

# The Mutual Friend: Dual Holder Monitoring and Firm Investment Efficiency

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We investigate the influence of simultaneous equity holdings by creditors (dual holders) on investment efficiency. Such creditors have stronger incentives and power to monitor firm investment as they have cash flow and control rights from both debt and equity sides. We provide evidence that dual holders, particularly noncommercial bank dual holders, significantly mitigate overinvestment. For high growth firms and those subject to debt overhang, dual holders also alleviate underinvestment. Equity value increases at the presence of dual holders. Our results indicate that by improving firm investment efficiency, dual holders not only make creditor investments safer but also create value for shareholders. (*JEL* G23, G31, G34)

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## Introduction

What happens when institutional shareholders are also creditors of the same firms in which they hold shares? Prior studies on such "dual holders" have shown that they tend to carry out information driven trades on the equity side using their superior information obtained from the debt side, raising potential regulatory concerns (Ivashina and Sun, 2011; Massa and Rehman, 2008; Massoud et al., 2011). On the other hand, research has also shown a bright side of dual holders, arguing that they facilitate incentive alignment between shareholders and creditors, leading to better creditor monitoring capacity and reduced firm risk.

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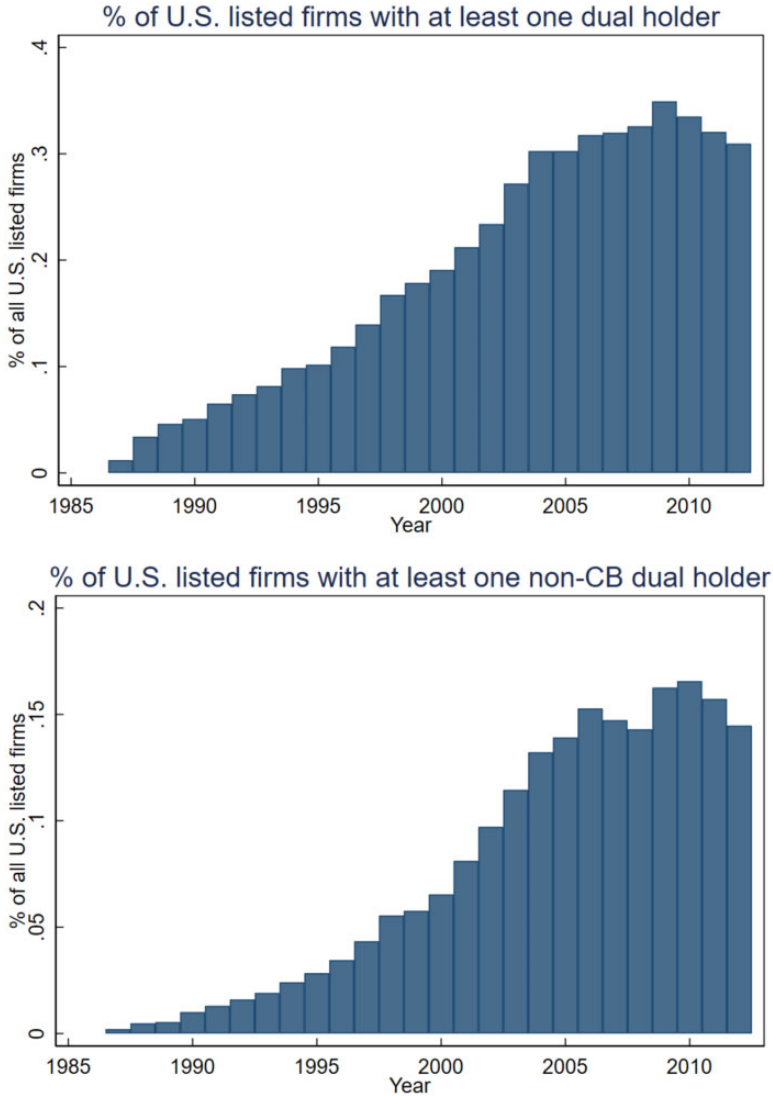
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This is evidenced by better loan terms including lower loan spreads (Jiang, Li, and Shao, 2010) and lower likelihood of having capital expenditures (CAPEX) covenants (Chava, Wang, and Zou, 2017). Chu (2017) goes beyond contractual terms and provides evidence of dual holder effect on real firm decisions by showing reduced payout levels. In the same spirit, this paper shows that such incentive alignment facilitated by dual holders mitigates inefficiencies in real corporate investment decisions. This result sheds light on the channels through which dual holders cast their influence and result in the favorable loan terms evidenced by prior studies.

The conflict of interests between shareholders and creditors is often reflected in payout and investment decisions (Jensen and Meckling, 1976). Shareholders tend to pressure for more payout to transfer wealth from creditors, especially during financial distress. Chu (2017) shows that, because dual holders internalize such conflict of interests, excess payout is mitigated. Shareholders can also shift risk to creditors by pressuring management to overinvest in risky projects. Dual holders have less incentive to do so, because they will be shifting risk from left pocket to right pocket. Overinvestment also can be caused by managerial overconfidence and empire building. Combining control power on the equity side with superior information and informal control rights (e.g., covenant renegotiation (Denis and Wang, 2014)) on the debt side, dual holders are also better equipped to monitor against managerial overinvestment and risk shifting by non-dual-holding shareholders.

The shareholder-creditor conflict can also lead to underinvestment. In highly levered firms, creditors are likely to reap most of the profits from a safe investment with stable future cash flows (Myers, 1977). As a result, these firms forgo some investments even with positive net present values (NPVs) and instead may overinvest in risky projects. Dual holders should mitigate this problem, because they can benefit from the investment through either their debt or equity holdings as long as the investment has a positive NPV. Overall, the incentive alignment and better monitoring fostered by dual holders should lead to improved investment efficiency.

As presented in Figure 1, the number of U.S.-listed firms with dual holders began substantially increasing from the mid-1990s until the 2007–2008 financial crisis, thanks to deregulation in the financial services industry and substantial amount of financial institution mergers. Even with the decline after 2008, the number of U.S. public firms with dual holders remains substantial at around 30% of all firms listed on NYSE, AMEX, and NASDAQ. From 1987 to 2012, the average number of dual holders in a firm with dual holder is 5.05, with an average of 4.18% equity in dual holding per firm.



**Figure 1**  
**Summary of the dual holder trend**

This figure presents the trend of dual holder participation over the sample period of 1987 to 2012, as the percentage of all U.S.-listed firms with dual holders and noncommercial bank (non-CB) dual holders. Firms listed on the NYSE, NASDAQ, and AMEX are included in the U.S.-listed firm universe.

Dual holder is defined following Jiang, Li, and Shao (2010), as institutions holding the firm’s syndicated loans and equity of over 1% of its total shares or value over 2 million U.S. dollars. Institutions involvements in syndicated loans usually make them significant creditors of

the borrowing firm.<sup>1</sup> As a result, syndicated loans represent influential and long-term debt ownership of the borrowing firms. The fluidity and high turnovers of bond ownership exclude it from use. Gorton and Winton (2003) point out that private bank debt is the largest source of external finance for corporations in developed economies, with more flows than public debt and equity combined. Because of the dispersed nature of corporate bonds, bond owners are more likely to be subject to the collective action problem when it comes to monitoring. As a result, omitting bond ownership should not significantly exclude those shareholders who can leverage information and power on the debt side. Many of the dual holders in our sample are large conglomerates who may also hold bonds of the same firms. They may have even stronger incentives to engage in monitoring in this case. Therefore, using bank loans to identify dual holders should only underestimate the positive effect of dual holder monitoring on investment decisions.

