Corporate Diversification, Investment Efficiency and the Business Cycles *

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ABSTRACT

I document the time-varying investment efficiency of conglomerates compared with single-segment firms. I find that, during recessions, conglomerates have higher Q-sensitivity of investment than do stand-alone firms, in contrast to the relationship during expansion periods. I also find that conglomerates, with the benefits from internal capital markets, exhibit increased dependence of investment on internal capital during recessionary periods, while stand-alone firms significantly increase cash retention and deviate their investment from its optimal level more severely. I examine the effect of the degree of diversification and find consistent evidence on investment efficiency and deployment of internal capital. I also provide evidence that conglomerates with better governance do not improve investment efficiency during recession, which suggests that improvement in investment efficiency is mainly driven by the benefits of internal capital markets, rather than better control of managerial discretion.

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1 Introduction

The study of conglomerates and the internal capital market through which they direct investment flows has been a focus of extensive research. The theoretical study of corporate diversification focuses on the determinants of diversification and its effect on firm value. Extant research following Lang and Stulz (1993) and Berger and Ofek (1995) has documented that diversified firms trade at a discount compared with equivalent single-segment companies. These studies provided evidence that conglomerates have lower firm value relative to a portfolio of stand-alone comparable companies operating in the same industries. This has been linked to inefficient internal capital marketsparticularly the inefficient capital allocation among different divisions within conglomerates (see Shin and Stulz (1998), Scharfstein (1998), Gertner, Powers, and Scharfstein (2002) and Ozbas and Scharfstein (2010)). This literature uses the relationship between divisional growth opportunities (computed as the median average of Tobin's q of all the stand-alone firms operating in the same industry as each division of the conglomerate) and the investment at divisional level to examine how internal capital markets allocate resources, and whether diversified firms respond to market opportunities as well as do single-segment firms. Empirically, conglomerates are less efficient in internal resource allocation, as segments in high-Q (low-Q) industries invest less (more) than do comparable stand-alone firms, and conglomerates exhibit lower Q-sensitivity of investment than do stand-alone firms.

This paper extends the relative advantages of conglomerates' internal capital markets and specifically compares the investment efficiency between conglomerates and stand-alone firms, with the aim of pinning down the channel of the improved efficiency of internal capital markets during economic downturnsspecifically during periods of recession, as defined by the NBER. The study is largely motivated by the bright side of internal capital markets, as recent research has demonstrated the existence of superior performance of conglomerates over stand-alone firms when external capital supply is highly constrained (Dimitrov and Tice (2006); Yan, Yang, and Jiao (2010), Gopalan and Xie (2011); Kuppuswamy and Villalonga (2010), Hovakimian (2011); Matvos and Seru (2014)), thereby suggesting a comparative advantage of conglomerates over single-segment firms during specific periods. Most of these studies attribute the reason for the improved performance of conglomerates to the more money effect, which indicates that conglomerates have a greater source of financing because of their advanced debt capacity. Several studies claim that managers increase project selec-

tion standards given tighter budgets. However, the intra-firm resource allocation remains unclear. If conglomerates allocate resources inefficiently during normal periods, the question is whether they change investment decisions during recessions.

If internal capital markets within conglomerates provide relative benefits over stand-alone firms and help mitigate external financial constraints, the question arises whether external financial market frictions affect intra-firm capital allocation. Given that conglomerates have relatively more money than do stand-alone firmseither because of the use of internal capital or their easier access to external financing than stand-alone firmsit remains largely unexplored whether conglomerates actively shift allocation of resources among divisions during recessionary periods to facilitate more efficient investment or are better at "winner picking", as stated by Stein (1997)).

I propose that external financial constraints promote intra-firm investment efficiency. This aligns with the finding that, during times of increased external cost of financing, the value of cash increases substantially (Faulkender and Wang (2006)). Luo (2011) argue that, when firms have difficulty raising external funds, empire-building managers of cash-rich firms are less likely to spend cash on negative NPV projects, compared with unconstrained managers, thereby suggesting that financial constraints substitute for good governance in disciplining managers. Zeng and Huang (2016) find that managers who face capital shocks tend to allocate available financial resources more efficiently and make better acquisition decisions that lead to greater value creation. This also suggests that financial constraints mitigate agency conflicts between managers and shareholders, and incentivize managers to channel available financial resources into value-increasing acquisitions. I follow the Q-sensitivity approach and find that the sensitivity of segment investment to the industry Q of diversified firms is higher than that of stand-alone firms during recession, thereby suggesting that conglomerates modify their capital allocation policies and invest more (less) in high-Q (low-Q) industries than do stand-alone firms. This relatively more effective resource allocation is consistent with the improved performance of conglomerates during financial distress.[1] This suggests that, when external capital markets are more restrictive, conglomerates enhance the efficiency of resource allocation significantly. Specifically, during recessions, the relationship between the Q-sensitivity of stand-alone

[1]I recognize that the improvement in relative investment efficiency may be due to either conglomerates' improved resource allocation or single-segment firms deviating from optimal investment more dramatically during economic downturns. For this reason, the improved investment efficiency is referred to as a change in relative investment efficiency.

firms and conglomerates flips, in comparison with during expansions.

Next, I study the channel of the flexibility of conglomerates to reallocate resources internally during economic downturns. If conglomerates are less likely to be financially constrained and the improvement of relative value is linked to the greater debt capacity or easier access to an external capital market, one would expect conglomerates to increase debt financing more than stand-alone firms during recessions. However, Volkov and Smith (2015) provide evidence that diversified firms in the US do not have better leverage than do stand-alone firms during downturns. They argue that the increase in the relative value of diversified firms is not attributed to broader access to the external debt market and, strikingly, conglomerates tend to reduce their relative leverage during deteriorating lending conditions, thereby suggesting that the benefit of diversification mainly comes from inside the firm and is driven by the diversification effect of internal capital markets.

I propose that, during downturns, conglomerates are more likely to finance investment with internal resources, rather than relying on the easier access to or cheaper cost of external financing. I then investigate the dependence of firm-level investment on the internal capital of conglomerates, and compare this with stand-alone firms. I find that the investmentcash flow sensitivity of conglomerates is significantly higher during recessions, which indicates that investment is more dependent on internally generated cash flows. This is also consistent with the findings in Fazzari, Hubbard, Petersen, Blinder, and Poterba (1988) and Hovakimian (2011), as the relationship suggests that investment is dependent on firms having sufficient internal cash flow. However, the investmentcash flow sensitivity of stand-alone firms is significantly lower during recessions, thereby suggesting they are exposed to external financing costs, yet do not have sufficient internal cash flow to fund investment. This indicates that stand-alone firms spend less on investment, while stockpiling cash during recession. Further, by incorporating the degree of diversificationwhich is the imperfect correlation between divisions within a conglomerateI provide evidence that both lowly and highly diversified firms show significantly higher investmentcash flow sensitivity, which suggests that they fund investment with internal cash flow, and highly diversified firms more significantly increase the dependence of investment on internal cash flow.

This result is significant and economically important because the higher degree of diversification represents greater ability to centralize internal capital and

mitigate negative outside shocks, which means that highly diversified firms are better at deploying internal capital to make investments during difficult times. Overall, this study provides support for the argument that conglomerates outperform stand-alone firms during recessions because of the benefit of internal capital markets, rather than easier access to external financing or greater debt capacity, and the effect is more pronounced for conglomerates with a higher degree of diversification.

Moreover, the current paper investigates the corporate cash holding policy across the business cycle. I propose that the relatively higher dependence of investment on the internal resources of conglomerates, as compared with stand-alone firms, is related to the greater precautionary saving motives of stand-alone firms during recessions. This suggests that, during times of greater need for cash reserves, conglomerates' ability to mitigate negative shocks in cash flows by saving less is beneficial, as they can invest more with internal resources.

If both conglomerates and stand-alone firms have trouble accessing external debt financing, one would expect the use of internal capital to become more important. Duchin, Ozbas, and Sensoy (2010) document the precautionary saving role of cash reserves during crises, and argue that internal resources should be relatively more important following a contraction of external financing. Similarly, Smith (2014) finds that the precautionary value of cash during times of uncertainty is beneficial. Therefore, I argue that the relative improved performance of conglomerates is related to the increased precautionary saving motives of stand-alone firms during recessions, while conglomerates do not need to save cash and reduce their investment as do stand-alone firms. Duchin (2010) documents that multi-divisional firms hold significantly less cash than do stand-alone firms because they are diversified in their investment opportunities. Several other studies report that firms with greater difficulties obtaining external capital or facing higher risk of uncertainty accumulate more cash (Harford (1999), Opler, Pinkowitz, Stulz, and Williamson (1999) and Bates, Kahle, and Stulz (2009)). This suggests that, during difficult times of the financial market, firms have greater need for cash reserves, and conglomerates' ability to mitigate negative shocks in cash flows and consequently save less could be essentially beneficial, as they can continue to invest with internal resources. I argue that stand-alone firms need to cut investment from the optimal level and save for precautionary purposes during downturns, while conglomerates do not need to save as much cash as do stand-alone firms. Similarly, I incorporate the degree of diversification to examine

the diversification effect of internal capital markets on mitigating the precautionary saving needs of firms faced with financial constraints.

Drawing on Hovakimian (2011) and other papers on financial constraint and crises, I separate the sample into constrained and unconstrained firms, based on dividend payout, commercial paper rating, two alternative benchmark indexes-the KZ index (from Kaplan and Zingales (1997)) and WW index (from Whited and Wu (2006))and the size and age (SA) index (from Hadlock and Pierce (2010)). Consistent with the notion that internal funds are relatively more important during periods of financial constraints, I provide evidence that constrained stand-alone firms are more subject to precautionary saving motives, as they save significantly more cash from cash flows, even during non-recessionary periods. Moreover, unconstrained stand-alone firms actively save from internal cash flows during recessions, perhaps because of the greater need for liquidity and precautionary saving when external financing is costly. In contrast, diversified firms do not exhibit a significant tendency to save from cash flows, whether constrained or unconstrained, during recessions or expansions (except the constrained conglomerates under the definition of the high KZ index contrarily save from cash flows.[2])

To establish the relationship between extra saving and decreased investment, I further test the relationship between FCF and investment deviation. If excess saving causes more FCF, it would help to understand its effect on actual investment and its deviation from the optimal level. I provide evidence that the investment deviation driven by FCFs is more pronounced within stand-alone firms during recessions. In contrast, this deviation in investment decreases for diversified firms. The evidence implies that conglomerates have less FCF during difficult times and may use limited internal capital to fund investment. At the same time, stand-alone firms deviate from optimal investment more severely.

Finally, agency-based theories suggest that conglomerates allocate resources less efficiently than do stand-alone firms due to agency costs, because, for diversified firms, managers have more discretion on resource allocation across business segments of the firm, and thus greater opportunities to pursue personal benefits at the expense of shareholders' wealth (see, for example, Berger and Ofek (1995), Shin and Stulz (1998), Lamont and Polk (2002), Rajan, Servaes, and Zingales (2000), and Scharfstein and Stein (2000)). The internal capital market of conglomerates affects the investment by segments and enables managers to fund projects with higher profitability or better investment opportunities. In contrast,

[2]Prior literature finds that the KZ index produces conflicting results compared with more recently developed measures of financial constraints (e.g., Almeida, Campello, and Weisbach (2004); Faulkender and Wang (2006); Denis and Sibilkov (2010)).

when firms comprise divisions with good and bad investment opportunities, rent-seeking behavior on behalf of divisional managers will lead top management to over-invest in weak divisions and underinvest in strong divisions. The ability to redistribute funds may also lead to over-investment in poor projects at the expense of good projects because of the various agency problems described in the previous literature (Jensen and Meckling (1976), Matvos and Seru (2014)). Therefore, I further study the effect of corporate governance on investment efficiency, specifically to determine whether the enhanced investment efficiency of conglomerates during recessions is due to improved corporate governance. I use three proxies for corporate governance: the G-index (Gompers, Ishii, and Metrick (2003)), the E-index (Bebchuk, Cohen, and Ferrell (2008)), and institutional ownership (Anderson, Bates, Bizjak, and Lemmon (2000)), Hoechle, Schmid, Walter, and Yermack (2012)). The results indicate that conglomerates with better governance increase the dependence of investment on internal cash flow, yet do not improve the investment efficiency (investment sensitivity to Q) significantly during recessions. This relationship implies that, for conglomerates with better governance, the value of internal cash flow prevails over investment opportunities. In addition, with weaker governance, conglomerates do not demonstrate lower investment efficiency during recessions.

The current paper contributes to the existing research on the topic of firm diversification in a number of ways. First, this paper examines the use of internal capital, rather than the scale of it. This study provides evidence that conglomerates not only have more money from centralizing internal capital markets, but also use the money more efficiently during economic downturns. Second, the evidence suggests that the relative improved corporate investment of conglomerates over stand-alone firms is partly because of stand-alone firms' precautionary saving purposes and the need to hoard cash during economic downturns. Even unconstrained stand-alone firms tend to save cash out from cash flows, thereby suggesting that economic downturns affect firms' cash holding negatively. Third, the evidence in this thesis also contributes to the literature on financial constraints and problems of underinvestment. Primarily, this literature examines the extent to which firms must rely on internal financial slack (e.g., cash flows) to finance investment. Prior literature suggests that financial slack is relatively more important during periods of financial constraints. Cooper and Jensen (2016) find that the relationship between cash holdings and equity returns is concentrated in periods of high financing costs, including financial crises. Similarly, Harford, Klasa, and Maxwell (2014) find that firms with shorter-term debt hold more cash

because of greater refinancing risk, and this association is stronger during times of tight credit conditions. As a result of the greater need for liquidity and the relatively high cost of debt during times of tight credit conditions, I expect that firms tend to save more during economic downturns. This study presents evidence that internal capital markets can largely alleviate the excess saving motives, while stand-alone firms need to save relatively more. Finally, the present study adds to the literature by identifying the effect of internal capital markets and the benefit of diversification more directly. By incorporating the degree of diversification, this study demonstrates that conglomerates invest more and save less with internal resources than do stand-alone firms. Moreover, highly diversified firms are able to save even less or invest more than lowly diversified firms. This supports the diversification effect as the main channel of the relative advantage of conglomerates during difficult periods.

The rest of this paper is organized as follows. Section 2 reviews the existing literature, while Section 3 discusses the main hypothesis. Section 4 explains the data and methodology of the study, while Section 5 discusses the results. Finally, Section 6 concludes this paper.

2 Related Literature

A large body of literature on conglomerates has examined the discount in corporate diversification. Lang and Stulz (1993) and Berger and Ofek (1995) provide strong evidence that conglomerates trade at a discount, and conclude that diversification destroys value. Lang and Stulz (1993) show that diversified firms have a lower Tobin's q than does a portfolio of comparable stand-alone companies. Using excess value methodology, Berger and Ofek (1995) find an average value loss of diversified firms compared with stand-alone firms. They argue that overinvestment and cross-subsidization contribute to value loss. Comment and Jarrell (1995) demonstrate a positive relationship between firm value and corporate focus, and diversified firms are less likely to exploit financial economics of scope. They also argued that diversified firms are more likely to be takeover targets.

In contrast, using comprehensive plant-level data from BITS instead of Compustat, Villalonga (2004) finds a significant premium of diversified firms over specialized firms. One possible explanation for this finding is that Compustat data may implicitly measure unrelated diversification, whereas census data cover related diversification. Santalo and Becerra (2008) find heterogeneous effects of industries on diversification performance, which may contribute to explaining the

inconclusive results of previous empirical studies, since they each use different subsamples from different industries.

2.1 Internal Capital Markets

The internal capital market enables management to take advantage of information about divisions and allocate resources actively to divisions with better investment opportunities. The internal capital market of conglomerates affects investment by segments and enables managers to fund projects with higher profitability or better investment opportunities, thereby directing corporate resources to the best uses, with the central concentration of capital within the firm. However, when firms comprise divisions with good and bad investment opportunities, rent-seeking behavior on behalf of divisional managers will lead top management to over-invest in weak divisions and underinvest in strong divisions.

Shin and Stulz (1998) find that investment by a segment of a diversified firm depends on the cash flow of both itself and other segments, and that investment by a segment does not respond to differences in Tobin's q across segments as rapidly as in stand-alone firms. At the same time, Scharfstein (1998) documents that conglomerate segments in high-Q (low-Q) industries invest less (more) than do comparable stand-alone firms. In a related study, Scharfstein and Stein (2000) argue that rent-seeking behavior on behalf of divisional managers will lead top management to over-invest in weak divisions and underinvest in strong divisions. Moreover, Gertner et al. (2002) examine the same firm's sensitivity of investment to Tobin's q before and after the spin-off, and find that segment sensitivity to industry Tobin's q increased after the segment spin-off. Recently, Ozbas and Scharfstein (2010) found that unrelated segments exhibit lower Q-sensitivity of investment than do stand-alone firms, and the differences are more pronounced in conglomerates in which top management has small ownership stakes.

A strand of research has demonstrated the existence of an efficient internal capital market. These studies examine cases in which an external capital supply is highly constrained, thereby suggesting a comparative advantage of conglomerates over single-segment firms. Dimitrov and Tice (2006) find that the sales and inventory growth of focused firms drop more than segments of diversified firms during recessions. Yan et al. (2010) document that corporate investment only declines for focused firms as a result of increased financing stress at the macroeconomic level, while remaining constant for diversified firms. Moreover, they found that the excess values of diversified firms are less negatively affected

than those of focused firms. Gopalan and Xie (2011) show that segments of conglomerate firms in times of industry distress have higher sales growth, higher cash flow, and higher expenditure on research and development than do single-segment firms, and that the diversification discount reduces during industry distress, thereby suggesting that conglomerate firms enable firm segments to avoid financial constraints during times of industry distress. Kuppuswamy and Villalonga (2010) study the effects of the 2007/2008 financial crisis and find that the excess value of diversified firms increased significantly, compared with focused firms, and that the diversification discount completely disappears at the peak of the crisis. Further, Hovakimian (2011) finds that, during recession, when external financing costs are higher, conglomerates improve the efficiency of investment by allocating more funds to divisions with better opportunities. In a related study, Matvos and Seru (2014) examine the effect of frictions in internal capital markets on the relationship between productivity and investment. Using the financial crisis as a simulated model, they find that resource allocation within firms is significantly cheaper and can offset shocks in the financial sector.

2.2 Diversification Effect

Recent studies on diversification have extended the possible benefit view. They focused on the effect of cross-divisional correlations in investment opportunities and cash flow, since corporate diversification reduces firms' overall cash flow volatility. Exploiting the imperfect correlations between divisions also aligns with the coinsurance effect, introduced by Lewellen (1971). In his work, the imperfect correlations between divisions' cash flows increase the debt capacity of firms by reducing the probability of default. Moreover, coinsurance enables a diversified firm to avoid the countercyclical deadweight costs of financial distress (Elton, Gruber, Agrawal, and Mann (2001) and Almeida and Philippon (2007)) that its business units would have otherwise incurred as stand-alone firms. Duchin (2010) examines the relationship between coinsurance and a firm's cash retention strategies, and finds that lower cross-divisional correlations in investment opportunity and higher correlations between investment opportunity and cash flow correspond to lower cash holdings. Duchin (2010) also finds that diversification is mainly correlated with lower cash holdings in financially constrained firms. Dimitrov and Tice (2006) find that, during recessions, sales growth rates drop more for bank-dependent focused firms than diversified firms. They conjecture that the lower volatility in business activity of diversified firms is due to

their greater debt capacity and lower credit constraints. Aivazian, Qiu, and Rahaman (2012) find that diversified firms have significantly lower loan rates than do comparable focused firms, and the diversification effect of the cost of bank loans is mainly channeled by coinsurance. Hann, Ogneva, and Ozbas (2013) examine the possibility that coinsurance can affect a firm's systematic risk, and find that diversified firms with less correlated segment cash flow have a lower cost of capital, which is consistent with the effect of coinsurance that reduces systematic risk.

One of the possible benefits to conglomerate firms is enhancement in productivity. A group of empirical works studying the productivity of conglomerate segments shed light on prior inconclusive literature. Maksimovic and Phillips (2002) found that diversified firms generally allocate resources more efficiently. However, using plant-level data from the Longitudinal Research and Database, they demonstrated that diversified firms are less productive. In contrast, Schoar (2002) found evidence that diversified firms are no less productive than benchmark stand-alone firms. Gomes and Livdan (2004) also demonstrated that diversification allows a firm to explore better productive opportunities, while taking advantage of synergies. They reconciled the existence of diversification discount, with conglomerates being more productive than focused firms.

2.3 Financial Constraints

The present study is related to the literature on financial constraints and corporate demand for cashnamely, the precautionary saving theory introduced by Keynes (1936). According to this theory, firms hold cash to protect themselves against adverse cash flow shocks that might force them to forgo valuable investment opportunities because of costly external financing. Opler et al. (1999) examined the relationship between cash flow and cash holdings, and conclude that firms operating in more volatile industries hold significantly more cash as a fraction of their assets. This finding is consistent with the insight of Modigliani and Miller (1958)' that cash only affects firm value when markets are not frictionless, as well as the results in Almeida et al. (2004) that cash holdings and cash flows are correlated only in financially constrained firms. Harford (1999), Opler et al. (1999) and Bates et al. (2009) argue that firms hold cash, rather than investing, to mitigate adverse cash flow shocks because of external financial constraints. According to Harford, Mansi, and Maxwell (2008), firms with weaker governance and excess cash holdings spend cash more quickly than do firms with stronger governance

and lower cash reserves. Bolton, Chen, and Wang (2011a) conclude that, when the cashcapital ratio is higher, the firm invests more and saves less, as the marginal value of cash is smaller. Eisfeldt and Muir (2014) report a positive correlation between liquidity accumulation and external finance, both with a model and actual data. Almeida, Campello, Cunha, and Weisbach (2014) formalize a framework, in which firms face financial constraints, and argue that liquidity management can alleviate the effects of financing frictions. The literature on financial constraints is related to problems of underinvestment. Primarily, this literature examines the extent to which firms must rely on internal financial slack (e.g., cash flows) to finance investment. Prior literature suggests that financial slack is relatively more important during periods of financial constraints. Cooper and Jensen (2016) find that the relationship between cash holdings and equity returns is concentrated during periods of high financing costs, including financial crises. Similarly, Harford et al. (2014) find that firms with shorter-term debt hold more cash because of greater refinancing risk, and this association is stronger during times of tight credit conditions. As a result of the greater need for liquidity and the relatively high cost of debt during times of tight credit conditions, we expect that firms tend to save more during economic downturns.

During an economic expansion, as cash reserves increase, managers make strategic decisions about whether to disburse the cash to shareholders, spend the cash on internal projects, use the cash for external investment, or continue to hold the cash. It is theoretically unclear how self-interested managers will decide between spending FCF and retaining it as cash reserves. Managers must trade-off the private benefits of current spending against the flexibility provided by accumulating excess cash reserves (Harford et al. (2008), Bolton et al. (2011a)). In contrast, during recessions, the external finance costs increase and firms can no longer invest at an optimal level. Several studies have reported that firms with greater difficulties obtaining external capital accumulate more cash (Harford (1999), Opler et al. (1999)). Corporations tend to hold more cash when their underlying earnings risk is higher or when they have higher growth opportunities (Bates et al. (2009)). Cash holdings can be valuable when other sources of funds, including cash flows, are insufficient to satisfy firms' demand for capital. That is, firms facing external financing constraints can use available cash holdings to fund the necessary expenditures. Consistent with this view, Almeida et al. (2004) provided evidence that firms with greater frictions in raising outside financing save a greater portion of their cash flow as cash than do firms with fewer frictions. Faulkender and Wang (2006) and Denis and Sibilkov (2010) report

evidence consistent with the view that cash holdings are more valuable for constrained firms than for unconstrained firms. Collectively, these studies support the view that higher cash holdings are more valuable for financially constrained firms. Recently, McLean and Zhao (2014) find that investment is less sensitive to Tobin's q and more sensitive to cash flow during recession. They argued that recessions increase external finance costs, thereby limiting investment at firm level. Maxwell, Klasa, and Harford (2014) find that firms increase cash holdings and save cash from internal cash flows to mitigate refinancing risk; otherwise, they have underinvestment problems because of lack of cash reserve.

For diversified firms, when investment opportunities or cash flows across divisions are less correlated, they enjoy greater diversification and greater reduction in variability (Lewellen (1971)). This coinsurancethe imperfect correlation of cash flows and investment opportunitiesamong a firm's business units can also enable mutual protection of investment across business units during difficult times, and subsequently lead to a reduction in hedging necessity. This is also related to risk management that focuses on optimal hedging policies, together with corporate investment and cash management. Mello, Parsons, and Triantis (1995) and Morellec and Smith (2007) analyze corporate investment together with optimal hedging, and document that the firm's ability to exploit its investment opportunity depends on the degree to which its flexibility is companioned by an appropriate hedging strategy. By studying the interaction between hedging and cash management, Mello and Parsons (2000) argue that optimal hedging maximizes liquidity value. In this manner, self-interested managers of conglomerates weigh the discipline of excess spending and cash holding differently in the sense that they have extra hedging benefit. Consistent with this view, Duchin (2010) documents that multi-divisional firms hold significantly less cash than do stand-alone firms because they are diversified in their investment opportunities. Moreover, the higher the degree of diversification, the lower the level of cash holding reported by conglomerates.

