Corporate Diversification, Investment Efficiency and Business Cycles *

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ABSTRACT

This study examines differences between the investment behaviors of stand-alone firms and conglomerates over business cycle. I find that diversification facilitates more effective use of internal capital during recessions. The utilization of internal capital by conglomerates increases with the ability to smooth capital variability. Stand-alone firms are more likely to save cash out of internal capital. Moreover, I find that conglomerates have increased Q-sensitivity of investment and the diversification discount decreases during recessions, suggesting enhanced efficiency of internal capital markets. This provides evidence against the argument that inefficient resource allocation is due to firm characteristics and measurement errors. This study extends the literature on bright side of internal capital markets and how business cycle affect investment decisions of conglomerates differently from stand-alone firms.

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I. Introduction

A conglomerate firm is one which operates in more than one industry. The study of conglomerate firm and internal capital market through which it directs investment flows has been a focus of extensive research. A firm with an internal capital market is one which centralize funds either from its own resources or from external financial markets and then allocate funds according to the profitability of various projects. The decision of how to deploy internal funds is central to the conflict between shareholders and managers (Jensen (1986)). Any discussion of the efficacy of corporate investment must address this issue. On the one hand, internal capital markets of conglomerates enable managers to deploy capital from divisions with poor investment opportunities to those with good investment opportunities, because managers are better informed about investment opportunities than external investors.(Stein (1997), Khanna and Tice (2001), Maksimovic and Phillips (2002)). On the other hand, with this concentration of fund usage and inside access to internal capital, managers may have incentives and opportunities to pursue personal benefits at the expenses of shareholders' wealth(Stulz (1990), Scharfstein and Stein (2000), Rajan, Servaes, and Zingales (2000a)). Both the advantage of centralized investment and managers' opportunistic behaviors are likely to increase, as the scale of internal capital market within the firm increases.

With the competing theories in the literature about internal capital market, it leaves the answer an empirical one. A strand of research uses the relation between Tobin's q and investment to examine internal capital markets allocate resource and whether diversified firms respond to market opportunities as well as single-segment firms(Shin and Stulz (1998), Scharfstein (1998), Gertner, Powers, and Scharfstein (2002) and Ozbas and Scharfstein (2010)). They document that conglomerate segments in high-Q(low-Q) industries invest less(more) than the comparable stand-alone firms. And conglomerate segments exhibit lower Q-sensitivity of investment than stand-alone firms. Overall, the internal capital markets are inefficient, in term of allocating resource with regard to differences in industry opportunities.

Recent researches have shown the existence of efficient internal capital market, they look

into the cases when external capital supply is highly constrained, suggesting a comparative advantage of conglomerates over single-segment firms(Dimitrov and Tice (2006), Yan, Yang, and Jiao (2010), Gopalan and Xie (2011), Kuppuswamy and Villalonga (2010), Hovakimian (2011), Aivazian, Qiu, and Rahaman (2012) and Matvos and Seru (2013)). These studies focus on the"more money" and "smart money" argument, suggesting that diversified firms have easier access to external capital markets and improve the standard of project selection during financial distress. Consistent with this view they document that diversified firms have higher capital expenditure, sales ratio, growth ratio, and excess value than stand-alone firms, and invest more in segments with high profitability during financial distress. I follow the Q-sensitivity approach and find that sensitivity of segment investment to industry Q of diversified firms is higher than that of stand-alone firms during recession, suggesting that conglomerates modify their capital allocation policies and invest more(less) in high-Q(low-Q) industries compared to stand-alone firms. This relatively more effective resource allocation is consistent with the improved performance of conglomerates in financial distress. The question is if the managers are self-interested, why would they change habitats and suddenly invest more efficiently during financial distress. If managers of conglomerates value some poor profitability projects and invest against the efficient way on average, why would they change during a different time period. It is more confusing and more important to address that if managers are equally rational and self-interested at the same time, what drives the cross-sectional different investment behaviors? Lots of recent studies focus on the effect of internal capital markets on firm performance, but how does the effect take place is not well examined. Traditional view is that the diversification nature enable conglomerates to smooth capital variability and have centralized internal capital markets, hence conglomerates are less likely financial constrained and have easier access to external capital marktes. Whether conglomerates make a good use of internal capital and how they reallocate it are largely unexplored. No study has systematically analyzed how the cross-the cross-sectional differences of investment behaviors vary with external financing constraints and changing

economic conditions. Business cycles provide an ideal empirical setting, firstly recessions create higher external financing costs, it helps distinguish the advantages of internal capital markets cause external financing are costly. Secondly, this time-varying difference in investment behaviors are less subject to biases arising from time invariance empirical difference, this provides evidence against the argument that inefficient resource allocation is due to firm characteristics and measurement errors.

During an economic expansion, as cash reserves increase, managers make strategic decisions about whether to disburse the cash to shareholders, spend it on internal projects, use it for external investment, or continue to hold it. It is theoretically not clear how self-interested managers will decide between spending free cash flow and retaining it as cash reserves. Managers must trade off private benefits of current spending against the flexibility provided by accumulating excess cash reserves(Harford, Mansi, and Maxwell (2008),Bolton, Chen, and Wang (2011)). On the contrary, during recessions, the external finance costs increase, firms can no longer invest at optimal level. Several studies report that firms with greater difficulties in obtaining external capital accumulate more cash(Harford (1999),Opler, Pinkowitz, Stulz, and Williamson (1999)). Corporations tend to hold more cash when their underlying earnings risk is higher or when they have higher growth opportunities (Bates, Kahle, and Stulz (2009)). Recently, McLean and Zhao (2013) find that investment is less sensitive to Tobin's q and more sensitive to cash flow during recession, they argue that recessions increase external finance costs, thereby limiting investment at firm-level.

For diversified firms, when investment opportunities or cash flows across divisions are less correlated, they enjoy greater diversification and greater reduction in variability(Lewellen (1971)). This coinsurance – the imperfect correlation of cash flows and investment opportunities – among a firm's business unites can also enables a mutual protection of investment across business units during bad times and in turn leads to a reduction in hedging necessity. This is also related to risk management that focus on optimal hedging policies and abstract away from corporate investment and cash management. Mello, Parsons, and Triantis (1995)

and Morellec and Smith (2007) analyze corporate investment together with optimal hedging, and document the firms ability to exploit its investment opportunity depends upon the degree to which its flexibility is companioned by an appropriate hedging strategy. Mello and Parsons (2000) argue that optimal hedging maximize liquidity value by studying the interaction between hedging and cash management. In this way, self-interested managers of conglomerates weigh the discipline of excess spending and cash-holding differently in the sense that they have extra hedging benefit. Consistent with this view, Duchin (2010) documents that multi-divisional firms hold significantly less cash than stand-alone firms because they are diversified in their investment opportunities. If this is the case, the cross-sectional difference against stand-alone firms in investment behaviors is even stronger for conglomerates with higher degree of diversification and hence lower demand for flexibility. The contrast is further more important when external capital markets are costly financial, when firms without the benefit of coinsurance across divisions are essentially vulnerable and subject to flexibility needs.

My general argument is that when external capital markets are more restrictive, conglomerates significantly enhance the efficiency of internal capital markets by deploying internal capital to finance investment and also shift resource away from non-productive divisions and towards productive divisions.

The major contribution of this study is the evidence on the time-varying and cross-sectional different investment behaviors between stand-alone firms and conglomerates. I find that diversification facilitates more effective use of internal capital during recessions. Furthermore, by incorporating the degree of diversification in both firm-level and segment-level analysis, this project extends the literature by examining how diversification affects corporate investment decisions. And I find that the utilization of internal capital by conglomerates increases with the ability to smooth capital variability. Stand-alone firms are more likely to save cash out of internal capital. Moreover, I find that conglomerates have increased Q-sensitivity of investment and the diversification discount decreases during re-

cessions, suggesting enhanced efficiency of internal capital markets. This provides evidence against the argument that inefficient resource allocation is due to firm characteristics and measurement errors. This study extends the literature on bright side of internal capital markets and how business cycle affect investment decisions of conglomerates differently from stand-alone firms.

II. Literature Review

Empirical studies on corporate diversification have shown that diversified firms trade at a discount compared to equivalent single-segment companies. A large body of literature has document that diversification destroys value and internal capital market is inefficient. This does not explain puzzle of sustained popularity of conglomerate firms. Recent researches have shown the existence of efficient internal capital market when external capital supply is highly constrained, suggesting a comparative advantage of conglomerates over single-segment firms, at least at a given point of time. Furthermore, some researchers point out that prior empirical methodology and biased reporting practice may have contributed to the conflicting results and interpretations. Overall, there is something more of diversification than simply disposing free cash flow to unprofitable projects because of the existence of agency cost.

