0000
Compustat HHI	4339	0.1526	0.1263	0.1141	0.0820	0.1833
Competition (Compustat)	4339	0.3284	0.0000	0.4697	0.0000	1.0000
C4-Index (Compustat)	4339	0.1396	0.1127	0.1183	0.0630	0.1722

Table 4.2 Corporate Diversification and the Bond Spreads

This table provides the results of regressions which examine the effect of diversification on the cost of borrowing. The dependent variable, *bond spread*, is defined as the yield to maturity of the corporate bond minus the yield to maturity of a Treasury security of similar maturity, expressed in percentage terms. *DIV3* is a dummy variable equal to 1 if a firm operates in more than one 3-digit SIC code industry, and zero otherwise. *NUMSEG* is the number of 3-digit SIC code segments reported in Compustat Segment database. *SALESHINDEX* is one minus the sum of the squares of each segment sales (at 3-digit SIC code level) over the firm's total sales. *Asset* is book value of total assets. *Market-to-book* is market value of the firm (total asset – book value of equity + market value of equity) divided by total asset. *Leverage* is the ratio of debt to total assets. *Profitability* is the ratio of EBITDA to total assets. *Firm risk* is the standard deviation of annual cash flows from operations (income before extraordinary items plus depreciation and amortization, normalized by total assets) for the past five years prior to bond issuance. *Tangibility* is the ratio of property, plant and equipments (net) to total assets. *Bond maturity* is the bond's maturity in years. *Bond size* is total amount of proceeds (in millions) received from the issue. *Rating* is the numerical S&P credit rating of the bond issue, where smaller numbers mean higher credit quality. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	Bond Spread		
	DIV3	NUMSEG	SALESHINDEX
	(1)	(2)	(3)
Intercept	10.055***	9.932***	9.911***
	(0.01)	(0.01)	(0.01)
DIV3	-0.162***		
	(0.01)		
NUMSEG		-0.078***	
		(0.01)	
SALESHINDEX			-0.396***
			(0.01)
Log (Asset)	-0.428***	-0.419***	-0.421***
	(0.01)	(0.01)	(0.01)
Market-to-Book	-0.233***	-0.236***	-0.237***
	(0.01)	(0.01)	(0.01)
Leverage	2.054***	2.035***	2.039***
	(0.01)	(0.01)	(0.01)
Profitability	-3.132***	-3.147***	-3.090***
	(0.01)	(0.01)	(0.01)
Firm risk	7.666***	7.675***	7.663***
	(0.01)	(0.01)	(0.01)
Tangibility	-0.185**	-0.180**	-0.207**
	(0.034)	(0.04)	(0.02)
Log(bond maturity)	-0.071**	-0.072**	-0.073**
	(0.02)	(0.02)	(0.02)
Bond size	0.217***	0.217***	0.217***
	(0.01)	(0.01)	(0.01)
Rating	0.052***	0.053***	0.052***
	(0.01)	(0.01)	(0.01)
Year & Industry Fixed Effects	Yes	Yes	Yes
No. of Observations	4,339	4,339	4,339
Adj. R^2	0.442	0.442	0.443

Table 4.3 Product Market Competition and the Bond Spreads

This table presents coefficient estimates of regressions which examine the effect of competition on bond spreads. The dependent variable, *bond spread*, is defined as the yield to maturity of the corporate bond minus the yield to maturity of a Treasury security of similar maturity, expressed in percentage terms. *Competition (Fitted HHI)* is a dummy variable equal to 1 if the fitted HHI is in the lowest terciles of the sample distribution, and zero otherwise. The *Fitted HHI* is Herfindahl-Hirschman Index at 3-digit SIC code level from Hoberg and Phillips (2010a). It is a measure of industry concentration that covers private and public firms in all industries by combing Compustat data with Herfindahl data from the Commerce Department and employee data from the Bureau of Labor Statistics (BLS). *Competition (Compustat)* is a dummy variable equal to one if the Herfindahl-Hirschman Index computed based on Compustat data is in the lowest terciles of the sample distribution, and zero otherwise. *C4-Index (Compustat)* is the sum of the market shares of the four largest firms in an industry based on Compustat data. For a diversified firm, the firm level HHI is the sales weighted average of all business segment HHI (at 3-digit SIC code level). *Asset* is book value of total assets. *Market-to-book* is market value of the firm (total asset – book value of equity + market value of equity) divided by total asset. *Leverage* is the ratio of debt to total assets. *Profitability* is the ratio of EBITDA to total assets. *Firm risk* is the standard deviation of annual cash flows from operations (income before extraordinary items plus depreciation and amortization, normalized by total assets) for the past five years prior to bond issuance. *Tangibility* is the ratio of property, plant and equipments (net) to total assets. *Bond maturity* is the bond's maturity in years. *Bond size* is total amount of proceeds (in millions) received from the issue. *Rating* is the numerical S&P credit rating of the bond issue, where smaller numbers mean higher credit quality. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	Bond Spread			
	Competition (Fitted HHI)	Competition (Compustat)	Fitted HHI	C4-Index Compustat)
	(1)	(2)	(3)	(1)
Intercept	17.068***	17.263***	13.222***	17.667***
	(0.01)	(0.01)	(0.01)	(0.01)
Competition (Fitted HHI)	0.156***			
	(0.01)			
Competition (Compustat)		0.138***		
		(0.01)		
Fitted HHI			-1.125**	
			(0.04)	
C4-Index (Compustat)				-0.090
				(0.58)
Log (Asset)	-0.857***	-0.863***	-0.725***	-0.876***
	(0.01)	(0.01)	(0.01)	(0.01)
Market-to-Book	-0.208***	-0.211***	-0.175***	-0.272***
	(0.01)	(0.01)	(0.01)	(0.01)
Leverage	2.319***	2.330***	2.084***	2.336***
	(0.01)	(0.01)	(0.01)	(0.01)
Profitability	-1.803***	-1.830***	-1.579***	-1.615***
	(0.01)	(0.01)	(0.01)	(0.01)
Firm risk	2.517***	2.458***	2.565***	2.520***
	(0.01)	(0.01)	(0.01)	(0.01)
Tangibility	-0.226***	-0.267***	-0.224***	-0.223***
	(0.01)	(0.01)	(0.01)	(0.01)
Log(bond maturity)	0.001	0.004	0.015	-0.006
	(0.96)	(0.877)	(0.34)	(0.84)
Bond size	0.194***	0.190***	0.231***	0.191***
	(0.01)	(0.01)	(0.01)	(0.01)
Rating	0.092***	0.093***	0.108***	0.092***
	(0.01)	(0.01)	(0.01)	(0.01)
Year & Industry Fixed Effects	Yes	Yes	Yes	Yes
No. of Observations	4,339	4,339	4,339	4,339
Adj. R^2	0.478	0.477	0.443	0.478

Table 4.4 The Impact of Competition on the Bond Spreads of Diversified Firms – Univariate Analysis

This table provides the average bond spreads across single-segment firms and diversified firms, the number 3-digit SIC code business segments, and the sales-based Herfindahl index, conditioned on the level of competition. *DIV3* is a dummy variable equal to 1 if a firm operates in more than one 3-digit SIC code industry, and zero otherwise. *NUMSEG* is the number of 3-digit SIC code segments reported in Compustat Segment database. *SALESHINDEX* is one minus the sum of the squares of each segment sales (at 3-digit SIC code level) over the firm's total sales. Firms are assigned to the '*Competitive Industry'* group if the firms' fitted HHI from Hoberg and Phillips (2010a) is in the lowest terciles of the sample. The rest of the firms are assigned to the '*Less-competitive Industry'* group. The *Difference* column provides the difference in bond spreads between the average bond spread and the average bond spread reported in the line above, within the same diversification proxy. The sample period is between 1986 and 2010. Asterisks (***, **, *) denote the statistical significance levels of the difference reported at the 1%, 5%, or 10% level, respectively, using a t-test.

	Less-competitive Industry			Competitive Industry		
	N	Mean Spread	Difference	N	Mean Spread	Difference
	(1)	(2)	(3)	(4)	(5)	(6)
Diversification Indicator (DIV3)						
Single-segment firms	1389	1.872		832	2.708	
Diversified firms	1518	1.526	-0.346***	600	1.673	-1.035***
Number of Industry Segments(NUMSEG)						
1 segments	1389	1.872		832	2.708	
2-3 segments	1112	1.577	-0.295***	454	1.835	-0.873***
>3 segments	406	1.076	-0.501*	146	1.304	-0.530***
Industrial Herfindahl Index (SALESHINDEX)						
Equal to 0	1389	1.890		832	2.708	
Between 0 and 0.46	733	1.658	-0.233***	326	1.898	-0.810***
Between 0.46 and 1	785	1.233	-0.425	274	1.328	-0.569**

Table 4.5A The Impact of Product Market Competition on the Relationship between Corporate Diversification and Bond Spreads: Regression Analysis Based on Competition (Fitted HHI)

This table examines the effect of competition on the relationship between diversification and bond spreads. The dependent variable, *bond spread*, is defined as the yield to maturity of the corporate bond minus the yield to maturity of a Treasury security of similar maturity, expressed in percentage terms. *DIV3* is a dummy variable equal to 1 if a firm operates in more than one 3-digit SIC code industry, and zero otherwise. *NUMSEG* is the number of 3-digit SIC code segments reported in Compustat Segment database. *SALESHINDEX* is one minus the sum of the squares of each segment sales (at 3-digit SIC code level) over the firm's total sales. *Competition (Fitted HHI)* is a dummy variable equal to 1 if the Herfindahl-Hirschman Index from Hoberg and Phillips (2010a) is in the lowest terciles of the sample distribution, and zero otherwise. The Herfindahl-Hirschman Index at the 3-digit SIC code industry level from Hoberg and Phillips (2010a) is a measure of industry concentration that covers private and public firms in all industries by combing Compustat data with Herfindahl data from the Commerce Department and employee data from the Bureau of Labor Statistics (BLS). For a diversified firm, the firm level HHI is the sales weighted average of all business segment HHI (at 3-digit SIC code level). *Asset* is book value of total assets. *Market-to-book* is market value of the firm (total asset – book value of equity + market value of equity) divided by total asset. *Leverage* is the ratio of debt to total assets. *Profitability* is the ratio of EBITDA to total assets. *Firm risk* is the standard deviation of annual cash flows from operations (income before extraordinary items plus depreciation and amortization, normalized by total assets) for the past five years prior to bond issuance. *Tangibility* is the ratio of property, plant and equipments (net) to total assets. *Bond maturity* is the bond's maturity in years. *Bond size* is total amount of proceeds (in millions) received from the issue. *Rating* is the numerical S&P credit rating of the bond issue, where smaller numbers mean higher credit quality. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	Bond Spread		
	DIV3	NUMSEG	SALESHINDEX
	(1)	(2)	(3)
Intercept	19.397***	19.134***	19.267***
	(0.01)	(0.01)	(0.01)
DIV3	-0.163***		
	(0.01)		
DIV3 × Competition (Fitted HHI)	-0.445***		
	(0.01)		
NUMSEG		-0.139***	
		(0.01)	
NUMSEG × Competition (Fitted HHI)		-0.111***	
		(0.01)	
SALESHINDEX			-0.649***
			(0.01)
SALESHINDEX × Competition (Fitted HHI)			-0.506***
			(0.01)
Competition (Fitted HHI)	0.337***	0.337***	0.220***
	(0.01)	(0.01)	(0.01)
Log (Asset)	-0.957***	-0.932***	-0.945***
	(0.01)	(0.01)	(0.01)
Market-to-Book	-0.238***	-0.241***	-0.241***
	(0.01)	(0.01)	(0.01)
Leverage	2.392***	2.344***	2.351***
	(0.01)	(0.01)	(0.01)
Profitability	-2.384***	-2.489***	-2.320***
	(0.01)	(0.01)	(0.01)
Firm risk	3.107***	3.107***	3.134***
	(0.01)	(0.01)	(0.01)
Tangibility	-0.264***	-0.248***	-0.311***
	(0.01)	(0.01)	(0.01)
Log(bond maturity)	-0.014	-0.024	-0.022
	(0.68)	(0.49)	(0.51)
Bond size	0.171***	0.170***	0.172***
	(0.01)	(0.01)	(0.01)
Rating	0.092***	0.092***	0.091***
	(0.01)	(0.01)	(0.01)
Year & Industry Fixed Effects	Yes	Yes	Yes
No. of Observations	4,339	4,339	4,339
Adj. R^2	0.432	0.435	0.434

Table 4.5B The Impact of Product Market Competition on the Relationship between Corporate Diversification and Bond Spreads: Regression Analysis based on Competition (Compustat)