3 Hypothesis Development

3.1 Investment Efficiency

Recent research has demonstrated the existence of superior performance of conglomerates over stand-alone firms when external capital supply is highly constrained (Dimitrov and Tice (2006); Yan et al. (2010), Gopalan and Xie (2011); Kup-

puswamy and Villalonga (2010), Matvos and Seru (2014)), thereby suggesting a comparative advantage of conglomerates over single-segment firms during specific periods. When external financing is costly, firms can no longer invest at the optimal level. The excess cash net of saving motives allows greater flexibility for conglomerates to hold a material advantage over other firms during recessionary periods. Given that conglomerates have relatively more money because of the substitution effect from internal capital markets, conglomerates may actively shift allocation of resources among divisions during recessionary periods in a manner different from their resource allocation policy during normal periods.

Prior literature has shown that, during times of financial constraints, the value of cash increases substantially, and managers tend to channel available financial resources into value-increasing projects (Luo (2011) and Zeng and Huang (2016)). This suggests that financial constraints mitigate agency conflicts during difficult times. Similarly, Volkov and Smith (2015) document that the relative improved performance of conglomerates during downturns is mostly driven by financially constrained firms, suggesting an improvement in the efficiency of internal markets. Therefore, I propose that conglomerates improve resource allocation more effectively and are better at "winner picking" (Stein (1997) and Matsusaka and Nanda (2002)). Specifically, I argue that external financial constraints enhance the intra-firm investment efficiency of conglomerates. To help disentangle which effect is the driving force behind the improved performance of conglomerates during recessions, I follow the literature on the measurement of internal capital market efficiency, and study the relationship between divisional growth opportunities and the corresponding investment arranged from headquarters, and how this relationship changes over time to identify the time-varying investment efficiency of diversified firms. Moreover, because of costly external financing during recessions, stand-alone firms cannot fund all investment projects, as they do not have the benefit of internal capital markets. The investment efficiency of stand-alone firms is expected to decrease significantly during recessions. The main tests and results for this hypothesis are presented in Section 5.1.

Hypothesis 1 *During recessions, diversified firms allocate resources more efficiently than they do during periods of expansions. This increased efficiency to reallocate resources is related to the diversification effect and benefits of internal capital markets.*

3.2 Internal Cash Flow

Prior studies focus on the advantages of conglomerates' higher debt capacity, higher leverage, and lower cost of capital. However, recent studies find little evidence of improved debt financing. For example, Volkov and Smith (2015) find that conglomerates tend to reduce their relative leverage in deteriorating lending conditions. Similarly, Rudolph and Schwetzler (2013) documented that the effect of crises on the improvement in relative value of diversified firms is insignificant in regions with a weaker capital market. Rather than easier access to or cheaper cost of external financing for conglomerates during downturns, I propose that conglomerates are more likely to depend on internal resources during recession. As documented by Volkov and Smith (2015), conglomerates in the US do not have better leverage than do stand-alone firms during downturns, as domestic capital market conditions deteriorate. Similarly, Rudolph and Schwetzler (2013) document that the effect of crises on the improvement in relative value of diversified firms is insignificant in regions with a weaker capital market. This suggests that conglomerates and stand-alone firms have similar access to external financing, given the contraction of the financial market. As a result, during downturns, the relatively improved performance of conglomerates should be mainly driven by the existence of internal capital markets, instead of the easier access to or cheaper cost of external financing.

Recent studies demonstrate the importance of internal cash flow on investment when financially constrained. Bolton et al. (2011a) indicate that investment sensitivity to Q decreases when the marginal value of cash is high. McLean and Zhao (2014) find that investment is less sensitive to Tobin's q and more sensitive to cash flow during recession, and argue that recessions increase external finance costs, thereby limiting investment at firm level. This is consistent with the current prediction that firms rely on internal cash flow to finance investment during recessions. Therefore, I propose that firms are more likely to finance investment with internal resources, and conglomerates benefit more because the scale of internal capital markets is larger than for stand-alone firms. In contrast, stand-alone firms cut more investment from the optimal level. Overall, one would expect the dependence of investment on internal capital to increase for both conglomerates and stand-alone firms, and the internal capital markets to make conglomerates fund more investment internally than stand-alone firms. Unlike the extant studies that examines the relative value of conglomerates during economic downturns, my study focuses on the channel of improved firm value.

Moreover, this improvement is associated with the existence of internal capi-

tal markets and the diversification effectthat is, the extent to which divisions are uncorrelated in business opportunities or operation cash flows. One would expect the dependence on internal capital markets to be more pronounced in highly diversified conglomerates, as the internal capital markets are more centralized and effective in highly diversified conglomerates than in lowly diversified conglomerates. By demonstrating that the degree of diversification magnifies the dependence of corporate investment on internal capital, this paper will provide support for the argument that conglomerates outperform stand-alone firms during difficult times because of the benefit of internal capital markets, instead of easier access to external financing or greater debt capacity. The main tests and results for this hypothesis are presented in Section 5.2.

Hypothesis 2 *Conglomerates deploy more internal capital for investment during recessions, relative to stand-alone firms. This is related to the diversification effect and benefits of internal capital markets.*

3.3 Cash Holdings

If firms have trouble accessing external financing during financial constraint, one would expect the use of internal capital to become more important. As a result of the greater need for liquidity and the relatively high cost of external financing during times of tight credit conditions, I expect that firms tend to save more, rather than investing. It has been shown in prior research that internal resources are relatively more valuable following a contraction of external financing, and that firms with greater difficulties obtaining external capital or facing higher risk of uncertainty accumulate more cash (Harford (1999), Opler et al. (1999) and Bates et al. (2009)). In imperfect financial markets, financially constrained firms need to relinquish value-increasing investments and accumulate more cash (Fazzari et al. (1988)). Almeida et al. (2004) find that cash holdings and cash flows are correlated in financially constrained firms, suggesting firms save from internal funds when constrained. Duchin et al. (2010) document the precautionary saving role of cash reserves during crises. Smith (2014) finds that the precautionary value of cash during times of uncertainty is beneficial. This implies that firms may need to cut investment from the optimal level and save for precautionary purposes during downturns, while conglomerates do not need to save as much cash as stand-alone firms. As documented by Duchin (2010), multi-divisional firms hold significantly less cash than do stand-alone firms because they are diversified in their investment opportunities. Moreover, the cash holding is negatively related

to the degree of diversification in divisional cash flows or investment opportunities.

This study aims to demonstrate that the difference in cash-saving policy between conglomerates and single-segment firms is more pronounced during recessionary periods. I propose that the relatively higher dependence of investment on the internal resources of conglomerates is related to the greater precautionary saving motives of stand-alone firms during recessions. The main tests and results for this hypothesis are presented in Section 5.3. This section also includes firm-level financial constraint measures to examine the cash holdings across different firms over the business cycle. This helps identify the main driver of the excess cash holdings across different firms. To establish the relationship between extra saving and decreased investment, I further test the relationship between FCF and investment deviation in Section 5.4. If excess saving causes more FCF, it would help to understand its effect on actual investment, and its deviation from the optimal level. Therefore, I examine whether conglomerates' ability to mitigate negative shocks in cash flows by saving less is beneficial, and whether their increased investment is mainly driven by internal resources during recessions, based on the following hypothesis.

Hypothesis 3 *During recessions, conglomerates save less from internal capital for precautionary purposes, relative to stand-alone firms. The increased investment of conglomerates is related to decreased saving of internal capital.*

4 Data and Variables

4.1 Data Collection and Important Measures

The sample and data in this paper come from the Compustat Industry Segment (CIS) database and Compustat annual database from 1979 to 2012. The CIS database reports segment information for all active Compustat firms other than utility subsidiaries. This file provides basic accounting information, such as sales, assets, capital expenditures, operating profits, and depreciation, as well as a pair of SIC codesthe primary SIC (SICS1) and the secondary SIC (SICS2). In a given year, I classify a firm as stand-alone if it reports only one segment or if all its segments share the same four-digit SICS1. I classify a firm as diversified or a conglomerate if it has two or more segments with different four-digit SICS1 codes throughout the year. As is standard practice (Berger and Ofek (1995)), I cross-validate observations in the segment files with observations in the Compustat

annual files. I drop segments with the following features: (i) the name "other"; (ii) a primary SIC code equal to zero or missing; (iii) incomplete accounting data (sales, assets, capital expenditure, depreciation, operating profits); (iv) anomalous accounting data (zero depreciation, capital spending greater than sales or assets, capital spending less than zero); and (v) sales less than $20 million in 1982 dollars, using the Bureau of Labor Statistics producer price index for finished goods (WPUSOP3000). I also drop segments that operate in the financial and utilities industriesspecifically, utilities (SIC code 4900-4999), banking (6000-6199), and insurance (6300-6499). I define investment as the capital expenditure at both firm level and segment level. I define industry Q as the median-bounded Q of stand-alone firms within the same four-digit primary SIC industry. Specifically, I compute bounded stand-alone Q as MVA/ (0.9BVA + 0.1MVA), following Kaplan and Zingales (1997) and Duchin et al. (2010). I measure cash flow as operating profits plus depreciation. This measure of cash flow is standard in the literature and does not adjust cash flow for taxes, working capital investments, and other factors because these data are unavailable in the segment files. An intuitive test of the time-varying effect on investment efficiency includes business cycle analysis by using the categorization data of recession and expansion from the NBER. During the sample period of 1979 to 2012 covered in the study, the NBER identified the following periods of economic recessions: January to July 1980, July 1981 to November 1982, July 1990 to March 1991, March to November 2001, and December 2007 to June 2009. Although these periods are not exactly annual periods, to use them with annual data on internal capital allocation, I classify a firm-year as a recession if it includes any NBER-specified recession months. As a result, the sample classifies 1980, 1981, 1982, 1990, 1991, 2001, 2008, and 2009 as recessions, and the rest of the sample years as non-recession periods. However, the recession subsample is far too limited (approximately 12.5% of the whole sample) compared with the expansion subsample; thus, it is necessary to employ matching analysis for the comparison of conglomerates and stand-alone firms.

4.1.1 Measurement Error of Q

The main focus of research interest in this paper is the ways in which segment investments respond to their investment opportunities differently across time. The results could be biased if productivity is mis-measured in a systematic manner because of various factors, including the endogenous composition of conglomerates (e.g., Maksimovic and Phillips (2002), Villalonga (2004), and Santalo and Becerra (2008)). Another issue is that the investment and Q are endogenously

determined (e.g., Bolton, Chen, and Wang (2011b), DeMarzo, Fishman, He, and Wang (2012)). Moreover, this paper also seeks to analyze the effect of internal cash flow on firms' financing and saving policy. Erickson and Whited (2000) and Cummins, Hassett, and Oliner (2006) pointed out that, if Q is estimated with error, then it could be that investment is sensitive to cash flow because cash flow reflects growth opportunities.

I address concerns of measurement error by: (1) showing that industry Q is estimated based on stand-alone firms in the same industry, which is unlikely to be endogenously related to a conglomerate segment's investment[3]; (2) showing that my results are similar when using alternative measures of productivity (e.g., including return on assets [ROA] and industry sales growth); (3) showing that the evidence on investment sensitivity is time-varying. However, there is no study suggesting that measurement error is lower during certain periods, such as recessions. More specifically, if the measurement error drives up the investment sensitivity to Q during recessions, I expect a similar relationship between conglomerates and stand-alone firms during expansions.

4.1.2 Matching Sample

Table 4 highlights substantial and pervasive heterogeneity between a segment of conglomerates and stand-alone firms. The analysis of the marginal effect of the business cycle on investment across different firms focuses more on the time-varying changes, which allows for heterogeneity in the firm characteristics. The discrepancy between conglomerates and stand-alone firms inherent in the organizational structure cannot be controlled. Therefore, a closer matched sample would help identify the marginal effect of the business cycle more directly. Specifically, because conglomerate segments are on average larger than stand-alone firms, as shown in Table 4, it is possible that larger segments exhibit higher Q-sensitivity of investment during recessions because the size of conglomerate segments decreases substantially. Or most of the investment opportunities require large scale of capital which is not available for stand-alone firms during recessions. If this is the case, it would be a mistake to attribute the enhanced Q-sensitivity of investment to an active change in resource allocation because of the benefit of internal capital markets. Moreover, there may be differences in Q across industrieseven firms within the same three-digit industry can engage in unrelated operations. Alternatively, stand-alone firms are more likely to be subject to survivorship bias during recessions, and the remaining ones may operate

[3]To a lesser degree, industry Q is served as a public signal to the board when allocating capital.

in low Q-sensitivity industries. If this is the case, it would be incorrect to attribute the primary finding of improved investment efficiency to the effects of the internal capital markets of conglomerates.

To address these problems, I form matched samples of conglomerate segments and stand-alone firms. First, to limit unwanted organizational heterogeneity, I estimate a propensity score for the likelihood of being a conglomerate segment for the full sample of segments. This propensity score is determined by regressing an indicator for the segment of being a conglomerate on segment characteristics, including segment investment, segment sales, profitability (cash flow over sales ratio), and industry opportunity (Q). The model also includes industry and year fixed effects. I then match each of the segments of conglomerates to a stand-alone segment with the closest propensity score. Matched segments are drawn without replacement. Second, I manually match the segments of conglomerates to the most comparable stand-alone firms. For each of the segments of conglomerates, I find an equivalent segment drawn from the subsample of stand-alone firms with the same industry, same fiscal year, and closest size of assets. Matched segments are also drawn without replacement. I report the estimation results for both matching methods in Section 5.1.2.

4.1.3 Degree of Diversification

Diversification is measured directly through the cross-divisional correlations in investment opportunity (measured by Tobin's q) and cash flow (measured by earnings less interest and taxes). When investment opportunities or cash flows across divisions are less correlated, firms enjoy greater diversification (or coinsurance). Measuring the level of coinsurance among a diversified firm's business units is empirically challenging because the joint distribution of future business unit cash flows is not observable. Moreover, using the distribution of historical business unit cash flows is problematic because firm composition changes over time. Accordingly, the literature measures diversification proxies using correlations of industry-level cash flows based on single-segment firms. I construct measurement for diversification in the firm's investment opportunities and cash flow following the approach in Duchin (2010) and Hann et al. (2013). For each year in the sample, I estimate pairwise industry correlations using the prior 10-year idiosyncratic industry cash flow. Consistent with the prior definition, I define industries using the narrowest primary SIC grouping that includes at least five single-segment firms with at least $20 million in sales over the last 10 years. For each industry in a given year, I compute the idiosyncratic industry cash flow of

the full sample for the prior 10 years, as residuals from a regression of average industry cash flow on average market-wide cash flow and two additional size and market-to-book factors. Similarly, I compute pairwise investment correlations using the prior 10-year idiosyncratic industry Q. As an inverse measure of diversification, for firm i in year t with n business segments, there is a sales-weighted aggregated correlation, which is given by:

$$\rho_{it}(n) = \sum_{p=1}^{n} \sum_{q=1}^{n} \omega_{ip(j)} \omega_{iq(k)} Corr_{[t-10,t-1]}(j,k) \tag{1}$$

where $\omega_{ip}(j)$ is the sales weight of segment p of firm i operating in industry j (similarly for business segment q of firm i operating in industry k) in a given year t, and $Corr_{[t-10,t-1]}(j,k)$ is the estimated correlation of idiosyncratic industry cash flows (investment opportunities) of firm i between industries j and k over the 10-year period.

4.1.4 Financial Constraints

Firm-level financial status could cause both stand-alone and diversified firms to be more or less vulnerable to changes in external capital market conditions. Prior literature studied the dependence of investment or cash holdings on internal cash flow by considering the degree of a firm's financial constraints (see, for example, Fazzari et al. (1988), Harford (1999), Almeida et al. (2004)). First, financial constraints restrict the amount of capital under managers' discretion, and restrain them from pursuing investment opportunities. Second, financial constraints affect the firm's ability to access external capital markets and change the value of internal cash flow. Therefore, I include several measures that are standard in the prior literature when studying the effect of internal cash flow. Financial constraints are measured based on the following six proxies: (i) Firm size, as smaller firms have more difficult access to external capital and rely on intermediary credit (Myers and Majluf (1984)). Smaller firms are more likely to be hit by liquidity shocks during recession times. (ii) Dividend payouts, prior literature has associated lower dividend payout with tighter financial constraints (Fazzari et al. (1988), Lamont, Polk, and Saaá-Requejo (2001)). (iii) Credit ratings, which directly reflect the market's assessment of a firm's credit quality and its ability to obtain external capital. Prior literature summarizes several firm characteristics into a single measure reflecting the severity of liquidity constraints, such as (iv) WW index (Whited and Wu (2006)), (v) KZ index (Kaplan and Zingales (1997))

and (vi) SA Index (Hadlock and Pierce (2010)). Higher values of these indices are associated with greater financial constraints.

4.1.5 Free Cash Flow

Easy access to external capital and FCF is expected to aggravate the allocation inefficiencies that exist within the conglomerate structure by facilitating excess spending. The presence of internally generated cash flow in excess of that required to maintain existing assets and finance new positive NPV creates the potential for wasteful expenditure (see, for example, Jensen (1986) and Stulz (1990)). During recessions, firms have trouble accessing external financing and the scale of FCF is expected to decrease. I expect the inefficient excess spending to become less severe for conglomerates. Therefore, the analysis of time-varying investment efficiency should also consider the changes in FCF and its effect on investment, as it is one of the main sources of inefficiency during normal times, especially for conglomerates. Moreover, if excess saving results in more cash held by the firm, it would affect actual investment. Identifying the ways in which the actual investment deviates from the optimal level helps establish the relationship between extra saving and decreased investment.

Prior literature, such as Lehn and Poulsen (1989) and Richardson (2006), defines FCF as cash flow beyond the level necessary to maintain assets in place and finance expected new investments. Lehn and Poulsen (1989) measure FCF as operating income before depreciation minus taxes, interest expenses, preferred dividends, and ordinary dividends, normalized by either the total book value of equity or assets in the previous year. However, this measure of FCF ignores capital expenditures or assumes that all capital expenditures are for negative NPV projects. I follow the measure of Griffin, Lont, and Sun (2010), deducting capital expenditures from the definition by Lehn and Poulsen (1989), as their definition could lead to an overestimation of real FCF, in that companies classified as high FCF under their approach may actually be low FCF companies with large capital expenditure.

4.1.6 Corporate Governance

Agency-based theories suggest that conglomerates allocate resources less efficiently than do stand-alone firms because of agency costs. For diversified firms, managers have more discretion on resource allocation across business segments of the firm, and subsequently have greater opportunities to pursue personal ben-

efits at the expense of shareholders' wealth (see, for example, Berger and Ofek (1995), Shin and Stulz (1998), Lamont and Polk (2002), Rajan et al. (2000) and Scharfstein and Stein (2000)). The flexibility to redistribute funds may also lead to over-investment in poor projects at the expense of good projects because of the various agency problems described in the previous literature (Jensen and Meckling (1976), Matvos and Seru (2014)). I further study the effect of corporate governance on investment efficiency, specifically to determine whether the enhanced investment efficiency of conglomerates is due to improved corporate governance. I use three proxies for corporate governance: the G-index (Gompers et al. (2003)), the E-index (Bebchuk et al. (2008)), and institutional ownership (Anderson et al. (2000)), Hoechle et al. (2012)).

The first proxy is related to the prevalence of antitakeover provisions. Gompers et al. (2003) constructed a broad index (G-index) of antitakeover provisions, which scaled from one to 24 points, where, for every firm, the index adds one point for every added provision that restricts shareholder rights. The index with the highest values has the weakest shareholder rights, and the index with the lowest values has the strongest shareholder rights. Stronger shareholder rights indicate stronger corporate governance. The second proxy is an alternative antitakeover index based on a subsample of the 24 provisions that affect shareholder value from the Gompers et al. (2003) index. These include classified boards, limits to amend charters, limits to amend bylaws, supermajority shareholder voting to approve mergers, golden parachute, and poison pill. They label this index as an "entrenchment index" (E-index). The E-index has a minimum value of 0, representing the most democratic governance, and a maximum value of 6, representing the most dictatorial governance. The G-index is constructed from data compiled by the Investor Responsibility Research Center (IRRC). The index is only available until 2006. The IRRC did not publish volumes each year; thus, following Gompers et al. (2003), I assume that firms' governance provisions reported in a given IRRC volume were in place during the period immediately following the publication of the volume until the publication of the subsequent IRRC volume. The E-index is available for the years 1993, 1995, 1998, 2000, 2002, 2004, 2006, and 2007 to 2012 during the sample period. Similarly, I use the E-index from the latest available years for intermediate years. The third proxy for institutional ownership data is collected from Thomson Reuters Institutional (13F) Holdings. The data include the numbers of institutional owners, institution manager information, number of share issues, and percentage of outstanding shares held by each institution. This dataset is not complete before 1990; thus, I use the subsample

from 1991. I add up the institutional ownership for each firm-year observation, and match the quarter end date in 13F with the fiscal year end month in Compustat.

4.2 Descriptive Statistics

The final sample consists of 74,822 firm-year observations, of which 50,541 (24,281) observations are stand-alone (diversified) firms, as reported in Table 1. On average, stand-alone firms are smaller and have lower levels of sales, net working capital, debt and leverage, cash holding, and dividend payout ratio. Conglomerates are usually larger and have higher debt capacity (Lewellen (1971)). On average, conglomerates report more than twice the quantity of stand-alone firms' assets (2,861.574/1,005.773), sales (2,903.390/1,062.048), and cash holdings (2,06.250/1,08.786). Moreover, stand-alone firms have lower internal cash flows on average. This implies that, during financially distressed times, stand-alone firms may have trouble financing investment internally. Stand-alone firms are usually firms with higher market-to-book ratio, as they are usually smaller and younger than conglomerates. Moreover, stand-alone firms have higher sales- and asset-normalized investment, suggesting that they have higher investment efficiency over time.

[Insert Table 1 here]

Further details about firm characteristics across the business cycle are included in Table 2 and Table 3. Similar relationships between conglomerates and stand-alone firms are reported in both recessions and expansions. Conglomerates have higher assets, sales, cash, and leverage, but lower sales growth and market-to-book ratio. However, unlike the average evidence, conglomerates report higher average asset-normalized investment during recession than do stand-alone firms (0.068/0.066), but lower average asset-normalized investment than stand-alone firms during expansion (0.060/0.064). This implies that, even though conglomerates have higher assetsnamely, larger scalethey still increase investment during recessions, compared with stand-alone firms. The median of both sales- and asset-normalized investment of conglomerates is higher for stand-alone firms during recessions, while the relationship is opposite during expansions. The statistical evidence across the business cycle implies that conglomerates have relatively higher investment during recessions, and, more intuitively, conglomerates actively change investment policy over time.

[Insert Table 2 here]

[Insert Table 3 here]

The time series of investment is presented in Figure 1 and Figure 2, which were measured by capital expenditure normalized by sales and assets, respectively. In Figure 1, the firm-level investment decreases during recessions for both conglomerates and stand-alone firms. On average, stand-alone firms have higher investment ratios than do conglomerates when the investment is sales-normalized. This may be related to the fact that stand-alone firms are able to make sole investments, rather than cross-subsidizing among divisions. However, during recessions, there is a clear narrowing of the gap between conglomerates and stand-alone firms. This implies that firm-level investment decreases less for conglomerates during recessions. Figure 2 presents similar evidenceboth conglomerates and stand-alone firms have declined investment during recessions. However, the shrink of the gap between the two groups during recessions is more pronounced. During the recent recession, the investment ratios of conglomerates were nearly the same as those of stand-alone firms.

[Insert Figure 1 here]

[Insert Figure 2 here]

Table 4 summarizes the segment-level statistics. On average, segments of conglomerates are larger in size and have higher sales, cash flow, and capital expenditure than do stand-alone firms. However, the industry opportunities for stand-alone firms are higher. For conglomerates, the sales- and asset-normalized capital expenditure is no greater than that for stand-alone firms in terms of median values.

[Insert Table 4 here]

Further details on the firm characteristics across the business cycle are included in Table 5 and Table 6. The relationships between conglomerates and stand-alone firms are reported in both recessions and expansions. Conglomerates have higher assets, sales, cash flow, and capital expenditure, yet lower industry opportunities. However, unlike the average evidence, conglomerates report higher average sales-normalized investment during recession than do stand-alone firms, and lower average sales-normalized investment than stand-alone

firms during expansion, in terms of both mean and median values. This implies that, even though conglomerates have higher assetsnamely, larger scalethey still increase the segment-level investment during recessions, compared with stand-alone firms. The median and mean values of asset-normalized investment of conglomerates are also higher than those for stand-alone firms during recessions, while the relationship is not clear during expansions. For the segment of conglomerates, sales are more accurate and representative for operations, as the assets are subject to accounting treatment inside the firm. Overall, the statistical evidence on the segment level across the business cycle implies that conglomerates have higher investment during recessions, and, more intuitively, conglomerates actively change investment policy over time.