A. Conglomerate Valuation

A large body of literature on conglomerates have studied the discount in corporate diversification. Lang and Stulz (1993) and Berger and Ofek (1995) provide strong evidence that conglomerate trade at a discount and interpret that diversification destroy value. Lang and Stulz (1993) show that diversified firms have lower Tobin's Q than a portfolio of comparable stand-alone companies. Berger and Ofek (1995) find an average value loss of diversified firms compared to stand-alone firms using excess value methodology, they argue that overinvestment and cross-subsidization contribute to the value loss. Comment and Jarrell (1995) show

a positive relation between firm value and corporate focus, and diversified firms are less likely to exploit financial economics of scope, they also argue that diversified firms are more likely to be takeover targets.

In contrast, Villalonga (2004) finds a significant premium of diversified firms over specialized firms, using the comprehensive plant-level data from Business Information Tracking Series (BITS) instead of COMPUSTAT. One possible explanation is that COMPUSTAT data may implicitly measure unrelated diversification, whereas Census data covers related diversification. Santalo and Becerra (2008) find heterogeneous effects of industries on diversification performance, this may contribute to explaining the inconclusive results of empirical studies, since they use different subsamples from different industries.

B. Internal Capital Market

The internal capital market enables the management to take advantage of information about divisions and allocate resources actively to divisions with better investment opportunities. Shin and Stulz (1998) find that investment by a segment of a diversified firm depends on the cash flow of both itself and other segments, and the investment by a segments investment does not respond to differences in Tobin q across segments as rapidly as stand-alone firms. At the same time, Scharfstein (1998) document that conglomerate segments in high-Q(low-Q) industries invest less(more) than the comparable stand-alone firms. In a related study, Scharfstein and Stein (2000) argue that rent-seeking behavior on the part of divisional managers will lead top management to overinvest in the weak division and underinvest in the strong division. Moreover, Gertner et al. (2002) examine the same firm's sensitivity of investment to Tobin's q before and after the spin-off and find that segment sensitivity to industry Tobin's q increases after the segment spin-off. Recently, Ozbas and Scharfstein (2010) find that unrelated segments exhibit lower Q-sensitivity of investment than stand-alone firms and the differences are more pronounced in conglomerates in which top management has small ownership stakes.

However, in contrast, some empirical studies produce opposite results and show the existence of efficient internal capital market. Campa and Kedia (2002) find that diversified firms traded at a discount before diversifying. Graham, Lemmon, and Wolf (2002) show that the average combined market reaction to acquisition announcement is positive and the reduction in excess value of the diversification process because the firms acquire already-discounted plants, following Berger and Ofek (1995) method for valuing conglomerates. Graham et al. (2002) argue that corporate diversification does not destroy value by questioning the validity of stand-alone firms as proper benchmark to conglomerate divisions. Peyer (2001) finds that the diversified firms tend to use more external capital than specialized firms because of the lower cost of external capital markets when the firms' internal capital market is efficient. He finds a higher excess values of these diversified firms with greater use of external capital. Information asymmetry between headquarters and divisional managers could make it optimal for firms to put substantial weight on divisional cash flows in allocating resources. Villalonga (2004) finds a significant premium of diversified firms over specialized firms, using the SIC code assigned by BITS instead of COMPUSTAT. Santalo and Becerra (2008) find heterogeneous effects of industries on diversification performance, this may contribute to explaining the inconclusive results of empirical studies, since they use different subsamples from different industries.

Recent researches have shown the existence of efficient internal capital market, they look into the cases when external capital supply is highly constrained, suggesting a comparative advantage of conglomerates over single-segment firms. Dimitrov and Tice (2006) find that sales and inventory growth of focused firms yields drop more than segments of diversified firms during recessions. Yan et al. (2010) document that corporate investment only declines for focused firms as a result of increased financing stress at the macroeconomic level while it remains constant for diversified firms. Moreover they find that the excess values of diversified firms are less negatively affected than those of focused firms. Gopalan and Xie (2011) show that segments of conglomerate firms in times of industry distress have higher sales growth,

higher cash flow, and higher expenditure on research and development than single-segment firms, and that the diversification discount reduces during industry distress, suggesting conglomerate firms enable firm segments to avoid financial constraints during times of industry distress. Kuppuswamy and Villalonga (2010) study the effects of the 2007/2008 financial crisis and find that the excess value of diversified firms increases significantly, compared to focused firms, and that the diversification discount completely disappears at the peak of the crisis. Further Hovakimian (2011) finds that during recession, when external financing costs are higher, conglomerates improve the efficiency of investment by allocating more funds to divisions with better opportunities. In a related study, Matvos and Seru (2013) examine the effect of frictions in internal capital markets on the relation between productivity and investment. Using the financial crisis as simulated model, they find resource allocation within firms are significantly cheaper and can offset shocks in financial sector.

C. Coinsurance

Recent studies on coinsurance have extend the possible benefit view, they focus on the effect of cross-divisional correlations in investment opportunity and cash flow, since corporate diversification reduces the firm's overall cash-flow volatility. Exploiting the imperfect correlations between divisions is also in line with the coinsurance effect, introduced by Lewellen (1971). In his work, the imperfect correlations between divisions cash flows increase the debt capacity of firms by reducing the probability of default. Moreover, coinsurance reduces also enables a diversified firm to avoid countercyclical deadweight costs of financial distress (Elton, Gruber, Agrawal, and Mann (2001) and Almeida and Philippon (2007)) that its business units would have otherwise incurred as stand-alone firms. Duchin (2010) examines the relation between coinsurance and a firm's cash retention strategies and finds that lower cross-divisional correlations in investment opportunity and higher correlations between investment opportunity and cash flow correspond to lower cash holdings. Duchin (2010) also finds that diversification is mainly correlated with lower cash holdings in finan-

cially constrained firms. Dimitrov and Tice (2006) find that during recessions sales-growth rates drop more for bank-dependent focused firms than diversified firms. They conjecture that the lower volatility in business activity of diversified firms is due to their greater debt capacity and lower credit constraints. **?** find that diversified firms have significantly lower loan rates than comparable focused firms, and the diversification effect of cost of bank loan is mainly channeled by coinsurance. Hann, Ogneva, and Ozbas (2013) examine the possibility that coinsurance can affect a firms systematic risk, they find that diversified firms with less correlated segment cash flow have a lower cost of capital, which is consistent with the effect of coinsurance that reduces systematic risk.

D. Synergies

A possible benefit to conglomerate firms is the enhancement in productivity, a group of empirical works studying the productivity of conglomerate segments shed light on prior inconclusive literature. Maksimovic and Phillips (2002) find that diversified firms generally allocate resources more efficiently, however, they show that diversified firms are less productive, using plant-level data from LRD. In contrast, Schoar (2002) find evidence that diversified firms are not less productive than benchmark stand-alone firms. Gomes and Livdan (2004) also demonstrate that diversification allows a firm to explore better productive opportunities while taking advantage of synergies. They reconcile the existence of diversification discount, with conglomerates being more productive than focused firms.

Another possible source of premium lies in the synergies of related segments. Event studies provide further empirical evidence on the positive effects of diversification. With the inappropriateness to set stand-alone counterparts as benchmark to the performance of conglomerate segments, a plant itself before acquisition serves as a better benchmark for that after it is acquired by a diversified firm. Khanna and Tice (2001) show that internal capital markets are likely to be efficient, at least for related diversified segments. Several studies document that the stock market tends to react positively to diversification acqui-

sition(e.g, Chevalier (2004); Akbulut and Matsusaka (2010)). Chevalier (2004) finds that returns of diversification acquisition are higher if the mergers are closely related. Berger and Ofek (1995) show that diversification discount is smaller when conglomerate segments are in the same two-digit SIC code. Santalo and Becerra (2008) find that diversification improve access to financial resources, and specialized firms may invest less than the optimal level. Furthermore, they argue that diversified firms perform better than specialized firms in more concentrated industries. A related study is Hoberg and Phillips (2012), they find that conglomerates are more likely to operate in industry pairs that are closer together in the product space, and that conglomerate firms have stock market premiums when their products are not easy to replicate and produce in more profitable industries.

III. Hypothesis Development

On the one hand, self-interested managers value excess cash reserves and freedom from capital market discipline (Easterbrook (1984); Jensen (1986)), this is the so-called flexibility habitat in this study. In trading off current overinvestment versus future flexibility, they put some weight on the latter. Thus, when the firm generates internal funds, managers would rather retain some of it than spend it immediately on current available projects, they prefer to maintain excess cash reserves. The less effective is shareholders' control of managers, the greater will be the cash reserves. On the other hand, self-interested managers aim at pursuing personal prestige associated with empire building of the firm and will spend excess cash flow when generated (Jensen and Meckling (1976)), this is the so-called spending habitat. In the event that these managers accumulate excess cash reserves, they will look for unrelated acquisitions or quickly deploy the cash even on negative NPV projects. In general, they prefer current spending at the expenses of the ability to invest more in the future. The flexibility and spending habitats effect oppositely on the firm-level investment decisions.

