# Corporate diversification, investment efficiency and the business cycle

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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 stronger governance do not improve investment efficiency during recession, which suggests that agency costs cannot fully explain the changes in investment of conglomerates.

# 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 market–particularly 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 downturns. 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 selection 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. For instance, most of current studies focus on providing evidence on better performance of conglomerates, such as better sales growth, inventory growth (Dimitrov and Tice (2006)), better efficiency as proxied by excess value (Kuppuswamy and Villalonga (2010)), or relative value ()Volkov and Smith (2015)). These papers either did not investigate the investment allocation within the conglomerates, or did not compare with comparable stand-alone firms in distinguishing investment opportunities. For example, Hovakimian (2011), which is close to my study, finds that conglomerates improve the efficiency of internal capital markets by increasing the allocation of funds to high q divisions relative to low q divisions by comparing the capital transfer with industry-wide capital, in high-Q divisions and low-Q divisions separately, not accurate enough. Moreover, my study focuses on the cross-sectional difference between stand-alone firms and conglomerates, as well as the fact that this difference changes over time, aiming to explain the reason of this change. The main argument is that the diversification itself creates the potential for flexibility and hence the ability to shift resource between segments of conglomerates, which provides advantage over stand-alone firms. By using stand-alone firms in the same industry as proxy, my study shows the investment opportunities (computed from external information) are essential for conglomerates' investment decisions. And the result is unlikely driven by endogeneity due to using market-to-book of conglomerates themselves (Hovakimian (2011)).

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 firms, either because of the use of internal capital or their easier access to external financing than stand-alone firms. It 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 argue 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 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

[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.

stand-alone firms. I find that the investment–cash 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 investment–cash 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 diversification, which is the imperfect correlation between divisions within a conglomerate. The potential benefit I argue lies in the flexibility to reallocate capital for investment, stemming directly from the structural difference between conglomerates and stand-alone firms. Having established that in the first set of tests, I then use the difference in degree of diversification among conglomerates to further validate this channel, i.e. if highly-diversified firms show higher sensitivity of investment to investment opportunities during recessions, the reasons are arguably that they have higher flexibility to do so.

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. The evidence of improved sensitivity supports the "more money" effect. 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.

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,

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 paper 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 discusses the main hypothesis. Section 3 explains the data and methodology of the study, while Section 4 discusses the results. Finally, Section 5 concludes this paper.

# 2 Hypothesis Development

## 2.1 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); Kuppuswamy 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 4.1.

**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.*

## 2.2 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) document 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, Chen, and Wang (2011) 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 capital markets and the diversification effect, 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 4.2.

**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 Data and Variables

## 3.1 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 codes: the 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 industries, specifically, 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, Ozbas, and Sensoy (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.

### 3.1.1 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 et al. (2011), 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[2]; (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.

### 3.1.2 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

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

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 industries, even 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 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 4.1.2.

### 3.1.3 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, Ogneva, and Ozbas (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.

### 3.1.4 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, Campello, and Weisbach (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.

### 3.1.5 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), de-

fines 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.

### 3.1.6 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 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)). 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 or reduced agency costs. 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) construct 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.

## 3.2 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 more assets in terms of scale, they 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 evidence that both 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. 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 use 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]**

# 4 Empirical Results

## 4.1 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 industry. This is also 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 time. Specifically, how the business cycle affects investment sensitivity to Q and cash flow. Consider a cross-sectional regression of segment investment scaled by sales 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.[3] 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

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

following equation:

$$\begin{aligned} Capex_{i,j}(t) =& \beta_0 + \beta_1 * Q_j(t-1) + \beta_2 * REC * Q_j(t-1) + \\ & \beta_3 * CF_i(t) + \beta_4 * REC * CF_i(t) + \beta_5 * REC \end{aligned} \tag{3}$$

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. $\beta_2$ 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 $\beta_2$ 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 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[4].

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 literature that conglomerates generally invest less efficiently than do stand-alone firms (see, for example, Scharfstein (1998) and Ozbas and Scharfstein (2010)).[5]

Moreover, for diversified firms, the coefficient of the interaction term between the LagQ and recession dummy variable $REC$ is positive and statistically signif-

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

[5]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.

icant 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.[6] 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 during recessions (see, for example, Fazzari et al. (1988), Kaplan and Zingales (1997))[7].