This table examines the effect of competition on the relationship between diversification and bond spreads. The dependent variable, *bond spread*, is defined as the yield to maturity of the corporate bond minus the yield to maturity of a Treasury security of similar maturity, expressed in percentage terms. *DIV3* is a dummy variable equal to 1 if a firm operates in more than one 3-digit SIC code industry, and zero otherwise. *NUMSEG* is the number of 3-digit SIC code segments reported in Compustat Segment database. *SALESHINDEX* is one minus the sum of the squares of each segment sales (at 3-digit SIC code level) over the firm's total sales. *Competition (Compustat)* is a dummy variable equal to one if the Herfindahl-Hirschman Index computed based on Compustat data is in the lowest terciles of the sample distribution, and zero otherwise. For a diversified firm, the firm level HHI is the sales weighted average of all business segment HHI (at 3-digit SIC code level). *Asset* is book value of total assets. *Market-to-book* is market value of the firm (total asset – book value of equity + market value of equity) divided by total asset. *Leverage* is the ratio of debt to total assets. *Profitability* is the ratio of EBITDA to total assets. *Firm risk* is the standard deviation of annual cash flows from operations (income before extraordinary items plus depreciation and amortization, normalized by total assets) for the past five years prior to bond issuance. *Tangibility* is the ratio of property, plant and equipments (net) to total assets. *Bond maturity* is the bond's maturity in years. *Bond size* is total amount of proceeds (in millions) received from the issue. *Rating* is the numerical S&P credit rating of the bond issue, where smaller numbers mean higher credit quality. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	Bond Spread		
	DIV3	NUMSEG	SALESHINDEX
	(1)	(2)	(3)
Intercept	10.567***	10.087***	10.443***
	(0.01)	(0.01)	(0.01)
DIV3	-0.053		
	(0.33)		
DIV3 × Competition (Compustat)	-0.401***		
	(0.01)		
NUMSEG		-0.061***	
		(0.01)	
NUMSEG × Competition (Compustat)		-0.085**	
		(0.04)	
SALESHINDEX			-0.274***
			(0.01)
SALESHINDEX × Competition (Compustat)			-0.609***
			(0.01)
Competition (Compustat)	0.211***	0.214**	0.141**
	(0.01)	(0.02)	(0.01)
Log (Asset)	-0.451***	-0.429***	-0.444***
	(0.01)	(0.01)	(0.01)
Market-to-Book	-0.168***	-0.153***	-0.170***
	(0.01)	(0.01)	(0.01)
Leverage	2.125***	2.084***	2.109***
	(0.01)	(0.01)	(0.01)
Profitability	-3.589***	-3.580***	-3.547***
	(0.01)	(0.01)	(0.01)
Firm risk	2.774***	2.781***	2.811***
	(0.01)	(0.01)	(0.01)
Tangibility	-0.183*	-0.159*	-0.202**
	(0.05)	(0.08)	(0.03)
Log(bond maturity)	-0.094***	-0.114***	-0.098***
	(0.01)	(0.01)	(0.01)
Bond size	0.220***	0.222***	0.219***
	(0.01)	(0.01)	(0.01)
Rating	0.058***	0.063***	0.059***
	(0.01)	(0.01)	(0.01)
Year & Industry Fixed Effects	Yes	Yes	Yes
No. of Observations	4,339	4,339	4,339
Adj. R^2	0.475	0.489	0.475

Table 4.5C The Impact of Product Market Competition on the Relationship between Corporate Diversification and Bond Spreads: Regression Analysis based on Fitted HHI

This table examines the effect of competition on the relationship between diversification and bond spreads. The dependent variable, *bond spread*, is defined as the yield to maturity of the corporate bond minus the yield to maturity of a Treasury security of similar maturity, expressed in percentage terms. *DIV3* is a dummy variable equal to 1 if a firm operates in more than one 3-digit SIC code industry, and zero otherwise. *NUMSEG* is the number of 3-digit SIC code segments reported in Compustat Segment database. *SALESHINDEX* is one minus the sum of the squares of each segment sales (at 3-digit SIC code level) over the firm's total sales. *Fitted HHI* is Herfindahl-Hirschman Index at the 3-digit SIC code industry level from Hoberg and Phillips (2010a). It is a measure of industry concentration that covers private and public firms in all industries by combing Compustat data with Herfindahl data from the Commerce Department and employee data from the Bureau of Labor Statistics (BLS). For a diversified firm, the firm level HHI is the sales weighted average of all business segment HHI (at 3-digit SIC code level). *Asset* is book value of total assets. *Market-to-book* is market value of the firm (total asset – book value of equity + market value of equity) divided by total asset. *Leverage* is the ratio of debt to total assets. *Profitability* is the ratio of EBITDA to total assets. *Firm risk* is the standard deviation of annual cash flows from operations (income before extraordinary items plus depreciation and amortization, normalized by total assets) for the past five years prior to bond issuance. *Tangibility* is the ratio of property, plant and equipments (net) to total assets. *Bond maturity* is the bond's maturity in years. *Bond size* is total amount of proceeds (in millions) received from the issue. *Rating* is the numerical S&P credit rating of the bond issue, where smaller numbers mean higher credit quality. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	Bond Spread		
	DIV3	NUMSEG	SALESHINDEX
	(1)	(2)	(3)
Intercept	19.839***	19.812***	19.129***
	(0.01)	(0.01)	(0.01)
DIV3	-0.537***		
	(0.01)		
DIV3 × Fitted HHI	3.564**		
	(0.03)		
NUMSEG		-0.228***	
		(0.01)	
NUMSEG × Fitted HHI		0.531	
		(0.41)	
SALESHINDEX			-1.048***
			(0.01)
SALESHINDEX × Fitted HHI			8.248**
			(0.02)
Fitted HHI	-2.249**	-2.449*	-0.643
	(0.04)	(0.09)	(0.46)
Log (Asset)	-0.966***	-0.985***	-0.764***
	(0.01)	(0.01)	(0.01)
Market-to-Book	-0.231***	-0.426***	-0.132***
	(0.01)	(0.01)	(0.01)
Leverage	2.407***	2.223***	1.545***
	(0.01)	(0.01)	(0.01)
Profitability	-2.418***	-1.968***	-2.529***
	(0.01)	(0.01)	(0.01)
Firm risk	3.122***	3.556***	2.233***
	(0.01)	(0.01)	(0.01)
Tangibility	-0.262***	-0.294***	-0.057
	(0.01)	(0.01)	(0.51)
Log(bond maturity)	-0.015	-0.068**	-0.191***
	(0.66)	(0.04)	(0.01)
Bond size	0.169***	0.169***	0.165***
	(0.01)	(0.01)	(0.01)
Rating	0.093***	0.107***	0.049***
	(0.01)	(0.01)	(0.01)
Year & Industry Fixed Effects	Yes	Yes	Yes
No. of Observations	4,339	4,339	4,339
Adj. R^2	0.429	0.435	0.465

Table 4.5D The Impact of Product Market Competition on the Relationship between Corporate Diversification and Bond Spreads: Regression Analysis based on C4-Index (Compustat)

This table provides coefficient estimates of regressions which examine the effect of competition on the relationship between diversification and bond spreads. The dependent variable, *bond spread*, is defined as the yield to maturity of the corporate bond minus the yield to maturity of a Treasury security of similar maturity, expressed in percentage terms. *DIV3* is a dummy variable equal to 1 if a firm operates in more than one 3-digit SIC code industry, and zero otherwise. *NUMSEG* is the number of 3-digit SIC code segments reported in Compustat Segment database. *SALESHINDEX* is one minus the sum of the squares of each segment sales (at 3-digit SIC code level) over the firm's total sales. *C4-Index (Compustat)* is the sum of the market shares of the four largest firms in an industry based on Compustat data. For a diversified firm, the firm level HHI is the sales weighted average of all business segment HHI based on 3-digit SIC code industry. For a diversified firm, the firm level HHI is the sales weighted average of all business segment HHI (at 3-digit SIC code level). *Asset* is book value of total assets. *Market-to-book* is market value of the firm (total asset – book value of equity + market value of equity) divided by total asset. *Leverage* is the ratio of debt to total assets. *Profitability* is the ratio of EBITDA to total assets. *Firm risk* is the standard deviation of annual cash flows from operations (income before extraordinary items plus depreciation and amortization, normalized by total assets) for the past five years prior to bond issuance. *Tangibility* is the ratio of property, plant and equipments (net) to total assets. *Bond maturity* is the bond's maturity in years. *Bond size* is total amount of proceeds (in millions) received from the issue. *Rating* is the numerical S&P credit rating of the bond issue, where smaller numbers mean higher credit quality. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	Bond Spread		
	DIV3	NUMSEG	SALESHINDEX
	(1)	(2)	(3)
Intercept	13.509***	12.887***	15.749***
	(0.01)	(0.01)	(0.01)
DIV3	-0.310***		
	(0.01)		
DIV3 ×C4-Index (Compustat)	0.808**		
	(0.02)		
NUMSEG		-0.147***	
		(0.01)	
NUMSEG ×C4-Index (Compustat)		0.319**	
		(0.04)	
SALESHINDEX			-1.098***
			(0.01)
SALESHINDEX ×C4-Index (Compustat)			1.503*
			(0.08)
C4-Index (Compustat)	-0.450*	-0.482	-0.223
	(0.06)	(0.14)	(0.32)
Log (Asset)	-0.583***	-0.450***	-0.815***
	(0.01)	(0.01)	(0.01)
Market-to-Book	-0.371***	-0.132***	-0.650***
	(0.01)	(0.01)	(0.01)
Leverage	2.096***	1.436***	2.208***
	(0.01)	(0.01)	(0.01)
Profitability	-2.674***	-2.900***	-1.961***
	(0.01)	(0.01)	(0.01)
Firm risk	2.653***	2.067***	3.823***
	(0.01)	(0.01)	(0.01)
Tangibility	-0.140	-0.001	-0.330***
	(0.12)	(0.98)	(0.01)
Log(bond maturity)	-0.108	-0.196***	-0.080**
	(0.01)	(0.01)	(0.02)
Bond size	0.207***	0.218***	0.151***
	(0.01)	(0.01)	(0.01)
Rating	0.066***	0.040***	0.115***
	(0.01)	(0.01)	(0.01)
Year & Industry Fixed Effects	Yes	Yes	Yes
No. of Observations	4,339	4,339	4,339
Adj. R^2	0.488	0.476	0.426

Table 4.6A Reductions of Import Tariff Cuts – Definition of Tariff Cut: Abs (ΔTariff) > 3 × Mean

This table provides coefficient estimates of regressions which examine the effect of tariff rate cuts on the relationship between diversification and bond spreads. *Tariff Cut* is a dummy variable that equals one if an industry where the firm operates has experienced a large tariff reduction in the previous year t-1 that is larger than *three* times the mean tariff rate reduction in that industry, and zero otherwise. The dependent variable, *bond spread*, is defined as the yield to maturity of the corporate bond minus the yield to maturity of a Treasury security of similar maturity, expressed in percentage terms. *DIV4* is a dummy variable equal to 1 if a firm operates in more than one 4-digit SIC code industry, and zero otherwise. *NUMSEG* is the number of 4-digit SIC code segments reported in Compustat Segment database. *SALESHINDEX* is one minus the sum of the squares of each segment sales (at 4-digit SIC code level) over the firm's total sales. *Asset* is book value of total assets. *Market-to-book* is market value of the firm (total asset – book value of equity + market value of equity) divided by total asset. *Leverage* is the ratio of debt to total assets. *Profitability* is the ratio of EBITDA to total assets. *Firm risk* is the standard deviation of annual cash flows from operations (income before extraordinary items plus depreciation and amortization, normalized by total assets) for the past five years prior to bond issuance. *Tangibility* is the ratio of property, plant and equipments (net) to total assets. *Bond maturity* is the bond's maturity in years. *Bond size* is total amount of proceeds (in millions) received from the issue. *Rating* is the numerical S&P credit rating of the bond issue, where smaller numbers mean higher credit quality. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The sample period is between 1986 and 2005. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	Bond Spread		
	Tariff Cut Definition : Abs (ΔTariff) > 3 × Mean		
	DIV4	NUMSEG	SALESHINDEX
	(1)	(2)	(3)
Intercept	18.887***	21.302***	21.732***
	(0.01)	(0.01)	(0.01)
DIV4	0.028		
	(0.93)		
DIV4 × Tariff Cut	-1.334**		
	(0.03)		
NUMSEG		-0.149***	
		(0.01)	
NUMSEG × Tariff Cut		-0.562***	
		(0.01)	
SALESHINDEX			-0.669***
			(0.01)
SALESHINDEX × Tariff Cut			-1.966**
			(0.04)
Tariff Cut	1.108**	1.500***	0.832*
	(0.04)	(0.01)	(0.06)
Log (Asset)	-0.805***	-0.979***	-1.034***
	(0.01)	(0.01)	(0.01)
Market-to-Book	-0.528***	-0.211***	-0.211***
	(0.01)	(0.01)	(0.01)
Leverage	3.227***	2.837***	3.002***
	(0.01)	(0.01)	(0.01)
Profitability	-1.312	-2.406***	-2.199***
	(0.19)	(0.01)	(0.01)
Firm risk	2.651***	2.367***	2.459***
	(0.01)	(0.01)	(0.01)
Tangibility	0.321	0.355	0.739*
	(0.50)	(0.32)	(0.08)
Log(bond maturity)	-0.159***	-0.128**	-0.167***
	(0.01)	(0.02)	(0.01)
Bond size	0.203***	0.178***	0.231***
	(0.01)	(0.01)	(0.01)
Rating	0.045***	0.054***	0.057***
	(0.01)	(0.01)	(0.01)
Year & Industry Fixed Effects	Yes	Yes	Yes
No. of Observations	1,414	1,414	1,414
Adj. R^2	0.563	0.596	0.597