We follow Richardson (2006) to identify investment deviations from expected levels based on growth opportunities and capital structure. Our baseline results indicate that dual holders on average mitigate investment distortion, with the effect mostly pronounced on overinvestment. The effect is mainly driven by noncommercial bank (non-CB) dual holders, consistent with previous findings.<sup>2</sup> Indeed, this literature has focused on non-CB dual holders, as commercial bank (CB) dual holders have the voting rights, but not the cash flow rights, on the equity side through holding shares with their trust accounts (Santos and Wilson, 2008). Having at least one non-CB dual holder in the firm can reduce overinvestment by 1% of total assets, which is substantial compared to the sample average overinvestment level (3.22% of total assets). CB dual holders can also mitigate overinvestment but to a much smaller extent. CB dual holders appear to even "overcorrect" and lead to a slight exacerbation of underinvestment. There is no significant effect from non-CB dual holders on underinvestment for the average firm. The effect of dual holders on overinvestment increases as number of dual holders and equity held by dual holders increase, suggesting that dual holder interests are generally aligned. It is also more pronounced when dual holders have major participation in their syndicated loans.

To further investigate the underinvestment problem, we focus on firms that are likely to be subject to debt overhang. For firms with higher leverage, both risk shifting and underinvestment are more pronounced.

<sup>1</sup> Ivashina and Sun (2011) point out an important characteristic of syndicated loans: they are issued to very large firms that are unlikely to be financially constrained. A syndicated loan is originated and monitored by a bank and funded by a group of lenders. Firms turn to syndicated loans when the projects they want to fund require too large of a loan for a single lender.

<sup>2</sup> Jiang, Li, and Shao (2010) and Chava, Wang, and Zou (2017) also find effects from CB dual holders, yet they are of much smaller economic magnitude.

We find some evidence that non-CB dual holders indeed mitigate underinvestment specifically for these firms. We further show that non-CB dual holders also mitigate the underinvestment problem for firms with high sales growths. Underinvestment is more costly for firms facing many growth opportunities. These results suggest that non-CB dual holders also alleviate the underinvestment problem when it is costly. Our additional analyses also indicate that underinvestment is mitigated mostly for CAPEX investments, which are the type of "safe investments" most likely to be forgone amid debt overhang (Chu, 2019).

Meanwhile, the effect of non-CB dual holders on overinvestment is mainly driven by cash acquisitions, providing evidence that dual holders serve as "the mutual friend" mitigating managerial agency costs for both shareholders and creditors. Empirical evidence in prior studies has shown that acquisitions are on average value destroying for both shareholders (Moeller, Schlingemann, and Stulz, 2005) and creditors (Billett, King, and Mauer, 2004). Finally, equity value increases with the presence of non-CB dual holders, specifically for firms in an overinvestment setting. Non-CB dual holders benefit regular shareholders by avoiding value loss from overinvestment, while lowering cash flow risk for creditors' debt investments.

To mitigate the reverse causality concern that investors self-select into dual holding in firms with more efficient investment policies, we use an instrumental variable (IV) approach and focus on the increased presence of dual holders induced by mergers between financial institutions. A regular institutional shareholder of a firm can become its dual holder by taking over debt holdings of another institution in an acquisition. Merging institutions tend to be large and hold extensive portfolios. They are unlikely to merge in order to become dual holders of certain firms with high investment efficiency. The IV regression results are consistent with our findings of non-CB dual holder's effects on overinvestment and underinvestment, suggesting that the link we have identified between dual holder monitoring and investment efficiency is indeed rooted in a causal relationship. However, we need to interpret the IV result of non-CB dual holders mitigating underinvestment for highly levered firms with caution, because the coefficient no longer has enough statistical power.

We first contribute to the growing dual holder literature. While some studies have uncovered dual holders' rent extraction behavior of trading on nonpublic information obtained from debt participation, other research shows that dual holders can benefit firms by facilitating shareholder creditor incentive alignment and better creditor monitoring capacity. This paper provides more direct empirical evidence of how such benefits are translated from more favorable loan terms (Chava, Wang, and Zou, 2017; Jiang, Li, and Shao, 2010) to be reflected in real

firm investment decisions. Our findings help better understand channels through which dual holders facilitate incentive alignment and more effective monitoring.

We then complement the corporate governance literature first on shareholder governance. While we already know that shareholders can govern through voice (Schleifer and Vishny, 1986), exit (Edmans, 2009), or activist campaigns, this paper shows that shareholders can also leverage information and bargaining power obtained from simultaneous debt holdings to better monitor against managerial agency costs and mitigate the agency cost of debt. Recent research has also shown more evidence on creditor governance through channels such as covenant restriction (Nini, Smith, and Sufi, 2009), covenant renegotiation (Denis and Wang, 2014), and post-covenant violation intervention (Nini, Smith, and Sufi, 2012). We add to this emerging literature showing that creditors can also effectively mitigate managerial discretion and shareholder risk shifting when they take on equity positions.

Lastly, our results add to the findings on information flow and decision coordination within financial conglomerates (Gaspar, Massa, and Matos, 2006). Prior dual holder literature has been able to shed light on how financial conglomerates can utilize their positions on both the debt and equity sides of the same firms for the benefits of their portfolio value as a group. While such findings may call for more stringent regulations over housing lending and asset managing institutions under the same roof, the positive influence it can facilitate also has been evident. Our results complement these findings from a new angle by showing the influence of such coordination on real firm decisions.

## 1. Hypothesis Development

### 1.1 Dual holders and overinvestment

A firm can overinvest because of either managerial agency costs or shareholder risk shifting. First, managers' incentives to pursue personal benefits can lead to empire-building acquisitions that destroy shareholder value (Jensen, 1986). Meanwhile, overconfidence can also lead managers to overestimate the returns of certain suboptimal investments (Malmendier and Tate, 2008). This overinvestment problem is detrimental to both shareholders and creditors. Suboptimal investment projects have negative net present values and destroy shareholder wealth. At the same time, the costs and limited income of these projects also increase future cash flow risk for creditors.

We argue that the presence of dual holders will help alleviate this overinvestment problem through increased monitoring, coming from two channels: higher incentives to monitor, and higher ability to monitor.

Dual holders should be more incentivized to monitor against such managerial misbehavior in this case. The marginal benefit of monitoring is higher, because dual holders have stakes on both the debt and equity sides, meaning the harm from managerial overinvestment is amplified for dual holders.

In addition to stronger incentives, dual holders are also better equipped to monitor against such investment inefficiencies as they can influence management through both debt and equity channels. As evidenced by prior literature on dual holders, there is information flow and decision coordination among a financial group's lending and asset management divisions. Compared to regular shareholders, dual holders enjoy more superior information about the firm's financial conditions and growth opportunities from their debt involvement.<sup>3</sup> As creditors, dual holders can also exert influence on management even before any covenant violation through loan renegotiation.

Compared to regular creditors, dual holders possess control power that enables them to directly influence managerial decisions, whereas regular creditors can only have informal control rights through covenants or covenant renegotiations (Denis and Wang, 2014; Nini, Smith, and Sufi, 2009, 2012). Dual holders can use the voice channel to jawbone managers, supported by their voting rights (Schleifer and Vishny, 1986), or the exit channel to impound their superior information into stock prices through disciplinary trading (Edmans, 2009). Such threats can discipline managers from overinvesting in pursuit of personal benefits. As in Jiang, Li, and Shao (2010), we argue that there is centralized decision coordination at the institution level within financial groups in order to enhance value for the group as a whole (Gaspar, Massa, and Matos, 2006). Dual holders should be able to combine their power through both the debt and equity channels to avoid overinvestment which can put their investments on both sides at risk<sup>4</sup>.