### 4.1.1 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

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

[7] 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.

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 conglomerates 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:

$$\begin{aligned} &Capex_{i,j}(t) = \beta_0 + \beta_1 * CF_i(t) + \beta_2 * REC * CF_i(t) + \\ &\beta_3 * DIV * CF_i(t) + \beta_4 * REC * DIV * CF_i(t) + \\ &\beta_5 * Q_j(t-1) + \beta_6 * REC * Q_j(t-1) + \beta_7 * DIV * Q_j(t-1) + \\ &\beta_8 * REC * DIV * Q_j(t-1) + \beta_9 * REC + \beta_{10} * DIV + \\ &\beta_{11} * DIV * REC \end{aligned} \tag{4}$$

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), $\beta_8$ tests whether investment sensitivity to Q is greater during economic recessions for diversified firms. If di-

versified 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 literature that 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:

$$\begin{aligned} Capex_{i,j}(t) =& \beta_0 + \beta_1 * CF_i(t) + \beta_2 * REC * CF_i(t) + \\ & \beta_3 * HIGH * CF_i(t) + \beta_4 * REC * HIGH * CF_i(t) + \\ & \beta_5 * Q_j(t-1) + \beta_6 * REC * Q_j(t-1) + \beta_7 * HIGH * Q_j(t-1) + \\ & \beta_8 * REC * HIGH * Q_j(t-1) + \beta_9 * REC + \beta_{10} * HIGH + \\ & \beta_{11} * HIGH * REC \end{aligned} \tag{5}$$

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]**

### 4.1.2 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 inter-

est, $DIV * REC * LagQ$, 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.

## 4.2 Firm-level Investment

The evidence presented in Section 4.1 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 cycle, specifically, whether to spend it or stockpile it at the aggregate level. I investigate the relationship between firm-level investment and firm-level cash flows in this section.[8] 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:

[8]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.

$$Capex_i(t) = \beta_0 + \beta_1 * CF_i(t) + \beta_2 * REC * CF_i(t) + \beta_3 * Q_i(t-1) + \beta_4 * REC * Q_i(t-1) + \beta_5 * REC \quad (7)$$

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 3.1.3.

**[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 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.[9] This suggests that diversified firms exhibit higher investment–cash 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,

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

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 investment–cash 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 investment–cash 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 investment–cash 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 investment–cash flow sensitivity of stand-alone firms is significantly lower during recessions, suggesting they are exposed 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. (2011) and McLean and Zhao (2014), who demonstrate 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 investment–cash flow sensitivity, which suggests that highly di-

versified 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 investment–cash 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 investment–cash flow sensitivity, from 9% to 14.12% (9% + 5.12%) in Column (3), and highly diversified firms report increased investment–cash 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:

$$\begin{aligned} Capex_{i,j}(t) =& \beta_0 + \beta_1 * CF_i(t) + \beta_2 * REC * CF_i(t) + \\ & \beta_3 * DIV * CF_i(t) + \beta_4 * REC * DIV * CF_i(t) + \\ & \beta_5 * Q_j(t-1) + \beta_6 * REC * Q_j(t-1) + \beta_7 * DIV * Q_j(t-1) + \\ & \beta_8 * REC * DIV * Q_j(t-1) + \beta_9 * REC + \beta_{10} * DIV + \\ & + \beta_{11} * DIV * REC \end{aligned} \tag{8}$$

In firm-level investment regressions, the variable of interest is the change of coefficients on cash flow, the way in which investment decisions are made dependent on internally generated cash flows across different firms in different periods. $\beta_4$ 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.[10]

**[Insert Table 13 here]**

Table 13 shows that the variable of interest, *DIV*REC*Cashflow*, has signifi-

[10]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.