[Insert Table 5 here]

[Insert Table 6 here]

In the time series of segment-level capital expenditure in Figure 3, sales-normalized capital expenditure decreases during recessions for both conglomerates and stand-alone firms. However, unlike the firm-level evidence, the segment-level investment of conglomerates is not always lower than that of stand-alone firms. In fact, during economic downturns, not only does the gap between the segments of conglomerates and stand-alone firms shrink, but conglomerates also sometimes have higher segment-level investment. Together with the evidence from the firm level, I can assume that some segments of conglomerates may be allocated more capital than others during recession. The evidence is similar to the time series of asset-normalized investment in Figure 4, where the discrepancy between conglomerates and stand-alone firms declines, while the conglomerate segments sometimes have even higher levels of scaled capital expenditure.

[Insert Figure 3 here]

[Insert Figure 4 here]

Prior studies used single-segment firms operating in the same industry as the standard for a division/segment of a conglomerate to examine the segment-level performance of conglomerates, because the information inside the firm is limited. Specifically, given the same industry characteristics and similar growth opportunities, examining whether a segment of conglomerates invests as much as comparable stand-alone firms in the same industry is a standard approach to value the

performance of conglomerates. Figure 5 and Figure 6 present the average value of segment-level investment of stand-alone and conglomerates within each four-digit industry during expansions and recessions separately. The industry Q is proxied by the industry average market-to-book ratio in the previous year; therefore, the current sample covers the period from 1980 to 2012. The comparison of stand-alone firms and conglomerates across different times is straightforward. During expansions, stand-alone firms in industries with higher Q make more investments than do segments in the same industry. This indicates that stand-alone firms have higher Q-sensitivity of investment than do segments of conglomerates during expansions. However, during recessions, the relationship between stand-alone firms and conglomerate segments changes, as that segments of conglomerates of industries with higher Q have higher capital expenditure, and the Q-sensitivity of investment is even higher than that of stand-alone firms.

[Insert Figure 5 here]

[Insert Figure 6 here]

5 Empirical Results

5.1 Investment Efficiency over the Business Cycle

Prior studies use single-segment firms operating in the same industry as the benchmark for a division/segment of a conglomerate to examine whether, given the same industry characteristics and similar growth opportunities, a segment of a conglomerate invests as much as the comparable stand-alone firm in the same industryalso known as investment sensitivity to Q (see, for example, Shin and Stulz (1998), Scharfstein (1998), Gertner et al. (2002), and Ozbas and Scharfstein (2010)).

The main objective of this section is to identify the different patterns of investment behaviors between conglomerates and stand-alone firms, and how they change over timespecifically, how the business cycle affects investment sensitivity to Q and cash flow. Consider a cross-sectional regression of segment investment scaled by lagged assets on lagged Q and contemporaneous cash flow:

$$Capex_{i,j}(t) = \beta_0 + \beta_1 * Q_j(t-1) + \beta_2 * CF_i(t) \tag{2}$$

In Equation (2), $CapEx_{i,j}(t)$ is the sales-normalized capital spending of segment i

(operating in industry j) in year t, and $Q_j(t-1)$ is the median-bounded Tobin's q of single-segment firms in industry j in the prior year as a proxy of investment opportunities. This median-bounded Q is computed as MVA/(0.9BVA + 0.1MVA) to reduce the expected potential measurement error in the book value of assets, following Scharfstein (1998) and Ozbas and Scharfstein (2010). BVA is the book value of assets, and MVA is the market value of assets, which equals the book value of assets plus the market value of common equity minus the book value of common equity and balance sheet deferred taxes. While the use of average industry stand-alone companies to proxy for the investment opportunities of conglomerate divisions has been criticized by previous studies (e.g., Campa and Kedia (2002), Villalonga (2004)), I follow this methodology mainly because of the non-availability of direct measures of investment opportunities at the division level. $CF_i(t)$ is the sales-normalized segment cash flow of segment i in year t. This measure of cash flow is standard in the literature (Shin and Stulz (1998), Duchin (2010)) as operating profits plus depreciation.[4] To examine how the business cycle affects investment sensitivity to Q and cash flow, I regress the investment in Equation (2) on measures of the business cycle (REC is a dummy variable proxy for recessions) and its interactions with Q and cash flow, as the following equation:

$$\begin{aligned} Capex_{i,j}(t) =& \beta_0 + \beta_1 * Q_j(t-1) + \beta_2 * REC * Q_j(t-1) + \\ & \beta_3 * CF_i(t) + \beta_4 * REC * CF_i(t) \end{aligned} \tag{3}$$

The interactions in Equation (3) estimate the marginal effect of recession on the CF and Q coefficients. With year fixed effect, the average level of investment, Q, or cash flow each year does not influence the main coefficients. β_2 estimates whether the investment sensitivity to Q is greater during recessions. If internal capital markets of conglomerates drive more efficient resource allocation, I would expect the β_2 to be positive. To examine differences in the investment efficiency of stand-alone firms and the conglomerate segments over the business cycle, I first estimate Equation (3) for stand-alone and diversified firms, respectively.

[Insert Table 7 here]

Panel A of Table 7 presents the regression results for all stand-alone firms and conglomerates separately. The regression is estimated with year and firm fixed effects. The results with year fixed effects in Columns (2) and (3) are more of

[4]Segment cash flow is not adjusted for taxes, working capital investments, and other factors because these data are unavailable.

interest, since I need to demean the average level of investment, which changes over time, and focus on the investment sensitivity. Given that I use year fixed effects, the average levels of Q, cash flow, and investment within a given year relative to other years do not influence the coefficients of investment sensitivity[5].

The coefficient estimates of $LagQ$ suggest that, for stand-alone firms during non-recession periods, the investment sensitivity to Q is positive and significant. Meanwhile, the coefficients of $REC * LagQ$ are insignificant, suggesting that, when moving from non-recession to recession periods, the investment sensitivity to Q of stand-alone firms does not change significantly. The coefficient estimates of $LagQ$ in Columns (4) to (6) are all lower than those in Columns (1) to (3), which indicates lower Q-sensitivity of investment of diversified firms than stand-alone firms during non-recession periods. This is consistent with the literaturethat conglomerates generally invest less efficiently than do stand-alone firms (see, for example, Scharfstein (1998) and Ozbas and Scharfstein (2010)).[6]

Moreover, for diversified firms, the coefficient of the interaction term between the LagQ and recession dummy variable REC is positive and statistically significant at the 1% level in Columns (4) and (6), and significant at the 10% level in Column (5). It is virtually unaffected when controlling for firm and year fixed effects.[7] This suggests that segments of diversified firms exhibit higher investment Q-sensitivity during recession periods, with or without controlling for the average firm investment level and yearly change in all variables. The change in investment sensitivity to Q in Column (6) is economically significant and represents that, for diversified firms, a change from a non-recession to a recession period implies an increase of 1.11% in segment-level investment sensitivity, from 0.48% to 1.59% (0.48% + 1.11%).

The coefficient estimates of $Cashflow$ suggest that, during non-recession periods, the cash flow sensitivity of investment is positive and significant for both stand-alone and diversified firms. However, the dependence of investment on cash flow decreases when moving from a non-recession to a recession period. A positive correlation between investment and cash flow suggests that investment is dependent on firms having sufficient internal cash flow. The results are consistent with firms having more internal generated cash during expansions than

[5]The REC term can be eliminated here, since time-series variables have no explanatory power in regressions that include year fixed effects.

[6]In untabulated statistics, segment growth opportunities decline significantly during recession. However, there is no significant difference between the changes in growth opportunities for stand-alone and diversified segments.

[7]In untabulated results, I extend the model to control for firm size, segment size, and segment ROA, and the results are unaffected.

during recessions (see, for example, Fazzari et al. (1988), Kaplan and Zingales (1997))[8].

5.1.1 Degree of Diversification

To further test the hypotheses about how diversification influences managers' trade-off between current spending and financial flexibility across time (i.e., the real effect of internal capital markets), I divide the conglomerates subsample into two groups by degree of diversification, which is measured with cross-divisional correlation in cash flow and investment opportunity. The annual median value of each measure is used as the cut-off point between lowly and highly diversified firms. With the lower correlation across divisions, the higher degree of diversification the firm can benefit from the internal capital markets. Similarly, I estimate the segment-level investment regression in Equation (3) for all conglomerates within each group. Panel B of Table 7 presents the regression results for all conglomerates divided by the correlation of past segment-level cash flows, and Panel C presents the conglomerates sample divided by the correlation of investment opportunities. The coefficient estimates of $LagQ$ suggest that, for both lowly and highly diversified firms in non-recession periods, the investment sensitivity to Q is largely negative when controlling for year fixed effects or without fixed effects, and is insignificant with both year and firm fixed effects. However, with year and firm fixed effects, the investment sensitivity to Q for highly diversified conglomerates in a recession is positive and significant at the 5% level, as shown with the coefficient estimate of $REC * LagQ$ in Column (6) of both Panels B and C. The coefficient estimates are also economically significant and represent that, for highly diversified firms, a change from a non-recession period to a recession period implies an increase of 0.94% and 0.95%, respectively, in segment-level investment sensitivity. This indicates that the enhanced investment Q-sensitivity of conglomerates demonstrated in Panel A is largely driven by the highly diversified subsample. The coefficient estimates of $Cashflow$ are positive and significant in all specifications. The interactions between recession and cash flow are negative and significant at the 1% level for lowly diversified conglomerates and insignificant for highly diversified firms. This result suggests that, for lowly diversified conglomerates, a change from non-recession to recession implies a decrease of over 4% in segment investment sensitivity to Q, while highly diversified con-

[8]Note here that the conglomerate segment having lower dependence on internal cash flow does not contradict my argument that internal capital markets facilitate higher investment efficiency because the cash flow in this model reflects only the dependence of investment on cash flow from this segment, without considering cash flow from other segments.

glomerates do not show a significant decrease in the dependence of investment on cash flow.

To illustrate the difference between diversified and stand-alone firms more clearly, I employ a difference-in-differences (DiD) approach, as in Equation (4), for a robustness check. Specifically, I examine whether the cross-sectional difference on investment Q-sensitivity is significant between stand-alone and diversified firms, and whether the marginal effect of recessions is significantly different for them:

$$\begin{aligned} Capex_{i,j}(t) = \beta_0 + \beta_1 * CF_i(t) + \beta_2 * REC * CF_i(t) + \\ \beta_3 * DIV * CF_i(t) + \beta_4 * REC * DIV * CF_i(t) + \\ \beta_5 * Q_j(t-1) + \beta_6 * REC * Q_j(t-1) + \beta_7 * DIV * Q_j(t-1) + \\ \beta_8 * REC * DIV * Q_j(t-1) \end{aligned} \tag{4}$$

where DIV is a dummy variable equal to 1 if it is a segment from diversified firms. Of key importance is the interaction term between the diversification dummy and recession dummy, and its effect on Q. In Equation (4), β_8 tests whether investment sensitivity to Q is greater during economic recessions for diversified firms. If diversified firms during recessions use the capacity of their internal capital markets to provide funding for their valuable investment projects, then the coefficient of the interaction term should be positive, and that means the marginal effect of recession on diversified firms is positive compared with stand-alone firms.

[Insert Table 8 here]

Table 8 presents the regression results for all firms in the sample. The variable of interest, *DIV*REC*LagQ*, has significantly positive coefficients in all three specifications. This is consistent with the findings in Panel A of Table 7. In Panel A of Table 8, I examine the difference of investment sensitivity to Q between stand-alone and diversified firms during recessions. The coefficients of $REC * LagQ$ for diversified firms are greater than those for stand-alone firms. This suggests that the marginal effect of diversification on this term is positive. These results are also highly economically significant. Based on the extended model, diversified firms have lower investment sensitivity of Q in non-recession periods, as the coefficient estimates of $DIV * LagQ$ are all negative and significant. This is consistent with the literaturethat conglomerates are generally less efficient in resource allocation. While considering the business cycle, a change from a non-recession period to a recession period implies an increase of 0.377% in investment sensitivity of Q for

stand-alone firms, and an increase of 0.855% (0.478% + 0.377%) for diversified firms, controlling for firm and year fixed effects.

Further, this result should be stronger for highly diversified conglomerates if I divide the sample based on the degree of diversification. Similarly, I employ the DiD approach in Equation (5) for a robustness check, to examine whether the cross-sectional difference on investment Q-sensitivity is significantly different between lowly and highly diversified firms:

$$\begin{aligned} Capex_{i,j}(t) =& \beta_0 + \beta_1 * CF_i(t) + \beta_2 * REC * CF_i(t) + \\ & \beta_3 * HIGH * CF_i(t) + \beta_4 * REC * HIGH * CF_i(t) + \\ & \beta_5 * Q_j(t-1) + \beta_6 * REC * Q_j(t-1) + \beta_7 * HIGH * Q_j(t-1) + \\ & \beta_8 * REC * HIGH * Q_j(t-1) \end{aligned} \tag{5}$$

Table 9 indicates that the variable of interest, *HIGH*REC*LagQ*, has significantly positive coefficient estimates in all three specifications of regressions, with both measures of the degree of diversification. These results are also highly economically significant. Based on the extended model, highly diversified firms have higher investment sensitivity of Q in non-recession periods, as the coefficient estimates of $High * LagQ$ are all positive and significant, thereby suggesting that the extent to which internal capital markets affect internal resource allocation is driven by the higher degree of diversification. While considering the business cycle, a change from a non-recession period to a recession period implies a decrease of over 4% in investment sensitivity of Q for lowly diversified firms, and an increase of over 2% (see, for example, in Column [3], 0.404% + 0.621%) for diversified firms, controlling for firm and year fixed effects. This is also consistent with the findings in Panels B and C of Table 7 that the enhanced investment Q-sensitivity of conglomerates is largely driven by the highly diversified subsample.

[Insert Table 9 here]

5.1.2 Matching Analysis

The results in Table 10 report estimates from regressions of Equation (3) for the matched sample. Panel A presents the results for the simple manual matched (MM) sample and Panel B presents the results for the sample matched by propensity score (PS). For the matched sample of conglomerates and stand-alone firms,

the coefficient estimates of $LagQ$ indicate that, during non-recession periods, conglomerates exhibit lower investment sensitivity to Q, controlling for firm and year fixed effects (0.474% versus 1.86% in Panel A and 0.482% versus 1.36% in Panel B). However, with all three specifications, the coefficient estimates of $REC * LagQ$ are positive and significant for diversified firms, as shown in Columns (4) to (6). These results are also economically significant. Based on the model results, for diversified segments, a change from a non-recession period to a recession period implies an increase of over 1% in investment sensitivity of Q. Specifically, with both firm and year fixed effects, conglomerate segments have an increased investment sensitivity to Q from 0.474% to 1.694% (0.474% + 1.22%) within the simple manual matched sample, as shown in Panel A, and an increase from 0.428% to 1.728% (0.428% + 1.3%) in Panel B. Meanwhile, in both matched samples, stand-alone firms do not show increased Q-sensitivity of investment, when controlling for year and firm fixed effects.

To illustrate more clearly the difference between the matched conglomerate segment and stand-alone firms, I employ the DiD approach, as in Equation (4), for a robustness check for both matched samples. The regression results are presented in Table 11. Similarly, the coefficient estimates of the variable of interest, $DIV * REC * LagQ$, are positive and statistically significant at the 1% level in Columns (3) and (6). This means that, after controlling for year and firm fixed effects, for conglomerate segments, a change from a non-recession period to a recession period implies an increase of 1.05% in investment sensitivity to Q, compared with the simple manual matched stand-alone firms, and an increase of 0.856% compared with the propensity-score-matched stand-alone firms. The coefficient estimates on $REC * LagQ$ are insignificant in Columns (3) and (6), which indicates that stand-alone pairs do not change investment efficiency significantly when moving from non-recession periods to recession periods.

5.2 Firm-level Investment

The evidence presented in Section 5.1 indicates that conglomerates in recessions actively enhance investment efficiency by invest more closely the changes in Q compared with stand-alone firms.

To test why managers allocate internal capital differently within the firm across the business cyclespecifically, whether to spend it or stockpile it at the aggregate levelI investigate the relationship between firm-level investment and firm-level

cash flows in this section.[9] One would expect higher sensitivity of investment to cash flows if the manager is concerned less with flexibility and will spend the cash when generated. First, I run a standard firm-level investment regression (Fazzari et al. (1988), Baker, Stein, and Wurgler (2003)), as denoted below:

$$Capex_i(t) = \beta_0 + \beta_1 * CF_i(t) + \beta_2 * Q_i(t-1) \tag{6}$$

where $CapEx_i(t)$ is the sales-normalized investment of firm i in year t, $CF_i(t)$ is the sales-normalized firm-level cash flow in year t, and $Q_i(t-1)$ is the market-to-book ratio of firm i in year $i-1$. The investment is measured as capital expenditures scaled by total sales, and cash flow is measured as operating income before depreciation scaled by total sales.

To examine how the business cycle affects investment sensitivity to cash flow, and whether there is a systematic difference between stand-alone firms and conglomerates, I estimate the sensitivity of investment to cash flows and investment opportunities, as in Equation (6), together with a dummy variable, REC, to end up with the following regression:

$$\begin{aligned} Capex_i(t) =& \beta_0 + \beta_1 * CF_i(t) + \beta_2 * REC * CF_i(t) + \\ & \beta_3 * Q_i(t-1) + \beta_4 * REC * Q_i(t-1) + \beta_5 * REC \end{aligned} \tag{7}$$

The interactions in Equation (7) estimate the marginal effects of recession on the CF and Q coefficients. To examine the difference in investment patterns, I conduct a cross-section analysis for each of the three pairs of subsamples: stand-alone versus diversified firms, lowly diversified firms versus highly diversified firms, and the degree of diversification as measured by cash flow correlation and investment opportunity correlation, as in Section 4.1.3.

[Insert Table 12 here]

Table 12 presents the regression results from the panel analysis explaining firm-level investment for the fiscal years 1980 to 2012. Panel A presents the results for stand-alone firms and diversified firms. Panel B presents the diversified firms with high and low diversification, which is measured by the cross-segment cash flow correlation. Panel C reports the diversified firms with high

[9] For conglomerates, Q does not accurately demonstrate the firm-wide investment opportunities, as each segment has a very different industry environment. Therefore, the firm-level Q-sensitivity of investment does not represent the investment efficiency of conglomerates.

and low diversification, which is measured by investment opportunity (Q) correlation. Regressions are estimated with no fixed effects, year fixed effects only, and both firm and year fixed effects. The results in Panel A demonstrate that both stand-alone and diversified firms show significant positive investment sensitivity to cash flow during non-recession periods. However, the results for stand-alone firms in Columns (1) to (3) show that the coefficient estimates of the interaction term between the $Cashflow$ and recession dummy variables REC are negative and statistically significant at the 1% level. Meanwhile, the results for diversified firms in Columns (4) to (6) show that the coefficient estimates of $REC * Cashflow$ are all positive and statistically significant at the 1% level. The results were virtually unaffected when I controlled for firm and year fixed effects.[10] This suggests that diversified firms exhibit higher investmentcash flow sensitivity during recession periods, with or without controlling for the average firm investment level and yearly change in all variables.

These results are also highly economically significant. Based on the model results, for diversified firms, a change from a non-recession period to a recession period implies an increase of over 10% in all three specifications. For example, in Column (6), when moving from non-recession to recession periods, conglomerates increase the dependence of investment on cash flow by 11.2%, from 11.7% to 22.9% (11.7% + 11.2%). However, for stand-alone firms, a change from a non-recession to a recession period implies a decrease in investmentcash flow sensitivity in all three specifications. For example, in Column (3), for stand-alone firms, a change from non-recession to recession periods implies that the dependence of investment on cash flow decreases by 0.403%, from 1.45% to 1.047% (1.45% 0. 403%), indicating an almost 30% lower investmentcash flow sensitivity. Further, with no fixed effects and year fixed effects only, this figure decreases by almost 50% (0.2004 versus 0.111 and 0.205 versus 0.111).

These results are consistent with the existence of external capital market frictions. The investmentcash flow sensitivity of conglomerates is significantly higher during recessions, which suggests that financial constraints are significantly tighter, and investment is more dependent on internally generated cash flows. This is also consistent with the findings in Fazzari et al. (1988) and Hovakimian (2011), as the relationship suggests that investment is dependent on firms having sufficient internal cash flow. However, the investmentcash flow sensitivity of stand-alone firms is significantly lower during recessions, suggesting they are exposed

[10] In untabulated results, I extend the model to control for firm size, firm leverage, and firm ROA, and the results are unaffected.

to external financing costs and do not have sufficient internal cash flow to fund investment. This indicates that stand-alone firms spend less for investment while stockpiling cash during recession.

The coefficient estimates of $REC * LagQ$ provide some information about firm growth opportunities. Given that stand-alone firms do not invest with much dependence on internal cash flow, firm growth opportunities could be an important benchmark for limited investment. Therefore, the coefficients being positive is consistent with the costly financing hypothesis. Moreover, conglomerates, which have internal funded investment opportunities, do not consider firm growth a priority because they value cash and fund valuable investment internally during recessions. This is also consistent with the evidence of Bolton et al. (2011a) and McLean and Zhao (2014), who demonstrated that investment sensitivity to Q decreases with the higher marginal value of cash and costly external financing. Our findings suggest that it is important to differentiate stand-alone firms and conglomerates, as they show significantly different investment sensitivity to firm growth opportunities.

Panels B and C present the results of diversified firms only, with different degrees of diversification. With year and firm fixed effects, highly diversified firms show negative investmentcash flow sensitivity, which suggests that highly diversified firms have lower financial constraints during non-recession periods and may not need to fund investment with internal cash flow. However, during recessions, both lowly and highly diversified firms show significantly higher investmentcash flow sensitivity, which suggests they fund investment with internal cash flow. This is also consistent with costly external financing. Specifically, lowly diversified firms have higher investmentcash flow sensitivity, from 9% to 14.12% (9% + 5.12%) in Column (3), and highly diversified firms report increased investmentcash flow sensitivity from negative to around 5% (4.68% + 10%) in Column (6). These results indicate that, during recession, firms with a higher degree of diversification have a greater increased dependence of investment on internal cash flow. These results are very similar to those in Panel C, where highly diversified firms increase investment cash flow sensitivity by 9.75% versus 4.86% for lowly diversified firms.

I then employ the DiD approach for a robustness check to further understand the marginal effect of business cycle on the cross-sectional difference between

stand-alone firms and conglomerates, as in Equation (8)) below:

$$\begin{aligned} Capex_{i,j}(t) =& \beta_0 + \beta_1 * CF_i(t) + \beta_2 * REC * CF_i(t) + \\ & \beta_3 * DIV * CF_i(t) + \beta_4 * REC * DIV * CF_i(t) + \\ & \beta_5 * Q_j(t-1) + \beta_6 * REC \end{aligned} \tag{8}$$

In firm-level investment regressions, the variable of interest is the change of coefficients on cash flownamely, the way in which investment decisions are made dependent on internally generated cash flows across different firms in different periods. β_4 tests the difference in the cash flow sensitivity of investment between stand-alone firms and conglomerates when moving from a non-recession to a recession period. The firm-level market-to-book ratio may not be an appropriate proxy for investment opportunities, especially for diversified firms that constitute more than one line of business. In this regression, I use market-to-book ratio as a control variable only.[11]

[Insert Table 13 here]

Table 13 shows that the variable of interest, *DIV*REC*Cashflow*, has significantly positive coefficients in all three fixed-effects regressions. This is consistent with the findings in Panel A of Table 12. Similarly, to further identify the effect of internal capital markets, I test the effect of the degree of diversification. I employ the DiD approach (Equation (5) for a robustness check to determine whether the cross-sectional difference in investmentcash flow sensitivity is more pronounced for highly diversified firms:

$$\begin{aligned} Capex_{i,j}(t) =& \beta_0 + \beta_1 * CF_i(t) + \beta_2 * REC * CF_i(t) + \\ & \beta_3 * HIGH * CF_i(t) + \beta_4 * REC * HIGH * CF_i(t) + \\ & \beta_5 * Q_j(t-1) + \beta_6 * REC \end{aligned} \tag{9}$$

Table 14 indicates that the variable of interest, *HIGH*REC*Cashflow*, has significantly positive coefficients in all regressions at the 5% level. This is consistent with the findings in Panels B and C of Table 12 that conglomerates increase the dependence of investment on internal cash flow as the degree of diversification increases, thereby indicating the positive effect of internal capital markets during recessions. Further, the significantly negative coefficients on $High * Cashflow$

[11] In untabulated results, I also include interaction between market-to-book ratio, *REC* and *DIV* in the regression to identify the treatment effect, which produces similar results.

imply that highly diversified conglomerates have lower cash flow sensitivity of investment during non-recession periods, which is consistent with the financial constraint literature that they are less constrained and do not fund investment significantly, dependent on internal cash flow.

[Insert Table 14 here]

5.3 Cash Holdings over Business Cycle

The evidence in Section 5.2 indicates that the dependence of investment on cash flow across the business cycle is different for stand-alone firms and conglomerates. In this section, I study the possible reasons that stand-alone firms significantly decrease internal funded investment compared with other firms. As with costly external financing, one can expect firms to increase the dependence of investment on internal cash. I propose that the deviation in the investment of stand-alone firms is largely driven by cash-saving needs during recessions. This section also aligns with financially constrained firms relinquishing value-increasing investments and accumulating more cash (Fazzari et al. (1988), Harford (1999), Opler et al. (1999), Bates et al. (2009) and Smith (2014)). Recently, Eisfeldt and Muir (2016) documented procyclical saving waves and a positive relationship between aggregate external financing and savings activity in the US. However, I argue that conglomerates, with the benefit of internal capital markets, do not need to save as much as do stand-alone firms during recession. The differentiation of conglomerates from stand-alone firms is important when studying investment and financing decisions in corporate finance.