Moreover, the trade-off between both habitats is time-varying, managers put different

weight on them during different time periods. Much of the empirical literature on firms cash holdings tries to identify a target cash inventory for a firm by weighing the costs and benefits of holding cash. The idea is that this target level helps determine when a firm should increase its cash savings and when it should dissave(see Almeida, Campello, and Weisbach (2004),Almeida, Campello, and Weisbach (2011),Faulkender and Wang (2006),Khurana, Martin, and Pereira (2006) and Dittmar and Mahrt-Smith (2007)).

In particular, during expansions, the firm-level cash reserves increase, the proportion of cash holding associated with flexibility concern will decrease, the supply of capital expenditure will increase, managers are then more inclined to spend cash. According to Harford et al. (2008), firms with weaker governance and excess cash holdings will spend cash more quickly than those with stronger governance and lower cash reserves. And Bolton et al. (2011) find that when the cash-capital ratio is higher, the firm invests more and saves less, as the marginal value of cash is smaller.

During recessions, with the external finance costs increase and cash reserves decrease, managers weigh the current excess spending and flexibility differently, as the ability to make excess investment decrease and the concerns about flexibility become more important, they would prefer to retain cash instead of spending it immediately. Cash holdings can be valuable when other sources of funds, including cash flows, are insufficient to satisfy firms' demand for capital. That is, firms facing external financing constraints can use available cash holdings to fund the necessary expenditures. Consistent with this view, Almeida et al. (2004) provide evidence that firms with greater frictions in raising outside financing save a greater portion of their cash flow as cash than do those with fewer frictions. Faulkender and Wang (2006) and Denis and Sibilkov (2010) report evidence consistent with the view that cash holdings are more valuable for constrained firms than for unconstrained firms. Collectively, these studies support the view that higher cash holdings are more valuable for financially constrained firms. Recently, as in the findings of McLean and Zhao (2013), investment is less sensitive to Tobin's q and more sensitive to cash flow during recession, they argue that recessions

increase external finance costs, thereby limiting investment at firm-level.

Furthermore, the difference of investment decisions between conglomerates and stand-alone firms is associated with the coinsurance effect resulting from joint income streams within conglomerates(Lewellen (1971)). Through the internal channel of funds within the firm, each segment could server as a counterpart to coinsure the other participant, as long as they do not share a perfect correlation of cash flow or investment. As a result, managers are able to invest sufficiently according to investment opportunities regardless of hedging concern. In this way, coinsurance effect provides good motives for conglomerate merger, to the extent it reduces the probability of underinvestment associated with agency costs, even it does not create operating efficiency. Firms' diversification to unrelated industries to capture the coinsurance benefit is an efficient decision, at least at some given point of time, especially during financial distress, when the distortions are more likely to occur because of the exogenous negative cash flow shock. Hence the effect of coinsurance impact firms' concern about flexibility and provide motives for conglomerates to spend more compared to those of stand-alone firms.

To sum up, I test the following four hypotheses related to the investment decisions and varying agency problems over business cycle. The first two hypotheses are related to the question whether conglomerates make better use of internal capital, whether they benefit from internal capital markets other than that their easier access to external financing. The later two competing hypothesis examine the resource allocation within conglomerates' multiple divisions. Particularly, whether they allocate resource similarly as they do in expansion, and whether they change. In line with efficiency hypothesis, if the change in resource allocation is relatively more efficient, we should expect diversification discount to decrease.

A. Financial Constraint Hypothesis

The starting point of financial constraint hypothesis is based on Lewellen (1971) and Billett and Mauer (2003), they argue that internal capital markets enable conglomerates to

smooth capital variability and rely on internal capital for continued financing. While stand-alone firms have trouble accessing external financing, conglomerates are more likely fund investment with internal capital. This hypothesis predicts that conglomerates invest more with internal capital than stand-alone firms. During expansion, the flexibility habitat predicts that when the cash reserves increase, managers will not make suboptimal investment decisions but rather continue to hold it. On the contrary, the spending habitat predicts managers prefer to overinvest (in acquisition or other negative NPV projects) during expansion. Since the extra cash holdings provide sufficient resource to invest in all available projects and the concern about future flexibility is minor, one would expect that the spending habitat dominates in expansion periods, for both stand-alone firms and conglomerates. Further, with the hedging function provided by multi-divisional operations, managers of conglomerates are naturally less concerned about flexibility needs, they would overinvest more than stand-alone firms given the same capital resources. If this is the case, the effect is even stronger for conglomerates with higher degree of diversification and hence lower demand for flexibility. Put together, during expansion periods, managers will be observed to overinvest, moreover, conglomerates overinvest than stand-alone firms, and highly-diversified (coinsured) firms overinvest more than lowly-diversified (coinsured) firms.

B. Precautionary Saving Hypothesis

This hypothesis is built on the theories of Harford (1999), Opler et al. (1999) and Bates et al. (2009), they argue that firms hold cash to mitigate adverse cash flow shocks due to external financial constraint. However conglomerates are more likely to mitigate negative cash flow shock since the nature of diversification diminish the capital volatility by offsetting the cash flows across multiple divisions. Hence conglomerates do not need to save as much as stand-alone firms. During recessions, firms utilize internal capital to finance investment opportunities, if this is the case, saving cash out of internal cash flow could impact investment. This hypothesis predicts that conglomerates save less cash out of internal capital than

stand-alone firms, it provides similar motives for conglomerates to spend more on investment.

C. Cross-subsidization Hypothesis

This hypothesis is related to the inefficiency of ICMs, as Scharfstein and Stein (2000) and Rajan, Servaes, and Zingales (2000b) argue that conglomerate ICMs transfer resources from the productive segments to the non-productive segments. During recession, if an industry has low productivity, either because it is distressed or ex ante non-productive, base on the hypothesis we expect the segment of conglomerate gets more money than stand-alone firms within that same industry. This hypothesis predicts that conglomerates have even lower Q-sensitivity of investment than stand-alone firms compared to them in expansions. Moreover, this change is investment Q-sensitivity is more likely inefficient, one would expect that the diversification discount increase further.

D. Flexibility Hypothesis

This hypothesis is built on Stein (1997) and Matsusaka and Nanda (2002), conglomerates ICMs are able to shift resources away from non-productive segment and towards the most productive segments. Similarly, in an industry with high productivity, either ex ante productive or less likely distressed, we expect the segment of conglomerate gets more money than stand-alone firms within the same industry. This hypothesis predicts that conglomerates have higher Q-sensitivity of investment than stand-alone firms. If this change in Q-sensitivity is efficient, one would expect that the diversification discount decreases. During recessions, with the external finance costs increase and cash reserves decrease, managers weigh the current excess spending and flexibility differently, as the ability to make excess investment decrease and the concerns about flexibility become more important, they would prefer to retain cash instead of spending it immediately. Overall, firms encounter insufficient investment compared to non-recession periods. However, the coinsurance benefit associated with cross-divisional operations mitigates the demand for flexibility. Conglomerates would

retain less cash than stand-alone firms, as a results managers of conglomerates invest in a manner more appropriate than those of stand-alone firms. Stand-alone firms invest less than conglomerates is mainly driven by the flexibility concern rather than costly external finance, and the managers of stand-alone firms will be observed to make investment at a lower level than optimal. Given the same shock to cash reserves, conglomerates can still transfer the cash desired for flexibility to efficient investment. If this is the case, the effect is even stronger for conglomerates with higher degree of diversification and hence lower demand for flexibility. Put together, during recession periods, managers will be observed to underinvest, moreover, stand-alone firms underinvest than conglomerates, and highly-diversified(coinsured) firms are more likely to make appropriate investment than lowly-diversified(coinsured) firms.

Additionally, as noted in the previous hypotheses, if the efficiency changes, we expect the inefficiency of resource allocation exists. Shareholders who have effective control of managers will refrain inefficient cross-subsidization due to agency costs. In later studies, I can control for corporate governance or managerial ownership.