cantly 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 investment–cash flow sensitivity is more pronounced for highly diversified firms:

$$\begin{aligned} Capex_{i,j}(t) =& \beta_0 + \beta_1 * CF_i(t) + \beta_2 * REC * CF_i(t) + \\ & \beta_3 * HIGH * CF_i(t) + \beta_4 * REC * HIGH * CF_i(t) + \\ & \beta_5 * Q_j(t-1) + \beta_6 * REC * Q_j(t-1) + \beta_7 * HIGH * Q_j(t-1) + \\ & \beta_8 * REC * HIGH * Q_j(t-1) + \beta_9 * REC + \beta_{10} * HIGH + \\ & \beta_{11} * HIGH * REC \end{aligned} \tag{9}$$

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 $High * Cashflow$ 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]**

## 4.3 Free Cash Flow

If the investment sensitivity to Q decreases significantly during recessions for stand-alone firms, as shown by the evidence in Section 4.1, 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. 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 sufficient 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 investment.

Table 15 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:

$$\begin{aligned}\Delta Capex_i(t) =& \beta_0 + \beta_1 * FCF_i(t) + \beta_2 * REC * FCF_i(t) + \\ & \beta_3 * Q_i(t-1) + \beta_4 * Leverage * CF_i(t) + \\ & \beta_5 * Cash_i(t) + \beta_6 * Size_i(t) + \beta_7 * Age_i(t) \end{aligned} \tag{10}$$

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 sales. $REC$ 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 16 here]**

Table 16 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 16 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.[11] 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 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

[11] 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.

findings in Panel A of Table 16 that 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 investment, such as either 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.

## 4.4 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 or reduced agency costs. On the one hand, if 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 than stand-alone firms. On the other hands, for firms with weaker governance, the low investment efficiency is expected to improve due to weakening agency costs. 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 3.1.6.

Table 17 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 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 or reduced agency costs. The overall results show that managers of conglomerates with stronger governance do not change the standard of project selection during downturns, indicating the improvement in investment efficiency cannot be fully explained by improved corporate governance. Moreover, for conglomerates with weaker governance, the investment sensitivity ot Q increase significantly, which implies weakening agency costs during recessions.

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 18. 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. (2011) 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.

# 5 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 constrained. It shows 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 controlling for firm-level constraints, this effect is still pronounced, both 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.