Commercial bank (CB) dual holders mostly hold equity through their trust accounts and do not have the cash flow rights of the stocks they hold (Santos and Wilson, 2008). Therefore, CB dual holders should have less incentive to monitor against managerial overinvestment than non-CB dual holders. Although CB dual holders can still utilize their control rights on the equity side to safeguard their debt investments, the marginal benefit of conducting monitoring is not as high as that for non-CB dual

<sup>3</sup> Borrowers in syndicated loans routinely report nonpublic information, such as monthly financial statements and internal projected future performance, to lenders. Ivashina and Sun (2011) point out that such information is usually protected by a confidentiality agreement and not subject to SEC Regulation Fair Disclosure.

<sup>4</sup> As indicated in Massa and Rehman (2008), "Chinese walls were originally meant to prevent investment bankers from exerting influence on analysts' research reports and to physically segregate the investment banking department from the brokerage, research, and other departments. They were, however, not designed to separate the commercial lending from the investment activity."



holders. We expect the effect of dual holders on mitigating overinvestment to be mainly driven by non-CB dual holders as in [Jiang, Li, and Shao \(2010\)](#) and [Chava, Wang, and Zou \(2017\)](#).

In addition to managerial agency costs, overinvestment can also occur due to shareholder risk shifting ([Jensen and Meckling, 1976](#)). Shareholders can pressure managers to pursue high risk high payoff investment projects in order to shift risk to creditors. Dual holders can facilitate incentive alignment between shareholders and creditors ([Chu, 2017](#); [Jiang, Li, and Shao, 2010](#)), so the incentives for such risk-shifting behavior should be lower. Pursuing high risk projects means shifting risk from left pocket to right pocket for dual holders. Having control power on the equity side can also allow dual holders to safeguard their debt investments from regular shareholders who do want managers to pursue risk-shifting behavior.

Taken together, the above rationale leads to the hypothesis that dual holders, especially non-CB, should mitigate overinvestment independently of whether it comes from managerial discretion or shareholder risk shifting. Dual holders would better monitor and have better incentive alignment, respectively. This effect should be increasing in the number of dual holders, and in the stake they hold both in equity and in loan participation.

## 1.2 Dual holders and underinvestment

Dual holders could also influence underinvestment, by internalizing shareholder creditor conflicts in a debt overhang situation. A firm subject to debt overhang may underinvest because creditors are likely to reap most of the investment payoffs ([Myers, 1977](#)), and, hence, shareholders would not support those investments. Firms can be underinvesting in safe projects and overinvesting in risky projects due to shareholder risk shifting. Incentive alignment facilitated by dual holders can mitigate this situation, because they are shareholders with debt claims ([Stulz, 1990](#)). As long as the project has a positive net present value, dual holders can benefit from it through either debt or equity. Meanwhile, taking on a new investment project for an underinvesting firm means raising new funds. This can make creditors' holdings riskier if it is through debt. It can also dilute the market value and control power of shareholders if it is through equity ([Myers and Majluf, 1984](#)). However, firms with dual holders enjoy improvement on credit conditions and easier access to debt financing ([Jiang, Li, and Shao, 2010](#)). This should alleviate the concerns raised by obtaining more external financing.

Debt overhang can also depend on the types of investment, as pointed out by [Chu \(2019\)](#). R&D projects may not benefit creditors as capital expenditures do due to their riskiness and uncertainty. Acquisitions also



have been shown to destroy creditor value (Billett, King, and Mauer, 2004). Therefore, if dual holders do mitigate underinvestment by alleviating debt overhang, the effect is likely to be more pronounced in capital expenditures. Overall, our hypothesis suggests that dual holders can also mitigate underinvestment for a particular subset of firms, those for which the underinvestment problem is more costly.

## 2. Data Overview

We select a sample of U.S.-listed firms from 1987 to 2012, restricted to firms with common stocks traded on NYSE, AMEX, and NASDAQ. Financial institution equity holding data are obtained from the 13F institutional holding database from Thomson Reuters. Debt holding data are obtained from the Reuters Loan Pricing Corporations (LPC) DealScan syndicated loan database. A syndicated loan deal can include multiple loan facilities allowing lenders with different investment horizons to participate. We match the facilities through GVKEY with the Compustat financial data using the link table available on DealScan (which provides matching up to 2012).

The above process leaves us with 44,947 facilities. The main challenge of dealing with these data is matching the institutions in these two separate databases. Because many institutional investors have different compositions of their names in the two databases, we manually match them by checking the SEC and Bloomberg Web sites for changes of names, subsidiary relationships, and mergers after an algorithmic fuzzy match. We aggregate the holdings of the first-level subsidiaries into the parent companies holdings. When there is a merger between two institutions, we aggregate the holdings of the target into the acquirers after the completion date. We obtain 2,454 matched pairs of lenders and managers from DealScan and 13F equity holdings in our sample. Of the 44,947 facilities in the sample, 16,996 have at least one dual holder. These facilities are associated with 11,996 loan deals and 2,657 borrower companies. The final sample includes 104,151 firm-year observations.

We use a regression of all-in-drawn loan spread on the presence of dual holders similar to that used in Jiang, Li, and Shao (2010) and show consistency with their findings. Table A.2 provides evidence that firms with dual holders enjoy cheaper access to debt financing. By including the number of dual holders, we show that dual holders appear to have aligned interests and can be treated as a block. Having more dual holders can strengthen the effect of monitoring posited in Jiang, Li, and Shao (2010). This effect is also mainly pronounced for financially risky firms (low z-score or high leverage).

We classify investor styles following the Brian Bushee institutional investor classifications (Bushee, 1998). The majority of dual holders in our sample are identified as investors with long investment horizon (72% of dual holders classified as dedicated or quasi-indexer). We also track the holdings of the transient and unclassified dual holders dynamically, as some of such investors also engage in dual holding beyond transience. For example, Morgan Stanley is classified as a transient asset manager, yet it remains as a dual holder of Alpharma Inc. for 5 years. We keep transient and unclassified dual holders with dual holding period over 1 year in our sample, leaving 94% of the original dual holders to be included in our analysis. The average holding period of a dual holder is 7.63 years, whereas the median holding period is similar at 7 years.<sup>5</sup> The average equity holding of a dual holder is 0.85% for the full sample, and 4.18% for firms with dual holders.

Table A.3 presents the top-ten CB and non-CB dual holders based on number of dual holding loans involved (the loans of subsidiaries and predecessors are aggregated according to ultimate parent IDs provided by DealScan).<sup>6</sup> Among the top CB dual holders are large banking conglomerates such as Bank of America, JP Morgan & Chase, and Wells Fargo. Such corporations all went through a series of significant mergers with other large financial institutions throughout the sample period, leading to asset takeovers which allowed them to become dual holders of many firms. Some top non-CB dual holders on the list were also involved in such mergers and ended up becoming parts of CB conglomerates. For example, JP Morgan (formerly non-CB) merged with Chase Manhattan Bank in 2000, with Bank One in 2004, and took over the assets of Lehman Brothers and Bear Stearns in 2008; and Bank of America acquired Merrill Lynch at the height of the 2008 Financial Crisis.