IV. Coinsurance Effect Framework

The conceptual framework adopted in this paper is derived directly from the financial benefit of internal capital market, and the prediction of such benefits will be based on the reduction in investment distortion, and the extent to which corporations can achieve a result that shareholders cannot achieve for themselves. The possible benefit comes from the opportunity that a resulting joint income streams from two previously separate companies will enable funds transfered from cash-rich division to cash-poor division based on respective investment opportunities. Then the both divisions could invest efficiently according to investment opportunities. In order to demonstrate the point, I follow Lewellen (1971) and construct a two firms case. If firm A has an optimal investment level Y_A^* based on the investment opportunities in the industry it operates in, there is a corresponding probability

of investment distortion in the case when the actual capital expenditure Y_A is smaller than Y_A^*. Similarly, firm B has a possibility of investment distortion when its cash flow realization Y_B is less than Y_B^*. If the two corporations operate independently as stand-alone firms with costly external financing, the respective probability of two firms is given by:

$$P(D_A) = P(Y_A < Y_A^*) \tag{1}$$

$$P(D_B) = P(Y_B < Y_B^*) \tag{2}$$

$P(D_i)$ denotes the probability of investment distortion.

However, if the two companies combine into one enterprise, as long as the annual cash flows of the combining corporations are not perfectly related with each other, then it is unlikely investment distortion of the two divisions will occur at the same time, at least not by the same extent. Through the aggregate internal capital market, there will exist at least some modest set of joint events having the characteristic $(Y_A < Y_A^*, Y_B \geqslant Y_B^* + Y_A^* - Y_A)$, when company B has excess cash flow to meet the required investment of company A, brought through the internal capital market. Similarly, there will also be an event $(Y_B < Y_B^*, Y_A \geqslant Y_A^* + Y_B^* - Y_B)$, the newly combined company has a joint probability of investment distortion, as given by:

$$\begin{aligned} P(D_{AB}) =& P(Y_A < Y_A^*) + P(Y_B < Y_B^*) \\ & - P(Y_A < Y_A^*, Y_B \geqslant Y_B^* + Y_A^* - Y_A) \\ & - P(Y_B < Y_B^*, Y_A \geqslant Y_A^* + Y_B^* - Y_B) \end{aligned} \tag{3}$$

Through the internal channel of funds within the firm, each segment could server as a counterpart to coinsure the other participant, as long as they do not share a perfect correlation of cash flow or investment. As a result, segments are able to invest efficiently according to investment opportunities. Coinsurance effect provides good motives for conglomerate merger,

to the extent it reduces the probability of investment distortion, even it does not create operating efficiency. Firms' diversification to unrelated industries to capture the coinsurance benefit is an efficient decision, at least at some given point of time, especially during financial distress, when the distortions are more likely to occur because of the exogenous negative cash flow shock. Following the preliminary framework, if firm wants to capture the coinsurance benefit, then it will not necessarily produce only in the industry in which it has the highest talent, instead it will take other unrelated projects in the industry it does not have much expertise with. And this benefit is not attainable by investors holding a portfolio of unrelated securities. Moreover, this reduction in deadweight cost related to costly financial distress, should be relates to the degree of coinsurance among divisions of conglomerates. One would expect the benefit of coinsurance and its effect on reducing investment distortion to be more pronounced with greater market-level financial distress or more firm-level financial constraint.

For concreteness, consider a population of firms that can operate in a maximum of twoindustries, denoted as industry A and industry B, respectively producing outputs q_A and q_B. All firms are assumed to be price-takers. The productivity of each firm can be modeled by a vector (d_A, d_B). If they choose to operate in industry i firms that have a higher productivity, d_i, produce more output d_i for a given level of inputs. Firms make investment in industry A and industry B, denoted as I_A and I_B, according to the respective investment efficiency, q'_A and q'_B, where $q' > 0$ and $q'_A > q'_B$, industry$A$ has more investment opportunities. Firms use two inputs. The profit function of each firm is given by

$$d_A p_A q_A(I_A) - \alpha q_A(I_A) - f(X) * I_A \tag{4}$$

$$d_B p_B q_B(I_B) - \alpha q_B(I_B) - f(X) * I_B \tag{5}$$

$f()$ denotes the distress cost, X denotes financial states, $f()$ is much greater in BAD state, that is $f'_X() < 0$. If the two firms operate as independent organizations, there is

no coinsurance benefit in diminishing distress cost. However, after they merge together, coinsurance would affect the distress cost. The profit function for the merged conglomerate firm is given by:

$$d_A p_A q_A(I_A - \Delta(C_{AB})) + d_B p_B q_B(I_B + \Delta(C_{AB})) - \alpha q_A(I_A) - \alpha q_B(I_B) - f(X, C_{AB}) * (I_A + I_B) \tag{6}$$

C_{AB} is the inverse measurement of coinsurance effect, represented by the correlation of investment or cash flow between the two industries. The greater diversification/coinsruance, namely the smaller correlation between cash flow and investment opportunities, is corresponding to smaller financial distress cost, that is $f'_{C_{ij}}() > 0$. $\Delta(C_{AB})$ is the distortion from efficient investment because of coinsurance pursuit, in the two industry case, by smoothing investment, fund transfer from cash rich division to cash poor division.

V. Data and Variable Construction

A. Sample

The sample and data in this study come from the Compustat Industry Segment (CIS) database and Compustat Annual database between 1979 and 2012. 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 along with a pair of Standard Industrial Classification (SIC) codes, primary Standard Industrial Classification (SICS1) and secondary Standard Industrial Classification (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 4-digit SICS1, and a diversified firm or conglomerate if it has two or more segments with different 4-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 further drop segments with (i) name "other"(ii) 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), (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 the segments that operate in regulated industries, specifically Transportation (SIC codes 4000-4799), Telecommunication Service (4800-4899), Utilities (4900-4999), Banking (6000-6199) and Insurance (6300-6499).

B. Coinsurance

Measuring the level of coinsurance among a diversified firms 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 measure coinsurance proxies using correlations of industry level cash flows based on single-segment firms. I construct measurement for coinsurance in the firm's investment opportunities and cash flow follow the approach Duchin (2010) and Hann et al. (2013). For each year in sample, I estimate pairwise industry correlations using prior 10-year idiosyncratic industry cash flow. Consistent with 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, compute 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 book-to-market factors. Similarly, I compute pairwise investments correlations using prior 10-year idiosyncratic industry Q. As an inverse measure of coinsurance, for firm i in year t with n business segments, there is a

sales-weighted aggregated correlation, which is given by

$$\rho_{it}(n) = \sum_{p=1}^{n} \sum_{q=1}^{n} \omega_{ip(j)} \omega_{iq(k)} Corr_{[t-10,t-1]}(j,k) \tag{7}$$

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, $Corr_{[t-10,t-1]}(j,k)$ is the estimated correlation of idiosyncratic industry cash flows(investments opportunities) of firm i between industries j and k over the 10-year period.

C. Financial Constraints

An intuitive test of the coinsurance effect on investment distortion includes business cycle analysis, using the categorization data of recession and expansion from NBER. During the period between 1980 and 2012 covered in the study, NBER identifies the following periods of economic recessions: January, 1980 July, 1980; July, 1981 November, 1982; July, 1990 March, 1991; March 2001- Novermber 2001; December 2007- June 2009. Although these periods are not exactly annual periods, in order to use them with annual data on internal capital allocation, I classify years 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 compared to expansion subsample, it is necessary to employ other standard macro economical proxies to identify financial distress. Moreover, another test involves identifying firm-level financial constraint, there are several economically important measures, such as payout, the WW index, the SA index, and S&P debt rating.

VI. Empirical Tests and Results

A. Time-series of Capital Expenditure

The main objective of this study is to identify the pattern of investment behaviors of conglomerates and stand-alone firms. In particular, how the external financial contraction affect their investment. The major variable of interest capital expenditure represents firms' investment decisions. The time series of capital expenditure in figure 1 below, normalized by firm sales, demonstrates decrease of investment during recessions for both conglomerates and stand-alone firms. Stand-alone firms on average have higher investment efficiency than conglomerates, in terms of ratio of assets. This is related to the fact that stand-alone firms are able to make sole investment other than cross-subsidizing among divisions. However, during recessions, there is a clear shrink of the gap between conglomerates and stand-alone firms. It also implies the relative investment during bad times decrease less for conglomerates.

[Insert Figure 1 here]

Prior studies use single-segment firms operating within the same industry as standard for a division/segment of a conglomerate, to examine that given the same industry characteristic and similar growth opportunities, whether a segment of conglomerates invest as much as comparable stand-alone firms in the same industry. In figure 2 below, segment-level sales normalized capital expenditure decrease during recessions for both conglomerates and stand-alone firms. However, unlike firm-level evidence, segment-level investment of conglomerates is not always lower than stand-alone firms. In fact, during those downturns, not only the gap between segments of conglomerates and stand-alone firms shrink, but also sometimes conglomerates have higher segment-level investment. Together with the evidence from firm-level, we can assume that some segments may be allocated with more capital than others. This is similar to the pattern of segment-level investment normalized by assets; the discrepancy between conglomerates and stand-alone firms decline

whereas sometimes conglomerate segments have a higher level of scaled capital expenditure.