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

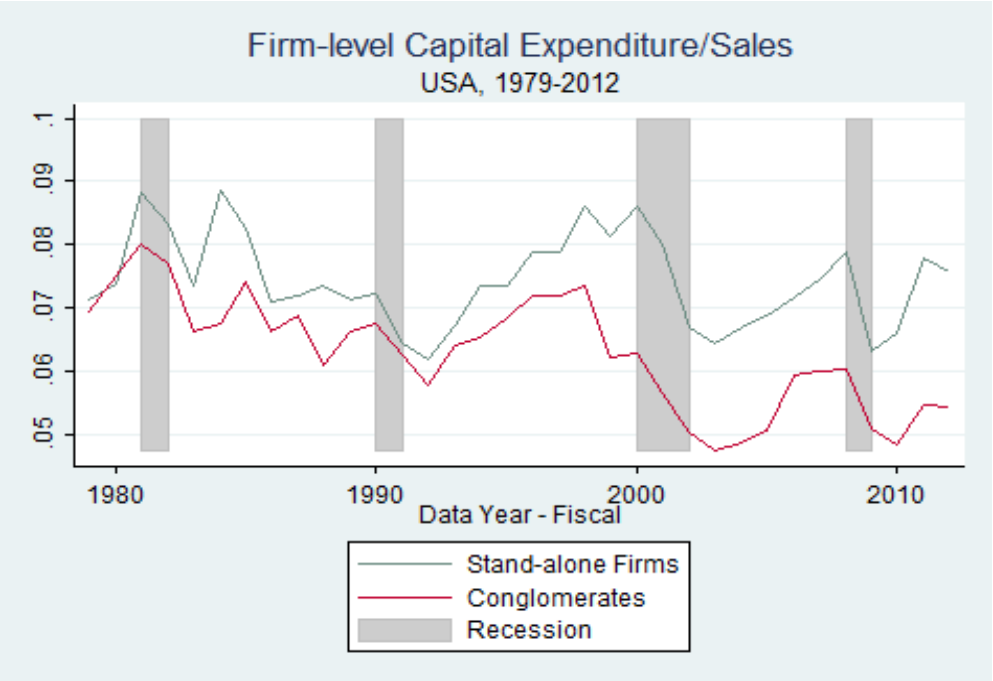


Figure 2: **Time Series of Firm-level Capital Expenditure/Assets**

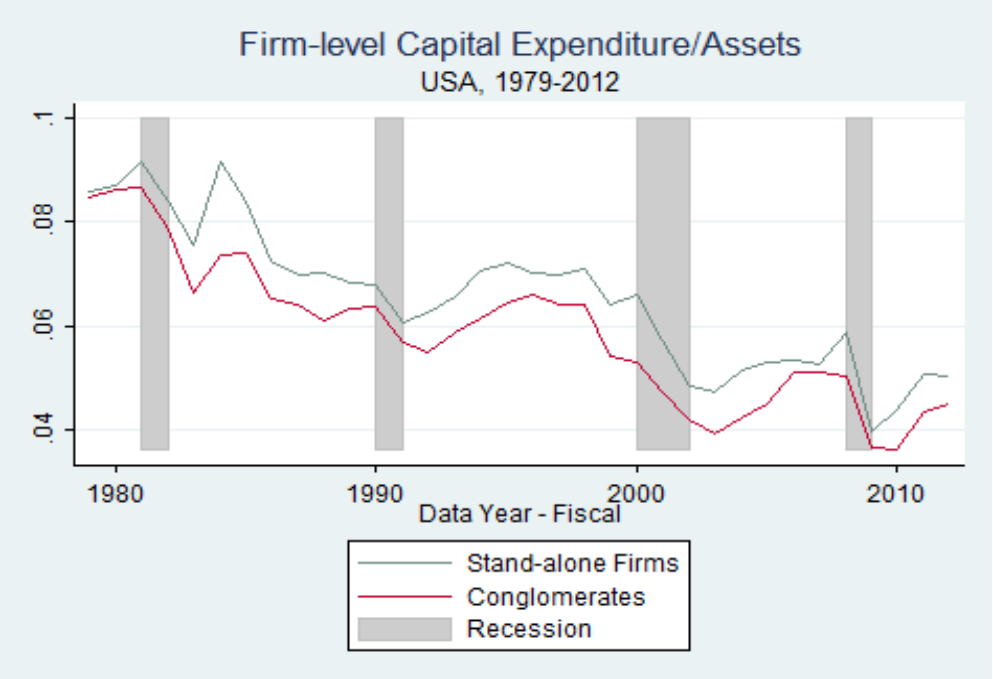

Table 1: **Firm-level Descriptive Statistics**

| | 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**

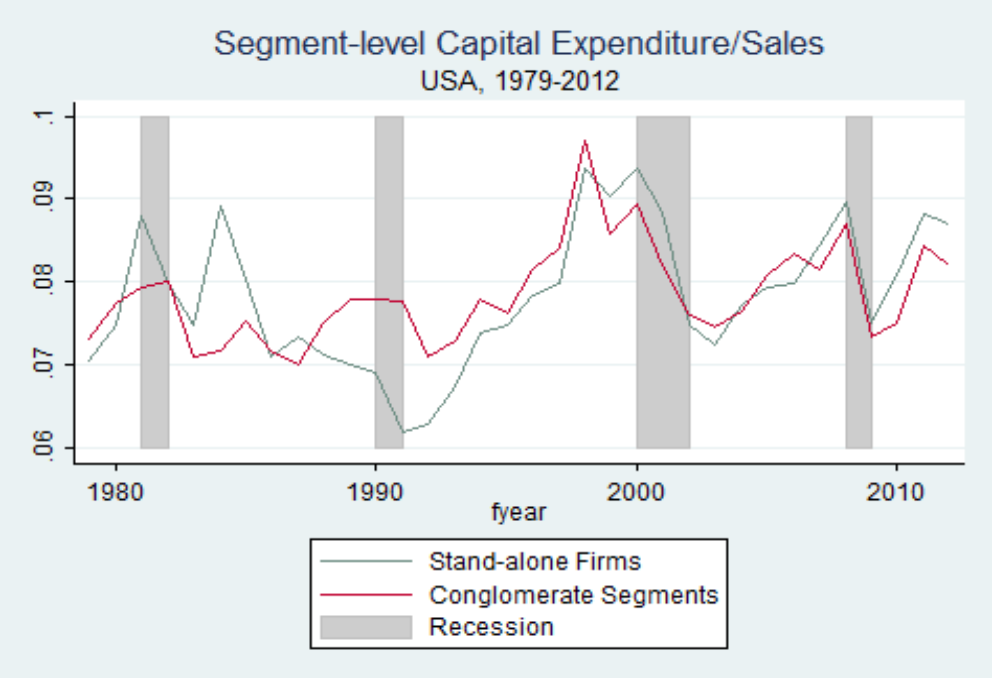


Figure 4: **Time Series of Segment-level Capital Expenditure/Assets**