5.3.1 Cash Flow Sensitivity of Cash

The main purpose of this section is to identify the differences between stand-alone firms and conglomerates in cash-saving behaviors over the business cycle. Similarly, I further incorporate the degree of diversification of conglomerates to determine the effect of internal capital markets on the mitigation of saving needs for firms with financial constraints. First, I test the dependence of cash holdings on internal cash flow, following Harford (1999) and Almeida et al. (2004):

$$\Delta Cash_i(t) = \beta_0 + \beta_1 * CF_i(t) + \beta_2 * Q_i(t) + \beta_3 * Size_i(t) \tag{10}$$

where $DeltaCash_i(t)$ is the change in firm cash holding from time $t-1$ to t, $Cashflow_i(t)$ is the sales-normalized firm-level cash flow of firm i in fiscal year t, $Q_i(t)$ is the

firm market-to-book ratio in the previous fiscal year, and $Size_i(t)$ is the logarithm of the firm's assets. Equation (10) tests the cash flow sensitivity of cash, which measures how much cash the firm saves from internal cash flow. To estimate how firms change cash holdings over the business cycle, I include the dummy variable for recession, REC. The interaction between REC and $Cashflow$ measures how the business cycle affects the cash flow sensitivity of cash, as denoted in the equation below:

$$\begin{aligned}\Delta Cash_i(t) =& \beta_0 + \beta_1 * Q_i(t-1) + \beta_2 * REC * Q_i(t-1) + \\ & \beta_3 * CF_i(t) + \beta_4 * REC * CF_i(t) + \\ & \beta_5 * Size_i(t) + \beta_6 * REC * Size_i(t)\end{aligned} \tag{11}$$

Table 15 presents the regression results for stand-alone and diversified firms separately. The coefficient estimates of $Cashflow$ imply that, during non-recessions, the dependence of cash holdings on internal cash flows is significantly positive for stand-alone firms, with no fixed effects control or controlling for both year and firm fixed effects. However, the dependence of cash on internal cash flow for diversified firms is significantly negative, with no fixed effects control or controlling for year fixed effects only. The estimate of coefficient is not significantly different from zero with both firm and year fixed effects. Moreover, the coefficient estimates of $REC * Cashflow$ are insignificantly different from zero for both stand-alone firms and conglomerates. This indicates that, overall, neither stand-alone nor diversified firms exhibit different cash flow sensitivity of cash when moving from non-recession to recession periods.

[Insert Table 15 here]

5.3.2 Financial Constraints

The insignificant difference between recessions and non-recessions in cash flow sensitivity of cash, as shown in Section 5.3.1, is probably driven by failing to consider firm-level financial constraints. Almeida et al. (2004) provide evidence that firms with greater frictions in raising outside financing save a greater portion of their cash flow as cash than do firms with fewer frictions. Faulkender and Wang (2006) and Denis and Sibilkov (2010) document evidence consistent with the view that cash holdings are more valuable for constrained firms than for unconstrained firms. Therefore, I further include firm-level financial constraints when considering firm-level cash savings across the business cycle. Financial constraints are

measured based on: (i) firm size, (ii) dividend payouts, (iii) commercial paper ratings, (iv) WW index (Whited and Wu (2006)), (v) KZ index (Kaplan and Zingales (1997)), and (vi) SA Index (Hadlock and Pierce (2010)). Given that the degree of a firm's financial constraints is not directly observable, cross-sectional analysis is biased subject to the selection of the measure and sample breakpoints. To assure that the results are not driven by a particular financial constraint measure, I test Equation (11) under six financial constraint proxies simultaneously across constrained and unconstrained samples.

[Insert Table 16 here]

Table 16 reports the cross-section correlations between each of the six financial constraint measures. The correlation matrix suggests that the overlap between the subsamples of constrained and unconstrained firms is far less than complete. Any similarities between the cross-sectional results obtained using alternative financial constraint will provide strong support for their robustness. In particular, the WW index exhibits the highest correlation with other measures, and the KZ index shows the lowest correlation with other constraint measures. This is consistent with the literaturethat the KZ index sometimes produces opposite results to other proxies (see, for example, Hadlock and Pierce (2010) and Farre-Mensa and Ljungqvist (2016)).

[Insert Table 17 here]

Table 17 summarizes the classification of constrained and unconstrained firms under each of the six financial constraints. Overall, the statistics in the first and second columns show that, under each measure, stand-alone firms are far more likely to be constrained than are conglomerates. There are more firms constrained during expansions than recessions, based on four out of six proxies for financial constraints. This suggests that the recessions and financial constraints are not overlapping.

[Insert Table 18 here]

Table 18 reports estimates for regressions in Equation (11) explaining corporate cash holdings for fiscal years 1980 to 2012. I only report the key variables of interest in this table because there are numerous measures. The evidence of cash flow sensitivity of cash suggests that stand-alone firms, if financially constrained, will hoard more cash from internal capital. The difference across the business cycle is not significant, which means that constrained stand-alone firms

continue to save during recessionary times. Stand-alone firms that are not ex ante financially constrained are much more sensitive to external financial shocks, as they do not significantly save cash out of internal cash flow during non-recession periods, yet significantly increase the dependence of cash holdings on cash flow when moving from non-recession to recession periods. The coefficient estimates of $REC * Cashflow$ of unconstrained stand-alone firms are positive and statistically significant. Moreover, conglomerates, constrained or unconstrained, do not show a tendency or need to save from internal cash flow, even in recessions. Except for the results with the KZ index, this is unsurprising, as the KZ index usually produces opposite results, as expected. As shown in Table 16, the KZ index correlates the least with the other five measures, which in turn correlate highly with each other. Overall, the evidence suggests that conglomerates are not vulnerable to outside financing and do not appear to need to save from internal cash flow, which may be due to the smooth capital variability.

Thus, the evidence in this section strongly supports the main hypothesis that stand-alone firms actively save from internal cash flow, rather than funding investment with it during recessions, which causes a more pronounced benefit of internal capital markets of conglomerates over stand-alone firms by funding investment internally. Moreover, the need to accumulate cash in stand-alone firms is mostly driven by firm-level financial constraints. This confirms with the literature that constrained firms have trouble accessing external financial markets, and liquidity reserves can alleviate the effects of financing frictions (Almeida et al. (2014)).

5.4 Free Cash Flow

If the investment sensitivity to Q decreases significantly during recessions for stand-alone firms, as shown by the evidence in Section 5.1, this could be attributed to the fact that they do not have sufficient internal cash flow, or the investment deviates from the optimal level with excess cash flow. Section 5.3 indicates that stand-alone firms increase cash holdings significantly from internal cash flow, compared with conglomerates. It is reasonable to presume that stand-alone firms deviate from the optimal level of investment, even with sufficient internal cash flow. Intuitively, excess cash retention in recessions produces excess FCF; however, the question is whether stand-alone firms deploy FCF and make efficient investments. Although stand-alone firms increase cash holdings significantly from internal cash flow compared with conglomerates, if given suf-

ficient FCF, stand-alone firms do not allocate it efficiently. Thus, one would expect the relative improvement of conglomerates' investment efficiency to become more pronounced. Therefore, the main purpose of this section is to test whether the investment of stand-alone firms and conglomerates deviates from the optimal level, given an excess level of cash flow beyond that necessary to maintain assets in place and finance expected investmentnamely, FCF.

Table 19 presents the reduced form model of aggregate FCF at firm level. The coefficient estimates of DIV indicate that conglomerates have much higher FCF during non-recession times in all three specifications. The positive coefficient on REC indicates that, during recessions, the level of FCF increases. This is probably because investment opportunities decline during recessions and firms cannot fund all valuable projects. However, the coefficient on the interaction term is negative for all three fixed effects. This suggests that conglomerates have less FCF inside during difficult times, and may use limited internal capital to fund investment. At the same time, stand-alone firms have more FCF within the firm.

However, changes in the level of FCF do not necessarily affect investment. Next, I study the relationship between investment and FCF. The main test is shown below:

$$\begin{aligned}\Delta Capex_i(t) =& \beta_0 + \beta_1 * FCF_i(t) + \beta_2 * REC * FCF_i(t) + \\ & \beta_3 * Q_i(t-1) + \beta_4 * Leverage * CF_i(t) + \\ & \beta_5 * Cash_i(t) + \beta_6 * Size_i(t) + \beta_7 * Age_i(t) \end{aligned} \tag{12}$$

The dependent variable is the residual from the predicted investment model of Richardson (2006), which indicates deviation from predicted investment (overinvestment/underinvestment). Overinvestment is defined as investment expenditure beyond that required to maintain assets in place and to finance expected new investments in positive NPV projects. Underinvestment includes passing up investment opportunities that would have positive NPV. FCF is cash flow beyond that necessary to maintain assets in place and finance expected investments, scaled by assets. REC is an indicator variable equal to 1 if observations are in recession periods, and 0 otherwise. $LagQ$ is the market-to-book ratio of the firm in the previous fiscal year. Age is the log of the number of years the firm has been listed on the Center for Research in Security Prices (CRSP) as of the start of the year. $Size$ is the log of total assets. $Leverage$ is the sum of the book value of short-term and long-term debt, deflated by the sum of the book value of total debt and the book value of equity. $Cash$ is the balance of cash and short-term investments,

deflated by total assets.

[Insert Table 20 here]

Table 20 reports estimates from the regressions explaining the relationship between FCF and investment deviation. Panel A presents the results of diversified and stand-alone firms separately, with the marginal effect of REC on the dependence of investment deviation on FCF. The coefficient estimates for FCF are all positive and significant for both stand-alone and diversified firms, which is consistent with firms overinvesting with positive FCF and underinvesting with negative FCF. The coefficients on $REC * FCF$ are also positive and significant. This suggests that the marginal effect of recession on the relationship between investment deviation and FCF is positive when changing from a non-recession to a recession period, and positive FCF drives further overinvestment. The results in Columns (3) and (6) are largely insignificant because the firm fixed effects may overlap with firm characteristics controls, as the dependent variable is a residual from the predicted model, which already controls for firm characteristics. To consider the cross-sectional differences, diversified firms over-invest more with FCF than do stand-alone firms during non-recessions. However, the effect is stronger for stand-alone firms during recessions, as the coefficients on $REC * FCF$ are greater than those of diversified firms. This indicates that stand-alone firms deviate from optimal investment more severely than do diversified firms during recessions.

I employ the DiD approach to include the marginal effect of diversification in the whole sample. Panel B of Table 20 reports the estimates from the DiD regressions explaining the relationship between firm-level investment deviation and FCF. Columns (1) to (3) estimate the reduced form regressions, while Columns (4) to (6) include firm characteristics for further control. Overall, the coefficient estimates on $REC * FCF$ are positive and statistically significant, suggesting that, for stand-alone firms, a change from a non-recession to a recession period implies an increased dependence of investment deviation on FCF.[12] The coefficient estimates on $DIV * REC * FCF$ estimate the marginal effect of recessions on diversified firms' investment deviation with regard to FCF, and the results are negative and significant at the 1% level with no fixed effects and year fixed effects. Specifically, the results in Column (2) suggest that, for diversified firms, a change from a non-recession to a recession period implies an increase in investment deviation

[12]The results in Columns (3) and (6) are largely insignificant because the firm fixed effects may overlap with firm characteristics controls, as the dependent variable is a residual from the predicted model, which already controls for firm characteristics.

relative to FCF of 2.6% (13.5% 10.9%) versus 13.5% for stand-alone firms. The results of the interactions in Columns (1) to (2) and (4) to (5) are consistent with the findings in Panel A of Table 20that the investment deviation of stand-alone firms is magnified by FCFs during recessions, while the deviation caused by FCF decreases for diversified firms. This implies that conglomerates have less FCF during difficult times because they may use internal capital to fund investment. At the same time, stand-alone firms deviate from optimal investment more severely. Therefore, by demonstrating that the overinvestment of FCF in conglomerates decreases significantly during difficult times, I provide further evidence that the investment efficiency of conglomerates improves. However, stand-alone firms show significant positive relationships between investment deviation and FCF during recessions. This suggests that stand-alone firms are making inefficient investmenteither over-spending FCF on less valuable projects or cutting back too much investment because of lack of FCF. Since the predicted investment model of Richardson (2006) captures both over- and underinvestment by investment deviation.

5.5 Corporate Governance

Agency-based theories suggest that conglomerates allocate resources less efficiently than do stand-alone firms because of agency costs. For diversified firms, managers have more discretion on resource allocation across business segments of the firm, and subsequently have greater opportunities to pursue personal benefits at the expense of shareholders' wealth (see, for example, Berger and Ofek (1995), Shin and Stulz (1998), Lamont and Polk (2002), Rajan et al. (2000) and Scharfstein and Stein (2000)). The flexibility to redistribute funds may also lead to over-investment in poor projects at the expense of good projects because of the various agency problems described in the previous literature (Jensen and Meckling (1976), Matvos and Seru (2014)). In this section, I test the effect of corporate governance on investment efficiency, specifically to determine whether the enhanced investment efficiency of conglomerates is due to improved corporate governance. The main purpose of this section is to illustrate whether the improved Q-sensitivity of investment of conglomerate segments is mainly driven by firms with stronger governance. If the agency cost is the main reason for the inefficient resource allocation among conglomerates, we would expect that, during difficult times, managers of firms with stronger governance would improve the standard of project selection more efficiently. In other words, for firms with

weaker governance, the low investment efficiency is expected to be persistent, or at least improve less, than in the conglomerates with stronger governance. I use three proxies for corporate governance: the G-index (Gompers et al. (2003)), the E-index (Bebchuk et al. (2008)), and institutional ownership (Hoechle et al. (2012)). The details of constructing these measures are described in Section 4.1.6.

Table 21 presents the regression results of Equation (4) for the sample separated by the Gompers, Ishii, and Metrick (GIM) index. Firms with a GIM index lower than 5 are classified as a "Democracy", in the group of "Strong Governance". Firms with a GIM index higher than 14 are classified as a "Dictatorship", in the group of "Weak Governance". I only report the estimates of the key variables of interest. The coefficient estimates on $LagQ$ in all three specifications are positive and significant for the Strong Governance subsample. This suggests that, in general, firms with stronger corporate governance allocate resources more efficiently during non-recession periods. This is also the case in Panel B, where the governance proxy is the E-index. However, the results in Panels A and B show that, for both stand-alone and diversified firms, a change from a non-recession to a recession period implies no significant change of investment sensitivity to Q, in either the Strong Governance or Weak Governance group. This indicates that better governance in terms of institutional ownership has no effect on the time-varying changes in investment sensitivity to Q. The significant negative coefficient of $REC * LagQ$ in Column (4) of Panel A implies that stand-alone firms with weaker governance invest less efficiently during recessions than during expansions, which is consistent with the conjecture that stand-alone firms do not take the available investment opportunities during difficult times, especially for firms with higher agency costs. However, this test for the time-varying changes in investment sensitivity needs to demean the changes in the average level of investment and other variables. The results with no fixed effects are not representative. Moreover, the coefficient estimates of $DIV * REC * LagQ$ are partially positive for the weak corporate governance group in Panel A, and significantly positive in all three specifications in Panel C. The results indicate that the overall improved investment sensitivity to Q in recessions is largely driven by the subsample with weak corporate governance.

I then employ the DiD approach for segment-level investment, including the dummy variable to proxy for segments with corporate governance. This is similar to the regression in Equation (5), where $HIGH$ is replaced by GOV, which is an indicator variable equal to 1 if the observation is from firms classified in the group of Strong Governance, based on each of the three measures of corporate

governance. For each conglomerate or stand-alone firm, I calculate the value of different governance proxies and classify the firm as strong or weak governance. I then examine the segment-level investment sensitivity to Q across diversified and stand-alone firms, respectively, to identify the different marginal effect of corporate governance with the coefficient of $GOV * REC * LagQ$.

The regression results are presented in Panels A, B, and C, respectively, in Table 22. The coefficients of $GOV * LagQ$ test the marginal effect of better governance on segment-level investment sensitivity to Q for firms in non-recession periods. The coefficient estimates of $GOV * LagQ$ in Panel A suggest there is no significant difference in investment sensitivity to Q between firms with better or weaker corporate governance in terms of the G-index during non-recessions. There is a significant positive effect of governance on investment sensitivity to Q in the regression with no fixed effects, for both diversified and stand-alone firms. The significant negative coefficient of $GOV * LagQ$ in Column (4) of Panel A implies that stand-alone firms with weaker governance invest less efficiently during recessions than during expansions, which is consistent with the conjecture that stand-alone firms do not take the available investment opportunities during difficult times, especially for firms with higher agency costs. However, this test for the time-varying changes in investment sensitivity needs to demean the changes in the average level of investment and other variables. The results with no fixed effects are not representative.

Moreover, the coefficient estimates of $GOV * REC * LagQ$ for diversified firms in Panel A are negative and statistically significant in all three specifications. This suggests that the marginal effect of better governance in recession for the Q-sensitivity of investment is negative, while the coefficient estimates of $GOV * REC * Cashflow$ for diversified firms in Panel A are positive and statistically significant. Overall, the results suggest that conglomerates with better governance increase the dependence of investment on internal cash flow, yet do not improve investment efficiency (investment sensitivity to Q) significantly during recessions. This relationship implies that, for conglomerates with better governance, the value internal cash flow prevails over its investment opportunities. This is consistent with Bolton et al. (2011a) that investment sensitivity to Q decreases when the marginal value of cash is high.

The results in Panel B do not indicate a significant marginal effect of the business cycle and corporate governance. However, some of the results with the governance proxy of institutional ownership in Panel C are consistent with Panel A. Specifically, the coefficient estimates of $GOV * REC * Cashflow$ for diversified

firms are positive and statistically significant, yet insignificant for stand-alone firms, while the coefficient estimates of $GOV * REC * LagQ$ for diversified firms are significantly negative at the 1% level with no fixed effects, and negative at the 10% level with year fixed effects. Collectively, the relationship is similar to the results shown in Panel A, which implies that, for conglomerates with better governance, the value of internal cash flow prevails over the investment opportunities during recessions. In summary, the changes in Q-sensitivity of investment in conglomerates cannot be fully explained by agency costs. In contrast to my prediction, conglomerates with better corporate governance (in terms of the G-index and institutional ownership) exhibit lower investment sensitivity to Q, which suggests that the improved investment efficiency is not driven by the subsample of firms with better governance.

6 Conclusion

This paper has examined the cross-sectional differences of corporate investment decisions and cash retention policy between stand-alone firms and conglomerates, and the fact that this relationship varies over time. The recent empirical literature documents the relative advantages of internal capital markets of conglomerates when external capital markets are constrainedthat is, diversified firms have higher capital expenditure, sales ratio, growth ratio, and excess value than do stand-alone firms during economic downturns. I find that conglomerates, which exhibit inefficient resource allocation, reallocate resources more efficiently during difficult times. In particular, the sensitivity of segment-level investment to investment opportunities for conglomerates is not only higher than that of stand-alone firms during recessions, but also higher than that of conglomerates themselves during expansions. Consistent with the literature, the current evidence indicates that firms rely more heavily on internal cash to finance investment. Conglomerates, with the benefits of internal capital markets, exhibit increased dependence of investment on internal capital during recessionary periods, while stand-alone firms show much lower dependence and cut investment from their optimal level. Moreover, precautionary saving motives drive managers to save cash out of internal cash flows, which is associated with a reduction of investment documented in stand-alone firms. Hence, this paper provides evidence that cash retention policy plays a role in the change of investment, especially during recessions. Stand-alone firms significantly save more cash out from internal capital as the sensitivity of cash-to-cash flows is higher during difficult times. After control-

ling for firm-level constraints, this effect is still pronouncedboth constrained and unconstrained stand-alone firms save significantly during recessions, while both constrained and unconstrained conglomerates do not generally save. Moreover, there are costs related to holding cash. I also examine the patterns of FCFs and their relationship with investment deviation over the business cycle. I find significantly lower FCFs of conglomerates and more severe investment deviation of stand-alone firms during recessions. More importantly, I further investigate the reason for the relative advantages of internal capital markets during recessions.

The time-varying difference in financing and investing decisions between stand-alone firms and conglomerates suggests that the nature of the diversification effect of internal capital markets is essentially beneficial. Following tests on investment and cash holdings, this study incorporates the degree of diversification analysis for all conglomerates in the sample, and concludes that the difference is significantly pronounced between highly and lowly diversified firms. This evidence further explains the effect of diversification on the efficiency of resource allocation, suggesting that the channel of value creation of conglomerates during difficult times is mainly through the diversification effect of internal capital markets.

References

Aivazian, Varouj A, Jiaping Qiu, and Mohammad M Rahaman, 2012, Bank loan contracting and corporate diversification: Does organizational structure matter to lenders?, Technical report, Working paper.

Almeida, Heitor, Murillo Campello, Igor Cunha, and Michael S Weisbach, 2014, Corporate liquidity management: A conceptual framework and survey, *Annu. Rev. Financ. Econ.* 6, 135–162.

Almeida, Heitor, Murillo Campello, and Michael S Weisbach, 2004, The cash flow sensitivity of cash, *The Journal of Finance* 59, 1777–1804.

Almeida, Heitor, and Thomas Philippon, 2007, The risk-adjusted cost of financial distress, *The Journal of Finance* 62, 2557–2586.

Anderson, Ronald C, Thomas W Bates, John M Bizjak, and Michael L Lemmon, 2000, Corporate governance and firm diversification, *Financial management* 5–22.

Baker, Malcolm, Jeremy C Stein, and Jeffrey Wurgler, 2003, When does the market matter? stock prices and the investment of equity-dependent firms, *The Quarterly Journal of Economics* 118, 969–1005.

Bates, Thomas W, Kathleen M Kahle, and René M Stulz, 2009, Why do us firms hold so much more cash than they used to?, *The Journal of Finance* 64, 1985–2021.

Bebchuk, Lucian, Alma Cohen, and Allen Ferrell, 2008, What matters in corporate governance?, *The Review of financial studies* 22, 783–827.

Berger, Philip G, and Eli Ofek, 1995, Diversification's effect on firm value, *Journal of financial economics* 37, 39–65.

Bolton, Patrick, Hui Chen, and Neng Wang, 2011a, A unified theory of tobin's q, corporate investment, financing, and risk management, *The journal of Finance* 66, 1545–1578.

Bolton, Patrick, Hui Chen, and Neng Wang, 2011b, A unified theory of tobin's q, corporate investment, financing, and risk management, *The journal of Finance* 66, 1545–1578.

Campa, Jose Manuel, and Simi Kedia, 2002, Explaining the diversification discount, *The Journal of Finance* 57, 1731–1762.

Comment, Robert, and Gregg A Jarrell, 1995, Corporate focus and stock returns, *Journal of Financial Economics* 37, 67–87.

Cooper, Michael J, and Tyler K Jensen, 2016, When cash is king: Funding conditions and the value of cash holdings, *Working paper* .

Cummins, Jason G, Kevin A Hassett, and Stephen D Oliner, 2006, Investment behavior, observable expectations, and internal funds, *American Economic Review* 96, 796–810.

DeMarzo, Peter M, Michael J Fishman, Zhiguo He, and Neng Wang, 2012, Dynamic agency and the q theory of investment, *The Journal of Finance* 67, 2295–2340.

Denis, David J, and Valeriy Sibilkov, 2010, Financial constraints, investment, and the value of cash holdings, *Review of Financial Studies* 23, 247–269.

Dimitrov, Valentin, and Sheri Tice, 2006, Corporate diversification and credit constraints: Real effects across the business cycle, *Review of Financial Studies* 19, 1465–1498.

Duchin, Ran, 2010, Cash holdings and corporate diversification, *The Journal of Finance* 65, 955–992.

Duchin, Ran, Oguzhan Ozbas, and Berk A Sensoy, 2010, Costly external finance, corporate investment, and the subprime mortgage credit crisis, *Journal of Financial Economics* 97, 418–435.

Eisfeldt, Andrea L, and Tyler Muir, 2014, Aggregate issuance and savings waves, *Available at SSRN 1984063* .

Eisfeldt, Andrea L, and Tyler Muir, 2016, Aggregate external financing and savings waves, *Journal of Monetary Economics* 84, 116–133.

Elton, Edwin J, Martin J Gruber, Deepak Agrawal, and Christopher Mann, 2001, Explaining the rate spread on corporate bonds, *The Journal of Finance* 56, 247–277.

Erickson, Timothy, and Toni M Whited, 2000, Measurement error and the relationship between investment and q, *Journal of political economy* 108, 1027–1057.

Farre-Mensa, Joan, and Alexander Ljungqvist, 2016, Do measures of financial constraints measure financial constraints?, *The Review of Financial Studies* 29, 271–308.

Faulkender, Michael, and Rong Wang, 2006, Corporate financial policy and the value of cash, *The Journal of Finance* 61, 1957–1990.