[Insert Figure 2 here]

B. Summary Statistics

The final sample consist of 61,819 segmen-year observations, in which there are 45,640 single-segment(single-segment) firms and 11,608 segments of conglomerates. As shown in Table I, stand-alone firms are smaller than segments of diversified firms on the basis of both sales ($912.9 million vs. $1174.2 million) and assets ($829.1 million vs. $1123.1 million). Stand-alone firms appear to be more profitable than segments as measured by the cash flow to sales ratio (13.7% vs. 13%). In addition, stand-alone firms appear to operate in industries with better investment opportunities than those of unrelated segments; the median industry Q of stand-alone firms is 1.584 as compared to 1.504 for conglomerate segments.

[Insert Table I here]

The sample consists of 48,123 firm-year observations, of which 38,765 (9,358) observations are from stand-alone (diversified) firms, as reported in Table II. On average, stand-alone firms are smaller, have lower levels of debt and leverage, cash holding and dividend payout ratio. This is due to the coinsurance effect among various segments within conglomerates, as they can smooth capital variablity and hence have higher debt capacity. On average, conglomerates report more than triple of stand-alone firms' assets ($3,273.7 million/$992.9 million), sales($4,332.8 million/$1,110.1 million). However, the overall less growth opportunities and much lower cash holdings. Moreover, stand-alone firms have lower internal generated cash flows on average, that suggests during financially distressed times, stand-alone firms may have trouble to finance themselves internally. And stand-alone firms are usually firms with higher Market-to-Book ratio and sales normalized investment, which is

consistent with time-series evidence that without cross-subsidization, stand-alone firms can centralize and improve investment efficiency.

[Insert Table II here]

C. Efficiency of Segment-level Investment

On the one hand, internal capital market of diversified firms affects the investment by segments and enables them to fund projects with higher profitability or better investment opportunities, thereby directing corporate resources to their best uses, with central concentration of capital of all segment. On the other hand, when firms are comprised of divisions with good and bad investment opportunities, rent seeking behavior on the part of divisional managers will lead top management to overinvest in the weak division and underinvest in the strong division. At first I run standard investment regression (Shin and Stulz (1998), Scharfstein (1998), Gertner et al. (2002), Ozbas and Scharfstein (2010)) as denoted below,

$$Capex_{i,j}(t) = a + b_1 * CF_i(t) + c_1 * Q_j(t-1) + \sum_{n=1}^{N} X_i^n(t) \tag{8}$$

where $CapEx_{i,j}(t)$ is sales-normalized capital spending of segment i (operating in industry j) in year t, with industry and year fixed effects, respectively. , $CF_i(t)$ is 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)) as operating profits plus depreciation and does not adjust cash flow for taxes, working capital investments, and other factors because that data is not available. I employ median bounded Tobin's Q of single-segment firms in industry in prior year as proxy of investment opportunities, following Scharfstein (1998) and Ozbas and Scharfstein (2010), to reduce the expect of potential measurement error in the book value of assets. This median bounded Q is computed as MV A/(0.9BV A + 0.1MV A), where the book value of assets equals Compustat item 6, and the market value of assets equals the

book value of assets plus the market value of common equity (Compustat item 25 times item 199) less the book value of common equity (item 60) and balance sheet deferred taxes (item 74). 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 due to nonavailability of direct measures of investment opportunities at the division level. Figure 3 and Figure 4 present the fitted value of segment-level investment (either segment from conglomerates or stand-alone firms given each industry) corresponding to industry's average investment opportunity, which is proxies by industry average market-to-book. The comparison between stand-alone firms and conglomerates across different time is straightforward that stand-alone firms presents higher Q-sensitivity of investment than segments of conglomerates. However, during recessions the relationship switched that segments of conglomerates show a higher Q-sensitivity of investment than stand-alone firms.

[Insert Figure 3 here]

[Insert Figure 4 here]

The main objective in this section is to determine whether there are systematic differences in the investment behavior of stand-alone firms and the unrelated segments of conglomerate firms. For this purpose, the regression focus on the Q-sensitivity of investment. $\sum_{n=1}^{N} X_i^n(t)$ is a series of control variables on behalf of firm characteristics, which can potentially affect the investment strategies across firms (to be tested in future). In order to examine whether organizational structure matters for investment efficiency controlling for selection bias, I conduct the regression below to identify the effect of diversification on segment investment decisions.

$$\begin{aligned} Capex_{i,j}(t) =& \beta_0 + \beta_1 * CF_i(t) + \beta_2 * REC * CF_i(t) \\ &+ \beta_3 * Q_j(t-1) + c_2 * REC * Q_j(t-1) \end{aligned} \tag{9}$$

where DIV is a dummy variable equal to one if it is a segment from diversified firms. See results in Table VII .

In order to examine whether managers' investment decisions are associated with costly external finance. I include another treatment effect of financial distress in the standard investment decision regression. For the intuitive purpose, I obtain information from the National Bureau of Economic Research (NBER) Business Cycle Expansions and Contractions (Dimitrov and Tice (2006)). The standard investment regression is as below:

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

Where REC is a dummy to identify financial distress effect, it equals to one for the observations during recession, and zero for observations during expansion periods. The focus of this regression lies on the interaction term of the diversification indicator and the recession dummy associated with industry Q, the sign of this coefficient serving as a proxy for the resource allocation efficiency during financial distress. To further testify the hypotheses about how coinsurance impact managers' trade-off between current spending and future flexibility across time, I divide the conglomerates subsample into two groups, lowly-diversified and highly-diversified firms respectively. The degree of diversification is measured with cross-divisional correlation in cash flow and investment opportunity. Where the lower correlation across divisions the higher coinsurance effect the firm can benefit. The annual median value of each measure, across diversified firms only, is used as the cutoff point between lowly-diversified and highly-diversified firms.

Similarly I run firm-level regression(13) and segment-level regression (9) for the two

groups with two different measures to examine the time-varying investment behavior for diversified firms with different degree of diversification. Then I employ Difference-in-Difference-in-Difference for robustness check, to further testify the effect of time-varying and cross-sectional difference with regard to degree of diversification. In the regression below I include treatment effect $HIGH$ to identify firms with higher degree of diversification.

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

Results in Panel A of Table III show that segment investment of diversified firms exhibits lower Q-sensitivity than stand-alone firms in non-recession periods but higher investment-Q sensitivity during recession periods, controlling for all three fixed effects. However, Panel B and C presents mixed evidence on investment-Q sensitivity, both lowly- and highly-diversified firms are not responsive to investment opportunity during non-recession periods, which suggests all diversified firms in non-recession periods invest not necessarily depending on investment opportunities. However, in recession periods, the highly-diversified firms report higher investment-Q sensitivity than lowly-diversified firms with year and firm fixed effects. This suggests that overall investment of diversified firms is not responsive enough to investment opportunities, but during financial distress highly-diversified firms make investment more efficiently in term of investment-Q sensitivity.

[Insert Table III here]

I then employ Difference-in-Difference-Difference approach(equation(10)) for robustness check, whether the cross-sectional difference on investment-Q sensitivity is significant between stand-alone and diversified firms. Table IV show the variable of interest

DIV^*REC^*LagQ has significantly positive coefficients in all three fixed effect regressions. This is consistent with the findings in Panel A of Table VI.

[Insert Table IV here]

Similarly I also employ Difference-in-Difference-Difference approach(equation(11) for robustness check, whether the cross-sectional difference on investment-Q sensitivity is significant between lowly- and highly-diversified firms. Table V show the variable of interest $HIGH^*REC^*LagQ$ has significantly positive coefficients in all three fixed effect regressions. This is consistent with the findings in Panel B and C of Table III.

[Insert Table V here]

D. Firm-level Analysis

In order to test how the managers allocate internal capital, in particular whether to spend it or stockpile it, I investigate the relation between firm-level investment and firm-level cash flows. One would expect higher sensitivity of investment to cash flows if the manager concerns less about flexibility and hence will spend the cash when generated. Further, I employ difference-in difference approach to identify the investment patterns between expansion periods and recession periods, for both stand-alone firms and conglomerates. At first I run standard investment regression (Shin and Stulz (1998), Scharfstein (1998), Gertner et al. (2002), Ozbas and Scharfstein (2010)) as denoted below,

$$Capex_i(t) = \beta_0 + \beta_1 * CF_i(t) + \beta_2 * Q_i(t-1) \tag{12}$$

where $CapEx_i(t)$ is sales-normalized investment of firm i in year t. $CF_i(t)$ is sales normalized firm-level cash flow in year t. 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, this measure is standard in the literature(Shin and Stulz (1998),Duchin (2010) and Hann et al. (2013))

To test the trade-off of spending against liquidity, I estimate the sensitivity of investment to cash flows in recession versus non-recession periods based on the following regression:

$$\begin{aligned} Capex_i(t) =& \beta_0 + \beta_1 * CF_i(t) + \beta_2 * REC * CF_i(t) \\ &+ \beta_3 * Q_i(t-1) + \beta_4 * REC * Q_i(t-1) + \beta_5 * REC \end{aligned} \tag{13}$$

To examine the difference in investment pattern, I conduct cross-section analysis for each of the three pairs of subsample: stand-alone versus diversified firms, lowly-diversified firms versus highly-diversified firms in term of cash flow correlation, and lowly-diversified firms versus highly-diversified firms in term of investment opportunity correlation.