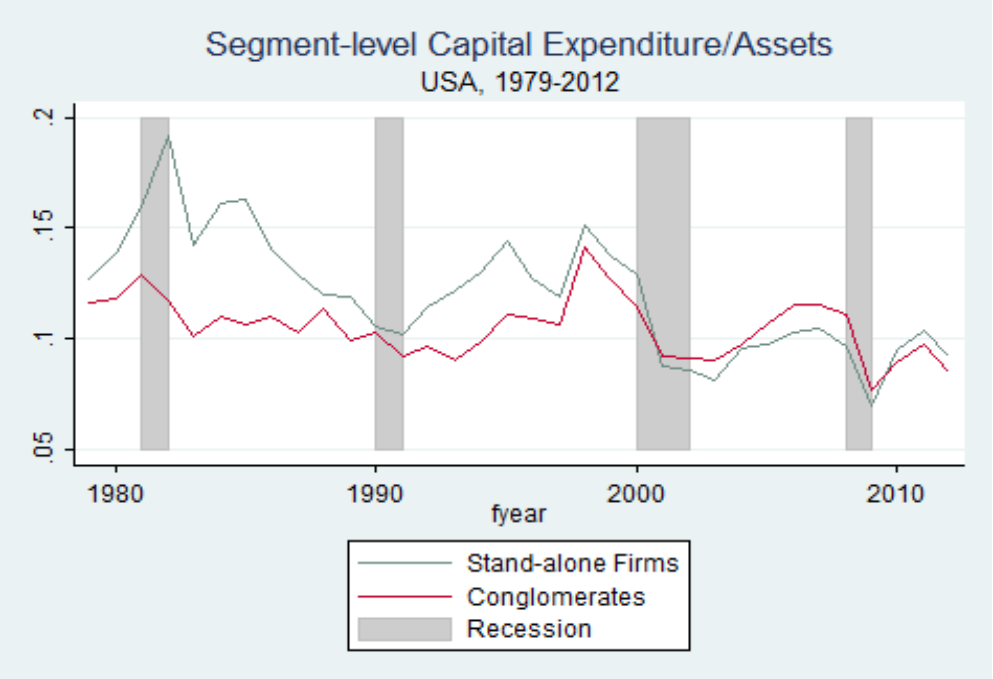

Figure 5: **Q-sensitivity of Investment during Expansion**

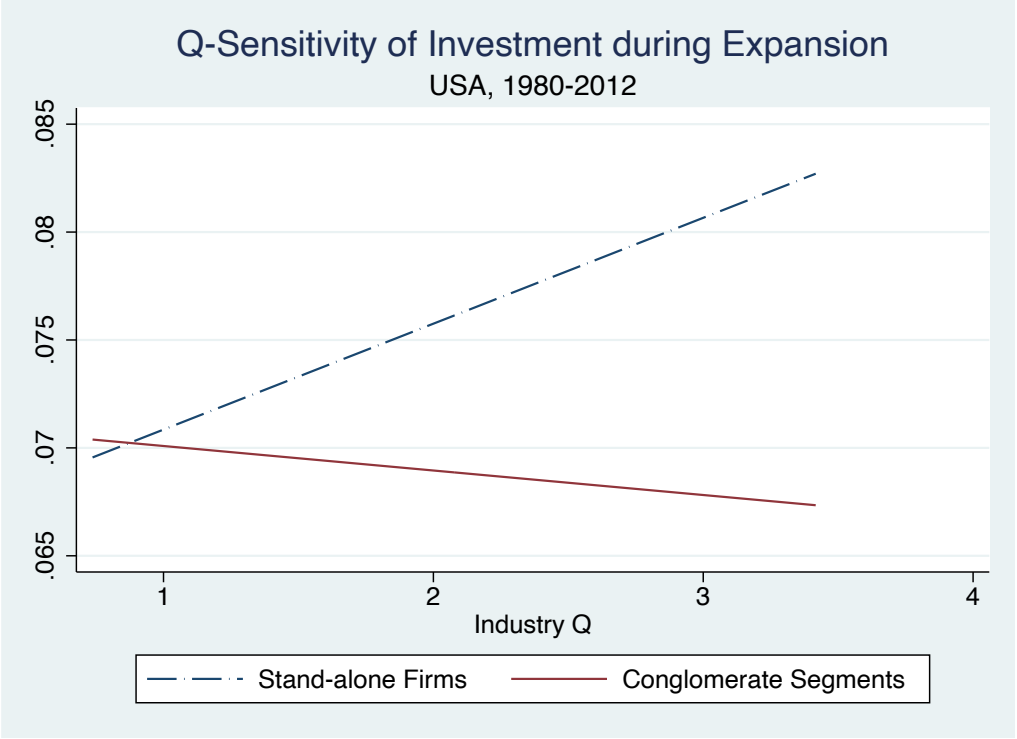


Figure 6: **Q-sensitivity of Investment during Recession**

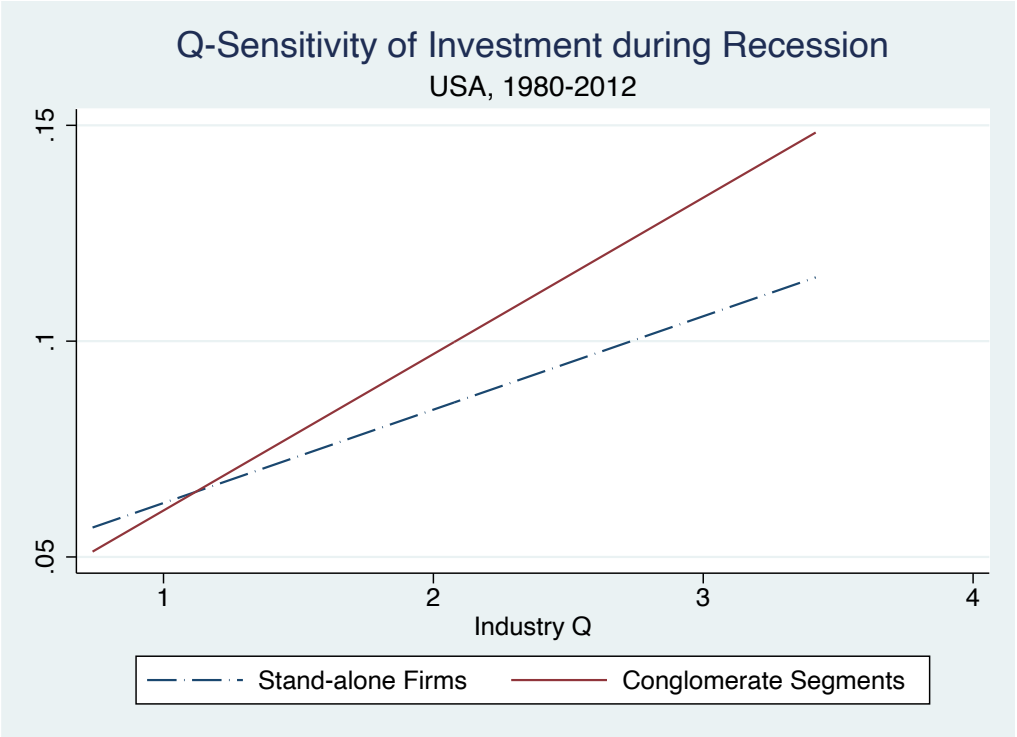

Table 7: **The Business Cycle and Cross-section of Segment-level Investment**

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: **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 16: 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 16–*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 17: **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 17–*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 18: **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 18--*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 |