Table 4.6B Reductions of Import Tariff Cuts – Definition of Tariff Cut: Abs (ΔTariff) > 3 × Median

This table provides coefficient estimates of regressions which examine the effect of tariff rate cuts on the relationship between diversification and bond spreads. *Tariff Cut* is a dummy variable that equals one if an industry where the firm operates has experienced a large tariff reduction in the previous year t-1 that is larger than *three* times the median tariff rate reduction in that industry, and zero otherwise. The dependent variable, *bond spread*, is defined as the yield to maturity of the corporate bond minus the yield to maturity of a Treasury security of similar maturity, expressed in percentage terms. *DIV4* is a dummy variable equal to one if a firm operates in more than one different 4-digit SIC code industry, and zero otherwise. *NUMSEG* is the number of 4-digit SIC code segments reported in Compustat Segment database. *SALESHINDEX* is one minus the sum of the squares of each segment sales in unique 4-digit SIC code industry over the firm's total sales. *Asset* is book value of total assets. *Market-to-book* is market value of the firm (total asset – book value of equity + market value of equity) divided by total asset. *Leverage* is the ratio of debt to total assets. *Profitability* is the ratio of EBITDA to total assets. *Firm risk* is the standard deviation of annual cash flows from operations (income before extraordinary items plus depreciation and amortization, normalized by total assets) for the past five years prior to bond issuance. *Tangibility* is the ratio of property, plant and equipments (net) to total assets. *Bond maturity* is the bond's maturity in years. *Bond size* is total amount of proceeds (in millions) received from the issue. *Rating* is the numerical S&P credit rating of the bond issue, where smaller numbers mean higher credit quality. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The sample period is between 1986 and 2005. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	Bond Spread		
	Tariff Cut Definition : Abs (ΔTariff) > 3 × Median		
	DIV4	NUMSEG	SALESHINDEX
	(1)	(2)	(3)
Intercept	12.494***	21.764***	10.849***
	(0.01)	(0.01)	(0.01)
DIV4	-0.062		
	(0.52)		
DIV4 * Tariff Cut	-1.212**		
	(0.03)		
NUMSEG		-0.149***	
		(0.01)	
NUMSEG * Tariff Cut		-0.102	
		(0.16)	
SALESHINDEX			-0.589***
			(0.01)
SALESHINDEX * Tariff Cut			-0.803*
			(0.07)
Tariff Cut	0.790	-0.034	-0.123
	(0.13)	(0.87)	(0.58)
Log (Asset)	-3.654**	-2.318**	-2.498**
	(0.04)	(0.02)	(0.02)
Market-to-Book	-0.439***	-0.294***	-0.480***
	(0.01)	(0.01)	(0.01)
Leverage	2.916***	3.040***	2.780***
	(0.01)	(0.01)	(0.01)
Profitability	-1.693**	-1.981***	-1.406*
	(0.03)	(0.01)	(0.09)
Firm risk	2.631***	2.413***	2.263***
	(0.01)	(0.01)	(0.01)
Tangibility	0.553	0.562	0.532
	(0.21)	(0.20)	(0.26)
Log(bond maturity)	-0.164***	-0.147***	-0.128**
	(0.01)	(0.01)	(0.04)
Bond size	0.224***	0.216***	0.225***
	(0.01)	(0.01)	(0.01)
Rating	0.057***	0.055***	0.039***
	(0.01)	(0.01)	(0.01)
Year & Industry Fixed Effects	Yes	Yes	Yes
No. of Observations	1,414	1,414	1,414
Adj. R^2	0.599	0.597	0.562

Table 4.6C Reductions of Import Tariff Cuts – Definition of Tariff Cut: Abs (ΔTariff) > 2 × Median

This table provides coefficient estimates of regressions which examine the effect of tariff rate cuts on the relationship between diversification and bond spreads. *Tariff Cut* is a dummy variable that equals one if an industry where the firm operates has experienced a large tariff reduction in the previous year t-1 that is larger than *two* times the median tariff rate reduction in that industry, and zero otherwise. The dependent variable, *bond spread*, is defined as the yield to maturity of the corporate bond minus the yield to maturity of a Treasury security of similar maturity, expressed in percentage terms. *DIV4* is a dummy variable equal to 1 if a firm operates in more than one 4-digit SIC code industry, and zero otherwise. *NUMSEG* is the number of 4-digit SIC code segments reported in Compustat Segment database. *SALESHINDEX* is one minus the sum of the squares of each segment sales (at 4-digit SIC code level) over the firm's total sales. *Asset* is book value of total assets. *Market-to-book* is market value of the firm (total asset – book value of equity + market value of equity) divided by total asset. *Leverage* is the ratio of debt to total assets. *Profitability* is the ratio of EBITDA to total assets. *Firm risk* is the standard deviation of annual cash flows from operations (income before extraordinary items plus depreciation and amortization, normalized by total assets) for the past five years prior to bond issuance. *Tangibility* is the ratio of property, plant and equipments (net) to total assets. *Bond maturity* is the bond's maturity in years. *Bond size* is total amount of proceeds (in millions) received from the issue. *Rating* is the numerical S&P credit rating of the bond issue, where smaller numbers mean higher credit quality. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The sample period is between 1986 and 2005. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	Bond Spread		
	Tariff Cut Definition : Abs (ΔTariff) > 2 × Median		
	DIV4	NUMSEG	SALESHINDEX
	(1)	(2)	(3)
Intercept	25.489***	23.597***	11.297***
	(0.01)	(0.01)	(0.01)
DIV4	-0.060		
	(0.53)		
DIV4 × Tariff Cut	-0.769*		
	(0.07)		
NUMSEG		-0.123***	
		(0.01)	
NUMSEG × Tariff Cut		-0.177	
		(0.24)	
SALESHINDEX			-0.641***
			(0.01)
SALESHINDEX × Tariff Cut			-0.804*
			(0.08)
Tariff Cut	0.401	0.402	0.300
	(0.26)	(0.35)	(0.38)
Log (Asset)	-3.605**	-1.048***	-1.064***
	(0.04)	(0.01)	(0.01)
Market-to-Book	-0.445***	-0.459***	-0.323***
	(0.01)	(0.01)	(0.01)
Leverage	2.868***	2.905***	3.007***
	(0.01)	(0.01)	(0.01)
Profitability	-1.834**	-1.369*	-1.640**
	(0.02)	(0.07)	(0.04)
Firm risk	2.585***	2.286***	2.463***
	(0.01)	(0.01)	(0.01)
Tangibility	0.562	0.592	0.732*
	(0.20)	(0.14)	(0.08)
Log(bond maturity)	-0.150***	-0.152***	-0.176***
	(0.01)	(0.01)	(0.01)
Bond size	0.225***	0.230***	0.234***
	(0.01)	(0.01)	(0.01)
Rating	0.055***	0.048***	0.055***
	(0.01)	(0.01)	(0.01)
Year & Industry Fixed Effects	Yes	Yes	Yes
No. of Observations	1,414	1,414	1,414
Adj. R^2	0.596	0.600	0.598

Table 4.7A The Impact of Product Market Competition – Coinsurance Channel: Regression Analysis based on Competition (Fitted HHI)

This table provides coefficient estimates of regressions which examine the coinsurance hypothesis. The regressions are estimated separately for financially constrained (denote C) and less-constrained (denote L) firms. Financial constraints are measured based on: (i) the Size-and-Age Index, (ii) the Whited and Wu (2006) index, (iii) Total Pay-out, (iv) Investment-grade vs Speculative-grade rating. The dependent variable, *bond spread*, is defined as the yield to maturity of the corporate bond minus the yield to maturity of a Treasury security of similar maturity, expressed in percentage terms. *COIN_CF* is the cash-flow coinsurance measure, constructed following Duchin (2010). *Competition (Fitted HHI)* is a dummy variable equal to 1 if the Herfindahl-Hirschman Index from Hoberg and Phillips (2010a) is in the lowest terciles of the sample distribution, and zero otherwise. The other variables are described in more detail in Table 4.1. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The sample period is between 1986 and 2005. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	Bond Spread							
	Size-and-Age Index		Whited and Wu Index		Pay-out		Investment/Speculative	
	[L]	[C]	[L]	[C]	[L]	[C]	[L]	[C]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	7.780***	13.064***	8.368***	8.824***	8.251***	8.723***	14.696***	13.567***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.80)	(0.01)
COIN_CF × 100	-0.136***	-0.005	-0.147***	-0.009	-0.080*	-0.119***	-0.097**	-0.063
	(0.01)	(0.94)	(0.01)	(0.85)	(0.09)	(0.01)	(0.02)	(0.32)
COIN_CF × 100 × Competition (Fitted HHI)	-0.030	-0.216**	-0.103	-0.174**	-0.042	-0.138**	0.129	-0.247**
	(0.77)	(0.04)	(0.46)	(0.04)	(0.73)	(0.04)	(0.14)	(0.03)
Competition (Fitted HHI)	-0.174	0.116*	-0.077	0.023	-0.142	0.079	-0.070	0.108
	(0.23)	(0.09)	(0.29)	(0.75)	(0.12)	(0.11)	(0.33)	(0.15)
Log (Asset)	-0.306***	-0.640***	-0.199***	-0.421***	-0.326***	-0.374***	-0.691	-0.564***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.81)	(0.01)
Market-to-Book	-0.254***	-0.196***	-0.137***	-0.574***	-0.335***	-0.225***	-0.226***	-0.223***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Leverage	1.354***	2.267***	1.670***	2.215***	1.065***	2.060***	-0.541**	2.321***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.03)	(0.01)
Profitability	-2.271***	-2.788***	-3.712***	-2.471***	-0.302	-3.160***	0.675	-3.582***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.63)	(0.01)	(0.22)	(0.01)
Firm risk	9.726***	7.132***	4.262***	10.355***	4.523***	7.395***	0.727	2.601***
	(0.01)	(0.01)	(0.01)	(0.75)	(0.01)	(0.01)	(0.59)	(0.01)
Tangibility	-0.073	-0.318***	-0.180	-0.037	0.091	-0.248***	0.200	-0.233*
	(0.62)	(0.01)	(0.18)	(0.12)	(0.58)	(0.01)	(0.12)	(0.08)
Log(bond maturity)	-0.006	-0.325***	-0.144***	-0.077	-0.053	-0.115***	0.016	-0.488***
	(0.88)	(0.01)	(0.01)	(0.01)	(0.22)	(0.01)	(0.61)	(0.01)
Bond size	0.122***	0.507***	0.124***	0.841***	0.090***	0.250***	0.044**	0.410***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.03)	(0.01)
Rating	0.045***	0.066***	0.063***	0.036***	0.027***	0.062***	0.048***	0.027***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Year & Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of Observations	2,360	1,930	2,145	1,990	1,267	3,023	2,274	2,016
Adj. R^2	0.265	0.549	0.343	0.594	0.328	0.560	0.177	0.450

Table 4.7B The Impact of Product Market Competition – Coinsurance Channel: Regression Analysis based on Competition (Compustat)