Then I employ Difference-in-Difference-in-Difference for robustness check, to further testify the effect of time-varying and cross-sectional difference. In firm-level investment regressions, the variable of interest is the change in coefficient of cash flow, namely how the investment decisions are made dependent on internally generated cash flows, across different firms in different time periods. While firm-level book-to-market may not be an appropriate proxy for investment opportunities, especially for diversified firms that constitute of more than one line of business, in this regression I use book-to-market as control variable only. For robustness purpose, I also include interaction of book-to-market and treatment effects in regressions, which produce similar results.

$$\begin{aligned} Capex_{i,j}(t) &= \beta_0 + \beta_1 * CF_i(t) + \beta_2 * REC * CF_i(t) \\ &+ \beta_3 * DIV * CF_i(t) + \beta_4 * REC * DIV * CF_i(t) \\ &+ \beta_5 * Q_j(t-1) + \beta_6 * REC \end{aligned} \tag{14}$$

Table VI reports estimates from panel regressions explaining firm-level investment for fis-

cal years 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. Regressions include no fixed effects, year fixed effects only and both firm and year fixed effects.

In order to examine whether there are systematic differences in the investment behavior of stand-alone firms and the conglomerate segments, and whether macroeconomic environment matters for this difference, I estimate the sensitivity of investment to cash flows in recession versus non-recession periods. Table VI presents the results of panel analysis for the full sample, diversified firms subsample divided with two measures of diversification, in terms of cash flow and investment opportunity correlation respectively. Results in Panel A show both stand-alone and diversified firms show significant investment-cash flow sensitivity, during both recession and non-recession periods, which is consistent with the existence of external capital market frictions. 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 Hovakimian (2011). However, Investment-cash flow sensitivity of stand-alone firms is significantly lower during recessions, which suggests that stand-alone firms spend less for investment while stockpile cash during recession. Specifically, the cash flow coefficient is 0.204, 0.205 and 0.0145 for non-recession periods, controlling for different fixed effects, and the coefficient on the interaction term between cash flow and RECESSION is -0.111, -0.111 and -0.0403, indicating almost 50% lower investment-cash flow sensitivity with no fixed effects and year fixed effects and 30% lower with year and firm fixed effects. Results in Panel B and C present results of diversified firms only, with different degree of diversification. With year and firm fixed effects, highly diversified firms show negative investment-cash flow sensitivity, which suggests that highly-diversified firms have lower financial constraints during non-recession periods and may have extra cash generated

internally. However, during recessions, both lowly-diversified and highly-diversified firms show significantly higher investment-cash flow sensitivity, which suggests they spend cash for investment when generated. Specifically, lowly-diversified firms show almost 50% higher investment-cash flow sensitivity and highly-diversified firms report 100% higher investment-cash flow sensitivity, indicating during recession, firms with higher degree of diversification spend more internally generated cash.

[Insert Table VI here]

I then employ Difference-in-Difference-Difference approach(equation(14)) for robustness check, whether the cross-sectional difference on investment-cash flow sensitivity is significant between stand-alone and diversified firms. Table VII show the variable of interest $DIV^*REC^*Cashflow$ has significantly positive coefficients in all three fixed effect regressions. This is consistent with the findings in Panel A of Table VI.

[Insert Table VII here]

Similarly I also employ Difference-in-Difference-Difference approach(equation(11) for robustness check, whether the cross-sectional difference on investment-cash flow sensitivity is significant between lowly- and highly-diversified firms. Table VIII show the variable of interest $HIGH^*REC^*Cashflow$ has significantly positive coefficients in all three fixed effect regressions. This is consistent with the findings in Panel B and C of Table VI.

[Insert Table VIII here]

D.1. Firm-level Cash-holding

I further include cross-sectional analysis to provide further support for the notion that the change in internal capital market efficiency is induced by financial constraints. Based on dividend payout, firm size, commercial paper rating, and KZ index, we identify conglomerates that are ex ante constrained or bank-dependent, which makes them more vulnerable to

the macroeconomic liquidity shocks. Table IX reports estimates from Diff-in-Diff regressions explaining corporate cash-holdings for fiscal years 1980-2012. Treatment *REC* indicate observations in recession periods. Regressions include results with no fixed effects, year fixed effects only and both firm and year fixed effects respectively. Financial constraints are measured based on: (i) firm size, (ii) dividend payouts, (iii) commercial paper ratings, (iv) the Whited and Wu (2006) financial constraints index, (v) the Kaplan and Zingales (1997) financial constraints index. Standard errors (in brackets) are heteroskedasticity consistent and clustered at the firm level. The evidence of cash holdings suggests stand-alone firms if financial constrained, will hoard more cash from internal capital, the difference across time is not obvious, which means they are still constrained during bad times. However stand-alone firms which are not ex ante financial constraints are much more sensitive to external financial shocks. Moreover, conglomerates, constrained or unconstrained, do not show the tendency or need to save more money, even in bad times. This suggests conglomerates are not vulnerable to outside financing, which may be due to the smooth capital variablity.

[Insert Table IX here]

E. Investment Efficiency: Diversification Discount

If the increased investment and increased Q-sensitivity by conglomerates is efficient, then we expect the diversification discount to reduce during times of recession. A strand of study following Berger and Ofek (1995) compare the difference between a conglomerate and a portfolio of comparable stand-alone firms and show the evidence of diversification discount. Another recent strand of study question the methodology and data used in this and related computation. While whether the diversification discount is appropriate is beyond my study, I follow this approach to see if there is diversification discount changes over time. Table X below shows that the overall diversification discount exists, but it diminishes during bad

times, the coefficient on *REC* is significantly negative, both using asset-weighted portfolio or sales-weighted portfolio of stand-alone firms, after control for firm characteristics and segment characteristics.

VII. Conclusion

This study examines the differences between the investment behaviors of stand-alone firms and conglomerates over business cycle and find preliminarily:

- Diversification facilitates more effective use of internal capital during recessions in term of Q-sensitivity, i.e. whether a firm invests more in segment with high growth opportunity or less with low growth opportunity.
- The degree of utilization of internal capital by conglomerates increases with the ability to smooth capital variability. That is conglomerates with higher degree of diversification reallocate resource more actively.
- The increased Q-sensitivity of investment is associated with decreases in diversification discount of conglomerates during recessions, suggesting enhanced efficiency of internal capital markets. This provides evidence against the argument that inefficient resource allocation is due to firm characteristics and measurement errors. It extends the literature on bright side of internal capital markets and how business cycle affects investment decisions of conglomerates differently from stand-alone firms.

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Figure 1. Time Series of Firm-level Investment