### 3. Research Design

To measure over/underinvestment, we follow the approach of Richardson (2006) to estimate abnormal investments based on investment regression residuals. Both CAPEX and non-CAPEX investments are included in the calculation of the firm investment ratio  $I$ . We then subtract the annual depreciation and amortization expenses, which are considered maintenance investments  $I_{maintenance}$ , to measure the new investments,  $I_{new}$ :

<sup>5</sup> As shown in Jiang, Li, and Shao (2010), dual holders typically engage in a long-term lending relationship with the dual held firms beyond just one syndicated loan.

<sup>6</sup> Jiang, Li, and Shao (2010) and Chava, Wang, and Zou (2017) show that lending institutions can influence borrowers through shares held by their subsidiaries.

$$I_{new,t} = \frac{CAPEX_t + Acquisitions_t + R\&D_t - Sales\ of\ PP\ \&\ E_t}{\underbrace{TotalAssets_{t-1}}_I} - \frac{Depreciation\ and\ Amortization_t}{\underbrace{TotalAssets_{t-1}}_{I_{maintenance}}} \quad (1)$$

We then regress  $I_{new}$  on growth opportunities (book to market), controlling for capital structure (leverage and cash holdings), firm listed age (logged), firm size (log of total assets), annual stock return, as well as year and industry fixed effects. The residuals obtained from this regression,  $I_{new}^e$ , reflect the levels of deviation from expected investments for each firm  $i$ :

$$I_{new,i,t} = \beta_1 Book\ to\ market_{i,t-1} + \beta_2 Leverage_{i,t-1} + \beta_3 Cash_{i,t-1} + \beta_4 Age_{i,t-1} + \beta_5 Size_{i,t-1} + \beta_6 Stock\ Return_{i,t-1} + Year\ FE + Industry\ FE + I_{new,i,t}^e \quad (2)$$

This residual variable  $I_{new}^e$ , calculated as actual investment minus predicted ( $I_{new} - \hat{I}_{new}$ ), is the key variable of interest, and measures investment distortion. For the presence of dual holders, we use a dummy variable *Dual holder*, which equals one if the firm has at least one dual holder during the year. Alternatively, we also measure the presence of dual holders with the variable *# of Dual holders* (the log of one plus the number of dual holders in the firm-year observation) and *% Held by Dual holders* (aggregated equity holdings by all dual holders in the firm during the year). We first regress the absolute value of  $I_{new}^e$  on *Dual holder* to measure the presence of dual holders helps mitigate investment distortion (the overall level of deviations from expected investments). We then define the overinvestment measure *OverI* as a variable that equals  $I_{new}^e$  when it is positive and zero when it is negative. Vice versa, we define the underinvestment measure *UnderI* as a variable that equals the absolute value of  $I_{new}^e$  when it is negative and zero when it is positive. Regressions of these two variables on *Dual holder* can give us an idea of which type of investment inefficiency dual holders are mitigating:

$$|I_{new,i,t}^e| = \beta_1 Dual\ holder_{i,t-1} + \sum_{j=1}^J \gamma_j Control_{j,i,t-1} + Firm\ FE + Industry \times Year\ FE + \epsilon. \quad (3)$$

The  $J$  controls reflect a list of firm characteristics that have been shown by prior literature to affect corporate investment and are not already included in the first stage regression based on Equation (2). *Sales*

*Growth* provides another measure of growth opportunities. Operating *Cash Flow* and asset *Tangibility* help account for potential financial constraints on firm investment decisions. Profitability and payout policy can also affect the funding needed for investment, and therefore we include two dummy variables, *Loss* and *Payout*. *Loss* is a dummy variable that equals one if the firm has a negative net income for the year. *Payout* indicates whether the firm makes any payout during the year.

We further control for shareholder governance by including total *Institutional Ownership* percentage and a dummy variable *Blockholder*, that indicates whether there is a blockholder in the firm. The Altman  $z$  – *score* is used to measure the firms distance to default. A higher score indicates a lower probability of default. Because we already account for firm leverage in the first regression, we control for industry capital structure to further capture firms' access to debt financing alongside with the  $z$ -score. *Industry Capital Structure* is the industry average leverage ratio. All explanatory variables are lagged 1 year. Firm fixed effects are included to isolate potential unobserved time-invariant within-firm variables. We also use industry $\times$ year fixed effects to control for industry-specific shocks throughout the sample period.

## 4. Empirical Results

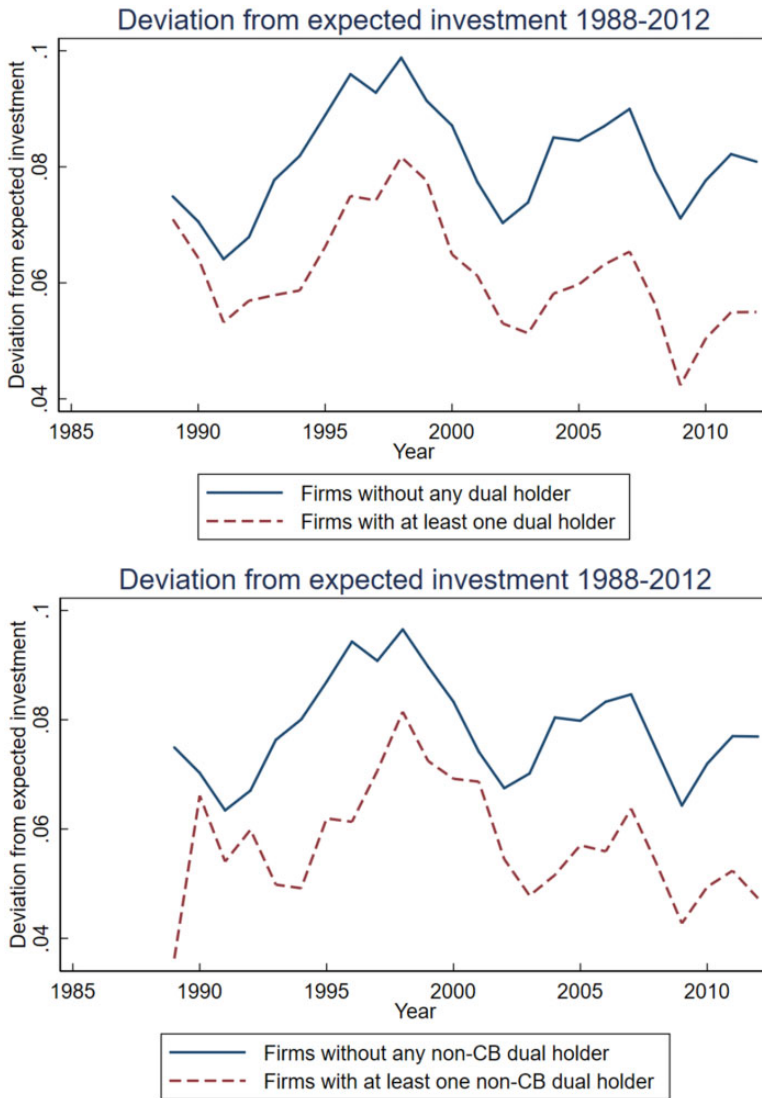
### 4.1 Summary statistics

For firm-level data, we follow the standard procedure and exclude finance and utility industries. According to summary statistics in [Table 1](#), there are five dual holders holding 4.18% of equity in an average firm with dual holders. One of such five dual holders is a non-CB dual holder. Firms with dual holders tend to be older and larger in size ( $\log(\text{Total Assets})$ ) compared to firms without dual holders. Firms with dual holders also show stronger profitability on average based on *ROA*. Despite having higher average leverage, they still show higher average Altman  $z$  – *score* than those without dual holders, signaling healthy debt financing. Firms with dual holders have relatively poorer growth opportunities (*Book-to-Market* and *Sales Growth*) compared to firms without dual holders. They tend to do more cash *Acquisitions* and invest significantly less in *R&D*. The difference in capital expenditures for the two appears to be minimal. Overall, firms with dual holders appear to have lower new investments yet a higher tendency to overinvest, based on  $I_{new}$  and  $I_{new}^e$ . We plot the average  $|I_{new}^e|$  for firms with and without dual holders over the sample period in [Figure 2](#). At first glance, firms with dual holders appear to consistently deviate less from their expected investment levels throughout the sample period. We see the same trend when we compare firms with and without non-CB dual holders.