This table provides coefficient estimates of regressions which examine the coinsurance hypothesis. The regressions are estimated separately for financially constrained (denote C) and less-constrained firms (denote L). Financial constraints are measured based on: (i) the Size-and-Age Index, (ii) the Whited and Wu (2006) index, (iii) Total Pay-out, (iv) Investment-grade vs Speculative-grade rating. The dependent variable, *bond spread*, is defined as the yield to maturity of the corporate bond minus the yield to maturity of a Treasury security of similar maturity, expressed in percentage terms. *COIN_CF* is the cash flow coinsurance measure, constructed following Duchin (2010). *Competition (Compustat)* is a dummy variable equal to one if the Herfindahl-Hirschman Index computed based on Compustat data is in the lowest terciles of the sample distribution, and zero otherwise. The other variables are described in more detail in Table 4.1. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	Bond Spread							
	Size-and-Age Index		Whited and Wu Index		Total Pay-out		Investment/Speculative	
	[L]	[C]	[L]	[C]	[L]	[C]	[L]	[C]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	6.766***	10.958***	5.228***	11.253***	6.538***	9.972***	10.904***	7.496***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.85)	(0.01)
COIN_CF × 100	-0.146***	-0.014	-0.162***	-0.030	-0.141***	-0.091**	-0.095**	-0.098
	(0.01)	(0.83)	(0.01)	(0.47)	(0.01)	(0.02)	(0.02)	(0.11)
COIN_CF × 100 × Competition (Compustat)	0.044	-0.198	-0.071	-0.233*	0.184	-0.237**	0.118	-0.348**
	(0.72)	(0.19)	(0.55)	(0.08)	(0.15)	(0.04)	(0.26)	(0.04)
Competition (Compustat)	-0.083	0.116	-0.025	0.172**	-0.135	0.157***	-0.087	0.112
	(0.25)	(0.12)	(0.73)	(0.02)	(0.11)	(0.01)	(0.19)	(0.16)
Log (Asset)	-0.272***	-0.540***	-0.188***	-0.457***	-0.265***	-0.428***	-0.501	-0.488***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.86)	(0.01)
Market-to-Book	-0.231***	-0.200***	-0.141***	-0.791***	-0.149***	-0.215***	-0.228***	-0.276***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Leverage	1.366***	2.207***	1.633***	2.132***	0.876***	2.345***	-0.549**	2.588***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)
Profitability	-2.126***	-2.334***	-3.604***	-1.534	-1.318**	-3.013***	0.689	-2.407***
	(0.01)	(0.01)	(0.01)	(0.18)	(0.03)	(0.01)	(0.21)	(0.01)
Firm risk	9.563***	3.541***	4.367***	3.033***	7.166***	2.884***	1.074	5.386***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.43)	(0.01)
Tangibility	-0.003	-0.436***	-0.166	-0.198	0.334**	-0.313***	0.232*	-0.527***
	(0.98)	(0.01)	(0.22)	(0.26)	(0.05)	(0.01)	(0.07)	(0.01)
Log(bond maturity)	-0.012	-0.402***	-0.143***	-0.166***	-0.052	-0.196***	0.016	-0.359***
	(0.75)	(0.01)	(0.01)	(0.01)	(0.23)	(0.01)	(0.63)	(0.01)
Bond size	0.128***	0.569***	0.128***	0.397***	0.111***	0.271***	0.046**	1.046***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)
Rating	0.052***	0.081***	0.064***	0.046***	0.044***	0.080***	0.047***	0.022***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Year & Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of Observations	2,360	1,930	2,145	1,990	1,267	3,023	2,274	2,016
Adj. R^2	0.287	0.523	0.342	0.578	0.329	0.507	0.177	0.416

Table 4.7C The Impact of Product Market Competition – Coinsurance Channel: Regression Analysis based on Fitted HHI

This table provides coefficient estimates of regressions which examine the coinsurance hypothesis. The regressions are estimated separately for financially constrained (denote C) and less-constrained firms (denote L). Financial constraints are measured based on: (i) the Size-and-Age Index, (ii) the Whited and Wu (2006) index, (iii) Total Pay-out, (iv) Investment-grade vs Speculative-grade rating. The dependent variable, *bond spread*, is defined as the yield to maturity of the corporate bond minus the yield to maturity of a Treasury security of similar maturity, expressed in percentage terms. *COIN_CF* is the cash flow coinsurance measure, constructed following Duchin (2010). *Fitted HHI* is Herfindahl-Hirschman Index at the 3-digit SIC code industry level from Hoberg and Phillips (2010a). The other variables are described in more detail in Table 4.1. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	Bond Spread							
	Size-and-Age Index		Whited and Wu Index		Pay-out		Investment/Speculative	
	[L]	[C]	[L]	[C]	[L]	[C]	[L]	[C]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	-6.620***	11.585***	5.315***	11.557***	6.431***	9.382***	14.599***	7.590***
	(0.73)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
COIN_CF ×100	-0.100	-0.336**	-0.192	-0.293**	0.040	-0.402***	0.050	-0.496***
	(0.46)	(0.03)	(0.18)	(0.03)	(0.78)	(0.01)	(0.68)	(0.01)
COIN_CF ×100 ×Fitted HHI	-1.318	4.342*	0.389	3.575*	-2.089	3.803**	-1.807	5.519**
	(0.50)	(0.08)	(0.85)	(0.08)	(0.30)	(0.03)	(0.30)	(0.03)
Fitted HHI	1.700	-1.748	1.276	0.745	4.743***	-0.253	1.134	-0.011
	(0.15)	(0.18)	(0.30)	(0.52)	(0.01)	(0.80)	(0.289)	(0.99)
Log (Asset)	0.356	-0.543***	-0.195***	-0.466***	-0.273***	-0.388***	-0.691	-0.495***
	(0.71)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.81)	(0.01)
Market-to-Book	-0.318***	-0.304***	-0.136***	-0.774***	-0.125***	-0.309***	-0.231***	-0.270***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Leverage	1.251***	2.324***	1.670***	2.142***	0.882***	2.397***	-0.532**	2.613***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.03)	(0.01)
Profitability	-0.810	-0.761	-3.681***	-1.901*	-1.602**	-2.849*	0.719	-2.456***
	(0.19)	(0.53)	(0.01)	(0.09)	(0.02)	(0.06)	(0.19)	(0.01)
Firm risk	10.071***	6.398***	4.302***	3.169***	7.529***	7.230***	1.049	5.407***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.447)	(0.01)
Tangibility	-0.193	-0.489***	-0.159	-0.157	0.341**	-0.337***	0.220*	-0.502***
	(0.18)	(0.01)	(0.24)	(0.37)	(0.04)	(0.01)	(0.09)	(0.01)
Log(bond maturity)	0.033	-0.394***	-0.147***	-0.167***	-0.065	-0.224***	0.014	-0.364***
	(0.39)	(0.01)	(0.01)	(0.01)	(0.13)	(0.01)	(0.66)	(0.01)
Bond size	0.078***	0.467***	0.123***	0.393***	0.105***	0.281***	0.045**	1.057***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.029)	(0.01)
Rating	0.068***	0.075***	0.064***	0.045***	0.042***	0.081***	0.177***	0.022***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Year & Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of Observations	2,360	1,930	2,145	1,990	1,267	3,023	2,274	2,016
Adj. R^2	0.256	0.529	0.343	0.578	0.334	0.528	0.177	0.416

Table 4.7D The Impact of Product Market Competition – Coinsurance Channel: Regression Analysis based on C4-Index (Compustat)

This table provides coefficient estimates of regressions which examine the coinsurance hypothesis. The regressions are estimated separately for financially constrained (denote C) and less-constrained firms (denote L). Financial constraints are measured based on: (i) the Size-and-Age Index, (ii) the Whited and Wu (2006) index, (iii) Total Pay-out, (iv) Investment-grade vs Speculative-grade rating. The dependent variable, *bond spread*, is defined as the yield to maturity of the corporate bond minus the yield to maturity of a Treasury security of similar maturity, expressed in percentage terms. *COIN_CF* is the cash flow coinsurance measure, constructed following Duchin (2010). *C4-Index (Compustat)* is the sum of the market shares of the four largest firms in an industry based on Compustat data. The other variables are described in more detail in Table 4.1. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	Bond Spread							
	Size-and-Age Index		Whited and Wu Index		Pay-out		Investment/Speculative	
	[L]	[C]	[L]	[C]	[L]	[C]	[L]	[C]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	-6.301***	17.260***	5.200***	18.120***	6.427***	17.867***	4.635***	17.949***
	(0.74)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
COIN_CF × 100	-0.240***	-0.247**	-0.139	-0.340***	-0.002	-0.382***	-0.047	-0.390***
	(0.01)	(0.04)	(0.11)	(0.01)	(0.98)	(0.01)	(0.52)	(0.01)
COIN_CF × 100 × C4-Index (Compustat)	0.252	0.801	-0.152	0.672*	-0.620	0.669*	0.011	0.928*
	(0.49)	(0.22)	(0.72)	(0.08)	(0.14)	(0.07)	(0.97)	(0.08)
C4-Index (Compustat)	0.470	-0.524*	-0.032	-0.083	0.659**	-0.631***	0.539*	-0.655**
	(0.12)	(0.08)	(0.91)	(0.74)	(0.02)	(0.01)	(0.08)	(0.02)
Log (Asset)	0.342	-0.966***	-0.187***	-0.967***	-0.266***	-0.901***	-0.167***	-0.861***
	(0.72)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Market-to-Book	-0.314***	-0.239***	-0.140***	-0.423***	-0.143***	-0.284***	-0.211***	-0.350***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Leverage	1.230***	2.796***	1.631***	2.415***	0.904***	2.513***	-0.448*	2.509***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.09)	(0.01)
Profitability	-0.954	4.032*	-3.572***	2.925***	-1.477**	1.367	-0.192	2.658*
	(0.13)	(0.08)	(0.01)	(0.01)	(0.02)	(0.38)	(0.75)	(0.09)
Firm risk	10.074***	2.326***	4.303***	2.557***	6.950***	2.802***	1.848	2.179***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.21)	(0.01)
Tangibility	-0.184	-0.459***	-0.188	-0.212*	0.318*	-0.442***	0.194	-0.466***
	(0.20)	(0.01)	(0.16)	(0.06)	(0.06)	(0.01)	(0.16)	(0.01)
Log(bond maturity)	0.035	-0.261***	-0.141***	-0.027	-0.047	-0.170***	0.014	-0.405***
	(0.36)	(0.01)	(0.01)	(0.55)	(0.28)	(0.01)	(0.70)	(0.01)
Bond size	0.081***	0.435***	0.129***	0.352***	0.108***	0.244***	0.073***	0.413***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Rating	0.067***	0.107***	0.064***	0.096***	0.044***	0.109***	0.034***	0.035***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Year & Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of Observations	2,360	1,930	2,145	1,990	1,267	3,023	2,274	2,016
Adj. R^2	0.257	0.461	0.342	0.534	0.330	0.490	0.170	0.443

Table 4.8A The Impact of Product Market Competition – The Efficient Internal Capital Market Channel: Regression Analysis based on Competition (Fitted HHI)

This table provides the results of regressions which examine the efficient internal capital market hypothesis. We split the diversified firm sample into two subsamples. We first measure the efficiency of internal transfers, following Rajan et al. (2000). We assign a diversified firm into the inefficient (efficient) transfers subsample if the firm has a negative (positive) efficiency measure. We then compare the split subsamples separately with single-segment firms. The dependent variable, *bond spread*, is defined as the yield to maturity of the corporate bond minus the yield to maturity of a Treasury security of similar maturity, expressed in percentage terms. *DIV3* is a dummy variable equal to 1 if a firm operates in more than one 3-digit SIC code industry, and zero otherwise. *NUMSEG* is the number of 3-digit SIC code segments reported in Compustat Segment database. *SALESHINDEX* is one minus the sum of the squares of each segment sales (at 3-digit SIC code level) over the firm's total sales. *Competition (Fitted HHI)* is a dummy variable equal to 1 if the Herfindahl-Hirschman Index from Hoberg and Phillips (2010a) is in the lowest terciles of the sample distribution, and zero otherwise. *Asset* is book value of total assets. *Market-to-book* is market value of the firm (total asset – book value of equity + market value of equity) divided by total asset. *Leverage* is the ratio of debt to total assets. *Profitability* is the ratio of EBITDA to total assets. *Firm risk* is the standard deviation of annual cash flows from operations (income before extraordinary items plus depreciation and amortization, normalized by total assets) for the past five years prior to bond issuance. *Tangibility* is the ratio of property, plant and equipments (net) to total assets. *Bond maturity* is the bond's maturity in years. *Bond size* is total amount of proceeds (in millions) received from the issue. *Rating* is the numerical S&P credit rating of the bond issue, where smaller numbers mean higher credit quality. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	Bond Spread					
	DIV3		NUMSEG		SALESHINDEX	
	Inefficient Transfers	Efficient Transfers	Inefficient Transfers	Efficient Transfers	Inefficient Transfers	Efficient Transfers
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	12.818***	11.239***	13.806***	11.207***	10.082***	15.368***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
DIV3	-0.088	0.034				
	(0.16)	(0.664)				
DIV3 × Competition (Fitted HHI)	-0.200*	-0.478***				
	(0.06)	(0.01)				
NUMSEG			-0.114***	0.011		
			(0.01)	(0.739)		
NUMSEG × Competition (Fitted HHI)			-0.032	-0.317***		
			(0.451)	(0.01)		
SALESHINDEX					-0.238*	-0.156
					(0.06)	(0.325)
SALESHINDEX × Competition (Fitted HHI)					0.026	-1.502***
					(0.905)	(0.01)
Competition (Fitted HHI)	0.160**	0.076	0.176**	0.391***	0.015	0.155**
	(0.02)	(0.272)	(0.046)	(0.01)	(0.813)	(0.021)
Log (Asset)	-0.577***	-0.499***	-0.613***	-0.498***	-0.437***	-0.705***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Market-to-Book	-0.135***	-0.129***	-0.181***	-0.129***	-0.111***	-0.163***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Leverage	2.018***	1.937***	2.094***	1.943***	1.193***	2.014***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Profitability	-4.058***	-4.097***	-3.261***	-4.122***	-4.535***	-3.572***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Firm risk	2.131***	2.328***	2.489***	2.336***	2.778***	2.131***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Tangibility	-0.153	-0.092	-0.209**	-0.084	-0.055	-0.087
	(0.13)	(0.417)	(0.032)	(0.458)	(0.64)	(0.452)
Log(bond maturity)	-0.059	-0.078*	-0.052	-0.075*	-0.103***	-0.011
	(0.12)	(0.078)	(0.154)	(0.090)	(0.01)	(0.800)
Bond size	0.195***	0.285***	0.200***	0.286***	0.213***	0.249***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Rating	0.061***	0.065***	0.063***	0.066***	0.593***	0.069***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Year & Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
No. of Observations	3,615	3,015	3,615	3,015	3,615	3,015
Adj. R^2	0.475	0.476	0.486	0.480	0.484	0.472