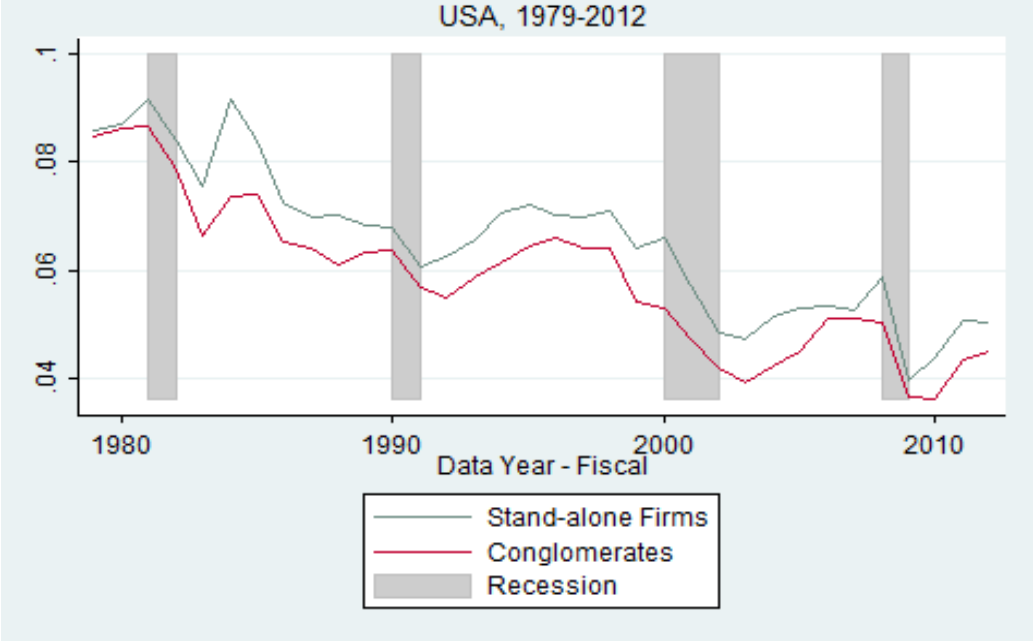

Figure 2. Time Series of Segment-level Investment

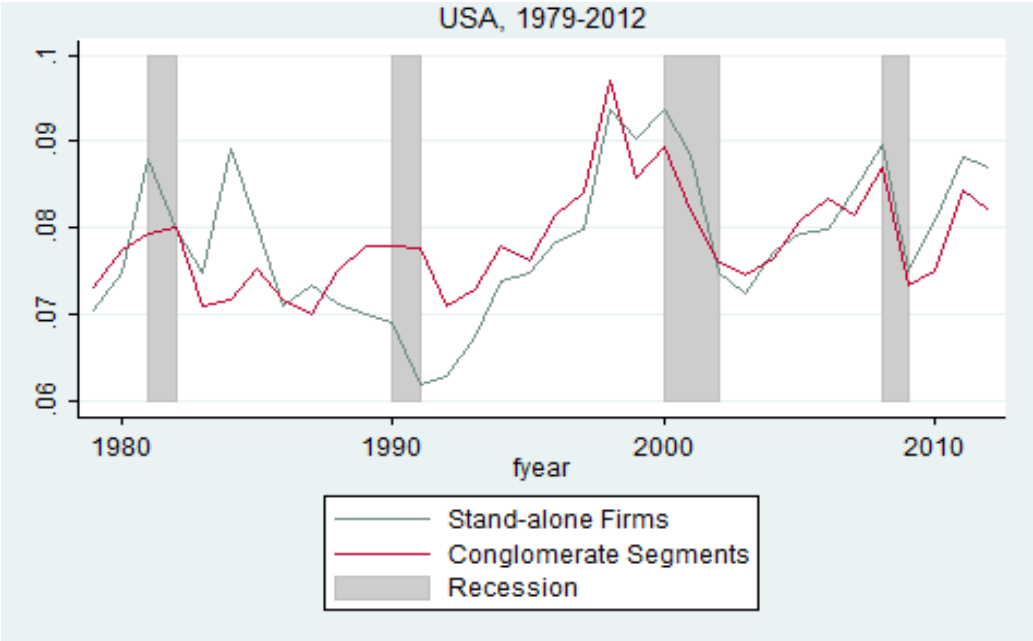

Table I Segment-level Descriptive Statistics

	N	Mean	Median	Min	25%	75%	Max
				All			
Segment Assets	61,819	974.5	206.8	12.6	72.3	686.7	17,161.0
Segment Sales	61,819	1,039.0	236.9	26.4	85.7	768.5	17,759.0
Segment Cash Flow	61,819	145.817	26.683	-52.000	6.838	102.051	2571
Segment Capital Expenditure	61,819	59.293	9.536	0.076	2.581	38.098	1099
Segment Number	61,819	1.730	1.000	1.000	1.000	2.000	11.000
Lagged Industry Q	61,819	1.571	1.446	0.766	1.184	1.862	3.431
Segment Cash Flow/Sales	61,819	0.138	0.118	-0.467	0.059	0.194	0.764
Segment Capital Expenditure/Sales	61,819	0.073	0.038	0.001	0.019	0.074	0.698
Segment Cash Flow/Assets	61,819	0.158	0.145	-0.303	0.081	0.222	0.788
Segment Capital Expenditure/Assets	61,819	0.069	0.049	0.001	0.024	0.090	0.353
				Expansion			
Segment Assets	45,640	829.1	178.4	12.6	64.4	586.6	17,161.0
Segment Sales	45,640	912.9	212.5	26.4	78.5	668.1	17,759.0
Segment Cash Flow	45,640	126.366	23.986	-52.000	6.580	88.138	2571
Segment Capital Expenditure	45,640	52.926	8.776	0.076	2.451	34.139	1099
Segment Number	45,640	1.725	1.000	1.000	1.000	2.000	11.000
Lagged Industry Q	45,640	1.584	1.452	0.766	1.201	1.868	3.431
Segment Cash Flow/Sales	45,640	0.137	0.117	-0.467	0.060	0.189	0.764
Segment Capital Expenditure/Sales	45,640	0.073	0.039	0.001	0.020	0.074	0.698
Segment Cash Flow/Assets	45,640	0.160	0.147	-0.303	0.085	0.222	0.788
Segment Capital Expenditure/Assets	45,640	0.071	0.051	0.001	0.026	0.092	0.353
				Recession			
Segment Assets	11,608	1,123.1	256.3	12.6	87.9	824.4	17,161.0
Segment Sales	11,608	1,174.2	282.0	26.4	99.1	926.0	17,759.0
Segment Cash Flow	11,608	162.501	30.351	-52.000	6.393	120.115	2571
Segment Capital Expenditure	11,608	69.089	10.985	0.076	2.846	45.999	1099
Segment Number	11,608	1.805	1.000	1.000	1.000	2.000	10.000
Lagged Industry Q	11,608	1.504	1.356	0.766	1.091	1.819	3.431
Segment Cash Flow/Sales	11,608	0.130	0.113	-0.467	0.049	0.195	0.764
Segment Capital Expenditure/Sales	11,608	0.074	0.037	0.001	0.018	0.075	0.698
Segment Cash Flow/Assets	11,608	0.149	0.137	-0.303	0.068	0.217	0.788
Segment Capital Expenditure/Assets	11,608	0.068	0.046	0.001	0.022	0.089	0.353

Table II Firm-level Descriptive Statistics

	N	Mean	Median	Min	25%	75%	Max
				All			
Assets	48,123	1,448.5	259.0	15.9	88.8	907.5	27,732.0
Sales	48,123	1,753.9	272.1	20.7	95.8	945.7	447,191.1
Sales Growth	48,123	1.089	1.078	0.697	1.010	1.148	1.740
Leverage	48,123	0.218	0.195	0.000	0.046	0.340	0.730
Acquisition	48,123	0.023	0.000	-0.002	0.000	0.012	0.339
New Working Capital	48,123	0.131	0.120	-0.297	0.007	0.248	0.572
Debt Ratio	48,123	0.245	0.218	0.000	0.053	0.378	0.876
Cash Holding	48,123	0.148	0.076	0.000	0.022	0.212	0.746
Dividend	48,123	0.029	0.008	-0.098	0.000	0.030	3.272
Book-to-Market	48,123	1.533	1.295	0.626	1.027	1.787	4.548
Investment	48,123	0.071	0.038	0.001	0.020	0.072	0.683
Cash Flow	48,123	0.123	0.110	-0.463	0.055	0.178	0.655
Free Cash Flow	48,123	93.823	9.894	-175.000	0.872	50.999	2,069
				Stand-Alone Firms			
Assets	38,765	992.9	192.9	15.9	73.0	601.5	27,732.0
Sales	38,765	1,110.1	199.4	20.7	78.3	606.7	195,805.0
Sales Growth	38,765	1.090	1.080	0.697	1.012	1.150	1.740
Leverage	38,765	0.208	0.174	0.000	0.025	0.336	0.730
Acquisition	38,765	0.022	0.000	-0.002	0.000	0.007	0.339
New Working Capital	38,765	0.130	0.120	-0.297	-0.003	0.256	0.572
Debt Ratio	38,765	0.235	0.195	0.000	0.029	0.375	0.876
Cash Holding	38,765	0.165	0.090	0.000	0.024	0.249	0.746
Dividend	38,765	0.028	0.004	-0.098	0.000	0.027	3.272
Book-to-Market	38,765	1.579	1.325	0.626	1.030	1.868	4.548
Investment	38,765	0.073	0.037	0.001	0.018	0.073	0.683
Cash Flow	38,765	0.121	0.106	-0.463	0.049	0.180	0.655
Free Cash Flow	38,765	63.295	6.917	-175.000	0.154	32.513	2,069
				Conglomerates			
Assets	9,358	3,273.7	951.5	17.7	312.2	3,083.6	27,732.0
Sales	9,358	4,332.8	1,092.2	44.6	369.1	3,151.2	447,191.1
Sales Growth	9,358	1.085	1.071	0.697	1.003	1.144	1.740
Leverage	9,358	0.257	0.247	0.000	0.148	0.351	0.730
Acquisition	9,358	0.029	0.000	-0.002	0.000	0.028	0.339
New Working Capital	9,358	0.135	0.122	-0.297	0.038	0.222	0.572
Debt Ratio	9,358	0.285	0.273	0.000	0.164	0.387	0.876
Cash Holding	9,358	0.078	0.045	0.000	0.017	0.107	0.746
Dividend	9,358	0.032	0.018	-0.001	0.005	0.038	1.275
Book-to-Market	9,358	1.344	1.210	0.626	1.017	1.530	4.548
Investment	9,358	0.063	0.042	0.001	0.026	0.069	0.683
Cash Flow	9,358	0.132	0.120	-0.463	0.078	0.172	0.655
Free Cash Flow	9,358	221.458	48.237	-175.000	9.824	201.164	2,069