Table 1  
Summary statistics for key variables

Variable	Full sample			Firms with dual holders			Firms without dual holders		
	N	Mean	Median	N	Mean		N	Mean	Difference
Number of dual holders	104,151	0.90	0.00	18,642	5.05		85,509	.	.
Equity held by dual holders (%)	104,151	0.70	0.00	18,642	4.18		85,509	.	.
Number of non-CB dual holders	104,151	0.17	0.00	18,642	0.93		85,509	.	.
Equity held by non-CB dual holders (%)	104,151	0.12	0.00	18,642	0.67		85,509	.	.
$I_{new}^{*}$ (% of total assets)	80,805	-1.45	-2.19	17,459	1.03		63,346	-2.14	3.17***
$I_{new}$ (% of total assets)	92,391	9.78	4.88	18,219	7.23		74,172	10.40	-3.18***
Overl	80,805	3.22	0.00	17,459	3.59		63,346	3.12	0.47***
Underl	80,805	4.68	2.19	17,459	2.56		63,346	5.26	2.70***
Acquisitions(% of total assets)	92,391	2.04	0.00	18,219	3.07		74,172	1.78	1.29***
Capital expenditures (% of total assets)	92,391	6.28	4.12	18,219	6.47		74,172	6.24	0.23***
R&D intensity (% of total assets)	92,391	5.20	0.07	18,219	1.62		74,172	6.07	-4.46***
Institutional ownership (%)	104,151	38	33	18,642	70		85,509	31	39***
Blockholder dummy	104,151	0.65	1.00	18,642	0.87		85,509	0.60	0.26***
log(total assets)	104,148	5.06	4.91	18,642	7.63		85,508	4.50	3.14***
Book-to-market	103,596	0.69	0.67	18,604	0.67		84,992	0.69	-0.02***
z-score	100,964	2.11	2.57	17,850	2.49		83,114	2.02	0.47***
Sales growth (%)	91,191	20.18	8.59	18,217	13.26		72,974	21.91	-8.66***
Cash holdings (% of total assets)	104,136	19.62	9.79	18,637	8.48		85,499	22.05	-13.58***
Operating cash flow (% of total assets)	104,147	4.45	6.52	18,642	12.76		85,505	2.63	10.12***
Leverage (% of total assets)	104,148	22.51	17.86	18,642	29.48		85,506	20.99	8.49***
Tangibility (% of total assets)	103,999	26.55	19.97	18,605	31.77		85,394	25.41	6.36***
ROA (%)	104,146	-7.04	2.59	18,642	3.89		85,504	-9.42	13.31***
Age	104,151	16	11	18,642	26		85,509	14	12***
Payout dummy	104,151	0.54	1.00	18,642	0.77		85,509	0.48	0.29***

This table provides Section 4.1, the summary statistics of the key variables used in our analyses, as well as some additional firm characteristics, for the full sample, as well as firms with and without a dual holder, respectively. The statistics under firms with dual holder summarize the characteristics of firm-year observations that have a dual holder dummy variable equaling one. All investment variables are winsorized at the 5th and 95th percentiles. All other nonlogged variables are winsorized at the 1st and 99th percentiles. Appendix 5 defines the variables in detail. \* $p < .1$ ; \*\* $p < .05$ ; \*\*\* $p < .01$ .



**Figure 2**

**Comparison of investment deviation between firms with and without dual holder**

This figure compares the average investment deviation of firms with and without dual holder for each sample year, as well as those with and without noncommercial bank (non-CB) dual holder. Investment deviation is calculated using Equation (2) following Richardson (2006). New investment is regressed on growth opportunities, controlling for the firm's capital structure (leverage and cash holdings), age, size, stock return, previous year new investment, industry, and year. The residual of actual new investment minus expected new investment is the investment deviation for the firm-year observation. New investment is the total investment ratio minus the maintenance investment that is depreciation and amortization scaled by lagged total assets. Investment ratio is the sum of capital expenditures, acquisitions, and R&D expenses, minus sales of PP&E, scaled by lagged total assets.

However, firms with dual holders seem to overinvest more and underinvest less. We resort to multivariate analyses to further explore these relationships.

#### 4.2 Dual holder influence on firm investment efficiency

Table 2 presents the baseline results of Equation (3). Column 1 shows a significant negative relationship between deviations from expected investments,<sup>7</sup>  $|I_{new}^e|$ , and the presence of dual holders, *Dual holder*. After controlling for firm characteristics, as well as firm and industry×year fixed effects, this relationship is still highly significant, as we see in Column 2. The presence of dual holders leads to a decrease in deviations from expected investments and therefore increases investment efficiency overall. We then analyze overinvestment and underinvestment, respectively, to further disentangle whether this improvement occurs on the overinvestment or underinvestment side of investment inefficiency.

*OverI* captures the positive  $I_{new}^e$  and is equal to zero when  $I_{new}^e$  is negative. *UnderI* is the absolute value of  $I_{new}^e$  when it is negative and is equal to zero when it is positive. Based on Columns 3 and 4, we see that the overall effect of dual holders (−0.004 from Column 1) comes largely from mitigating overinvestment (−0.005) rather than underinvestment (0.001). Having at least one dual holder in the firm on average can mitigate overinvestment by 0.5% of total assets. This effect is consistent across different dual holder measures: Columns 5 to 8 show that the effect of dual holders on overinvestment increases as the number of dual holders and equity held by dual holders increase, supporting the notion that dual holder interests are generally aligned and they can jointly reduce firm overinvestment. The alleviation of overinvestment could come at the expense of an “overcorrection,” because the results on underinvestment indicate that dual holders could exacerbate underinvestment. However, this effect is of much smaller statistical and economic significance than that on overinvestment.

#### 4.3 Dual holder heterogeneity

Prior literature has shown evidence that the incentive alignment and better monitoring facilitated by dual holders mainly come from non-CB dual holders, because CB dual holders often hold equity through their trust accounts and tend to lack the incentives to engage in monitoring (Jiang, Li, and Shao, 2010; Chava, Wang, and Zou, 2017). We therefore repeat our analyses with dual holders separated into non-CB and CB dual holders (The CB dual holder dummy takes the value of one if the firm has and only has CB dual holders in the sample year). Table 3

<sup>7</sup> Table A.4 reports regression results for expected investments.