Table 4.8B The Impact of Product Market Competition – The Efficient Internal Capital Market Channel: Regression Analysis based on Competition (Compustat)

This table provides the results of regressions which examine the efficient internal capital market hypothesis. We split the diversified firm sample into two subsamples. We first measure the efficiency of internal transfers, following Rajan et al. (2000). We assign a diversified firm into the inefficient (efficient) transfers subsample if the firm has a negative (positive) efficiency measure. We then compare the split subsamples separately with single-segment firms. The dependent variable, *bond spread*, is defined as the yield to maturity of the corporate bond minus the yield to maturity of a Treasury security of similar maturity, expressed in percentage terms. *DIV3* is a dummy variable equal to 1 if a firm operates in more than one 3-digit SIC code industry, and zero otherwise. *NUMSEG* is the number of 3-digit SIC code segments reported in Compustat Segment database. *SALESHINDEX* is one minus the sum of the squares of each segment sales (at 3-digit SIC code level) over the firm's total sales. *Competition (Compustat)* is a dummy variable equal to one if the Herfindahl-Hirschman Index computed based on Compustat data is in the lowest terciles of the sample distribution, and zero otherwise. The other variables are described in more detail in Table 4.1. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	Bond Spread					
	DIV3		NUMSEG		SALESHINDEX	
	Inefficient Transfers	Efficient Transfers	Inefficient Transfers	Efficient Transfers	Inefficient Transfers	Efficient Transfers
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	13.059***	11.203***	10.048***	11.209***	10.079***	11.152***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
DIV3	-0.110*	0.033				
	(0.08)	(0.66)				
DIV3 × Competition (Compustat)	-0.093	-0.554***				
	(0.41)	(0.01)				
NUMSEG			-0.091***	-0.004		
			(0.01)	(0.89)		
NUMSEG × Competition (Compustat)			0.004	-0.310***		
			(0.92)	(0.01)		
SALESHINDEX					-0.240*	-0.089
					(0.06)	(0.55)
SALESHINDEX × Competition (Compustat)					0.043	-1.375***
					(0.85)	(0.01)
Competition (Compustat)	0.119*	0.156**	0.109	0.440***	0.051	0.135**
	(0.06)	(0.02)	(0.22)	(0.01)	(0.39)	(0.03)
Log (Asset)	-0.586***	-0.497***	-0.423***	-0.498***	-0.437***	-0.492***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Market-to-Book	-0.134***	-0.128***	-0.158***	-0.130***	-0.111***	-0.132***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Leverage	2.022***	1.924***	2.026***	1.923***	1.933***	1.899***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Profitability	-4.044***	-4.107***	-3.754***	-4.113***	-4.452***	-4.104***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Firm risk	2.982***	2.281***	2.603***	2.289***	2.654***	2.299***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Tangibility	-0.189*	-0.115	-0.206**	-0.102	-0.079	-0.128
	(0.07)	(0.32)	(0.03)	(0.37)	(0.51)	(0.27)
Log(bond maturity)	-0.057	-0.080*	-0.096***	-0.079*	-0.101***	-0.083*
	(0.12)	(0.07)	(0.01)	(0.07)	(0.01)	(0.06)
Bond size	0.194***	0.280***	0.222***	0.284*	0.213***	0.279***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Rating	0.061***	0.065***	0.062***	0.065***	0.059***	0.065***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Year & Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
No. of Observations	3,615	3,015	3,615	3,015	3,615	3,015
Adj. R^2	0.474	0.480	0.490	0.479	0.485	0.480

Table 4.8C The Impact of Product Market Competition – The Efficient Internal Capital Market Channel: Regression Analysis based on Fitted HHI

This table provides the results of regressions which examine the efficient internal capital market hypothesis. We split the diversified firm sample into two subsamples. We first measure the efficiency of internal transfers, following Rajan et al. (2000). We assign a diversified firm into the inefficient (efficient) transfers subsample if the firm has a negative (positive) efficiency measure. We then compare the split subsamples separately with single-segment firms. The dependent variable, *bond spread*, is defined as the yield to maturity of the corporate bond minus the yield to maturity of a Treasury security of similar maturity, expressed in percentage terms. *DIV3* is a dummy variable equal to 1 if a firm operates in more than one 3-digit SIC code industry, and zero otherwise. *NUMSEG* is the number of 3-digit SIC code segments reported in Compustat Segment database. *SALESHINDEX* is one minus the sum of the squares of each segment sales (at 3-digit SIC code level) over the firm's total sales. *Fitted HHI* is Herfindahl-Hirschman Index at the 3-digit SIC code industry level from Hoberg and Phillips (2010a). The other variables are described in more detail in Table 4.1. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	Bond Spread					
	DIV3		NUMSEG		SALESHINDEX	
	Inefficient Transfers	Efficient Transfers	Inefficient Transfers	Efficient Transfers	Inefficient Transfers	Efficient Transfers
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	14.121***	15.900***	10.363***	11.558***	10.098***	11.339***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
DIV3	-0.353***	-0.512***				
	(0.01)	(0.01)				
DIV3 × Fitted HHI	2.761	5.416**				
	(0.12)	(0.02)				
NUMSEG			-0.068	-0.222**		
			(0.11)	(0.01)		
NUMSEG × Fitted HHI			0.043	2.477**		
			(0.48)	(0.04)		
SALESHINDEX					-0.415	-1.357***
					(0.11)	(0.01)
SALESHINDEX × Fitted HHI					0.444	16.084***
					(0.90)	(0.01)
Fitted HHI	-0.566	-0.309	1.638	-1.569	1.092	0.069
	(0.60)	(0.77)	(0.21)	(0.40)	(0.26)	(0.95)
Log (Asset)	-0.631***	-0.727***	-0.452***	-0.519***	-0.433***	-0.502***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Market-to-Book	-0.138***	-0.180***	-0.185***	-0.134***	-0.152***	-0.128***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Leverage	2.053***	2.090***	1.956***	2.013***	2.060***	1.920***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Profitability	-3.807***	-3.419***	-3.146***	-3.251***	-3.773***	-4.148***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Firm risk	2.657***	2.123***	2.870***	2.655***	2.660***	2.337***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Tangibility	-0.193*	-0.056	-0.179**	-0.040	-0.160	-0.088
	(0.07)	(0.60)	(0.04)	(0.71)	(0.11)	(0.43)
Log(bond maturity)	-0.055	-0.017	-0.040	-0.072*	-0.104***	-0.078*
	(0.15)	(0.68)	(0.22)	(0.09)	(0.01)	(0.08)
Bond size	0.198***	0.247***	0.213***	0.298***	0.223***	0.284***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Rating	0.067***	0.066***	0.057***	0.065***	0.062***	0.065***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Year & Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
No. of Observations	3,615	3,015	3,615	3,015	3,615	3,015
Adj. R^2	0.463	0.493	0.490	0.493	0.489	0.479

Table 4.8D The Impact of Product Market Competition – The Efficient Internal Capital Market Channel: Regression Analysis based on C4-Index (Compustat)

This table provides the results of regressions which examine the efficient internal capital market hypothesis. We split the diversified firm sample into two subsamples. We first measure the efficiency of internal transfers, following Rajan et al. (2000). We assign a diversified firm into the inefficient (efficient) transfers subsample if the firm has a negative (positive) efficiency measure. We then compare the split subsamples separately with single-segment firms. The dependent variable, *bond spread*, is defined as the yield to maturity of the corporate bond minus the yield to maturity of a Treasury security of similar maturity, expressed in percentage terms. *DIV3* is a dummy variable equal to 1 if a firm operates in more than one 3-digit SIC code industry, and zero otherwise. *NUMSEG* is the number of 3-digit SIC code segments reported in Compustat Segment database. *SALESHINDEX* is one minus the sum of the squares of each segment sales (at 3-digit SIC code level) over the firm's total sales. *C4-Index (Compustat)* is the sum of the market shares of the four largest firms in an industry based on Compustat data. The other variables are described in more detail in Table 4.1. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	Bond Spread					
	DIV3		NUMSEG		SALESHINDEX	
	Inefficient Transfers	Efficient Transfers	Inefficient Transfers	Efficient Transfers	Inefficient Transfers	Efficient Transfers
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	10.308***	12.247***	10.142***	11.345***	10.216***	15.614***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
DIV3	-0.188**	-0.315***				
	(0.02)	(0.01)				
DIV3 × C4-Index (Compustat)	0.236	1.081**				
	(0.57)	(0.04)				
NUMSEG			-0.086**	-0.069		
			(0.02)	(0.16)		
NUMSEG × C4-Index (Compustat)			-0.069	0.086		
			(0.72)	(0.74)		
SALESHINDEX					-0.289	-0.975***
					(0.12)	(0.01)
SALESHINDEX × C4-Index (Compustat)					-0.394	2.377**
					(0.71)	(0.04)
C4-Index (Compustat)	-0.287	-0.244	-0.117	-0.197	-0.187	-0.239
	(0.26)	(0.33)	(0.75)	(0.64)	(0.42)	(0.33)
Log (Asset)	-0.438***	-0.546***	-0.426***	-0.498***	-0.436***	-0.712***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Market-to-Book	-0.108***	-0.148***	-0.156***	-0.146***	-0.109***	-0.182***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Leverage	1.966***	1.972***	2.029***	1.955***	1.963***	2.037***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Profitability	-4.273***	-3.925***	-3.754***	-3.953***	-4.227***	-3.394***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Firm risk	2.663***	2.208***	2.641***	2.356***	2.677***	2.127***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Tangibility	-0.170*	-0.029	-0.170*	-0.091	-0.187*	-0.084
	(0.09)	(0.79)	(0.08)	(0.40)	(0.07)	(0.44)
Log(bond maturity)	-0.105***	-0.062	-0.099***	-0.089**	-0.106***	-0.022
	(0.01)	(0.14)	(0.01)	(0.03)	(0.01)	(0.60)
Bond size	0.228***	0.281***	0.224***	0.288***	0.230***	0.252***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Rating	0.066***	0.062***	0.062***	0.064***	0.066***	0.067***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Year & Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
No. of Observations	3,615	3,015	3,615	3,015	3,615	3,015
Adj. R^2	0.468	0.499	0.490	0.499	0.489	0.495

Table 4.9A The Impact of Product Market Competition – Multimarket Contact Channel: Regression Analysis based on Competition (Fitted HHI)