Fazzari, Steven M, R Glenn Hubbard, Bruce C Petersen, Alan S Blinder, and James M Poterba, 1988, Financing constraints and corporate investment, *Brookings papers on economic activity* 1988, 141–206.

Gertner, Robert, Eric Powers, and David Scharfstein, 2002, Learning about internal capital markets from corporate spin-offs, *The Journal of Finance* 57, 2479–2506.

Gomes, Joao, and Dmitry Livdan, 2004, Optimal diversification: Reconciling theory and evidence, *The Journal of Finance* 59, 507–535.

Gompers, Paul, Joy Ishii, and Andrew Metrick, 2003, Corporate governance and equity prices, *The quarterly journal of economics* 118, 107–156.

Gopalan, Radhakrishnan, and Kangzhen Xie, 2011, Conglomerates and industry distress, *Review of Financial Studies* 24, 3642–3687.

Griffin, Paul A, David H Lont, and Yuan Sun, 2010, Agency problems and audit fees: further tests of the free cash flow hypothesis, *Accounting & Finance* 50, 321–350.

Hadlock, Charles J, and Joshua R Pierce, 2010, New evidence on measuring financial constraints: Moving beyond the kz index, *The Review of Financial Studies* 23, 1909–1940.

Hann, Rebecca N, Maria Ogneva, and Oguzhan Ozbas, 2013, Corporate diversification and the cost of capital, *The Journal of Finance* .

Harford, Jarrad, 1999, Corporate cash reserves and acquisitions, *The Journal of Finance* 54, 1969–1997.

Harford, Jarrad, Sandy Klasa, and William F Maxwell, 2014, Refinancing risk and cash holdings, *The Journal of Finance* 69, 975–1012.

Harford, Jarrad, Sattar A Mansi, and William F Maxwell, 2008, Corporate governance and firm cash holdings in the us, *Journal of Financial Economics* 87, 535–555.

Hoechle, Daniel, Markus Schmid, Ingo Walter, and David Yermack, 2012, How much of the diversification discount can be explained by poor corporate governance?, *Journal of Financial Economics* 103, 41–60.

Hovakimian, Gayané, 2011, Financial constraints and investment efficiency: Internal capital allocation across the business cycle, *Journal of Financial Intermediation* 20, 264–283.

Jensen, Michael C, 1986, Agency costs of free cash flow, corporate finance, and takeovers, *The American Economic Review* 76, 323–329.

Jensen, Michael C, and William H Meckling, 1976, Theory of the firm: Managerial behavior, agency costs and ownership structure, *Journal of financial economics* 3, 305–360.

Kaplan, Steven N, and Luigi Zingales, 1997, Do investment-cash flow sensitivities provide useful measures of financing constraints?, *The Quarterly Journal of Economics* 169–215.

Keynes, John Maynard, 1936, The general theory of interest, employment and money.

Kuppuswamy, Venkat, and Belen Villalonga, 2010, Does diversification create value in the presence of external financing constraints? evidence from the 2007–2009 financial crisis, *Evidence from the* 2009, 10–101.

Lamont, Owen, Christopher Polk, and Jesús Saaá-Requejo, 2001, Financial constraints and stock returns, *The review of financial studies* 14, 529–554.

Lamont, Owen A, and Christopher Polk, 2002, Does diversification destroy value? evidence from the industry shocks, *Journal of Financial Economics* 63, 51–77.

Lang, Larry HP, and Rene M Stulz, 1993, Tobin's q, corporate diversification and firm performance, Technical report, National Bureau of Economic Research.

Lehn, Kenneth, and Annette Poulsen, 1989, Free cash flow and stockholder gains in going private transactions, *The Journal of Finance* 44, 771–787.

Lewellen, Wilbur G, 1971, A pure financial rationale for the conglomerate merger, *The Journal of Finance* 26, 521–537.

Luo, Mi, 2011, A bright side of financial constraints in cash management, *Journal of Corporate Finance* 17, 1430–1444.

Maksimovic, Vojislav, and Gordon Phillips, 2002, Do conglomerate firms allocate resources inefficiently across industries? theory and evidence, *The Journal of Finance* 57, 721–767.

Matsusaka, John G, and Vikram Nanda, 2002, Internal capital markets and corporate refocusing, *Journal of Financial Intermediation* 11, 176–211.

Matvos, Gregor, and Amit Seru, 2014, Resource allocation within firms and financial market dislocation: Evidence from diversified conglomerates, *Review of Financial Studies* 27, 1143–1189.

Maxwell, William F, Sandy Klasa, and Jarrad Harford, 2014, Refinancing risk and cash holdings, *The Journal of Finance* 69, 1.

McLean, R David, and Mengxin Zhao, 2014, The business cycle, investor sentiment, and costly external finance, *The Journal of Finance* 69, 1377–1409.

Mello, Antonio S, and John E Parsons, 2000, Hedging and liquidity, *Review of Financial Studies* 13, 127–153.

Mello, Antonio S, John E Parsons, and Alexander J Triantis, 1995, An integrated model of multinational flexibility and financial hedging, *Journal of International Economics* 39, 27–51.

Modigliani, Franco, and Merton H Miller, 1958, The cost of capital, corporation finance and the theory of investment, *The American economic review* 48, 261–297.

Morellec, Erwan, and Clifford W Smith, 2007, Agency conflicts and risk management, *Review of Finance* 11, 1–23.

Myers, Stewart C, and Nicholas S Majluf, 1984, Corporate financing and investment decisions when firms have information that investors do not have, *Journal of financial economics* 13, 187–221.

Opler, Tim, Lee Pinkowitz, René Stulz, and Rohan Williamson, 1999, The determinants and implications of corporate cash holdings, *Journal of Financial Economics* 52, 3–46.

Ozbas, Oguzhan, and David S Scharfstein, 2010, Evidence on the dark side of internal capital markets, *Review of Financial Studies* 23, 581–599.

Rajan, Raghuram, Henri Servaes, and Luigi Zingales, 2000, The cost of diversity: The diversification discount and inefficient investment, *The Journal of Finance* 55, 35–80.

Richardson, Scott, 2006, Over-investment of free cash flow, *Review of accounting studies* 11, 159–189.

Rudolph, Christin, and Bernhard Schwetzler, 2013, Conglomerates on the rise again? a cross-regional study on the impact of the 2008–2009 financial crisis on the diversification discount, *Journal of Corporate Finance* 22, 153–165.

Santalo, Juan, and Manuel Becerra, 2008, Competition from specialized firms and the diversification–performance linkage, *The Journal of Finance* 63, 851–883.

Scharfstein, David S, 1998, The dark side of internal capital markets ii: Evidence from diversified conglomerates, Technical report, National Bureau of Economic Research.

Scharfstein, David S, and Jeremy C Stein, 2000, The dark side of internal capital markets: Divisional rent-seeking and inefficient investment, *The Journal of Finance* 55, 2537–2564.

Schoar, Antoinette, 2002, Effects of corporate diversification on productivity, *The Journal of Finance* 57, 2379–2403.

Shin, Hyun-Han, and René M Stulz, 1998, Are internal capital markets efficient?, *The Quarterly Journal of Economics* 113, 531–552.

Smith, Garrett, 2014, After a market panic: cash is king, *Managerial Finance* 40, 506–534.

Stein, Jeremy C, 1997, Internal capital markets and the competition for corporate resources, *The Journal of Finance* 52, 111–133.

Stulz, ReneM, 1990, Managerial discretion and optimal financing policies, *Journal of financial Economics* 26, 3–27.

Villalonga, Beln, 2004, Diversification discount or premium? new evidence from the business information tracking series, *The Journal of Finance* 59, 479–506.

Volkov, Nikanor I, and Garrett C Smith, 2015, Corporate diversification and firm value during economic downturns, *The Quarterly Review of Economics and Finance* 55, 160–175.

Whited, Toni M, and Guojun Wu, 2006, Financial constraints risk, *Review of Financial Studies* 19, 531–559.

Yan, An, Zaihui Yang, and Jie Jiao, 2010, Conglomerate investment under various capital market conditions, *Journal of Banking & Finance* 34, 103–115.

Zeng, Hongchao, and Ying Huang, 2016, The impact of capital shocks on m & a transactions, *Studies in Economics and Finance* 33, 126–146.

Figure 1: **Time Series of Firm-level Investment**

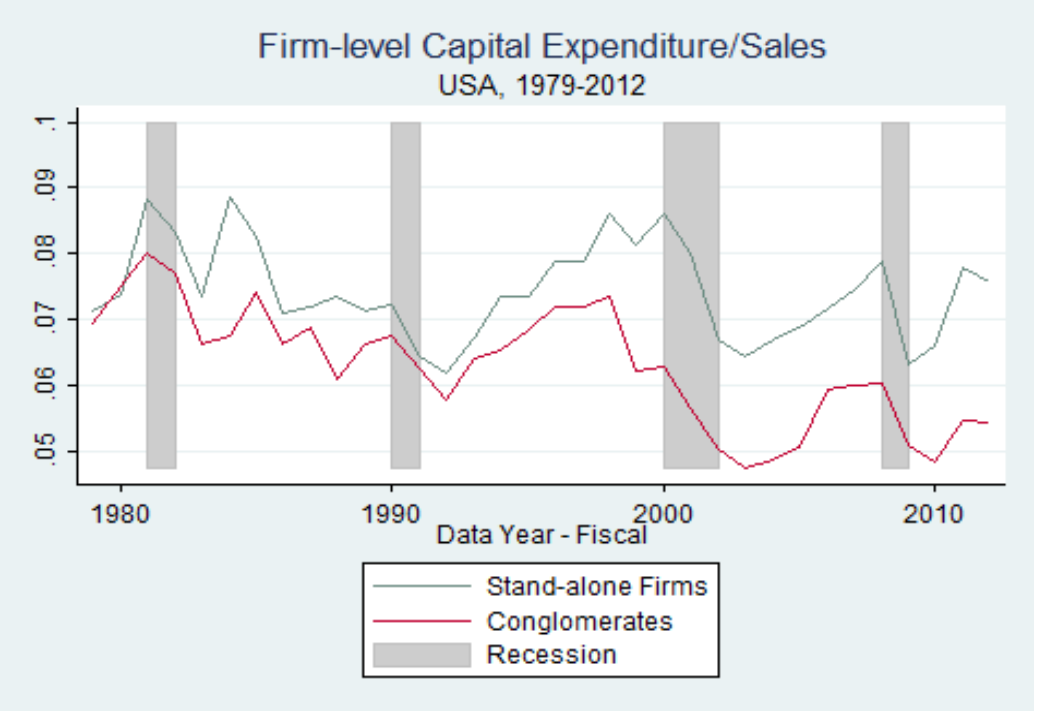

Figure 2: **Time Series of Firm-level Capital Expenditure/Assets**

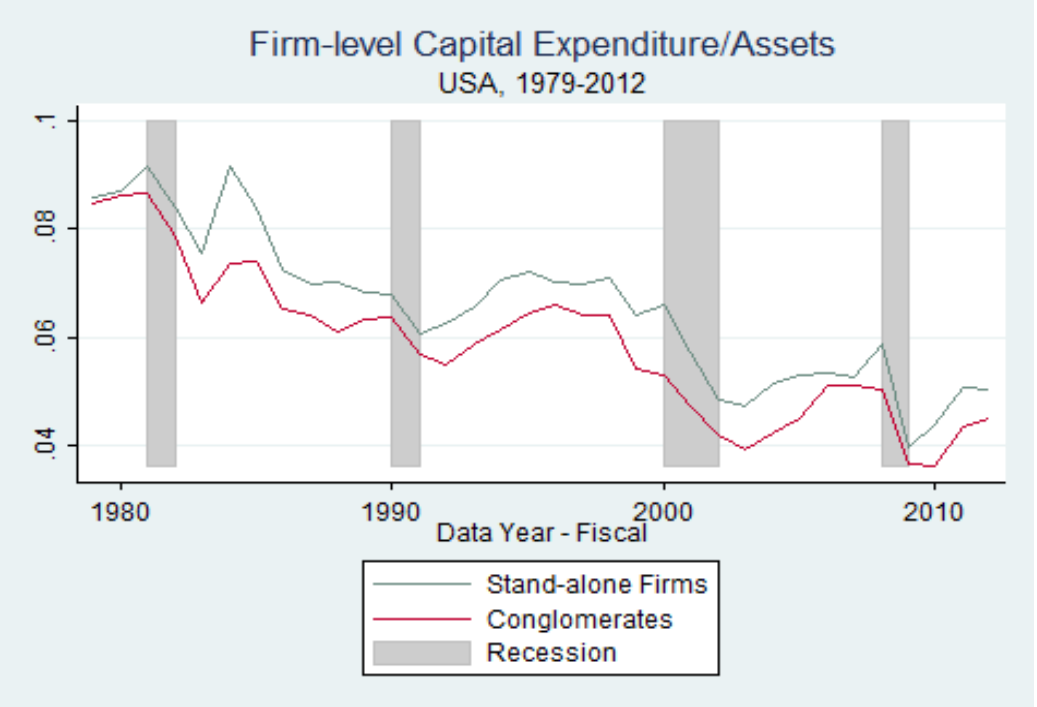

Table 1: **Firm-level Descriptive Statistics**

	N	Mean	Median	Min	25%	75%	Max
				Stand-Alone Firms			
Assets	50,541	1,005.773	167.695	11.046	60.584	550.225	37,933.000
Sales	50,541	1,062.048	190.679	22.905	73.574	609.969	36,298.000
Sale Growth	50,541	1.135	1.087	0.509	0.982	1.223	2.700
Leverage	50,541	0.240	0.199	0.000	0.042	0.366	1.114
Acquisition	50,541	0.020	0.000	-0.002	0.000	0.005	0.368
Net Working Capital	50,541	0.125	0.122	-0.549	-0.008	0.264	0.570
Debt	50,541	0.273	0.223	0.000	0.049	0.412	1.329
Cash holding	50,541	108.786	13.881	0.000	2.746	58.882	3,721.000
Dividends	50,541	0.025	0.004	0.000	0.000	0.025	0.336
Market-to-Book	50,541	1.573	1.322	0.630	1.027	1.865	4.566
Capital Expenditure/Sales	50,541	0.070	0.036	0.001	0.018	0.071	0.690
Cashflow/Sales	50,541	0.114	0.099	-0.450	0.045	0.168	0.643
Capital Expenditure/Assets	50,541	0.064	0.046	0.001	0.023	0.085	0.317
Cashflow/Assets	50,541	0.122	0.127	-0.306	0.069	0.187	0.448
				Conglomerates			
Assets	24,281	2,861.574	506.593	11.046	118.545	2,228.399	37,933.000
Sales	24,281	2,903.390	600.437	22.905	143.768	2,326.500	36,298.000
Sale Growth	24,281	1.099	1.067	0.509	0.974	1.168	2.700
Leverage	24,281	0.275	0.252	0.000	0.146	0.375	1.114
Acquisition	24,281	0.026	0.000	-0.002	0.000	0.019	0.368
Net Working Capital	24,281	0.133	0.124	-0.549	0.027	0.241	0.570
Debt	24,281	0.308	0.278	0.000	0.162	0.414	1.329
Cash holding	24,281	206.250	23.385	0.000	4.643	107.330	3,721.000
Dividends	24,281	0.028	0.015	0.000	0.002	0.033	0.336
Market-to-Book	24,281	1.298	1.162	0.630	0.969	1.470	4.566
Capital Expenditure/Sales	24,281	0.063	0.040	0.001	0.023	0.068	0.690
Cashflow/Sales	24,281	0.118	0.107	-0.450	0.063	0.158	0.643
Capital Expenditure/Assets	24,281	0.061	0.049	0.001	0.029	0.079	0.317
Cashflow/Assets	24,281	0.128	0.128	-0.306	0.085	0.174	0.448
				All Firms			
Assets	74,822	1,608.012	223.760	11.046	71.163	895.314	37,933.000
Sales	74,822	1,659.594	257.184	22.905	85.887	987.334	36,298.000
Sale Growth	74,822	1.123	1.079	0.509	0.979	1.203	2.700
Leverage	74,822	0.251	0.222	0.000	0.075	0.370	1.114
Acquisition	74,822	0.022	0.000	-0.002	0.000	0.009	0.368
Net Working Capital	74,822	0.127	0.123	-0.549	0.005	0.256	0.570
Debt	74,822	0.284	0.246	0.000	0.086	0.412	1.329
Cash holding	74,822	140.414	16.284	0.000	3.242	72.360	3,721.000
Dividends	74,822	0.026	0.008	0.000	0.000	0.028	0.336
Market-to-Book	74,822	1.484	1.258	0.630	1.005	1.721	4.566
Capital Expenditure/Sales	74,822	0.068	0.037	0.001	0.019	0.070	0.690
Cashflow/Sales	74,822	0.115	0.102	-0.450	0.052	0.164	0.643
Capital Expenditure/Assets	74,822	0.063	0.047	0.001	0.025	0.083	0.317
Cashflow/Assets	74,822	0.124	0.128	-0.306	0.075	0.182	0.448

Table 2: **Firm-level Descriptive Statistics - Recession**

	N	Mean	Median	Min	25%	75%	Max
				Stand-Alone Firms			
Assets	5,855	1,212.744	175.849	11.046	58.565	647.423	37,933.000
Sales	5,855	1,190.872	208.975	22.905	75.230	718.300	36,298.000
Sale Growth	5,855	1.122	1.078	0.509	0.976	1.201	2.700
Leverage	5,855	0.250	0.209	0.000	0.047	0.380	1.114
Acquisition	5,855	0.019	0.000	-0.002	0.000	0.003	0.368
Net Working Capital	5,855	0.118	0.114	-0.549	-0.014	0.264	0.570
Debt	5,855	0.287	0.234	0.000	0.055	0.433	1.329
Cash holding	5,855	122.129	14.475	0.000	2.793	72.016	3,721.000
Dividends	5,855	0.032	0.008	0.000	0.000	0.032	0.336
Market-to-Book	5,855	1.586	1.326	0.630	1.012	1.893	4.566
Capital Expenditure/Sales	5,855	0.072	0.035	0.001	0.017	0.070	0.690
Cashflow/Sales	5,855	0.111	0.096	-0.450	0.040	0.166	0.643
Capital Expenditure/Assets	5,855	0.066	0.044	0.001	0.022	0.087	0.317
Cashflow/Assets	5,855	0.119	0.125	-0.306	0.065	0.186	0.448
				Conglomerates			
Assets	3,223	3,094.208	407.467	11.046	93.931	2,193.173	37,933.000
Sales	3,223	3,148.542	539.296	22.905	128.450	2,410.751	36,298.000
Sale Growth	3,223	1.097	1.068	0.509	0.975	1.171	2.700
Leverage	3,223	0.275	0.254	0.000	0.150	0.378	1.114
Acquisition	3,223	0.022	0.000	-0.002	0.000	0.014	0.368
Net Working Capital	3,223	0.150	0.141	-0.549	0.039	0.270	0.570
Debt	3,223	0.309	0.282	0.000	0.169	0.417	1.329
Cash holding	3,223	218.574	18.501	0.000	3.909	95.148	3,721.000
Dividends	3,223	0.028	0.017	0.000	0.003	0.035	0.336
Market-to-Book	3,223	1.292	1.153	0.630	0.945	1.497	4.566
Capital Expenditure/Sales	3,223	0.064	0.040	0.001	0.023	0.070	0.690
Cashflow/Sales	3,223	0.114	0.103	-0.450	0.061	0.155	0.643
Capital Expenditure/Assets	3,223	0.068	0.053	0.001	0.031	0.088	0.317
Cashflow/Assets	3,223	0.132	0.133	-0.306	0.090	0.179	0.448
				All Firms			
Assets	9,078	1,880.728	227.288	11.046	67.740	1,009.225	37,933.000
Sales	9,078	1,885.911	275.569	22.905	86.280	1,124.829	36,298.000
Sale Growth	9,078	1.113	1.075	0.509	0.976	1.188	2.700
Leverage	9,078	0.259	0.231	0.000	0.086	0.379	1.114
Acquisition	9,078	0.020	0.000	-0.002	0.000	0.007	0.368
Net Working Capital	9,078	0.129	0.126	-0.549	0.006	0.266	0.570
Debt	9,078	0.295	0.255	0.000	0.099	0.425	1.329
Cash holding	9,078	156.371	15.729	0.000	3.133	80.837	3,721.000
Dividends	9,078	0.030	0.011	0.000	0.000	0.033	0.336
Market-to-Book	9,078	1.481	1.258	0.630	0.981	1.734	4.566
Capital Expenditure/Sales	9,078	0.069	0.037	0.001	0.019	0.070	0.690
Cashflow/Sales	9,078	0.112	0.099	-0.450	0.048	0.162	0.643
Capital Expenditure/Assets	9,078	0.066	0.048	0.001	0.025	0.087	0.317
Cashflow/Assets	9,078	0.124	0.128	-0.306	0.074	0.183	0.448

Table 3: **Firm-level Descriptive Statistics - Expansion**

	N	Mean	Median	Min	25%	75%	Max
				Stand-Alone Firms			
Assets	44,686	978.655	166.502	11.046	60.806	539.645	37,933.000
Sales	44,686	1,045.168	189.047	22.905	73.344	597.915	36,298.000
Sale Growth	44,686	1.137	1.088	0.509	0.983	1.226	2.700
Leverage	44,686	0.238	0.198	0.000	0.042	0.365	1.114
Acquisition	44,686	0.021	0.000	-0.002	0.000	0.005	0.368
Net Working Capital	44,686	0.125	0.123	-0.549	-0.007	0.264	0.570
Debt	44,686	0.272	0.222	0.000	0.049	0.409	1.329
Cash holding	44,686	107.037	13.787	0.000	2.742	57.455	3,721.000
Dividends	44,686	0.024	0.003	0.000	0.000	0.024	0.336
Market-to-Book	44,686	1.571	1.321	0.630	1.028	1.862	4.566
Capital Expenditure/Sales	44,686	0.070	0.036	0.001	0.018	0.071	0.690
Cashflow/Sales	44,686	0.114	0.099	-0.450	0.046	0.168	0.643
Capital Expenditure/Assets	44,686	0.064	0.046	0.001	0.023	0.084	0.317
Cashflow/Assets	44,686	0.122	0.127	-0.306	0.070	0.187	0.448
				Conglomerates			
Assets	21,058	2,825.968	521.540	11.046	122.021	2,242.153	37,933.000
Sales	21,058	2,865.868	609.589	22.905	145.916	2,318.293	36,298.000
Sale Growth	21,058	1.099	1.066	0.509	0.973	1.167	2.700
Leverage	21,058	0.275	0.252	0.000	0.145	0.374	1.114
Acquisition	21,058	0.026	0.000	-0.002	0.000	0.020	0.368
Net Working Capital	21,058	0.131	0.122	-0.549	0.025	0.238	0.570
Debt	21,058	0.307	0.278	0.000	0.161	0.413	1.329
Cash holding	21,058	204.363	24.126	0.000	4.793	108.756	3,721.000
Dividends	21,058	0.028	0.015	0.000	0.002	0.033	0.336
Market-to-Book	21,058	1.298	1.164	0.630	0.974	1.467	4.566
Capital Expenditure/Sales	21,058	0.062	0.040	0.001	0.023	0.068	0.690
Cashflow/Sales	21,058	0.118	0.107	-0.450	0.064	0.158	0.643
Capital Expenditure/Assets	21,058	0.060	0.048	0.001	0.029	0.078	0.317
Cashflow/Assets	21,058	0.127	0.128	-0.306	0.085	0.173	0.448
				All Firms			
Assets	65,744	1,570.355	223.347	11.046	71.621	884.166	37,933.000
Sales	65,744	1,628.344	254.447	22.905	85.790	967.045	36,298.000
Sale Growth	65,744	1.125	1.080	0.509	0.980	1.206	2.700
Leverage	65,744	0.250	0.220	0.000	0.074	0.368	1.114
Acquisition	65,744	0.023	0.000	-0.002	0.000	0.010	0.368
Net Working Capital	65,744	0.127	0.123	-0.549	0.005	0.255	0.570
Debt	65,744	0.283	0.245	0.000	0.084	0.411	1.329
Cash holding	65,744	138.211	16.363	0.000	3.258	71.243	3,721.000
Dividends	65,744	0.025	0.007	0.000	0.000	0.028	0.336
Market-to-Book	65,744	1.484	1.258	0.630	1.007	1.719	4.566
Capital Expenditure/Sales	65,744	0.068	0.037	0.001	0.020	0.070	0.690
Cashflow/Sales	65,744	0.115	0.103	-0.450	0.052	0.165	0.643
Capital Expenditure/Assets	65,744	0.063	0.047	0.001	0.025	0.082	0.317
Cashflow/Assets	65,744	0.124	0.127	-0.306	0.075	0.182	0.448