Table 2  
Dual holder influence on firm investment efficiency

	$ I_{new}^e $ (1)	$ I_{new}^e $ (2)	Overl (3)	Underl (4)	Overl (5)	Underl (6)	Overl (7)	Underl (8)
Dual holder	-0.026*** (-47.03)	-0.004*** (-3.872)	-0.005*** (-5.176)	0.001* (1.876)	-0.005*** (-8.148)	0.001** (2.411)		
# of dual holders								
% held by dual holders								
Sales growth		0.004*** (8.888)	-0.001** (-2.255)	0.005*** (11.36)	-0.001** (-2.202)	0.005*** (11.35)	-0.075*** (-6.466)	0.010 (1.097)
Cash flow		0.004** (2.017)	-0.004* (-1.646)	0.008*** (3.790)	-0.004* (-1.711)	0.008*** (3.805)	-0.001** (-2.243)	0.005*** (11.36)
Tangibility		-0.009** (-2.510)	-0.000 (-0.0478)	-0.009*** (-2.632)	-0.001 (-0.300)	-0.009*** (-2.566)	-0.000 (-1.677)	0.008*** (3.789)
Loss		-0.007*** (-10.54)	-0.011*** (-16.49)	0.004*** (7.244)	-0.011*** (-16.60)	0.004*** (7.271)	-0.011*** (-16.43)	-0.009*** (-2.636)
Payout		-0.002*** (-3.452)	-0.000 (-0.0232)	-0.002*** (-4.085)	0.000 (0.0734)	-0.002*** (-4.110)	-0.000 (-0.0431)	0.004*** (7.224)
Institutional ownership		0.009*** (3.914)	0.001 (0.544)	0.007*** (3.873)	0.002 (0.696)	0.007*** (3.881)	0.001 (0.268)	-0.002*** (-4.081)
Blockholder		-0.003*** (-3.421)	0.001 (1.322)	-0.004*** (-5.570)	0.001 (1.209)	-0.004*** (-5.555)	0.001 (1.476)	0.008*** (4.079)
z-score		-0.001*** (-6.769)	-0.002*** (-8.959)	0.001*** (4.303)	-0.002*** (-8.954)	0.001*** (4.299)	-0.002*** (-8.945)	-0.004*** (-5.635)
Industry capital structure		-0.057*** (-11.04)	-0.045*** (-8.943)	-0.012*** (-2.819)	-0.046*** (-9.051)	-0.012*** (-2.795)	-0.045*** (-8.852)	0.001*** (4.290)
N	80,805	76,292	76,292	76,292	76,292	76,292	76,292	-0.012*** (-2.833)
Firm FE	No	Yes	Yes	Yes	Yes	Yes	Yes	0.001*** (2.411)
Industry×Year FE	No	Yes	Yes	Yes	Yes	Yes	Yes	0.005*** (11.35)
Adj. R-squared	.01	.30	.17	.43	.17	.43	.17	0.008*** (3.789)

This table presents the relationship between the presence of dual holders and investment distortion. Columns 1 and 2 use the absolute value of the investment deviation measure  $I_{new}^e$ . *Overl* equals  $I_{new}^e$  when it is greater than zero and equals zero when  $I_{new}^e$  is smaller than zero. *Underl* is the absolute value of  $I_{new}^e$  when it is less than zero and equals zero when  $I_{new}^e$  is greater than zero. All explanatory variables are lagged 1 year.  $I_{new}^e$  is winsorized at the 5th and 95th percentiles. All other nonlogged variables are winsorized at the 1st and 99th percentiles. Appendix 5 defines the variables in detail. Standard errors are clustered at the firm level. *t*-statistics are displayed in parentheses. \* $p < .1$ ; \*\* $p < .05$ ; \*\*\* $p < .01$ .

**Table 3**  
**Non-CB and CB dual holders**

	$ f_{new}^i $ (1)	OverI (2)	UnderI (3)	OverI (4)	UnderI (5)	OverI (6)	UnderI (7)
CB dual holder	-0.002** (-2.183)	-0.003*** (-3.449)	0.001* (1.850)				
# of CB dual holders				-0.003*** (-3.949)	0.001** (2.192)		
% Held by CB dual holders						-0.062*** (-4.240)	0.012 (1.073)
Non-CB dual holder	-0.008*** (-6.727)	-0.009*** (-7.329)	0.001 (0.962)				
# of non-CB dual holders				-0.008*** (-6.816)	0.001 (0.608)		
% held by non-CB dual holders						-0.101*** (-5.788)	0.005 (0.340)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	76,292	76,292	76,292	76,292	76,292	76,292	76,292
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry×Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	.30	.17	.43	.17	.43	.17	.43
Significance of difference (CB vs. Non-CB):							
F-statistic	14.05	10.95	0.17	10.32	0.34	2.81	0.16
Prob > F	0.000	0.000	0.682	0.001	0.560	0.094	0.689

This table presents the relationship between investment deviation and two types of dual holders, non-commercial bank (non-CB) dual holders, and commercial bank (CB) dual holders. *OverI* equals  $f_{new}^i$  when it is greater than zero and equals zero when  $f_{new}^i$  is smaller than zero. *UnderI* is the absolute value of  $f_{new}^i$  when it is less than zero and equals zero when  $f_{new}^i$  is greater than zero. All explanatory variables are lagged 1 year.  $f_{new}^i$  is winsorized at the 5th and 95th percentiles. All other nonlogged variables are winsorized at the 1st and 99th percentiles. Standard errors are at the firm level. *t*-statistics are displayed in parentheses. \* $p < .1$ ; \*\* $p < .05$ ; \*\*\* $p < .01$ .

reports the results, which clearly indicate that the effect of dual holders on improving investment efficiency mainly comes from non-CB dual holders. CB dual holders also appear to mitigate overinvestment, but the effect only has a third of the magnitude (−0.003 with a *t*-statistic of −3.449) to that of non-CB dual holders (−0.009 with a *t*-statistic of −7.329). Having at least one non-CB dual holder in the firm on average lowers excess investments from expected levels by 0.9% of total assets, whereas the presence of at least one CB dual holder is associated with an effect of only one-third of this magnitude (0.3%). This is of great economic significance, because the average sample overinvestment is 3.22% of total assets. The presence of non-CB dual holders can mitigate over a quarter of overinvestment in an average firm. Meanwhile, the “overcorrection” that leads to some exacerbation in underinvestment is mainly driven by CB dual holders. This could be due to most CB dual holders’ lack of cash flow incentives on their equity holdings. Therefore, they are likely to mainly use their equity holdings as a leverage to protect their debt investments.

We have shown that the effect of dual holders strengthens as the equity they hold increases. This effect can also depend on how involved dual

holders are in their debt investments. Following Jiang, Li, and Shao (2010), we separate dual holders into major and nonmajor loan participation based on their roles<sup>8</sup> in the loan syndicates. Table 4 reports the results. As expected, the effect of dual holders is mainly driven by dual holders with major participation on the debt side. This is particularly true when we focus on non-CB dual holders. Such major dual holders have more financial incentives to monitor against risky investments and enjoy more access to information as loan arrangers, agents, or managers, compared to those with nonmajor participation. Dual holders with nonmajor loan participation also appear to improve investment efficiency overall, and specifically reduce overinvestment. However, this relationship is only around half the size of the effect from dual holders with major loan participation.<sup>9</sup> Again, the underinvestment problem does not appear to be mitigated and it can even be slightly exacerbated by some CB dual holders with major participation, according to Column 4.

#### 4.4 Firm heterogeneity: Debt overhang and growth opportunities

The financial risk of borrower firms is an important concern for creditors. Jiang, Li, and Shao (2010) show that compared to regular lenders, dual holders tend to be more willing to lend to financially risky firms. They show that the presence of dual holders improves firms' credit conditions over time. In the same spirit, Chava, Wang, and Zou (2017) show that their result (lower likelihood of having a CAPEX covenant at the presence of dual holders) is also more pronounced for highly levered firms. Highly levered firms are likely to be more financially constrained and suffer from the underinvestment problem. Risk shifting can be at play in firms close to financial distress, leading to underinvestment in safe projects and overinvestment in risky projects (Myers, 1977). We test the effect of non-CB dual holders in this particular environment.