This table provides the results of regressions which examine the multimarket contacts hypothesis. *MMC* is the average number of industries shared by a diversified firm and its multimarket rivals. We split the sample of diversified firms with multimarket contacts into two subsamples. We assign a diversified firm into the high (low) MMC subsample if the number of multimarket contacts of the firm is above (equal to or below) the median value of MMC. We then compare the split subsamples separately with single-segment firms. The dependent variable, *bond spread*, is defined as the yield to maturity of the corporate bond minus the yield to maturity of a Treasury security of similar maturity, expressed in percentage terms. *DIV3* is a dummy variable equal to 1 if a firm operates in more than one 3-digit SIC code industry, and zero otherwise. *NUMSEG* is the number of 3-digit SIC code segments reported in Compustat Segment database. *SALESHINDEX* is one minus the sum of the squares of each segment sales (at 3-digit SIC code level) over the firm's total sales. *Competition (Fitted HHI)* is a dummy variable equal to 1 if the Herfindahl-Hirschman Index from Hoberg and Phillips (2010a) is in the lowest terciles of the sample distribution, and zero otherwise. The other variables are described in more detail in Table 4.1. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	Bond Spread					
	DIV3		NUMSEG		SALESHINDEX	
	High MMC	Low MMC	High MMC	Low MMC	High MMC	Low MMC
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	10.736***	10.260***	10.592***	10.292***	9.908***	10.271***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
DIV3	-0.150*	-0.067				
	(0.08)	(0.23)				
DIV3 × Competition (Fitted HHI)	-0.195	-0.305***				
	(0.14)	(0.01)				
NUMSEG			-0.022	-0.049*		
			(0.40)	(0.08)		
NUMSEG × Competition (Fitted HHI)			-0.063	-0.172***		
			(0.12)	(0.01)		
SALESHINDEX					-0.093	-0.378***
					(0.51)	(0.01)
SALESHINDEX × Competition (Fitted HHI)					-0.315	-0.442**
					(0.19)	(0.04)
Competition (Fitted HHI)	0.113**	0.103	0.137*	0.226**	0.062	0.042
	(0.04)	(0.10)	(0.08)	(0.04)	(0.25)	(0.48)
Log (Asset)	-0.467***	-0.450***	-0.457***	-0.450***	-0.422***	-0.447***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Market-to-Book	-0.196***	-0.163***	-0.169***	-0.112***	-0.195***	-0.158***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Leverage	1.905***	1.948***	1.937***	1.833***	1.894***	1.914***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Profitability	-3.109***	-3.672***	-3.247***	-4.313***	-3.219***	-3.709***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Firm risk	4.717***	2.543***	1.442***	2.628***	4.983***	2.630***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Tangibility	-0.168*	-0.121	-0.184*	-0.099	-0.228**	-0.142
	(0.07)	(0.204)	(0.06)	(0.34)	(0.02)	(0.14)
Log(bond maturity)	0.004	-0.099***	-0.014	-0.110***	-0.022	-0.113***
	(0.91)	(0.01)	(0.70)	(0.01)	(0.55)	(0.01)
Bond size	0.208***	0.260***	0.224***	0.264***	0.216***	0.259***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Rating	0.046***	0.067***	0.049***	0.073***	0.046***	0.068***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Year & Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
No. of Observations	2,670	3,890	2,670	3,890	2,670	3,890
Adj. R^2	0.525	0.494	0.531	0.454	0.539	0.487

Table 4.9B The Impact of Product Market Competition – Multimarket Contact Channel: Regression Analysis based on Competition (Compustat)

This table provides the results of regressions which examine the multimarket contacts hypothesis. *MMC* is the average number of industries shared by a diversified firm and its multimarket rivals. We split the sample of diversified firms with multimarket contacts into two subsamples. We assign a diversified firm into the high (low) MMC subsample if the number of multimarket contacts of the firm is above (equal to or below) the median value of MMC. We then compare the split subsamples separately with single-segment firms. The dependent variable, *bond spread*, is defined as the yield to maturity of the corporate bond minus the yield to maturity of a Treasury security of similar maturity, expressed in percentage terms. *DIV3* is a dummy variable equal to 1 if a firm operates in more than one 3-digit SIC code industry, and zero otherwise. *NUMSEG* is the number of 3-digit SIC code segments reported in Compustat Segment database. *SALESHINDEX* is one minus the sum of the squares of each segment sales (at 3-digit SIC code level) over the firm's total sales. *Competition (Compustat)* is a dummy variable equal to one if the Herfindahl-Hirschman Index computed based on Compustat data is in the lowest terciles of the sample distribution, and zero otherwise. The other variables are described in more detail in Table 4.1. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	Bond Spread					
	DIV3		NUMSEG		SALESHINDEX	
	High MMC (1)	Low MMC (2)	High MMC (3)	Low MMC (4)	High MMC (5)	Low MMC (6)
Intercept	11.154***	10.285***	11.182***	10.344***	11.210***	10.215***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
DIV3	-0.170*	-0.044				
	(0.07)	(0.44)				
DIV3 × Competition (Compustat)	0.063	-0.401***				
	(0.70)	(0.01)				
NUMSEG			-0.046	-0.069***		
			(0.11)	(0.01)		
NUMSEG × Competition (Compustat)			0.037	-0.189***		
			(0.47)	(0.01)		
SALESHINDEX					-0.156	-0.340***
					(0.32)	(0.01)
SALESHINDEX × Competition (Compustat)					0.057	-0.683***
					(0.84)	(0.01)
Competition (Compustat)	0.202***	0.156**	0.161*	0.292***	0.211***	0.092
	(0.01)	(0.02)	(0.08)	(0.01)	(0.01)	(0.11)
Log (Asset)	-0.472***	-0.449***	-0.473***	-0.447***	-0.476***	-0.444***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Market-to-Book	-0.149***	-0.158***	-0.148***	-0.160***	-0.147***	-0.160***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Leverage	2.045***	1.930***	2.040***	1.911***	2.058***	1.903***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Profitability	-4.131***	-3.750***	-4.102***	-3.753***	-4.080***	-3.690***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Firm risk	2.244***	2.592***	2.248***	2.596***	2.240***	2.615***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Tangibility	-0.288***	-0.128	-0.290***	-0.129	-0.293***	-0.157
	(0.01)	(0.19)	(0.01)	(0.19)	(0.01)	(0.11)
Log(bond maturity)	-0.065	-0.112***	-0.066	-0.112***	-0.063	-0.116***
	(0.13)	(0.01)	(0.12)	(0.01)	(0.147)	(0.01)
Bond size	0.233***	0.255***	0.237***	0.259***	0.235***	0.258***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Rating	0.053***	0.067***	0.053***	0.067***	0.053***	0.067***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Year & Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
No. of Observations	2,670	3,890	2,670	3,890	2,670	3,890
Adj. R^2	0.517	0.487	0.517	0.488	0.516	0.488

Table 4.9C The Impact of Product Market Competition – Multimarket Contact Channel: Regression Analysis based on Fitted HHI

This table provides the results of regressions which examine the multimarket contacts hypothesis. *MMC* is the average number of industries shared by a diversified firm and its multimarket rivals. We split the sample of diversified firms with multimarket contacts into two subsamples. We assign a diversified firm into the high (low) MMC subsample if the number of multimarket contacts of the firm is above (equal to or below) the median value of MMC. We then compare the split subsamples separately with single-segment firms. The dependent variable, *bond spread*, is defined as the yield to maturity of the corporate bond minus the yield to maturity of a Treasury security of similar maturity, expressed in percentage terms. *DIV3* is a dummy variable equal to 1 if a firm operates in more than one 3-digit SIC code industry, and zero otherwise. *NUMSEG* is the number of 3-digit SIC code segments reported in Compustat Segment database. *SALESHINDEX* is one minus the sum of the squares of each segment sales (at 3-digit SIC code level) over the firm's total sales. *Fitted HHI* is Herfindahl-Hirschman Index at the 3-digit SIC code industry level from Hoberg and Phillips (2010a). The other variables are described in more detail in Table 4.1. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	Bond Spread					
	DIV3		NUMSEG		SALESHINDEX	
	High MMC (1)	Low MMC (2)	High MMC (3)	Low MMC (4)	High MMC (5)	Low MMC (6)
Intercept	11.282***	10.489***	11.246***	10.669***	11.291***	10.414***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
DIV3	-0.273*	-0.424***				
	(0.089)	(0.01)				
DIV3 × Fitted HHI	1.684	4.335***				
	(0.494)	(0.01)				
NUMSEG			-0.035	-0.258***		
			(0.47)	(0.01)		
NUMSEG × Fitted HHI			-0.163	2.387***		
			(0.82)	(0.01)		
SALESHINDEX					-0.183	-1.134***
					(0.55)	(0.01)
SALESHINDEX × Fitted HHI					0.013	10.258**
					(0.99)	(0.02)
Fitted HHI	-0.169	0.051	0.425	-2.041	0.298	0.456
	(0.87)	(0.96)	(0.77)	(0.23)	(0.77)	(0.64)
Log (Asset)	-0.475***	-0.456***	-0.475***	-0.454***	-0.480***	-0.452***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Market-to-Book	-0.142***	-0.152***	-0.141***	-0.153***	-0.140***	-0.154***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Leverage	2.088***	1.960***	2.080***	1.940***	2.095***	1.926***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Profitability	-4.198***	-3.836***	-4.161***	-3.840***	-4.144***	-3.776***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Firm risk	2.311***	2.613***	2.324***	2.612***	2.322***	2.626***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Tangibility	-0.186*	-0.088	-0.196*	-0.094	-0.196*	-0.127
	(0.09)	(0.36)	(0.07)	(0.33)	(0.07)	(0.19)
Log(bond maturity)	-0.075*	-0.116***	-0.077*	-0.114***	-0.074*	-0.118***
	(0.09)	(0.01)	(0.07)	(0.01)	(0.08)	(0.01)
Bond size	0.227***	0.253***	0.232***	0.256***	0.233***	0.255***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Rating	0.053***	0.068***	0.054***	0.067***	0.053***	0.067***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Year & Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
No. of Observations	2,670	3,890	2,670	3,890	2,670	3,890
Adj. R^2	0.514	0.487	0.514	0.488	0.514	0.488

Table 4.9D The Impact of Product Market Competition – Multimarket Contact Channel: Regression Analysis based on C4-Index (Compustat)

This table provides the results of regressions which examine the multimarket contacts hypothesis. *MMC* is the average number of industries shared by a diversified firm and its multimarket rivals. We split the sample of diversified firms with multimarket contacts into two subsamples. We assign a diversified firm into the high (low) MMC subsample if the number of multimarket contacts of the firm is above (equal to or below) median value of MMC. We then compare the split subsamples separately with single-segment firms. The dependent variable, *bond spread*, is defined as the yield to maturity of the corporate bond minus the yield to maturity of a Treasury security of similar maturity, expressed in percentage terms. *DIV3* is a dummy variable equal to 1 if a firm operates in more than one 3-digit SIC code industry, and zero otherwise. *NUMSEG* is the number of 3-digit SIC code segments reported in Compustat Segment database. *SALESHINDEX* is one minus the sum of the squares of each segment sales (at 3-digit SIC code level) over the firm's total sales. *C4-Index (Compustat)* is the sum of the market shares of the four largest firms in an industry based on Compustat data. The other variables are described in more detail in Table 4.1. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	Bond Spread					
	DIV3		NUMSEG		SALESHINDEX	
	High MMC	Low MMC	High MMC	Low MMC	High MMC	Low MMC
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	11.280***	9.994***	11.263***	9.244***	11.327***	9.924***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
DIV3	-0.111	-0.271***				
	(0.40)	(0.01)				
DIV3 × C4-Index (Compustat)	-0.692	0.696*				
	(0.46)	(0.07)				
NUMSEG			-0.010	-0.156***		
			(0.82)	(0.01)		
NUMSEG × C4-Index (Compustat)			-0.333	0.291*		
			(0.27)	(0.08)		
SALESHINDEX					-0.053	-0.791***
					(0.83)	(0.01)
SALESHINDEX × C4-Index (Compustat)					-1.269	1.588*
					(0.48)	(0.08)
C4-Index (Compustat)	-0.345	-0.288	0.015	-0.536*	-0.335	-0.145
	(0.15)	(0.26)	(0.97)	(0.09)	(0.16)	(0.50)
Log (Asset)	-0.474***	-0.449***	-0.475***	-0.420***	-0.478***	-0.454***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Market-to-Book	-0.144***	0.000	-0.143***	-0.009	-0.142***	0.008
	(0.01)	(0.99)	(0.01)	(0.69)	(0.01)	(0.78)
Leverage	2.062***	1.923***	2.061***	1.727***	2.075***	1.832***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Profitability	-4.135***	-3.629***	-4.106***	-2.939***	-4.085***	-3.441***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Firm risk	2.299***	2.604***	2.303***	1.649***	2.300***	2.105***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Tangibility	-0.214**	-0.128	-0.216**	-0.091	-0.218**	-0.146
	(0.05)	(0.20)	(0.04)	(0.25)	(0.04)	(0.12)
Log(bond maturity)	-0.072*	-0.099***	-0.073*	-0.053*	-0.070	-0.046
	(0.09)	(0.01)	(0.09)	(0.07)	(0.11)	(0.17)
Bond size	0.234***	0.250***	0.237***	0.258***	0.237***	0.257***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Rating	0.053***	0.072***	0.054***	0.070***	0.054***	0.068***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Year & Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
No. of Observations	2,670	3,890	2,670	3,890	2,670	3,890
Adj. R^2	0.515	0.457	0.515	0.510	0.514	0.469