Figure 4. Q-sensitivity of Investment during Recession

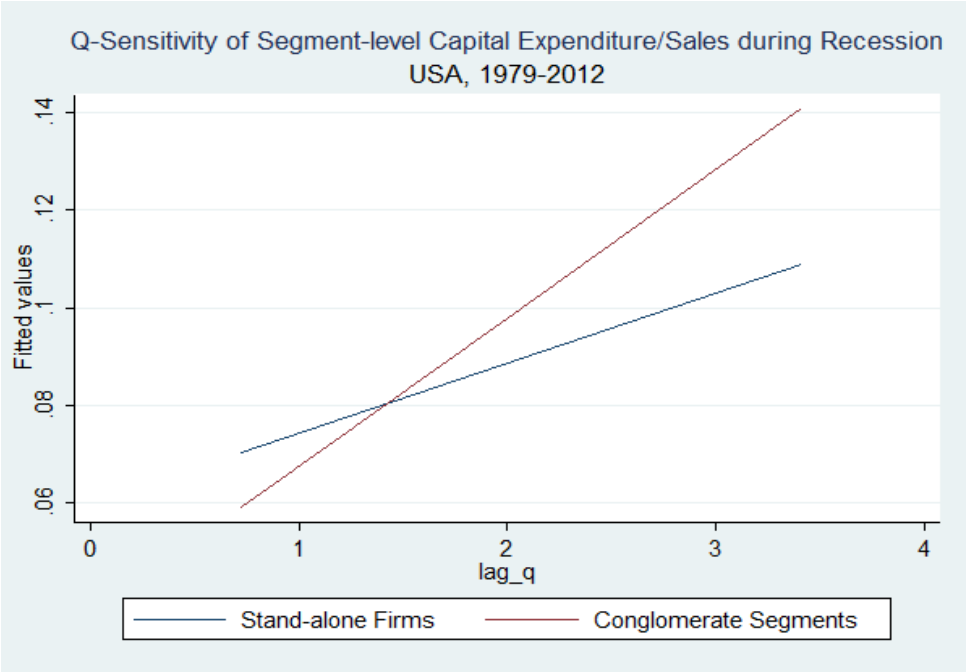

Figure 3. Q-sensitivity of Investment during Expansion

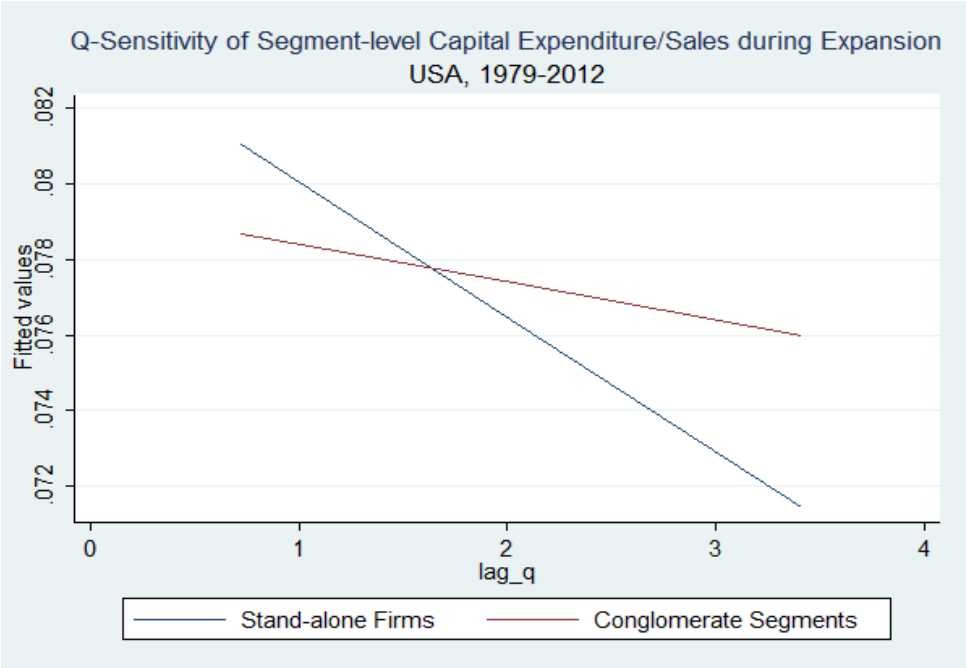

Table III The Business Cycle and Cross-section of Segment-level Investment

This table reports estimates from panel regressions explaining segment-level investment for fiscal years 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. 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

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

Table V – *Continued*

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 IV Segment-level Investment: Stand-alone vs. Diversified firms

This table reports estimates from Diff-in-Diff-in-Diff regressions explaining segment-level investment for fiscal years 1980-2012. Treatment *REC* indicate observations in recession periods, *DIV* indicates observations of diversified firms. 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 V Segment-level Investment: Lowly- vs. Highly-diversified firms

This table reports estimates from Diff-in-Diff-in-Diff regressions explaining segment-level investment for fiscal years 1980-2012. Treatment *REC* indicate observations in recession periods, *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)
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 VI The Business Cycle and Cross-section of Firm-level Investment

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 X – *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 VII Firm-level Investment: Stand-alone vs. Diversified firms

This table reports estimates from Diff-in-Diff-in-Diff regressions explaining firm-level investment for fiscal years 1980-2012. Treatment *REC* indicate observations in recession periods, *DIV* indicates observations of diversified firms. 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 VIII Firm-level Investment: Lowly vs. Highly-diversified firms

This table reports estimates from Diff-in-Diff-in-Diff regressions explaining firm-level investment for fiscal years 1980-2012. Treatment *REC* indicate observations in recession periods, *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 IX Firm-level Cash-holding and Financial Constraint

Financial constraint		Stand-alone		Diversified	
		Constrianed	Unconstrained	Constrianed	Unconstrained
Dividend	Cashflow	**0.211****	0.0178	0.228	-0.0710
		(0.0852)	(0.0617)	(0.148)	(0.0498)
	REC*cashflow	0.0163	**0.319****	-0.342	0.0457
		(0.179)	(0.154)	(0.310)	(0.0570)
Rating	Cashflow	**0.135*****	-0.229*	-0.0819	-0.0103
		(0.0462)	(0.126)	(0.0592)	(0.0805)
	REC*cashflow	0.143	**0.850***	0.0468	-0.287
		(0.101)	(0.511)	(0.0891)	(0.215)
WW index	Cashflow	**0.232*****	-0.167***	-0.0185	-0.0663
		(0.0635)	(0.0568)	(0.0915)	(0.0533)
	REC*cashflow	0.0400	**0.349*****	-0.0923	0.0593
		(0.125)	(0.104)	(0.180)	(0.0720)
KZ index	Cashflow	**0.141***	0.0581	0.142***	-0.161**
		(0.0844)	(0.0609)	(0.0536)	(0.0736)
	REC*cashflow	0.201	**0.294*****	-0.285*	0.154
		(0.182)	(0.112)	(0.162)	(0.0923)

Table X Investment Efficiency – Diversification Discount

The dependent variable is diversification discount, calculated as the difference between a conglomerate's book-to-market ratio and a sales-weighted/asset-weighted portfolio of stand-alone firms

	(1) sales-weighted	(2) asset-weight
Constant	0.108***	0.108***
	(0.00357)	(0.00358)
REC	-0.0139**	-0.0134**
	(0.00643)	(0.00645)
segment sales	-1.63e-06	-1.48e-06
	(1.02e-06)	(1.02e-06)
segment asset	1.22e-05***	1.18e-05***
	(1.33e-06)	(1.33e-06)
segment cash flows	-7.78e-05***	-7.46e-05***
	(6.55e-06)	(6.58e-06)
Observations	27,116	27,116
R-squared	0.552	0.549