We create a dummy variable *High leverage* that equals one if a firm has a leverage ratio in the top quartile of the sample year. We then add *High Leverage* and its interaction of the non-CB dual holder dummy in our regression. Columns 1 to 4 of Table 5 report the results. Because of debt overhang, highly levered firms are less likely to overinvest and more likely to underinvest in terms of overall new investments. In the

<sup>8</sup> Admin agent, agent, arranger, book runner, coagent, coarranger, colead arranger, colead manager, comanager, cosyndications agent, coordinating arranger, documentation agent, joint arranger, joint lead manager, lead arranger, lead bank, lead manager, manager, managing agent, mandated arranger, senior arranger, senior colead manager, senior lead manager, senior lender, senior managing agent, sole lender, and syndications agent.

<sup>9</sup> A limitation of the DealScan database is that it does not allow us to conduct further extensions on dual holder incentives on the debt side, because it only reports loan origination. Data on allocations of the loans for each lender are also largely missing.

Table 4  
Major and nonmajor participation in loan investment

	All dual holders			Non-CB dual holders			
	$ f_{new} $	Overl	Underl	$ f_{new} $	Overl	Underl	
	(1)	(2)	(3)	(4)	(5)	(6)	(7) (8)
Dual holder	-0.004*** (-3.872)						
Dual holder_major		-0.004*** (-4.123)	-0.006*** (-5.446)	0.001* (1.850)			
Dual holder_nonmajor		-0.002* (-1.716)	-0.003** (-2.200)	0.001 (0.894)			
Non-CB dual holder					-0.009*** (-7.301)		
Non-CB Dual holder_Major					-0.012*** (-7.399)	-0.013*** (-8.186)	0.001 (1.031)
Non-CB dual holder_nonmajor					-0.006*** (-4.343)	-0.008*** (-5.378)	0.001 (1.461)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	76,292	76,292	76,292	76,292	76,292	76,292	76,292
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry×Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	.30	.30	.17	.43	.30	.17	.43
Significance of difference (major vs. nonmajor):							
F-statistic	-	1.60	2.49	0.34	-	9.03	0.06
Prob > F	-	0.206	0.114	0.560	-	0.003	0.800

This table presents the relationship between investment deviation and dual holders with different level of participation on the debt side. Dual holders with the following roles in the loan syndicates are classified as dual holders with major participation: admin agent, agent, arranger, book runner, coagent, coarranger, colead arranger, colead manager, comanager, cosyndications agent, coordinating arranger, joint arranger, joint lead manager, lead arranger, lead bank, lead manager, manager, managing agent, mandated arranger, senior arranger, senior colead manager, senior lender, senior managing agent, sole lender, and syndications agent. *Overl* equals  $f_{new}$  when it is greater than zero and equals zero when  $f_{new}$  is smaller than zero. *Underl* is the absolute value of  $f_{new}$  when it is less than zero and equals zero when  $f_{new}$  is greater than zero. The same list of controls from Table 2 are included. All explanatory variables are lagged 1 year.  $f_{new}$  is winsorized at the 5th and 95th percentiles. All other nonlogged variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered at the firm level. *t*-statistics are displayed in parentheses. \* $p < .1$ ; \*\* $p < .05$ ; \*\*\* $p < .01$ .

**Table 5**  
**Cross-sectional tests: Debt overhang and growth opportunities**

	Overl (1)	Underl (2)	Overl (3)	Underl (4)	Overl (5)	Underl (6)	Overl (7)	Underl (8)
Non-CB dual holder			-0.011*** (-8.280)	0.003*** (3.086)			-0.010*** (-7.864)	0.003*** (3.278)
Non-CB dual holder×High leverage			0.006*** (2.748)	-0.006*** (-4.771)				
High leverage	-0.020*** (-22.82)	0.011*** (16.05)	-0.020*** (-22.41)	0.012*** (16.23)				
Non-CB dual holder×High growth								
High growth					-0.001* (-1.679)	0.005*** (9.091)	-0.002 (-0.882)	-0.008*** (-5.490)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	76,292	76,292	76,292	76,292	76,292	76,292	76,292	76,292
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry×Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	.17	.43	.17	.43	.18	.43	.18	.43
Post-estimation tests								
(1) Non-CB + Non-CB×High leverage							Overl	Underl
							-0.006*** (-3.071)	-0.003*** (-2.723)
(2) Non-CB + Non-CB×High growth							-0.012*** (-5.310)	-0.005*** (-3.183)

This table presents the results of cross-sectional tests from Section 4.4. *High leverage* (CG13) is a dummy variable that equals one if the firm-year observation has a leverage in the top quartile of the sample year. *High growth* is a dummy variable that equals one if the firm-year observation has a sales growth in the top quartile of the sample year. The same list of controls from Table 2 are included. *Overl* equals  $I_{new}$  when it is greater than zero, and equals zero when  $I_{new}$  is smaller than zero. *Underl* is the absolute value of  $I_{new}$  when it is less than zero, and equals zero when  $I_{new}$  is greater than zero. All explanatory variables are lagged 1 year.  $I_{new}$  is winsorized at the 5th and 95th percentiles. All other nonlogged variables are winsorized at the 1st and 99th percentiles. The post-estimation tests provide the combined effect of the variables used for interactions. Standard errors are clustered at the firm level. *t*-statistics are displayed in parentheses. \* $p < .1$ ; \*\* $p < .05$ ; \*\*\* $p < .01$ .

cross-section, we show that the effect of non-CB dual holders on mitigating overinvestment is weaker for highly levered firms (Column 3). This is likely due to highly levered firms already overinvesting significantly less than other firms. The coefficient of *High Leverage* indicates that the average highly levered firm overinvests less than other firms by 2% of total assets, which is of high economic significance regarding the overall sample average overinvestment (3.22% of total assets).

Interestingly, we do find some evidence of non-CB dual holders mitigating underinvestment in this cross-section. Based on Column 2, highly levered firms are indeed more likely to underinvest due to debt overhang, that is, more difficult access to external finance and stronger risk shifting incentives. The presence of non-CB dual holders appears to alleviate this problem (Column 4). The interaction term has a significant negative coefficient ( $-0.006$ ). In this specification, the non-CB dual holder dummy also has a significant positive coefficient ( $0.003$ ) in this regression. For firms not subject to debt overhang (*High Leverage*=0), even non-CB dual holders appear to overcorrect and lead to a small increase in underinvestment. This could be due to dual holders being more conservative in their tastes for firm investment, because firms with lower leverage are more prone to overinvest. Managers of firms with lower leverage also can be overly cautious and underinvest slightly amid monitoring pressure from dual holders over overinvestment.

In a high leverage environment, the combined effect of the presence of non-CB dual holders significantly mitigates underinvestment by 0.3% of total assets. Although this evidence is relatively weak compared to that on overinvestment, it suggests incentive alignment between shareholders and creditors, because in this case non-CB dual holders no longer increase (and even mitigate) underinvestment. This resonates the findings of Jiang, Li, and Shao (2010) that dual holders tend to lend to firms with more financial risk and facilitate better monitoring leading to gradual improvement in credit conditions. Our results suggest that allowing otherwise forgone safe investments with stable future cash flows to happen can be a channel through which dual holders improve risky firms' credit conditions.