Table 4.10 Robustness Tests
– Instrumental Variable Two-Stage Estimation: First Stage

This table provides the results from the probit regression. The dependent variable is a dummy variable that equals one for diversified firms and zero otherwise. In Endogeneity (1), we include *PNDIV* and *PSDIV* to generate the instruments for diversification. *PNDIV* is the fraction of diversified firms (excluding sample firms) in the industry. *PSDIV* is the fraction of industry sales accounted for by diversified firms (excluding sample firms). In Endogeneity (2), *PNDIV_Modified* and *PSDIV_Modified* are computed in the same way as in Endogeneity (1), but only using diversified firms who have a leverage ratio less than 5% or at least "A-" S&P credit rating. The dependent variable, *bond spread*, is defined as the yield to maturity of the corporate bond minus the yield to maturity of a Treasury security of similar maturity, expressed in percentage terms. *Competition (Fitted HHI)*, *Competition (Compustat)*, *Fitted HHI* and *C4-Index (Compustat)* are proxies for product market competition (definitions are described in Table 4.1). The other variables are described in more detail in Table 4.1. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	Dummy Variable							
	Endogeneity (1)				Endogeneity (2)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	-2.387***	4.232***	3.860	3.734	-1.456***	4.059*	-0.476	-2.521***
	(0.01)	(0.07)	(0.11)	(0.11)	(0.01)	(0.08)	(0.72)	(0.01)
PNDIV	1.413***	1.316***	1.548***	1.427***				
	(0.01)	(0.01)	(0.01)	(0.01)				
PSDIV	0.515***	0.499***	0.391***	0.460***				
	(0.01)	(0.01)	(0.01)	(0.01)				
PNDIV_Modified					1.722***	1.991***	1.793***	1.728***
					(0.01)	(0.01)	(0.01)	(0.01)
PSDIV_Modified					0.262**	0.152	0.212*	0.278**
					(0.04)	(0.24)	(0.09)	(0.03)
Competition (Fitted HHI)	-0.083*				-0.126***			
	(0.06)				(0.01)			
Competition (Compustat)		-0.575***				-0.651***		
		(0.01)				(0.01)		
Fitted HHI			-3.183***				-2.643***	
			(0.01)				(0.01)	
C4-Index (Compustat)				0.841***				1.058***
				(0.01)				(0.01)
Log (Asset)	0.166***	-0.140	-0.121	-0.127	0.149***	-0.107	0.125*	0.204***
	(0.01)	(0.26)	(0.33)	(0.31)	(0.01)	(0.39)	(0.05)	(0.01)
Market-to-Book	-0.223***	-0.198***	-0.217***	-0.207***	-0.309***	-0.263***	-0.276***	-0.261***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Leverage	-0.761***	-0.784***	-0.865***	-0.814***	-0.694***	-0.719***	-0.832***	-0.780***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Profitability	0.212	-0.429	0.037	-0.284	0.175	-0.408	-0.039	-0.355
	(0.56)	(0.23)	(0.91)	(0.42)	(0.62)	(0.25)	(0.91)	(0.31)
Firm risk	-1.758***	-2.091***	-2.725***	-2.520***	-1.937***	-1.951***	-2.551***	-1.946***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Tangibility	-0.407***	-0.127	-0.375***	-0.311***	-0.433***	-0.139	-0.417***	-0.358***
	(0.01)	(0.16)	(0.01)	(0.01)	(0.01)	(0.12)	(0.01)	(0.01)
Log(bond maturity)	-0.135***	-0.183***	-0.156***	-0.163***	-0.104***	-0.147***	-0.122***	-0.125***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Bond size	-0.078***	-0.042**	-0.025	-0.039**	-0.082***	-0.048***	-0.040**	-0.062***
	(0.01)	(0.02)	(0.15)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)
Rating	-0.026***	-0.050***	-0.051***	-0.051***	-0.025***	-0.047***	-0.044***	-0.037***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
No. of Observations	4,339	4,339	4,339	4,339	4,339	4,339	4,339	4,339
Pseudo R^2	0.208	0.217	0.193	0.194	0.142	0.164	0.126	0.136

Table 4.11A Robustness Tests
– Instrumental Variable Estimation & Heckman's Two-stage Estimation

This table provides results from instrumental variables estimation and Heckman's two-stage estimation to examine the effect of competition on the relationship between diversification and bond spreads (see text for more details). We include *PNDIV* and *PSDIV* to generate the instruments for diversification. *PNDIV* is the fraction of diversified firms (excluding sample firms) in the industry. *PSDIV* is the fraction of industry sales accounted for by diversified firms (excluding sample firms). The dependent variable, *bond spread*, is defined as the yield to maturity of the corporate bond minus the yield to maturity of a Treasury security of similar maturity, expressed in percentage terms. *DIV3* is a dummy variable equal to 1 if a firm operates in more than one 3-digit SIC code industry, and zero otherwise. *Competition (Fitted HHI), Competition (Compustat), Fitted HHI* and *C4-Index (Compustat)* are proxies for product market competition. All firm- and bond-specific characteristics are defined in Table 4.1. Lambda is the inverse Mills ratio obtained from the probit estimates in Table 4.10. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	Bond Spread							
	Endogeneity (1)							
	Instrumental variables estimation: second stage				Heckman's two-stage estimation: second stage			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	10.319***	19.310***	19.301***	18.596***	10.314***	19.333***	19.289***	18.585***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
DIV3	-0.185	-0.356**	-0.955***	-0.787***	-0.188	-0.365**	-0.870***	-0.699***
	(0.23)	(0.02)	(0.01)	(0.01)	(0.22)	(0.02)	(0.01)	(0.01)
DIV3 × Competition (Fitted HHI)	-0.665***				-0.635***			
	(0.01)				(0.01)			
Competition (Fitted HHI)	0.239**				0.227**			
	(0.03)				(0.04)			
DIV3 × Competition (Compustat)		-0.537**				-0.428*		
		(0.02)				(0.06)		
Competition (Compustat)		0.252**				0.210**		
		(0.02)				(0.04)		
DIV3 × Fitted HHI			8.092**				6.970**	
			(0.02)				(0.04)	
Fitted HHI			-5.206***				-4.736***	
			(0.01)				(0.01)	
DIV3 × C4-Index (Compustat)				1.959**				1.511*
				(0.02)				(0.07)
C4-Index (Compustat)				-0.989**				-0.721
				(0.04)				(0.14)
Log (Asset)	-0.432***	-1.000***	-0.990***	-0.960***	-0.432***	-1.002***	-0.991***	-0.963***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Market-to-Book	-0.135***	-0.304***	-0.226***	-0.204***	-0.133***	-0.298***	-0.221***	-0.198***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Leverage	1.973***	2.236***	2.320***	2.240***	1.973***	2.240***	2.319***	2.246***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Profitability	-4.139***	-2.140***	-2.519***	-2.555***	-4.146***	-2.166***	-2.543***	-2.591***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Firm risk	2.689***	3.403***	3.625***	3.537***	2.705***	3.460***	3.676***	3.592***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Tangibility	-0.162	-0.295***	-0.298***	-0.257***	-0.165*	-0.306***	-0.313***	-0.266***
	(0.11)	(0.01)	(0.01)	(0.01)	(0.09)	(0.01)	(0.01)	(0.01)
Log(bond maturity)	-0.122***	-0.069**	-0.026	-0.073**	-0.121***	-0.066**	-0.024	-0.070**
	(0.01)	(0.04)	(0.46)	(0.03)	(0.01)	(0.04)	(0.49)	(0.03)
Bond size	0.216***	0.154***	0.153***	0.155***	0.216***	0.154***	0.152***	0.154***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Rating	0.063***	0.111***	0.112***	0.114***	0.063***	0.111***	0.112***	0.114***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Lambda					-0.051*	-0.176***	-0.188***	-0.180***
					(0.09)	(0.01)	(0.01)	(0.01)
Year & Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of Observations	4,339	4,339	4,339	4,339	4,339	4,339	4,339	4,339
Adj. R^2	0.452	0.433	0.395	0.423	0.452	0.438	0.401	0.428

Table 4.11B Robustness Tests – Alternative Instruments – Instrumental Variable Estimation & Heckman's Two-Stage Estimation

This table provides results from instrumental variables estimation and Heckman's two-stage estimation to examine the effect of competition on the relationship between diversification and bond spreads (see text for more details). We include *PNDIV_Modified* and *PSDIV_Modified* to generate the instruments for diversification. *PNDIV_Modified* is the fraction of diversified firms with a leverage ratio less than 5% or at least "A-" S&P credit rating (excluding sample firms) in the industry. *PSDIV_Modified* is the fraction of industry sales accounted for by diversified firms with a leverage ratio less than 5% or at least "A-" S&P credit rating (excluding sample firms). The dependent variable, *bond spread*, is defined as the yield to maturity of the corporate bond minus the yield to maturity of a Treasury security of similar maturity, expressed in percentage terms. *DIV3* is a dummy variable equal to 1 if a firm operates in more than one 3-digit SIC code industry, and zero otherwise. *Competition (Fitted HHI)*, *Competition (Compustat)*, *Fitted HHI* and *C4-Index (Compustat)* are proxies for product market competition. All firm- and bond-specific characteristics are defined in Table 4.1. Lambda is the inverse Mills ratio obtained from the probit estimates in Table 4.10. All regressions control for year and industry fixed effects whose coefficients are not reported for brevity. The sample period is between 1986 and 2010. The p-value is reported in the parentheses. The 1%, 5%, and 10% significance levels are denoted with ***, **, and *, respectively.

	Bond Spread							
	Endogeneity (2)							
	Instrumental variables estimation: second stage				Heckman's two-stage estimation: second stage			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	9.963***	19.437***	17.497***	19.731***	9.946***	19.506***	17.487***	19.749***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
DIV3	0.029	-0.464*	-0.631**	-0.791**	0.027	-0.479*	-0.551**	-0.691**
	(0.91)	(0.08)	(0.02)	(0.02)	(0.91)	(0.07)	(0.03)	(0.04)
DIV3 × Competition (Fitted HHI)	-0.720***				-0.677***			
	(0.01)				(0.01)			
Competition (Fitted HHI)	0.280**				0.262**			
	(0.02)				(0.03)			
DIV3 × Competition (Compustat)		-0.693**				-0.587**		
		(0.02				(0.03)		
Competition (Compustat)		0.276**				0.234*		
		(0.04)				(0.08)		
DIV3 × Fitted HHI			2.081**				1.706*	
			(0.02)				(0.06)	
Fitted HHI			-1.181**				-0.951*	
			(0.03)				(0.08)	
DIV3 × C4-Index (Compustat)				7.805*				6.313
				(0.06)				(0.12)
C4-Index (Compustat)				-4.502**				-3.893*
				(0.03)				(0.07)
Log (Asset)	-0.424***	-0.996***	-0.811***	-0.968***	-0.424***	-1.000***	-0.814***	-0.971***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Market-to-Book	-0.161***	-0.323***	-0.213***	-0.236***	-0.158***	-0.316***	-0.206***	-0.230***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Leverage	1.979***	2.198***	2.260***	2.399***	1.981***	2.199***	2.265***	2.397***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Profitability	-3.804***	-2.152***	-2.534***	-2.332***	-3.825***	-2.198***	-2.581***	-2.372***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Firm risk	2.752***	3.326***	2.645***	3.239***	2.780***	3.383***	2.694***	3.293***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Tangibility	-0.150	-0.308***	-0.201**	-0.272***	-0.152	-0.316***	-0.205**	-0.288***
	(0.13)	(0.01)	(0.03)	(0.01)	(0.12)	(0.01)	(0.02)	(0.01)
Log(bond maturity)	-0.141***	-0.079**	-0.066**	-0.021	-0.140***	-0.076**	-0.064*	-0.019
	(0.01)	(0.02)	(0.04)	(0.56)	(0.01)	(0.02)	(0.06)	(0.59)
Bond size	0.224***	0.149***	0.179***	0.167***	0.224***	0.149***	0.179***	0.166***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Rating	0.068***	0.108***	0.079***	0.100***	0.068***	0.108***	0.079***	0.099***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Lambda					-0.076***	-0.186***	-0.149***	-0.190***
					(0.01)	(0.01)	(0.01)	(0.01)
Year & Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of Observations	4,339	4,339	4,339	4,339	4,339	4,339	4,339	4,339
Adj. R^2	0.463	0.433	0.472	0.415	0.464	0.439	0.476	0.420

Chapter 5

Conclusion and Limitations

5.1 Conclusion

This thesis explores the implications of corporate diversification.