Table 4: **Segment-level Capital Descriptive Statistics**

	N	Mean	Median	Min	25%	75%	Max
				Stand-alone firms			
Segment Assets	69,737	878.8	130.7	1.5	47.6	414.9	621,626.0
Segment Sales	69,737	843.3	144.4	15.5	57.8	450.4	195,805.0
Segment Cash Flow	69,737	113.3	14.8	-3,057.4	3.9	56.0	17,121.0
Segment Capital Expenditure	69,737	48.8	5.9	0.0	1.7	22.1	9,741.4
Segment Number	69,737	1.000	1.000	1.000	1.000	1.000	1.000
Lagged Industry Q	67,545	1.596	1.462	0.290	1.184	1.912	6.767
Segment Cash Flow/Sales	69,737	0.118	0.105	-7.429	0.047	0.184	3.439
Segment Capital Expenditure/Sales	69,737	0.075	0.036	0.000	0.017	0.075	2.212
Segment Cash Flow/Assets	69,737	0.135	0.132	-52.108	0.070	0.202	13.334
Segment Capital Expenditure/Assets	69,737	0.069	0.046	0.000	0.022	0.089	1.574
				Conglomerates			
Segment Assets	33,487	1,171.5	188.1	0.5	60.5	702.4	251,476.7
Segment Sales	33,487	1,393.3	254.0	15.5	87.7	871.8	296,284.6
Segment Cash Flow	33,487	186.9	28.8	-3,705.0	8.1	109.6	48,873.8
Segment Capital Expenditure	33,487	81.5	9.7	0.0	2.6	41.8	25,763.7
Segment Number	33,487	3.151	3.000	2.000	2.000	4.000	13.000
Lagged Industry Q	31,368	1.407	1.296	0.290	1.074	1.622	6.063
Segment Cash Flow/Sales	33,487	0.149	0.125	-10.589	0.071	0.193	11.132
Segment Capital Expenditure/Sales	33,487	0.071	0.038	0.000	0.019	0.072	1.604
Segment Cash Flow/Assets	33,487	0.205	0.175	-5.035	0.104	0.266	51.998
Segment Capital Expenditure/Assets	33,487	0.076	0.055	0.000	0.030	0.097	1.654
				All firms			
Segment Assets	103,224	973.7	144.8	0.5	50.8	496.6	621,626.0
Segment Sales	103,224	1,021.7	171.6	15.5	64.5	560.1	296,284.6
Segment Cash Flow	103,224	137.2	18.4	-3,705.0	4.9	71.0	48,873.8
Segment Capital Expenditure	103,224	59.4	6.9	0.0	1.9	27.3	25,763.7
Segment Number	103,224	1.698	1.000	1.000	1.000	2.000	13.000
Lagged Industry Q	98,913	1.536	1.407	0.290	1.148	1.818	6.767
Segment Cash Flow/Sales	103,224	0.128	0.112	-10.589	0.054	0.187	11.132
Segment Capital Expenditure/Sales	103,224	0.074	0.037	0.000	0.018	0.074	2.212
Segment Cash Flow/Assets	103,224	0.157	0.145	-52.108	0.080	0.223	51.998
Segment Capital Expenditure/Assets	103,224	0.071	0.049	0.000	0.025	0.091	1.654

Table 5: **Segment-level Capital Descriptive Statistics – Recession**

	N	Mean	Median	Min	25%	75%	Max
				Stand-alone firms			
Segment Assets	16,472	858.9	117.0	1.8	41.4	390.1	479,195.0
Segment Sales	16,472	844.0	133.0	15.5	53.1	418.3	147,848.0
Segment Cash Flow	16,472	111.0	12.0	-3,057.4	3.0	47.9	15,746.0
Segment Capital Expenditure	16,472	50.0	5.1	0.0	1.4	19.6	9,741.4
Segment Number	16,472	1.000	1.000	1.000	1.000	1.000	1.000
Lagged Industry Q	15,685	1.468	1.321	0.440	1.054	1.763	4.944
Segment Cash Flow/Sales	16,472	0.106	0.099	-6.958	0.040	0.177	2.862
Segment Capital Expenditure/Sales	16,472	0.074	0.034	0.000	0.015	0.073	1.957
Segment Cash Flow/Assets	16,472	0.131	0.131	-5.158	0.063	0.203	5.312
Segment Capital Expenditure/Assets	16,472	0.069	0.045	0.000	0.021	0.090	1.244
				Conglomerates			
Segment Assets	9,061	892.8	130.6	0.5	44.5	509.7	135,673.0
Segment Sales	9,061	1,122.3	192.7	15.8	71.2	680.8	241,144.0
Segment Cash Flow	9,061	146.8	20.8	-3,350.0	6.0	81.4	32,163.0
Segment Capital Expenditure	9,061	69.9	7.5	0.0	2.0	33.0	15,436.0
Segment Number	9,061	3.211	3.000	2.000	2.000	4.000	10.000
Lagged Industry Q	8,492	1.287	1.181	0.470	0.967	1.482	4.431
Segment Cash Flow/Sales	9,061	0.143	0.119	-8.667	0.065	0.186	11.132
Segment Capital Expenditure/Sales	9,061	0.076	0.037	0.000	0.019	0.072	0.995
Segment Cash Flow/Assets	9,061	0.209	0.178	-2.846	0.105	0.271	29.825
Segment Capital Expenditure/Assets	9,061	0.081	0.058	0.000	0.031	0.103	1.305
				All firms			
Segment Assets	25,533	870.9	121.5	0.5	42.6	426.3	479,195.0
Segment Sales	25,533	942.8	150.5	15.5	58.3	500.1	241,144.0
Segment Cash Flow	25,533	123.7	14.8	-3,350.0	3.9	58.1	32,163.0
Segment Capital Expenditure	25,533	57.1	5.8	0.0	1.6	23.6	15,436.0
Segment Number	25,533	1.785	1.000	1.000	1.000	2.000	10.000
Lagged Industry Q	24,177	1.404	1.266	0.440	1.017	1.645	4.944
Segment Cash Flow/Sales	25,533	0.119	0.107	-8.667	0.048	0.181	11.132
Segment Capital Expenditure/Sales	25,533	0.075	0.035	0.000	0.017	0.073	1.957
Segment Cash Flow/Assets	25,533	0.159	0.146	-5.158	0.077	0.227	29.825
Segment Capital Expenditure/Assets	25,533	0.073	0.050	0.000	0.024	0.095	1.305

Table 6: **Segment-level Capital Descriptive Statistics – Expansion**

	N	Mean	Median	Min	25%	75%	Max
				Stand-alone firms			
Segment Assets	53,265	885.0	134.7	1.5	49.7	423.6	621,626.0
Segment Sales	53,265	843.1	148.5	15.6	59.3	461.6	195,805.0
Segment Cash Flow	53,265	114.0	15.7	-2,152.3	4.3	58.5	17,121.0
Segment Capital Expenditure	53,265	48.5	6.2	0.0	1.8	22.8	9,531.0
Segment Number	53,265	1.000	1.000	1.000	1.000	1.000	1.000
Lagged Industry Q	51,860	1.635	1.492	0.290	1.225	1.943	6.767
Segment Cash Flow/Sales	53,265	0.122	0.107	-7.429	0.049	0.186	3.439
Segment Capital Expenditure/Sales	53,265	0.076	0.037	0.000	0.018	0.075	2.212
Segment Cash Flow/Assets	53,265	0.136	0.133	-52.108	0.072	0.201	13.334
Segment Capital Expenditure/Assets	53,265	0.069	0.047	0.000	0.023	0.088	1.574
				Conglomerates			
Segment Assets	24,426	1,274.9	212.6	0.9	67.9	771.0	251,476.7
Segment Sales	24,426	1,493.8	277.6	15.5	95.4	940.6	296,284.6
Segment Cash Flow	24,426	201.8	32.2	-3,705.0	9.1	121.6	48,873.8
Segment Capital Expenditure	24,426	85.8	10.8	0.0	2.9	45.1	25,763.7
Segment Number	24,426	3.129	3.000	2.000	2.000	4.000	13.000
Lagged Industry Q	22,876	1.452	1.341	0.290	1.127	1.664	6.063
Segment Cash Flow/Sales	24,426	0.151	0.127	-10.589	0.073	0.195	8.382
Segment Capital Expenditure/Sales	24,426	0.071	0.036	0.000	0.019	0.071	1.604
Segment Cash Flow/Assets	24,426	0.203	0.174	-5.035	0.104	0.265	51.998
Segment Capital Expenditure/Assets	24,426	0.075	0.054	0.000	0.029	0.095	1.654
				All firms			
Segment Assets	77,691	1,007.5	152.8	0.9	54.2	521.1	621,626.0
Segment Sales	77,691	1,047.7	179.5	15.5	66.9	582.1	296,284.6
Segment Cash Flow	77,691	141.6	19.7	-3,705.0	5.3	75.5	48,873.8
Segment Capital Expenditure	77,691	60.2	7.3	0.0	2.0	28.6	25,763.7
Segment Number	77,691	1.669	1.000	1.000	1.000	2.000	13.000
Lagged Industry Q	74,736	1.579	1.443	0.290	1.188	1.861	6.767
Segment Cash Flow/Sales	77,691	0.131	0.114	-10.589	0.056	0.189	8.382
Segment Capital Expenditure/Sales	77,691	0.074	0.036	0.000	0.018	0.074	2.212
Segment Cash Flow/Assets	77,691	0.157	0.144	-52.108	0.081	0.221	51.998
Segment Capital Expenditure/Assets	77,691	0.071	0.049	0.000	0.025	0.091	1.654

Figure 3: **Time Series of Segment-level Capital Expenditure/Sales**

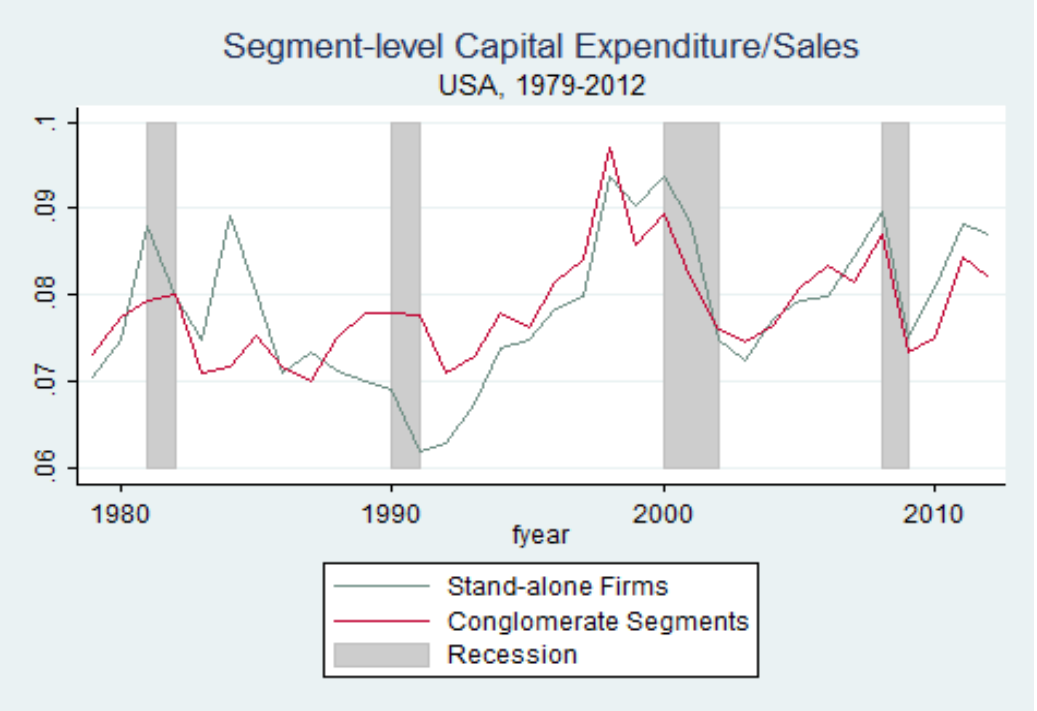

Figure 4: **Time Series of Segment-level Capital Expenditure/Assets**

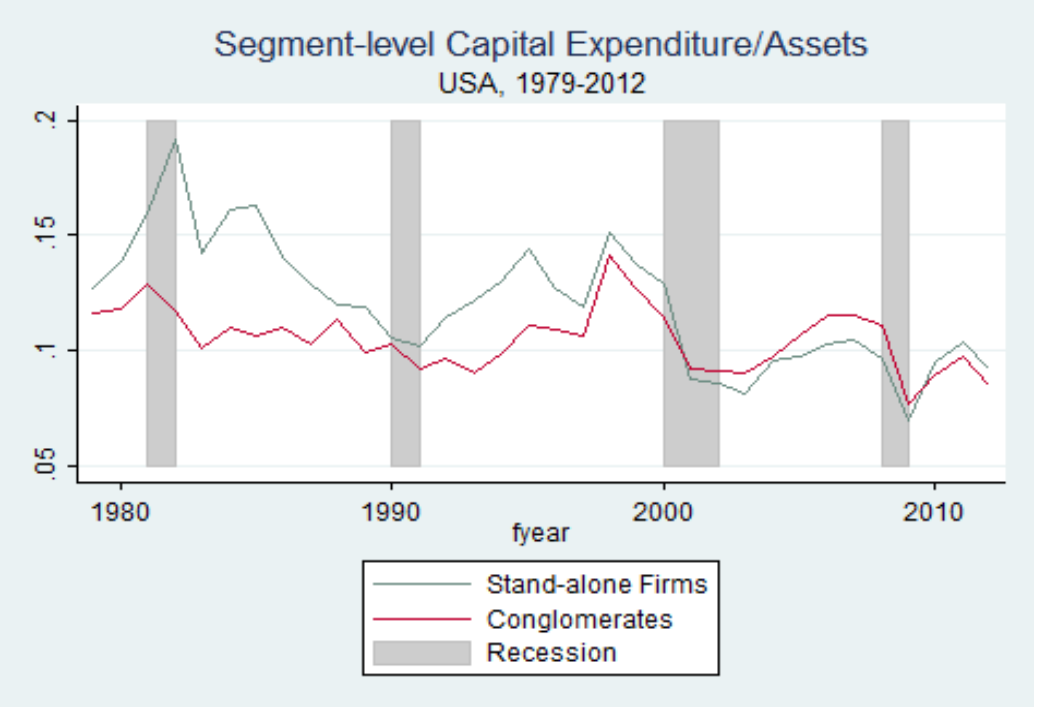

Figure 5: **Q-sensitivity of Investment during Expansion**

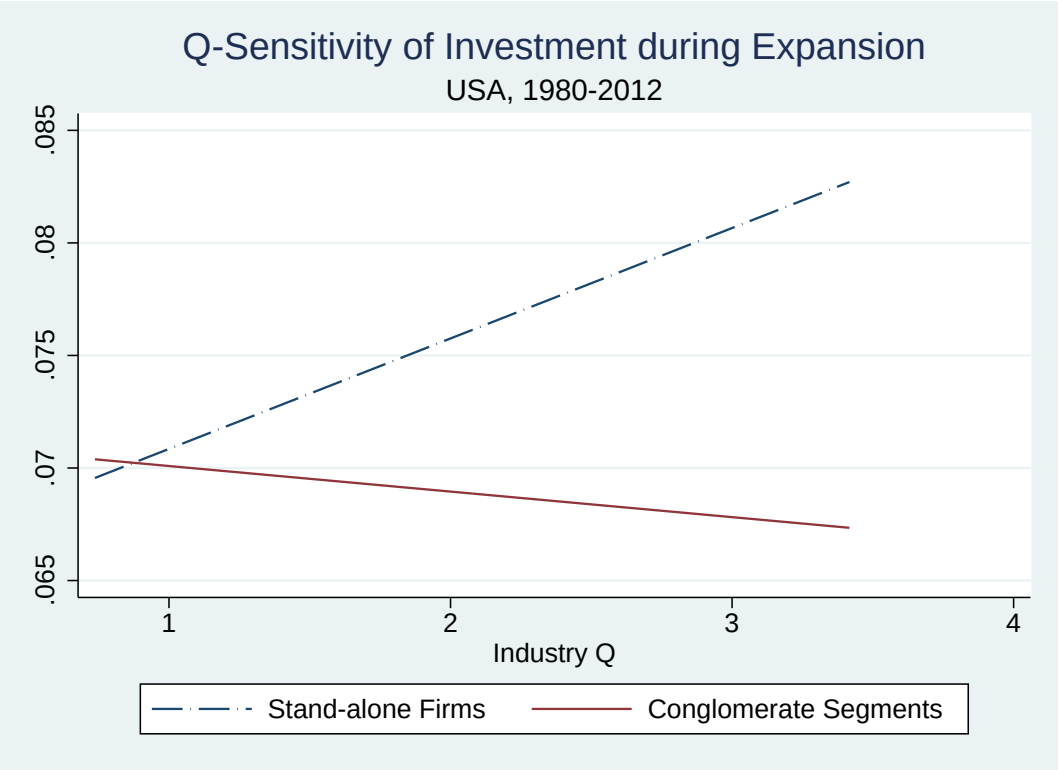

Figure 6: **Q-sensitivity of Investment during Recession**

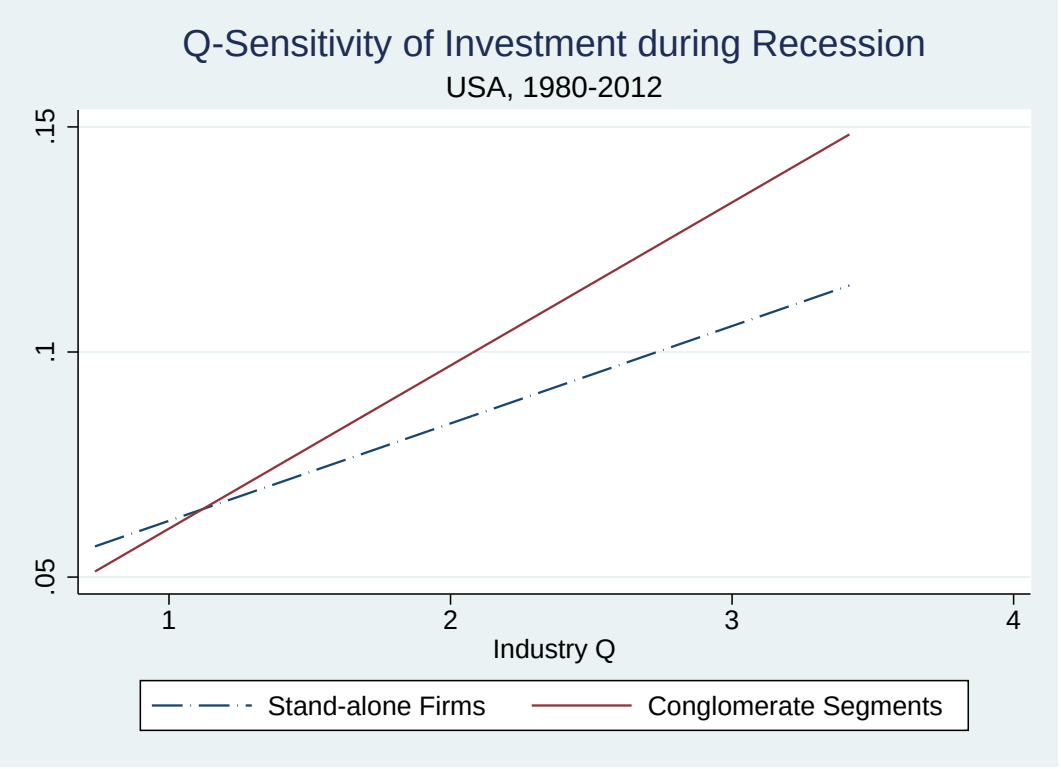

Table 7: **The Business Cycle and Cross-section of Segment-level Investment**

This table reports estimates from regressions in equation (3) explaining segment-level investment of stand-alone firms and conglomerates for fiscal years from 1980-2012. Panel A presents stand-alone firms and diversified firms. Panel B presents diversified firms with high and low diversification, which is measured by in term of cross-segment cash flow correlation. Panel C reports diversified firms with high and low diversification, which is measured by investment opportunity (Q) correlation. REC is an indicator variable equals to one if observations in recession periods, zero otherwise. DIV is an indicator variable equals to one for observations of diversified firms. $HIGH$ indicates observations of highly-diversified firms. The degree of diversification is measured with cash flow correlation and investment opportunity(Q) correlation. $Cashflow$ is the sales normalized segment-level cash flow in the fiscal year. $LagQ$ is the median Q of all the stand-alone firms within the same 4-digit SIC industry as the segment's primary SIC in the previous fiscal year. Regressions include no fixed effects, year fixed effects only and both firm and year fixed effects. Standard errors (in brackets) are heteroskedasticity consistent and clustered at the firm level. Asterisks indicate significance at the 10% (*), 5% (**), and 1% (***) levels.

Panel A: All firms

	Stand-alone			Diversified		
	(1)	(2)	(3)	(4)	(5)	(6)
LagQ	0.00167	0.0170***	0.0183***	-0.00572***	0.00782***	0.00484***
	(0.00119)	(0.00250)	(0.00116)	(0.00169)	(0.00248)	(0.00171)
REC*LagQ	0.00739***	0.00103	0.00170	0.0162***	0.00673*	0.0111***
	(0.00261)	(0.00282)	(0.00175)	(0.00373)	(0.00355)	(0.00347)
Cashflow	0.172***	0.0444***	0.0141***	0.132***	0.0777***	0.0901***
	(0.00316)	(0.0166)	(0.00291)	(0.00327)	(0.0169)	(0.00298)
REC*Cashflow	-0.0931***	-0.0360***	-0.0196***	-0.0376***	-0.0334*	-0.0252***
	(0.00564)	(0.0115)	(0.00375)	(0.00616)	(0.0197)	(0.00570)
REC	-6.77e-05	0.00395	0.00305	-0.0376***	-0.0378***	-0.0252***
	(0.00452)	(0.00519)	(0.00409)	(0.00616)	(0.00615)	(0.00570)
Year F.E.	No	Yes	Yes	No	Yes	Yes
Firm F.E.	No	No	Yes	No	No	Yes
Observations	38,292	38,292	38,292	21,573	21,573	21,573
R-squared	0.078	0.081	0.770	0.085	0.085	0.432

Table 7 – *Continued*

Panel B: Diversified firms (cash flow correlation)

	Lowly-Diversified			Highly-Diversified		
	(1)	(2)	(3)	(4)	(5)	(6)
LagQ	-0.00732**	-0.00902***	0.00638*	-0.00831***	-0.00910***	0.00267
	(0.00330)	(0.00339)	(0.00344)	(0.00267)	(0.00270)	(0.00298)
REC*LagQ	0.0151**	0.0179**	0.00738	0.00851	0.0117*	0.00940**
	(0.00666)	(0.00706)	(0.00634)	(0.00571)	(0.00596)	(0.00413)
Cashflow	0.107***	0.107***	0.0707***	0.128***	0.127***	0.0876***
	(0.00462)	(0.00463)	(0.00412)	(0.00601)	(0.00600)	(0.0203)
REC*Cashflow	-0.0454***	-0.0443***	-0.0408***	0.0153	0.0162	-0.0143
	(0.00804)	(0.00805)	(0.00739)	(0.0134)	(0.0134)	(0.0366)
REC	-0.0132	-0.0189	0.00471	-0.0224***	-0.00705	-0.00163
	(0.0104)	(0.0154)	(0.0139)	(0.00869)	(0.0126)	(0.00693)
Year F.E.	No	Yes	Yes	No	Yes	Yes
Firm F.E.	No	No	Yes	No	No	Yes
Observations	7,101	7,101	7,101	7,051	7,051	7,021
R-squared	0.081	0.082	0.475	0.081	0.080	0.468

Panel C: Diversified firms (Q correlation)

	Lowly-Diversified			Highly-Diversified		
	(1)	(2)	(3)	(4)	(5)	(6)
LagQ	-0.00764**	-0.00930***	0.00633*	-0.00812***	-0.00892***	0.00277
	(0.00331)	(0.00340)	(0.00345)	(0.00267)	(0.00270)	(0.00298)
REC*LagQ	0.0149**	0.0179**	0.00715	0.00906	0.0118**	0.00951**
	(0.00673)	(0.00714)	(0.00641)	(0.00565)	(0.00589)	(0.00406)
Cashflow	0.107***	0.107***	0.0711***	0.127***	0.126***	0.0874***
	(0.00463)	(0.00463)	(0.00413)	(0.00600)	(0.00599)	(0.0202)
REC*Cashflow	-0.0462***	-0.0450***	-0.0413***	0.0178	0.0187	-0.0139
	(0.00804)	(0.00807)	(0.00740)	(0.0134)	(0.0134)	(0.0368)
REC	-0.0129	-0.0198	0.00523	-0.0235***	-0.00715	-0.00156
	(0.0105)	(0.0155)	(0.0140)	(0.00862)	(0.0126)	(0.00692)
Year F.E.	No	Yes	Yes	No	Yes	Yes
Firm F.E.	No	No	Yes	No	No	Yes
Observations	7,088	7,088	7,088	7,064	7,064	7,034
R-squared	0.082	0.082	0.474	0.080	0.079	0.467

Table 8: **Segment-level Investment: Stand-alone vs. Diversified firms**

This table reports estimates from Diff-in-Diff regressions in equation (4) explaining segment-level investment of stand-alone firms and conglomerates for fiscal years from 1980-2012, to examine the marginal effect of recession and diversification. *REC* is an indicator variable equals to one if observations in recession periods, zero otherwise. DIV is an indicator variable equals to one for observations of diversified firms. $Cashflow$ is the sales normalized segment-level cash flow in the fiscal year. $LagQ$ is the median Q of all the stand-alone firms within the same 4-digit SIC industry as the segment's primary SIC in the previous fiscal year. Regressions include no fixed effects, year fixed effects only and both firm and year fixed effects. Standard errors (in brackets) are heteroskedasticity consistent and clustered at the firm level. Asterisks indicate significance at the 10% (*), 5% (**), and 1% (***) levels.