Chapter 2 investigates the relationship between the coinsurance across divisional investment opportunities and the value of corporate cash holdings. We develop three hypotheses, based on financial constraints, the efficient internal capital market, and the agency problems. We find that the coinsurance across divisional investment opportunities reduces the value of cash for poorly governed firms and constrained firms, but increases the value of cash for firms with efficient internal capital markets.

Chapter 3 examines how coinsurance across divisional investment opportunities affects merger outcomes. We find that coinsurance across divisional investment opportunities is negatively associated with acquirer announcement returns and post-merger operating performance. We document a positive link between the effect of coinsurance across divisional investment opportunities and the probability of firms initiating mergers when they are poorly-governed. Evidence suggests that coinsurance across divisional investment opportunities is closely associated with agency problems and thus can lead to value destruction in diversified firms.

Chapter 4 investigates the impact of product market competition on the relationship between corporate diversification and the cost of debt financing. We develop three hypotheses based on the coinsurance effect, the efficient internal capital markets and the multimarket contacts in diversified firms. We find that the product market competition

increases the negative relationship between diversification and the cost of borrowing for firms that are financially constrained or make efficient cross-divisional transfers. Although intense competition may, in some cases, undermine the tacit collusion through the multimarket contacts in diversified firms, overall, the negative association between diversification and cost of debt financing is stronger in firms facing intense competition.

5.2 Limitations

5.2.1 Biases in Measurement Methodology

5.2.1.1 Segment Comparability

In the thesis, in order to compute the value of coinsurance across divisional investment opportunities and cash flows in a diversified firm, we need the data of investment opportunities and cash flows at the segment level. We employ the average Tobin's Q and the average cash flows of single-segment firms in an industry to proxy for the investment opportunities and cash flows in a diversified firm's segment.

The methodology goes back to work of Lang and Stulz (1994) and Berger and Ofek (1995) who treat single-segment firms as benchmarks for conglomerate segments and document the "diversification discount" phenomenon, which stimulated a voluminous literature on the value consequences of diversification. Over the past two decades, this methodology has been widely used in a large body of research on diversification. However, the assumption underlying the methodology, that the firm characteristics, such as investment opportunities of single-segment firms and diversified firms are comparable, has been questioned by researchers. A number of subsequent papers suggest diversified firms tend to have lower Tobin's Qs, a lower growth rate, a lower R&D investment, a greater profitability, and higher cash flows and returns (e.g., Lamont and Polk, 2001; Hyland and Diltz, 2002; Campa and Kedia, 2002). Therefore, using focused firms to represent segment characteristics of conglomerates is prone to selection

bias, and undermines the accuracy of the diversification-related measurements utilized in this thesis.

5.2.1.2 Flaws in Segment Reporting Data

As is the case with the majority of empirical papers in the literature on diversification, this thesis is based on the Compustat segment data. Nonetheless, Compustat segment reporting is also subject to several biases. First, under the FASB Accounting Standards, firms can report up to 10 business segments. Given that many conglomerates operate in more than 10 industries, the number of segments reported in Compustat are well below the true level of a firm's diversification (Lichtenberg, 1991; Montgomery, 1994). Secondly, there is no clear-cut definition of "segment"; thus, a segment reported by a firm can be a mere gathering of multiple unrelated lines of business. This generates the question of whether the segments of different firms are comparable with each other (Davis and Duhaime, 1992). Thirdly, a good number of the segment changes reported by firms and recorded in Compustat are just reporting adjustments and do not reflect real changes in organizational forms (Denis et al., 1997; Hyland and Diltz, 2002). Fourthly, established proxies for segment investments (CAPEX/asset) and investment opportunities (Tobin's Q) do not capture mergers and acquisition activities and their impacts, and they thus neglect a significant portion of the total investments made by conglomerates (Maksimovic and Phillips, 2008; Custódio, 2014). Therefore, as argued by Villalonga (2004a), studies based on the Compustat file are susceptible to measurement errors in segment reporting, which can cause misrepresentations of segment-level data.

5.2.1.3 Discretionary Segment Disclosure

Moreover, the segment reporting problem is compounded by the fact that firms can intentionally reduce segment disclosure via aggregation of cross-divisional activities

with the proprietary cost motive or the agency cost motive. The former underscores the need to conceal from rivals information that can put the disclosing firms themselves in a disadvantageous position (Harris, 1998; Botosan and Stanford, 2005), and the latter underscores the conflict between shareholders and managers who want to hide poor performance of diversification strategies (Berger and Hann, 2007). Therefore, discretionary disclosure challenges the objectivity of segment-specific data documented in Compustat.

Collectively, we acknowledge that the findings from our empirical tests are subject to the above-mentioned issues. Nonetheless, as the inter-segment activities and performance within diversified firms are not directly observable, we follow most researchers in the field and adopt this methodology and employ the Compustat segment data.

5.2.1.4 Limitation of the G-index

In this section, we discuss some limitations regarding the Gompers et al.'s (2003) G-index. First of all, the G-index, as a measurement of corporate governance, is constructed in a simple way. It is defined as the total number of a firm's defensive provisions such as poison pills and staggered boards. One possible problem of such naively-formed governance index is that it may not actually capture the essence of complex governance mechanisms. Another problem is that G-index is constructed using anti-takeover provisions. It does not cover other important aspects of corporate governance such as board structure and shareholder ownership. As Larcker et al. (2007) argues, omitted aspects of corporate governance are likely to be correlated with the G-index and thus the regression results based on G-index are open to doubt. In addition, the G-index data is static. It only provides data for every two years from 1990 to 2006, covering mostly larger firms. Therefore, our empirical findings based on the G-index may not be representative of the general population of U.S. companies.

5.2.1.5 Limitation of the Tobin's Q Proxy

In this thesis, we use Tobin's Q - the market value of a firm's assets to its replacement cost - as the proxy for investment opportunities (the incentive to invest). Although widely used in corporate finance, there are some limitations regarding the Q proxy.

Firstly, the calculation of Tobin's Q is often subject to measurement errors. For example, the book value of a firm's assets does not necessarily equal its replacement cost. Historical costs of previous investments are recorded by accounting figures that are usually not inflation-adjusted. Also, accounting depreciation data may not reflect true economic depreciation. Similarly, it is difficult to obtain the market value of preferred equity and corporate debt. Debt prices are usually not directly observable since many debt securities are not traded in the public market. In addition, Tobin's Q has also been used as a proxy for corporate performance, firm value and agency conflicts and hence it contains noisy information.

Secondly, a firm's real incentive to invest only equals Tobin's Q under strict theoretical conditions. The Tobin's (1969) Q-theory argues that a firm's investment decisions depend on marginal Q - the management's valuation of the expected marginal cash flows produced by an extra unit of capital. In empirical studies, researches use the observable (average) Tobin's Q as an estimate of marginal Q because the latter is not directly observable. However, such common practice to equate marginal Q with Tobin's Q relies on very restrictive assumptions of perfect market competition and constant returns-to-scale technology (Hayashi, 1982). As empirical evidence on the estimated sensitivity of investment to Q so far is mixed, some researchers have questioned the validity of these assumptions under which marginal Q equals (average) Tobin's Q. For example, possible deviations from perfect competition and homogeneity technology include market power or decreasing returns to scale in production (Gomes, 2001).

Thirdly, there can be discrepancy between Tobin's Q proxy (market valuation of capital) and the marginal Q (managers' valuation of capital). One possible reason is that the market's valuation of capital can deviate from managers' valuation due to market inefficiencies. Another possible reason is that managers' incentives for investment can diverge from those of shareholders. For instance, management's empire building preference can lead to overinvestment decisions (Jensen, 1986). In addition, short-termism may cause managers to boost short-term reported earnings at the price of long-term firm value by underinvesting in hard-to-measure projects such as maintenance and training (Stein 1989).

Therefore, our empirical findings based on Tobin's Q are subject to the above-mentioned limitations. We nonetheless choose to use this proxy because Tobin's Q is still widely used, primarily due to lack of observable and model-free alternatives, in empirical studies of takeovers (Lang et al., 1989; Servaes, 1991; Dong et al., 2006) and corporate diversification (Lang and Stulz, 1994; Rajan et al., 2000; Duchin 2010).

5.2.2 Heterogeneity across Industries

Researchers have argued that diversification can be endogenous. Conglomerates are likely to be already discounted before diversification and diversifying decisions are influenced by industry characteristics (Campa and Kedia, 2002; Villalonga, 2004b; Graham et al., 2002). In this thesis, we follow Campa and Kedia (2002), and address endogeneity by using instrumented variables, based on the industry attractiveness. The Campa and Kedia (2002) model has been adopted by almost every subsequent empirical paper in the literature on diversification.

However, as documented and argued by Santalo and Becerra (2008), diversification does not affect firms similarly or randomly across industries. Instead, diversified firms can perform poorly in some industries, but perform better in some others. For instance, conglomerate can outperform focused firms in industries where soft information is

important,[18] or where firms are vertically integrated. Therefore, Santalo and Becerra (2008) question the instrumental variable specification developed by Campa and Kedia (2002). If industry heterogeneity moderates the "diversification-performance" relationship, industry attractiveness will be correlated to both a firm's diversifying decision and the firm value. This implies that the instrument for diversification, which is based on industry attractiveness, may not serve as a good instrument. According to Santalo and Becerra (2008), conglomerates are more likely to outperform in sectors dominated by diversified firm, thus, the instrumented variables computed from the model in Campa and Kedia (2002) can lead to an upward bias in the valuation of diversified firms. This critique highlights the need to enhance the modelling of diversification decisions, as well as the need to investigate the industry characteristics that determine whether diversified firms thrive or struggle.

5.3 Future work

This thesis could be extended in a number of ways.

First, in Chapter 2 and Chapter 3 we document a negative value consequence of coinsurance across divisional investment opportunities. Evidence supports the dark side of the internal capital markets associated with agency problems. The theoretical models on the dark side of the internal capital markets are founded on the bargaining powers among the stakeholders inside the firm. Researchers have argued that cross-subsidization results from the bargaining powers of division managers against each other and the CEO (Scharfstein and Stein, 2000; Rajan et al., 2000). This stresses the importance of understanding how bargaining powers of division managers can influence resource allocation, which is not yet covered in this thesis. Maksimovic and Phillips (2007) underline the importance of examining firms from inside in order to grasp the

[18] Soft information is the information that cannot be correctly conveyed to outsiders (e.g., Stein 2002; Faure-Grimaud et al. 2003).

effect of managerial power and connections on resource allocations. Thus, the interaction between coinsurance across divisional investment opportunities and the bargaining power of division managers should trigger interesting questions. For example, if internal resources are shifted away from a promising segment to another with poor investment opportunities because the latter has a powerful manager who exercises influence in favour of his/her division, the transfers are obviously inefficient. On the other hand, if the same manager draws resources when his/her division has better opportunities, his/her bargaining powers in fact result in efficient transfers and mitigate the negative impact of coinsurance across divisional investment opportunities.

Secondly, the role of multimarket contacts in diversification is an under-explored area, where empirical evidence is scarce. Yu and Cannella Jr. (2013) highlight the rising awareness of the need to link multimarket contacts research with the diversification study. In Chapter 4, we provide evidence that multimarket contacts undermine the tacit collusions in diversified firms when product market competition intensifies. It can be extended in a number of ways. For example, we can study the impact of the multimarket contacts on the diversification discount. If diversified firms can silently collude and drive out single-segment firms, we should expect a diversification premium in industries where it is easier to establish multimarket contacts and facilitates tacit collusion. The diversification premium should be discounted in industries where tacit collusion is difficult to sustain. This could offer another explanation for the diversification discount debate.

Thirdly, given the limitations of Compustat segment data, one extension is to test the diversification effects, using different data sources and underlying benchmarks. For example, Villalonga (2004a) employs the US business establishments database (BITS) from the Census Bureau and links it to Compustat for a more accurate identification of conglomerate segments. She documents a diversification premium based on the data

from BITS. Maksimovic and Phillips (2002), Schoar (2002) and Bens et al. (2011) use the Longitudinal Research Database (LRD) from the Census Bureau to identify segments at a plant-level in manufacturing sectors. Hoberg and Phillips (2010b) utilize a text-based analysis to redefine industry relatedness based on products' similarity. Researchers have also started adopting unique manually-collected data to examine the internal capital markets of conglomerates (e.g., Glaser et al., 2013; Duchin et al., 2016). As noted by Maksimovic and Phillips (2013), the difficulty in directly observing segment-level activities within firms highlights the importance of addressing biases in data and valuation methodology in recent literature. The uncertainty about when the selection of alternative data sources and benchmarks would produce different results, and the merits and drawbacks of alternative data sources are still open questions.

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