	All Firms		
	(1)	(2)	(3)
LagQ	0.00167	0.000496	0.0172***
	(0.00115)	(0.00119)	(0.00120)
DIV*LagQ	-0.00739***	-0.00739***	-0.0129***
	(0.00215)	(0.00215)	(0.00180)
REC*LagQ	0.00739***	0.00778***	0.00377**
	(0.00252)	(0.00265)	(0.00186)
DIV*REC*LagQ	0.00886*	0.0121**	0.00478**
	(0.00474)	(0.00476)	(0.00236)
Cashflow	0.172***	0.172***	0.0314***
	(0.00304)	(0.00304)	(0.00321)
DIV*Cashflow	-0.0398***	-0.0402***	0.0598***
	(0.00465)	(0.00464)	(0.00405)
REC*Cashflow	-0.0931***	-0.0922***	-0.0261***
	(0.00544)	(0.00544)	(0.00431)
DIV*REC*Cashflow	0.0555***	0.0547***	-0.00124
	(0.00857)	(0.00857)	(0.00648)
Year F.E.	No	Yes	Yes
Firm F.E.	No	No	Yes
Observations	59,865	59,865	59,865
R-squared	0.081	0.084	0.648

Table 9: **Segment-level Investment: Lowly- vs. Highly-diversified firms**

This table reports estimates from regressions in equation (5) explaining segment-level investment of diversified firms for fiscal years from 1980-2012, to examine the marginal effect of the degree of diversification. *REC* is an indicator variable equals to one if observations in recession periods, zero otherwise. *HIGH* indicates observations of highly-diversified firms. The degree of diversification is measured with cash flow correlation and investment opportunity(Q) correlation. *Cashflow* is the sales normalized firm-level cash flow in the fiscal year. *LagQ* is the median Q of all the stand-alone firms within the same 4-digit SIC industry as the firm's primary operation SIC in the previous fiscal year. Standard errors (in brackets) are heteroskedasticity consistent and clustered at the firm level. Asterisks indicate significance at the 10% (*), 5% (**), and 1% (***) levels.

	Diversified (CF)			Diversified (Q)		
	(1)	(2)	(3)	(4)	(5)	(6)
LagQ	0.107***	0.107***	0.0710***	0.107***	0.107***	0.0714***
	(0.00433)	(0.00433)	(0.00384)	(0.00433)	(0.00433)	(0.00383)
HIGH*LagQ	0.0213***	0.0209***	0.0164**	0.0201***	0.0196**	0.0151**
	(0.00779)	(0.00778)	(0.00690)	(0.00779)	(0.00778)	(0.00690)
REC*LagQ	-0.0454***	-0.0443***	-0.0404***	-0.0462***	-0.0451***	-0.0410***
	(0.00753)	(0.00753)	(0.00691)	(0.00753)	(0.00753)	(0.00691)
HIGH*REC*LagQ	0.0608***	0.0604***	0.0621***	0.0640***	0.0635***	0.0643***
	(0.0163)	(0.0163)	(0.0148)	(0.0163)	(0.0163)	(0.0148)
Cashflow	-0.00732**	-0.00827***	0.00722**	-0.00764**	-0.00856***	0.00717**
	(0.00310)	(0.00313)	(0.00305)	(0.00310)	(0.00313)	(0.00305)
HIGH*Cashflow	-0.000990	-0.00112	-0.00366	-0.000482	-0.000667	-0.00365
	(0.00423)	(0.00423)	(0.00404)	(0.00423)	(0.00423)	(0.00404)
REC*Cashflow	0.0151**	0.0173***	0.00654	0.0149**	0.0174***	0.00633
	(0.00624)	(0.00642)	(0.00556)	(0.00630)	(0.00648)	(0.00561)
HIGH*REC*Cashflow	-0.00655	-0.00604	-0.00496	-0.00588	-0.00562	-0.00425
	(0.00877)	(0.00877)	(0.00778)	(0.00877)	(0.00876)	(0.00779)
Year F.E.	No	Yes	Yes	No	Yes	Yes
Firm F.E.	No	No	Yes	No	No	Yes
Observations	14,152	14,152	14,152	14,152	14,152	14,152
R-squared	0.083	0.083	0.454	0.083	0.084	0.454

Table 10: **Segment-level Investment: Matched Stand-alone and Diversified Firms – I**

This table reports estimates from regressions in equation (3) explaining segment-level investment of stand-alone firms and conglomerates for fiscal years from 1980-2012, to examine the marginal effect of recession. Panel A presents results for the simple manual matched sample of stand-alone firms and segments of diversified firms, which are matched by the same industry, same fiscal year and closest size of asset. Panel B presents results for the propensity score matched sample of stand-alone firms and segments of diversified firms, which are matched by propensity score estimated based on segment investment, segment sales, profitability (cash flow over sales ratio), industry opportunity (Q), including industry and year fixed effects. *REC* is an indicator variable equals to one if observations in recession periods, zero otherwise. $Cashflow$ is the sales normalized segment-level cash flow in the fiscal year. $LagQ$ is the median Q of all the stand-alone firms within the same 4-digit SIC industry as the segment's primary SIC in the previous fiscal year. Standard errors (in brackets) are heteroskedasticity consistent and clustered at the firm level. Asterisks indicate significance at the 10% (*), 5% (**), and 1% (***) levels.

Panel A: Manual Match

	Stand-alone			Diversified		
	(1)	(2)	(3)	(4)	(5)	(6)
REC	0.000458	0.00154	0.00276	-0.00904*	-0.0221***	0.00149
	(0.00457)	(0.00687)	(0.00436)	(0.00517)	(0.00797)	(0.00839)
LagQ	0.00185	-1.25e-05	0.0186***	-0.00469***	-0.00580***	0.00474**
	(0.00121)	(0.00127)	(0.00188)	(0.00158)	(0.00163)	(0.00240)
REC*LagQ	0.00715***	0.00516*	0.00172	0.0159***	0.0231***	0.0122***
	(0.00264)	(0.00285)	(0.00227)	(0.00350)	(0.00370)	(0.00471)
Cashflow	0.170***	0.170***	0.0106	0.121***	0.121***	0.0808***
	(0.00320)	(0.00321)	(0.00994)	(0.00298)	(0.00298)	(0.0188)
REC*Cashflow	-0.0938***	-0.0925***	-0.0178*	-0.0585***	-0.0584***	-0.0389
	(0.00568)	(0.00569)	(0.00967)	(0.00513)	(0.00513)	(0.0306)
Year F.E.	No	Yes	Yes	No	Yes	Yes
Firm F.E.	No	No	Yes	No	No	Yes
Observations	24,771	24,771	24,771	24,771	24,771	24,771
R-squared	0.077	0.077	0.773	0.071	0.072	0.428

Table 10 – *Continued*

Panel B: Propensity Score Match

	Stand-alone			Diversified		
	(1)	(2)	(3)	(4)	(5)	(6)
REC	-0.00894*	-0.0116*	-0.00482	-0.0126**	-0.0303***	-0.00466
	(0.00460)	(0.00669)	(0.0102)	(0.00541)	(0.00840)	(0.00856)
LagQ	0.00312***	0.000140	0.0136***	-0.00559***	-0.00660***	0.00428**
	(0.00117)	(0.00123)	(0.00357)	(0.00170)	(0.00175)	(0.00211)
REC*LagQ	0.0103***	0.00948***	0.00111	0.0164***	0.0251***	0.0130***
	(0.00263)	(0.00283)	(0.00588)	(0.00369)	(0.00387)	(0.00491)
Cashflow	0.144***	0.143***	-0.0154	0.148***	0.147***	0.0904***
	(0.00304)	(0.00304)	(0.0152)	(0.00339)	(0.00338)	(0.0203)
REC*Cashflow	-0.0960***	-0.0945***	0.000822	-0.0508***	-0.0512***	-0.0246
	(0.00547)	(0.00549)	(0.0145)	(0.00625)	(0.00624)	(0.0331)
Year F.E.	No	Yes	Yes	No	Yes	Yes
Firm F.E.	No	No	Yes	No	No	Yes
Observations	22,017	22,017	22,017	22,017	22,017	22,017
R-squared	0.060	0.059	0.874	0.093	0.094	0.482

Table 11: **Segment-level Investment: Matched Stand-alone and Diversified Firms – II**

This table reports estimates from Diff-in-Diff regressions in equation (4) explaining segment-level investment of stand-alone firms and conglomerates for fiscal years from 1980-2012, to examine the marginal effect of recession and diversification. Column (1) – (3) present results for the simple manual matched sample of stand-alone firms and segments of diversified firms, which are matched by the same industry, same fiscal year and closest size of asset. Column (4) – (6) present results for the matched sample of stand-alone firms and segments of diversified firms, which are matched by propensity score estimated based on segment investment, segment sales, profitability (cash flow over sales ratio), industry opportunity (Q), including industry and year fixed effects. REC is an indicator variable equals to one if observations in recession periods, zero otherwise. DIV is an indicator variable equals to one for observations of diversified firms. $Cashflow$ is the sales normalized segment-level cash flow in the fiscal year. $LagQ$ is the median Q of all the stand-alone firms within the same 4-digit SIC industry as the segment's primary SIC in the previous fiscal year. Regressions include no fixed effects, year fixed effects only and both firm and year fixed effects. Standard errors (in brackets) are heteroskedasticity consistent and clustered at the firm level. Asterisks indicate significance at the 10% (*), 5% (**), and 1% (***) levels.

	Manual Match			Propensity Score -Match		
	(1)	(2)	(3)	(4)	(5)	(6)
LagQ	0.00312***	0.00101	0.0144***	0.00185	0.000660	0.0177***
	(0.00113)	(0.00116)	(0.00142)	(0.00116)	(0.00120)	(0.00128)
DIV*LagQ	-0.00871***	-0.00783***	-0.00947***	-0.00654***	-0.00675***	-0.0124***
	(0.00215)	(0.00215)	(0.00183)	(0.00204)	(0.00204)	(0.00177)
REC*LagQ	0.0103***	0.0118***	0.00126	0.00715***	0.00748***	0.00294
	(0.00253)	(0.00265)	(0.00237)	(0.00254)	(0.00267)	(0.00202)
DIV*REC*LagQ	0.00608	0.00878*	0.0105***	0.00874*	0.0120***	0.00856***
	(0.00470)	(0.00471)	(0.00336)	(0.00450)	(0.00452)	(0.00331)
Cashflow	0.144***	0.144***	-1.83e-05	0.170***	0.170***	0.0293***
	(0.00293)	(0.00293)	(0.00368)	(0.00309)	(0.00309)	(0.00330)
DIV*Cashflow	0.00371	0.00360	0.0892***	-0.0491***	-0.0495***	0.0535***
	(0.00466)	(0.00466)	(0.00430)	(0.00442)	(0.00442)	(0.00399)
REC*Cashflow	-0.0960***	-0.0953***	-0.00146	-0.0938***	-0.0931***	-0.0228***
	(0.00527)	(0.00528)	(0.00478)	(0.00548)	(0.00548)	(0.00441)
DIV*REC*Cashflow	0.0453***	0.0443***	-0.0220***	0.0353***	0.0348***	-0.0180***
	(0.00853)	(0.00852)	(0.00644)	(0.00773)	(0.00773)	(0.00611)
Year F.E.	No	Yes	Yes	No	Yes	Yes
Firm F.E.	No	No	Yes	No	No	Yes
Observations	44,034	44,034	44,034	44,034	44,034	44,034
R-squared	0.071	0.071	0.733	0.075	0.075	0.634

Table 12: **The Business Cycle and Cross-section of Firm-level Investment**

This table reports estimates from regressions in equation (7) explaining segment-level investment of stand-alone firms and conglomerates for fiscal years from 1980-2012. Panel A presents stand-alone firms and diversified firms. Panel B presents diversified firms divided by cash flow correlation. Panel C reports diversified firms divided by investment opportunity (Q) correlation. *REC* is an indicator variable equals to one if observations in recession periods, zero otherwise. $Cashflow$ is sales normalized firm-level cash flow in this year. *LagQ* is the market-to-book ratio of the firm in the previous fiscal year. Regressions include no fixed effects, year fixed effects and both firm and year fixed effects. Standard errors (in brackets) are heteroskedasticity consistent and clustered at the firm level. Asterisks indicate significance at the 10% (*), 5% (**), and 1% (***) levels.

Panel A: All firms						
	Stand-alone			Diversified		
	(1)	(2)	(3)	(4)	(5)	(6)
Cashflow	0.204***	0.205***	0.0145***	0.442***	0.207***	0.117***
	(0.00339)	(0.00339)	(0.00896)	(0.00958)	(0.0301)	(0.0370)
REC*Cashflow	-0.111***	-0.111***	-0.00403***	0.130***	0.124***	0.112***
	(0.00569)	(0.00571)	(0.0012)	(0.0183)	(0.0330)	(0.0355)
LagQ	0.00213***	0.00203***	0.0153***	0.0072***	0.0111***	0.0175***
	(0.000701)	(0.000715)	(0.00106)	(0.00170)	(0.00359)	(0.00436)
REC*LagQ	0.0111***	0.0116***	0.00221*	-0.00354	-0.0103***	-0.0114**
	(0.00142)	(0.00148)	(0.00127)	(0.00334)	(0.00373)	(0.00417)
REC	-0.00444*	-0.00659	0.000561	-0.00701*	0.000792	0.00501
	(0.00249)	(0.00436)	(0.00248)	(0.00423)	(0.00444)	(0.00490)
Year F.E.	No	Yes	Yes	No	Yes	Yes
Firm F.E.	No	No	Yes	No	No	Yes
Observations	47,803	47,803	47,803	11,042	11,042	11,042
R-squared	0.083	0.083	0.735	0.244	0.247	0.734

Panel B: Diversified firms (cash flow correlation)						
	Lowly-Diversified			Highly-Diversified		
	(1)	(2)	(3)	(4)	(5)	(6)
Cashflow	0.463***	0.470***	0.0900***	0.411***	0.407***	-0.0468**
	(0.0170)	(0.0170)	(0.0203)	(0.0220)	(0.0223)	(0.0220)
REC*Cashflow	-0.0776**	-0.0796**	0.0512**	0.0581	0.0597	0.100***
	(0.0337)	(0.0338)	(0.0237)	(0.0466)	(0.0466)	(0.0311)
LagQ	-0.0113***	-0.0128***	0.0158***	-0.0178***	-0.0182***	0.0202***
	(0.00273)	(0.00277)	(0.00258)	(0.00349)	(0.00352)	(0.00351)
REC*LagQ	-0.00325	-0.00196	-0.00885**	-0.0134	-0.00917	-0.0143**
	(0.00510)	(0.00518)	(0.00354)	(0.00864)	(0.00895)	(0.00586)
REC	0.0170**	0.0124	0.00795	0.00509	0.000723	0.00875
	(0.00750)	(0.0116)	(0.00512)	(0.0115)	(0.0158)	(0.00761)
Year F.E.	No	Yes	Yes	No	Yes	Yes
Firm F.E.	No	No	Yes	No	No	Yes
Observations	2,592	2,592	2,592	2,523	2,523	2,523
R-squared	0.273	0.284	0.838	0.161	0.174	0.840

Table 12 – *Continued*

Panel C: Diversified firms (Q correlation)						
	Lowly-Diversified			Highly-Diversified		
	(1)	(2)	(3)	(4)	(5)	(6)
Cashflow	0.464***	0.472***	0.0907***	0.410***	0.405***	-0.0403*
	(0.0170)	(0.0170)	(0.0204)	(0.0220)	(0.0222)	(0.0219)
REC*Cashflow	-0.0757**	-0.0783**	0.0486**	0.0563	0.0582	0.0975***
	(0.0337)	(0.0339)	(0.0237)	(0.0465)	(0.0464)	(0.0309)
LagQ	-0.0114***	-0.0128***	0.0156***	-0.0177***	-0.0182***	0.0200***
	(0.00273)	(0.00277)	(0.00259)	(0.00348)	(0.00351)	(0.00350)
REC*LagQ	-0.00311	-0.00196	-0.00843**	-0.0145*	-0.00996	-0.0143**
	(0.00509)	(0.00517)	(0.00355)	(0.00871)	(0.00902)	(0.00584)
REC	0.0166**	0.0122	0.00754	0.00662	0.00194	0.00908
	(0.00752)	(0.0116)	(0.00515)	(0.0115)	(0.0158)	(0.00754)
Year F.E.	No	Yes	Yes	No	Yes	Yes
Firm F.E.	No	No	Yes	No	No	Yes
Observations	2,586	2,586	2,586	2,529	2,529	2,529
R-squared	0.274	0.279	0.838	0.160	0.173	0.839

Table 13: **Firm-level Investment: Stand-alone vs. Diversified firms**

This table reports estimates from Diff-in-Diff regressions in equation (8) explaining firm-level investment for fiscal years 1980-2012. REC is an indicator variable equals to one if the observation is in recession periods, zero otherwise. DIV is an indicator variable equals to one if the observation is a diversified firm, zero otherwise. $Cashflow$ is sales normalized firm-level cash flow in this year. $LagQ$ is the market-to-book ratio of the firm in the previous fiscal year. Regressions include no fixed effects, year fixed effects only and both firm and year fixed effects. Standard errors (in brackets) are heteroskedasticity consistent and clustered at the firm level. Asterisks indicate significance at the 10% (*), 5% (**), and 1% (***) levels.

	All Firms		
	(1)	(2)	(3)
Cashflow	0.204***	0.204***	0.00488**
	(0.00318)	(0.00319)	(0.00202)
DIV*Cashflow	0.200***	0.201***	0.0251**
	(0.0141)	(0.0141)	(0.0118)
REC*Cashflow	-0.107***	-0.107***	-0.00616**
	(0.00534)	(0.00535)	(0.00306)
DIV*REC*Cashflow	0.223***	0.226***	0.106***
	(0.0261)	(0.0261)	(0.0175)
DIV	-0.0369***	-0.0377***	-0.0081***
	(0.00227)	(0.00227)	(0.00203)
REC	0.0117***	0.00986***	0.00388*
	(0.00127)	(0.00327)	(0.00213)
DIV*REC	-0.0191***	-0.0200***	-0.0098***
	(0.00411)	(0.00414)	(0.00276)
LagQ	0.00338***	0.00358***	0.0159***
	(0.000556)	(0.000572)	(0.000558)
Year F.E.	No	Yes	Yes
Firm F.E.	No	No	Yes
Observations	58,845	58,845	58,845
R-squared	0.097	0.097	0.718

Table 14: **Firm-level Investment: Lowly vs. Highly-diversified firms**

This table reports estimates from Diff-in-Diff regressions in equation (9) explaining firm-level investment for fiscal years 1980-2012. *REC* is an indicator variable equals to one if the observation is in recession periods, zero otherwise. $Cashflow$ is sales normalized firm-level cash flow in this year. *LagQ* is the market-to-book ratio of the firm in the previous fiscal year. *HIGH* indicates observations of highly-diversified firms. The degree of diversification is measured with cash flow correlation and investment opportunity(Q) correlation. Regressions include no fixed effects, year fixed effects only and both firm and year fixed effects. Standard errors (in brackets) are heteroskedasticity consistent and clustered at the firm level. Asterisks indicate significance at the 10% (*), 5% (**), and 1% (***) levels.

	Diversified (CF)			Diversified (Q)		
	(1)	(2)	(3)	(4)	(5)	(6)
Cashflow	0.473***	0.477***	0.0617***	0.474***	0.479***	0.0643***
	(0.0181)	(0.0181)	(0.0210)	(0.0181)	(0.0180)	(0.0210)
HIGH*Cashflow	-0.0652**	-0.0759***	-0.0540**	-0.0680***	-0.0786***	-0.0591**
	(0.0262)	(0.0262)	(0.0253)	(0.0262)	(0.0262)	(0.0254)
REC*Cashflow	-0.0851**	-0.0768**	0.0116	-0.0834**	-0.0754**	0.0112
	(0.0348)	(0.0348)	(0.0261)	(0.0348)	(0.0349)	(0.0262)
HIGH*REC*Cashflow	0.119**	0.120**	0.0655**	0.114**	0.117**	0.0661**
	(0.0532)	(0.0531)	(0.0304)	(0.0531)	(0.0530)	(0.0303)
HIGH	0.00696*	0.00824**	0.00562	0.00721*	0.00848**	0.00596
	(0.00419)	(0.00419)	(0.00421)	(0.00419)	(0.00419)	(0.00422)
REC	0.0133**	0.0107	0.00207	0.0131**	0.0106	0.00209
	(0.00558)	(0.00888)	(0.00637)	(0.00559)	(0.00888)	(0.00638)
HIGH*REC	-0.0221***	-0.0222***	-0.00695	-0.0217***	-0.0218***	-0.00694
	(0.00829)	(0.00826)	(0.00619)	(0.00828)	(0.00826)	(0.00619)
LagQ	-0.0157***	-0.0160***	0.0121***	-0.0157***	-0.0161***	0.0121***
	(0.00193)	(0.00195)	(0.00222)	(0.00193)	(0.00195)	(0.00222)
Year F.E.	No	Yes	Yes	No	Yes	Yes
Firm F.E.	No	No	Yes	No	No	Yes
Observations	5,115	5,115	5,115	5,115	5,115	5,115
R-squared	0.209	0.211	0.765	0.210	0.211	0.765

Table 15: **Firm-level Cash Saving and Business Cycles: Stand-alone vs. Diversified Firms**

This table reports estimates from regressions in equation (11) explaining firm-level cash saving of stand-alone firms and conglomerates for fiscal years from 1980-2012, to examine the marginal effect of recession. *REC* is an indicator variable equals to one if observations in recession periods, zero otherwise. $Cashflow$ is the sales normalized firm-level cash flow in the fiscal year. $LagQ$ is the firm market-to-book ratio in the previous fiscal year. *Size* is the logarithm of firm's asset. Regressions include both firm and year fixed effects. Standard errors (in brackets) are heteroskedasticity consistent and clustered at the firm level. Asterisks indicate significance at the 10% (*), 5% (**), and 1% (***) levels.

	Stand-alone			Diversified		
	(1)	(2)	(3)	(4)	(5)	(6)
Cashflow	0.165***	0.171	0.133***	-0.0887***	-0.0854***	-0.0494
	(0.0219)	(0.139)	(0.0420)	(0.0212)	(0.0299)	(0.0419)
REC*Cashflow	-0.0590	-0.0566	0.0694	0.0105	0.0301	0.000103
	(0.0455)	(0.160)	(0.0915)	(0.0449)	(0.0657)	(0.0708)
LagQ	0.00198	1.32e-05	0.0342***	0.0158***	0.0161***	0.0136**
	(0.00357)	(0.0319)	(0.00907)	(0.00318)	(0.00464)	(0.00679)
REC*LagQ	0.0336***	0.0322	-0.000243	0.0121*	0.00884	0.00706
	(0.00851)	(0.0332)	(0.0113)	(0.00689)	(0.0117)	(0.0113)
Size	0.0110***	0.0118***	0.0231***	0.00209	0.000826	0.00498
	(0.00362)	(0.00401)	(0.00796)	(0.00176)	(0.00174)	(0.0116)
REC*Size	-0.00288	-0.00286	-0.00501	0.00398	0.00462	0.00424
	(0.00780)	(0.00722)	(0.00687)	(0.00406)	(0.00429)	(0.00567)
REC	-0.0184	-0.0185	0.0337	-0.0466	-0.0592*	-0.0474
	(0.0602)	(0.0462)	(0.0463)	(0.0332)	(0.0346)	(0.0438)
Year F.E.	No	Yes	Yes	No	Yes	Yes
Firm F.E.	No	No	Yes	No	No	Yes
Observations	33,956	33,956	33,956	9,147	9,147	9,147
R-squared	0.005	0.007	0.554	0.008	0.015	0.281

Table 16: **Cross-correlation of Financial Constraints**

This table reports the pairwise correlation between each of the financial constraints. The six financial constraint proxies used are *Size*, *Dividend*, *Rating*, *WW index*, *KZ index* and *SA index*. *Size* is an indicator variable equal to one if the firm's asset is lower than the median, zero otherwise. *Dividend* is an indicator variable equal to one if the firm did not pay a dividend in the fiscal year, zero otherwise. *Rating* is an indicator variable equal to one if the firm did not have a credit rating from S&P, Moodys, Fitch, or Duff & Phelps in the fiscal year, zero otherwise. *WW index* is an indicator variable equal to one if the firms WW Index (Whited and Wu (2006)) is higher than the median. *KZ index* is an indicator variable equal to one if the firm's KZ Index (Kaplan and Zingales (1997)) is higher than the median. *SA index* is an indicator variable equal to one if the firm's SA Index (Hadlock and Pierce (2010)) is higher than the median.

Financial Constraint	Size	Dividend	Rating	WW index	KZ index	SA index
Size	1					
Dividend	0.1979	1				
Rating	0.3337	0.1992	1			
WW index	0.4598	0.4358	0.2692	1		
KZ index	0.1948	0.2523	0.1059	0.1343	1	
SA index	0.3742	0.2948	0.2366	0.4123	0.0375	1

Table 17: **Financial Constraints: Stand-alone vs. Diversified Firms**

This table reports the percentage of financial constrained stand-alone firms and conglomerates respectively, during recessions and expansions. The six financial constraint proxies used are *Size*, *Dividend*, *Rating*, *WW index*, *KZ index* and *SA index*. *Size* is an indicator variable equal to one if the firm's asset is lower than the median, zero otherwise. *Dividend* is an indicator variable equal to one if the firm did not pay a dividend in the fiscal year, zero otherwise. *Rating* is an indicator variable equal to one if the firm did not have a credit rating from S&P, Moodys, Fitch, or Duff & Phelps in the fiscal year, zero otherwise. *WW index* is an indicator variable equal to one if the firms WW Index (Whited and Wu (2006)) is higher than the median. *KZ index* is an indicator variable equal to one if the firm's KZ Index (Kaplan and Zingales (1997)) is higher than the median. *SA index* is an indicator variable equal to one if the firm's SA Index (Hadlock and Pierce (2010)) is higher than the median.

	All		Expansion		Recession	
	Stand-alone	Diversified	Stand-alone	Diversified	Stand-alone	Diversified
Size	57.13%	28.31%	57.60%	29.42%	55.10%	23.58%
Dividend	43.19%	17.57%	44.03%	17.96%	39.54%	15.93%
Rating	92.17%	71.00%	92.17%	70.26%	92.18%	74.13%
WW index	48.75%	19.84%	49.15%	20.16%	47.00%	18.51%
KZ index	43.04%	37.53%	43.37%	37.45%	41.62%	37.88%
SA index	41.67%	6.97%	41.35%	6.90%	43.04%	7.27%
Observation	41,839	10,996	34,002	8,905	7,837	2,091

Table 18: **Financial Constraints and Cash Saving: Stand-alone vs. Diversified Firms**

This table reports estimates from regressions in equation (11) explaining firm-level cash saving of stand-alone firms and conglomerates respectively for fiscal years from 1980-2012, when they are either financially constrained or unconstrained. The six financial constraint proxies used are *Size*, *Dividend*, *Rating*, *WW index*, *KZ index* and *SA index*. *Size* is an indicator variable equal to one if the firm's asset is lower than the median, zero otherwise. *Dividend* is an indicator variable equal to one if the firm did not pay a dividend in the fiscal year, zero otherwise. *Rating* is an indicator variable equal to one if the firm did not have a credit rating from S&P, Moodys, Fitch, or Duff & Phelps in the fiscal year, zero otherwise. *WW index* is an indicator variable equal to one if the firms WW Index (Whited and Wu (2006)) is higher than the median. *KZ index* is an indicator variable equal to one if the firm's KZ Index (Kaplan and Zingales (1997)) is higher than the median. *SA index* is an indicator variable equal to one if the firm's SA Index (Hadlock and Pierce (2010)) is higher than the median. Observations are categorized as *Constrianed* if the corresponding financial constraint indicator equals to one, otherwise as *Unonstrianed*. *REC* is an indicator variable equals to one if observations in recession periods, zero otherwise. *Cashflow* is the sales normalized firm-level cash flow in the fiscal year. Regressions include both firm and year fixed effects. Standard errors (in brackets) are heteroskedasticity consistent and clustered at the firm level. Asterisks indicate significance at the 10% (*), 5% (**), and 1% (***) levels.

Financial Constraints		Stand-alone		Diversified	
		Constrianed	Unconstrained	Constrianed	Unconstrained
Size	Cashflow	0.207***	-0.0498	0.0736	-0.0636
		(0.036)	(0.108)	(0.075)	(0.057)
	REC*Cashflow	0.0481	0.291***	0.0361	-0.0422
		(0.082)	(0.106)	(0.115)	(0.096)
Dividend	Cashflow	0.211**	0.0178	0.228	-0.071
		(0.085)	(0.062)	(0.148)	(0.050)
	REC*Cashflow	0.0163	0.319**	-0.342	0.0457
		(0.179)	(0.154)	(0.310)	(0.057)
Rating	Cashflow	0.135***	-0.229*	-0.0819	-0.0103
		(0.046)	(0.126)	(0.059)	(0.081)
	REC*Cashflow	0.143	0.850*	0.0468	-0.287
		(0.101)	(0.511)	(0.089)	(0.215)
WW index	Cashflow	0.232***	-0.167***	-0.0185	-0.0663
		(0.064)	(0.057)	(0.092)	(0.053)
	REC*Cashflow	0.04	0.349***	-0.0923	0.0593
		(0.125)	(0.104)	(0.180)	(0.072)
KZ index	Cashflow	0.141*	0.0581	0.142***	-0.161**
		(0.084)	(0.061)	(0.054)	(0.074)
	REC*Cashflow	0.201	0.294***	-0.285*	0.154*
		(0.182)	(0.112)	(0.162)	(0.092)
SA index	Cashflow	0.210***	-0.00999	-0.198	-0.0299
		(0.0469)	(0.0820)	(0.415)	(0.0414)
	REC*Cashflow	0.151	0.332*	0.440	-0.0191
		(0.117)	(0.185)	(0.430)	(0.0710)

Table 19: **The Business Cycle and Cross-section of Free Cash Flow**

This table presents the reduced form model of aggregate free cash flow at firm level for the fiscal year 1980-2012. REC is an indicator variable equals to one if observations in recession periods, zero otherwise. DIV is an indicator variable equals to one for observations of diversified firms. Regressions include both firm and year fixed effects. Standard errors (in brackets) are heteroskedasticity consistent and clustered at the firm level. Asterisks indicate significance at the 10% (*), 5% (**), and 1% (***) levels.

	(1)	(2)	(3)
DIV	174.5***	188.1***	49.48**
	(5.865)	(25.57)	(21.76)
REC	11.30**	15.57**	15.37*
	(4.943)	(7.925)	(8.550)
DIV*REC	-77.68***	-58.72**	-33.18**
	(11.02)	(23.48)	(15.83)
Year F.E.	No	Yes	Yes
Firm F.E.	No	No	Yes
Observations	62,782	62,782	62,782
R-squared	0.016	0.029	0.614

Table 20: Free Cash Flow and Investment Deviation over Business Cycle

This table reports estimates from regressions explaining the effect of free cash flow on investment deviation (overinvesment/underinvestment) at firm level for fiscal years 1980-2012. The dependent variable is residuals of the predicted investment model (Richardson (2006)). Panel A presents results of diversified and stand-alone firms separately, including the marginal effect of recession. Panel B presents results with Diff-in-Diff approach, including the marginal effect of recession and diversification. *FCF* is cash flow beyond that necessary to maintain assets in place and finance expected investments. *REC* is an indicator variable equals to one if observations in recession periods, zero otherwise. *LagQ* is the median Q of all the stand-alone firms within the same 4-digit SIC industry as the firm's primary operation SIC in the previous fiscal year. *Age* is the log of the number of years the firm has been listed on CRSP as of the start of the year. *Size* is the log of total assets. *Leverage* is the sum of the book value of short term and long term debt deflated by the sum of the book value of total debt and the book value of equity. *Cash* is the balance of cash and short term investments deflated by total assets. Regressions include both firm and year fixed effects. Standard errors (in brackets) are heteroskedasticity consistent and clustered at the firm level. Asterisks indicate significance at the 10% (*), 5% (**), and 1% (***) levels.

Panel A

	Diversified			Stand-alone		
	(1)	(2)	(3)	(4)	(5)	(6)
FCF	0.0810***	0.0751***	0.139***	0.00334***	0.00331***	0.0779**
	(0.0106)	(0.0107)	(0.0373)	(0.000593)	(0.000590)	(0.0382)
REC*FCF	0.0902***	0.0834***	0.116	0.143***	0.142***	0.0245
	(0.0239)	(0.0242)	(0.0968)	(0.00878)	(0.00877)	(0.0316)
REC	-0.00812***	-0.00223	-0.00678	0.00216	-0.00510	0.00440
	(0.00249)	(0.00626)	(0.0122)	(0.00139)	(0.00384)	(0.00478)
LagQ	-0.0334***	-0.0343***	-0.0219***	-0.0226***	-0.0224***	-0.0145***
	(0.00171)	(0.00173)	(0.00442)	(0.000769)	(0.000779)	(0.00230)
Leverage	-0.0185***	-0.0204***	-0.0727***	-0.00872***	-0.00796***	-0.0388***
	(0.00480)	(0.00478)	(0.0239)	(0.00303)	(0.00302)	(0.00998)
Cash	0.101***	0.0961***	0.113***	-0.0512***	-0.0589***	0.136***
	(0.00882)	(0.00877)	(0.0214)	(0.00342)	(0.00347)	(0.0119)
Age	0.00167**	0.00196**	0.00482**	0.0130***	0.0125***	0.00805***
	(0.000784)	(0.000785)	(0.00213)	(0.000593)	(0.000601)	(0.00184)
Size	-0.00515***	-0.00473***	-0.0388***	-0.0153***	-0.0159***	-0.0335***
	(0.00108)	(0.00109)	(0.00613)	(0.000754)	(0.000785)	(0.00380)
Year F.E.	No	Yes	Yes	No	Yes	Yes
Firm F.E.	No	No	Yes	No	No	Yes
Observations	12,127	12,127	12,127	44,509	44,509	44,509
R-squared	0.052	0.051	0.442	0.094	0.092	0.565

Table 20--*Continued*

Panel B

	(1)	(2)	(3)	(4)	(5)	(6)
FCF	0.000974***	0.000981***	0.00103	0.00337***	0.00332***	0.0798**
	(0.000325)	(0.000323)	(0.000691)	(0.000563)	(0.000560)	(0.0377)
REC*FCF	0.139***	0.135***	0.0703***	0.150***	0.146***	0.0281
	(0.00853)	(0.00850)	(0.0158)	(0.00827)	(0.00826)	(0.0314)
DIV*FCF	0.0927***	0.0930***	0.100**	0.0686***	0.0683***	0.0583
	(0.0107)	(0.0107)	(0.0412)	(0.0108)	(0.0107)	(0.0440)
DIV*REC*FCF	-0.111***	-0.109***	-0.0457	-0.116***	-0.109***	0.0154
	(0.0262)	(0.0261)	(0.0575)	(0.0252)	(0.0251)	(0.0584)
REC	0.00237*	0.000575	0.00188	0.000434	-0.00326	0.00345
	(0.00126)	(0.00344)	(0.00423)	(0.00122)	(0.00332)	(0.00447)
LagQ				-0.0242***	-0.0243***	-0.0151***
				(0.000688)	(0.000694)	(0.00212)
Leverage				-0.0122***	-0.0119***	-0.0445***
				(0.00261)	(0.00260)	(0.00889)
Cash				-0.0425***	-0.0495***	0.129***
				(0.00309)	(0.00313)	(0.0105)
Age				0.0104***	0.0103***	0.00761***
				(0.000488)	(0.000494)	(0.00136)
Size				-0.0140***	-0.0141***	-0.0359***
				(0.000630)	(0.000649)	(0.00308)
Year F.E.	No	Yes	Yes	No	Yes	Yes
Firm F.E.	No	No	Yes	No	No	Yes
Observations	57,608	57,608	57,608	56,636	56,636	56,636
R-squared	0.007	0.006	0.505	0.085	0.083	0.534

Table 21: **Segment-level Investment and Corporate Governance – I**

This table reports estimates from regressions in equation (4) explaining segment-level investment for fiscal years 1980-2012. Panel A presents results for the sample separate by GIM index, firms with GIM index lower than 5 are categorized as "Democracy", namely in the group of "Strong Governance". Firms with GIM index higher than 14 are categorized as "Dictatorship", namely in the group of "Weak Governance". Panel B presents results for the sample separate by E-index, firms with E-index higher than median are categorized as "Weak Governance", otherwise as "Strong Governance". Panel C presents results for the sample ranked by institutional ownership, firms ranked in the top quarter are categorized as "Strong Governance", and in the bottom quarter are categorized as "Weak Governance". REC is an indicator variable equals to one if observations in recession periods, zero otherwise. DIV is an indicator variable equals to one for observations of diversified firms. $Cashflow$ is the sales normalized segment-level cash flow in the fiscal year. $LagQ$ is the median Q of all the stand-alone firms within the same 4-digit SIC industry as the segment's primary SIC in the previous fiscal year. Regressions include both firm and year fixed effects. Standard errors (in brackets) are heteroskedasticity consistent and clustered at the firm level. Asterisks indicate significance at the 10% (*), 5% (**), and 1% (***) levels.

Panel A: GIM Index

	Strong Governance			Weak Governance		
	(1)	(2)	(3)	(4)	(5)	(6)
LagQ	0.00577*	0.0104***	0.0109***	0.00221	0.00597	0.00602
	(0.00327)	(0.00351)	(0.00394)	(0.00415)	(0.00394)	(0.00402)
REC*LagQ	0.00739	0.00624	0.00476	-0.0441***	0.00131	0.00440
	(0.00868)	(0.0113)	(0.0113)	(0.0120)	(0.0154)	(0.0150)
DIV*REC*LagQ	-0.0167	-0.0148	-0.0150	0.0530***	0.00445	0.00258
	(0.0103)	(0.0117)	(0.0115)	(0.00920)	(0.0115)	(0.0117)
Cashflow	0.0703***	0.00407	0.00437	0.167***	0.0434**	0.0439**
	(0.00760)	(0.0101)	(0.0106)	(0.0115)	(0.0172)	(0.0172)
REC*Cashflow	0.190***	0.0667	0.0688	0.438***	0.0863	0.0831
	(0.0365)	(0.0846)	(0.0830)	(0.0545)	(0.0776)	(0.0779)
DIV*REC*Cashflow	0.00163	0.114	0.123	-0.591***	-0.148*	-0.144*
	(0.0770)	(0.134)	(0.134)	(0.0563)	(0.0809)	(0.0812)
Year F.E.	No	Yes	Yes	No	Yes	Yes
Firm F.E.	No	No	Yes	No	No	Yes
Observations	2,637	2,637	2,637	1,841	1,841	1,841
R-squared	0.062	0.708	0.715	0.167	0.725	0.730

Table 21--*Continued*

Panel B: E-index

	Strong Governance			Weak Governance		
	(1)	(2)	(3)	(4)	(5)	(6)
LagQ	0.00458**	0.00940***	0.00897***	-0.00676	0.00677	0.00648
	(0.00225)	(0.00253)	(0.00266)	(0.00531)	(0.00432)	(0.00424)
REC*LagQ	-0.00377	0.000559	-0.000400	0.00278	0.00738	0.00522
	(0.00536)	(0.00557)	(0.00568)	(0.00760)	(0.00585)	(0.00590)
DIV*REC*LagQ	0.00143	-0.000717	-0.000148	-0.00739*	-0.00493	-0.00464
	(0.00453)	(0.00644)	(0.00636)	(0.00414)	(0.00545)	(0.00561)
Cashflow	0.0664***	0.0255	0.0249	0.172***	0.0247	0.0259
	(0.00448)	(0.0168)	(0.0169)	(0.0127)	(0.0328)	(0.0331)
REC*Cashflow	0.101***	-0.00142	0.00307	-0.0718***	-0.0312	-0.0304
	(0.0180)	(0.0321)	(0.0316)	(0.0176)	(0.0373)	(0.0378)
DIV*REC*Cashflow	-0.0683***	0.000825	-0.00420	-0.0286	0.0362	0.0345
	(0.0255)	(0.0593)	(0.0574)	(0.0201)	(0.0293)	(0.0300)
Year F.E.	No	Yes	Yes	No	Yes	Yes
Firm F.E.	No	No	Yes	No	No	Yes
Observations	7,443	7,443	7,443	3,264	3,264	3,264
R-squared	0.045	0.687	0.690	0.079	0.785	0.789

Panel C: Institutional Ownership

	Strong Governance			Weak Governance		
	(1)	(2)	(3)	(4)	(5)	(6)
LagQ	-0.00682***	0.00845***	0.00763***	0.00354	0.0127***	0.0127***
	(0.00246)	(0.00261)	(0.00268)	(0.00233)	(0.00348)	(0.00379)
REC*LagQ	0.00772*	0.00479	0.00201	0.00255	-0.00334	-0.00273
	(0.00449)	(0.00402)	(0.00420)	(0.00529)	(0.00441)	(0.00465)
DIV*REC*LagQ	-0.00573*	-0.00226	-0.00120	0.0219***	0.0101**	0.0101**
	(0.00335)	(0.00426)	(0.00424)	(0.00416)	(0.00469)	(0.00461)
Cashflow	0.0867***	0.0173	0.0170	0.176***	0.0824***	0.0821***
	(0.00466)	(0.0107)	(0.0108)	(0.00553)	(0.0225)	(0.0224)
REC*Cashflow	-0.00771	-0.0196	-0.0176	0.00103	-0.0532*	-0.0527*
	(0.0100)	(0.0192)	(0.0193)	(0.0152)	(0.0308)	(0.0305)
DIV*REC*Cashflow	0.000470	0.0378	0.0359	-0.145***	-0.0131	-0.0137
	(0.0162)	(0.0281)	(0.0285)	(0.0160)	(0.0393)	(0.0389)
Year F.E.	No	Yes	Yes	No	Yes	Yes
Firm F.E.	No	No	Yes	No	No	Yes
Observations	9,195	9,195	9,195	10,760	10,760	10,760
R-squared	0.048	0.744	0.749	0.102	0.726	0.727

Table 22: **Segment-level Investment and Corporate Governance – II**

This table reports estimates from Diff-in-Diff regressions explaining segment-level investment for fiscal years 1980-2012, for diversified and stand-alone firms respectively. Panel A presents results for the sample separate by GIM index, firms with GIM index lower than 5 are categorized as "Democracy", namely in the group of "Strong Governance". Firms with GIM index higher than 14 are categorized as "Dictatorship", namely in the group of "Weak Governance". Panel B presents results for the sample separate by E-index, firms with E-index higher than median are categorized as "Weak Governance", otherwise as "Strong Governance". Panel C presents results for the sample ranked by institutional ownership, firms ranked in the top quarter are categorized as "Strong Governance", and in the bottom quarter are categorized as "Weak Governance". *GOV* is an indicator variable equal to one if firms are categorized in the group of "Strong Governance", zero if in the group of "Weak Governance". *REC* is an indicator variable equals to one if observations in recession periods, zero otherwise. $Cashflow$ is the sales normalized segment-level cash flow in the fiscal year. $LagQ$ is the median Q of all the stand-alone firms within the same 4-digit SIC industry as the segment's primary SIC in the previous fiscal year. Regressions include both firm and year fixed effects. Standard errors (in brackets) are heteroskedasticity consistent and clustered at the firm level. Asterisks indicate significance at the 10% (*), 5% (**), and 1% (***) levels.

Panel A: GIM Index

	Diversified			Stand-alone		
	(1)	(2)	(3)	(4)	(5)	(6)
LagQ	0.00299	0.00319	0.00275	-0.0198***	0.00727	0.00785
	(0.00349)	(0.00504)	(0.00503)	(0.00530)	(0.00486)	(0.00573)
GOV*LagQ	0.00712***	0.00734	0.00712	0.0225***	0.00565	0.00452
	(0.00239)	(0.00685)	(0.00667)	(0.00404)	(0.00664)	(0.00710)
REC*LagQ	0.00883	0.00683	0.00609	-0.00951	0.00979	0.0100
	(0.00804)	(0.00613)	(0.00637)	(0.0150)	(0.0144)	(0.0144)
GOV*REC*LagQ	-0.0343***	-0.0239***	-0.0232***	0.0209*	-0.00344	-0.00308
	(0.00768)	(0.00831)	(0.00831)	(0.0123)	(0.0134)	(0.0135)
Cashflow	0.0673***	0.0388**	0.0386**	0.340***	0.0129	0.00504
	(0.0121)	(0.0186)	(0.0184)	(0.0252)	(0.0340)	(0.0351)
GOV*Cashflow	-0.0282**	-0.0317	-0.0326	-0.223***	-0.0478	-0.0383
	(0.0138)	(0.0203)	(0.0204)	(0.0281)	(0.0547)	(0.0552)
REC*Cashflow	-0.0525***	-0.0590***	-0.0590***	0.264***	0.0741	0.0716
	(0.0194)	(0.0179)	(0.0178)	(0.0731)	(0.0772)	(0.0783)
GOV*REC*Cashflow	0.279***	0.215***	0.223***	-0.121	0.0103	0.0126
	(0.0518)	(0.0809)	(0.0803)	(0.0834)	(0.121)	(0.121)
Year F.E.	No	Yes	Yes	No	Yes	Yes
Firm F.E.	No	No	Yes	No	No	Yes
Observations	2,020	2,020	2,020	2,458	2,458	2,458
R-squared	0.054	0.423	0.430	0.144	0.823	0.828

Table 22--*Continued*

Panel B: E-index

	Diversified			Stand-alone		
	(1)	(2)	(3)	(4)	(5)	(6)
LagQ	0.000892	0.00388	0.00544	-0.0197***	0.00746**	0.00895**
	(0.00368)	(0.00475)	(0.00501)	(0.00409)	(0.00369)	(0.00384)
GOV*LagQ	0.00297	0.00325	0.000497	0.0216***	0.00680**	0.00392
	(0.00260)	(0.00426)	(0.00468)	(0.00321)	(0.00322)	(0.00309)
REC*LagQ	0.00153	-0.00235	-0.00123	0.0141**	0.00730	0.00507
	(0.00648)	(0.00696)	(0.00765)	(0.00673)	(0.00509)	(0.00509)
GOV*REC*LagQ	-0.000190	0.00116	-0.000584	-0.0254***	-0.00270	-0.00480
	(0.00485)	(0.00692)	(0.00778)	(0.00507)	(0.00446)	(0.00448)
Cashflow	0.0603***	0.0240	0.0249	0.371***	0.0230	0.0281
	(0.0126)	(0.0348)	(0.0353)	(0.0212)	(0.0336)	(0.0322)
GOV*Cashflow	-0.0110	0.00673	0.00521	-0.273***	-0.0529	-0.0575*
	(0.0135)	(0.0390)	(0.0394)	(0.0227)	(0.0356)	(0.0347)
REC*Cashflow	0.0148	0.0116	0.0113	-0.271***	-0.0247	-0.0288
	(0.0180)	(0.0349)	(0.0352)	(0.0245)	(0.0354)	(0.0346)
GOV*REC*Cashflow	0.0352	-0.0237	-0.0233	0.335***	0.0526	0.0567
	(0.0250)	(0.0581)	(0.0577)	(0.0324)	(0.0462)	(0.0449)
Year F.E.	No	Yes	Yes	No	Yes	Yes
Firm F.E.	No	No	Yes	No	No	Yes
Observations	4,871	4,871	4,871	5,836	5,836	5,836
R-squared	0.039	0.474	0.477	0.090	0.838	0.842

Panel C: Institutional Ownership

	Diversified			Stand-alone		
	(1)	(2)	(3)	(4)	(5)	(6)
LagQ	-0.00678*	0.00435	0.00208	-0.00201	0.0168***	0.0134***
	(0.00359)	(0.00537)	(0.00572)	(0.00223)	(0.00286)	(0.00296)
GOV*LagQ	0.0245***	0.0140**	0.0149**	0.000714	-0.00220	-0.00610*
	(0.00724)	(0.00690)	(0.00723)	(0.00470)	(0.00345)	(0.00367)
REC*LagQ	0.00226	-0.00171	0.000747	0.00418***	-0.000121	0.00609**
	(0.00233)	(0.00532)	(0.00585)	(0.00147)	(0.00242)	(0.00263)
GOV*REC*LagQ	-0.0198***	-0.0121*	-0.0101	0.00444	0.00393	0.00514*
	(0.00500)	(0.00636)	(0.00687)	(0.00309)	(0.00240)	(0.00265)
Cashflow	0.152***	0.112***	0.111***	0.185***	-0.000860	-0.00598
	(0.00861)	(0.0345)	(0.0345)	(0.00719)	(0.0247)	(0.0252)
GOV*Cashflow	-0.115***	-0.0863**	-0.0863**	-0.0482***	-0.00773	-0.000924
	(0.0107)	(0.0378)	(0.0378)	(0.00952)	(0.0317)	(0.0322)
REC*Cashflow	-0.120***	-0.0956**	-0.0955**	-0.0111	-0.00520	-0.00254
	(0.0112)	(0.0424)	(0.0424)	(0.0162)	(0.0285)	(0.0287)
GOV*REC*Cashflow	0.164***	0.109**	0.110**	-0.0447**	-0.00404	-0.00583
	(0.0182)	(0.0482)	(0.0482)	(0.0194)	(0.0355)	(0.0355)
Year F.E.	No	Yes	Yes	No	Yes	Yes
Firm F.E.	No	No	Yes	No	No	Yes
Observations	5,601	5,601	5,601	14,354	14,354	14,354
R-squared	0.072	0.448	0.451	0.087	0.834	0.837