In our second cross-sectional test, we focus on analyzing firms with different growth opportunities. We follow Biddle, Hilary, and Verdi (2009) and use sales growth as a proxy for growth prospects. Sales growth is included as a control variable for all our analyses so far. Firms with more sales growth have better investment prospects. We create a dummy variable *High Growth* that equals one if a firm has a sales growth in the top quartile of the sample year. We then add *High Growth* and its interaction of the non-CB dual holder dummy in our regression. Based on Columns 5 and 6 of Table 5, firms with high growth underinvest more and overinvest slightly less than other firms. Column 7

shows that the effect of the presence of non-CB dual holders on mitigating overinvestment does not significantly differ for firms with different growth prospects.

However, as shown in Column 8, non-CB dual holders do mitigate underinvestment for firms with high growth prospects. Non-CB dual holders again slightly overcorrect and lead to a small increase in underinvestment for firms without high sales growth. This is likely due to dual holders being more cautious over investment policies of firms with average or poor growth opportunities. For high growth firms, non-CB dual holders mitigate underinvestment by 0.5% of total assets. This suggests that on average the presence of non-CB dual holders can almost offset the effect high sales growth has (+0.006) on inducing underinvestment. Because the underinvestment problem is more costly for firms facing many growth opportunities, this result again supports the notion that dual holders not only alleviate the overinvestment problem but also mitigate severe underinvestment.

Overall, these results support the incentive alignment hypothesis argued by prior literature (Chava, Wang, and Zou, 2017; Chu, 2017; Jiang, Li, and Shao, 2010). Especially with our findings on highly levered firms, we complement prior findings of better loan terms with the presence of dual holders, by providing more direct empirical evidence on the real effect of dual holder monitoring on firm behavior.

#### 4.5 Identification strategy to address reverse causality concerns

Although the results of our previous analyses are suggestive, further identification is required to disentangle the causal effect of dual holders on investment efficiency. It still could be argued that investors choose to invest in both the debt and equity of firms with more efficient investment policies. Our identification strategy uses financial institution mergers as exogenous shocks to the presence of dual holders, following prior literature (Chu, 2017). We use an instrumental variable approach to obtain exogenous variation in the presence of dual holders. The purpose is to identify institutional investors who become dual holders accidentally. Such identification can help us determine whether the improved investment efficiency is the outcome of the presence of dual holders.

If an institution only becomes a dual holder because of taking over the assets of the institution it merges with, it is unlikely to be subject to the self-selection problem. Each of the merging institutions usually has hundreds and even thousands of portfolio firms in both its debt and equity portfolios. It is unlikely that the holdings of a few firms could have caused the mergers. For example, before their merger in 1994, the Swiss investment bank Swiss Bank Corp. (SBC) had been engaged in a \$1.1 billion loan as a coagent to the telecommunication firm Sprint Corp.



since June 1993, whereas Brinson Partners was holding 2.4% (\$231 million) of Sprint's equity. After SBC's acquisition of Brinson Partners, SBC became a dual holder of Sprint for a reason not related to the fundamentals of its portfolio holdings. The investment bank continued a dual holding relationship with Sprint until 2005, even throughout its merger with UBS in 1998. Such accidental dual holding cases provide a good setting to isolate the treatment effect of the presence of dual holders.

The exclusion restriction relies on the reasonable idea that *Merger* does not affect firm investment unless it is through dual holders.<sup>10</sup> This allows a combination of incentives and power from the debt and the equity side. Because of such a combination, the merged institution now has more incentives and power to influence management over investment decisions than when they were standalone shareholder and creditor before the merger.

When there is a new dual holder created for the focal firm by a merger between two financial institutions, even if the firm already has one or more existing dual holders, the presence of dual holders increases. Such increases in the presence of dual holders, as proxied by the non-CB dual holder dummy and the number of non-CB dual holders, should reduce the firm's deviation from its expected investment level as in the baseline results shown in Table 3. We therefore adopt an instrumental variable approach by instrumenting the presence of non-CB dual holders with a dummy variable, *Merger*, which equals one if there is a new non-CB dual holder created for the firm by a merger in that year. For the first stage of the 2SLS regression, we use an ordinary least squares (OLS) regression to instrument for the non-CB dual holder dummy, since it has been pointed out that using a binary response model in the first stage can bias the consistency of the 2SLS test (Angrist and Krueger, 2001). To mitigate concerns over using an OLS model with a binary dependent variable, we also use the continuous dual holder measure (number of non-CB dual holders) as an alternative for exogenous variation in the presence of dual holders induced by financial institution mergers, with results reported in Table A.5.

Table 6 presents the results of the 2SLS regression. An increase in the presence of non-CB dual holders induced by financial institution mergers leads to a decrease in overinvestment for the average firm, with a 50%

<sup>10</sup> A similar argument is made by Azar, Schmalz, and Tecu (2018), Chu (2019), and Chu (2017). Still, a potential threat to this assumption is that mergers among financial institutions may affect firms' investment through representatives of financial institutions sitting on the board of the borrower. We think this does not invalidate our IV, because big financial conglomerates don't normally have seats on the boards of the portfolio companies. For example, Blackrock only has a little over 40 people in their Blackrock Investment Stewardship team, for the more than 4,800 different companies in their portfolio. A second potential threat is that investment is affected by amendments to lending policy that may arise from the change in the lenders capital condition after mergers. Even if this was the case—something that would be difficult to test—this would still happen *through* dual holders.

**Table 6**  
**IV estimation**

	OverI (1)	UnderI (2)	OverI (3)	UnderI (4)	OverI (5)	UnderI (6)
<i>Second stage:</i>						
Non-CB dual holder	-0.015*** (-2.746)	0.003 (0.904)	-0.019*** (-3.567)	0.006* (1.732)	-0.016*** (-2.950)	0.007** (2.066)
Non-CB dual holder× High leverage			0.014* (1.648)	-0.009** (-2.164)		
High leverage			-0.021*** (-15.99)	0.012*** (13.81)		
Non-CB dual holder× High growth					0.003 (0.460)	-0.015*** (-3.508)
High growth					-0.001 (-1.614)	0.006*** (9.504)
<i>First stage:</i>						
Merger	0.423*** (27.87)		0.438*** (24.00)		0.416*** (25.28)	
Merger×High leverage			0.627*** (22.64)			
Merger×High growth					0.826*** (41.59)	
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	76,292	76,292	76,292	76,292	76,292	76,292
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry×Year FE	Yes	Yes	Yes	Yes	Yes	Yes
F-statistic	776.86	776.86	346.11	346.11	373.91	373.91
Post-estimation tests					OverI	UnderI
(1) Non-CB + Non-CB× High leverage					-0.005 (-0.623)	-0.003 (-0.772)
(2) Non-CB + Non-CB× High growth					-0.012 (-1.493)	-0.008* (-1.683)

This table presents the two-stage least squares (2SLS) regressions in Section 4.5, with financial institution merger as the instrumental variable. *Merger* is a dummy variable that equals one if there is an increase in the presence of dual holders caused by a merger between two financial institutions in a firm-year observation. *OverI* equals  $I_{new}^e$  when it is greater than zero and equals zero when  $I_{new}^e$  is smaller than zero. *UnderI* is the absolute value of  $I_{new}^e$  when it is less than zero and equals zero when  $I_{new}^e$  is greater than zero. The same list of controls from Table 2 are included. *High leverage* is a dummy variable that equals one if the firm-year observation has a leverage in the top quartile of the sample year. *High growth* is a dummy variable that equals one if the firm-year observation has a sales growth in the top quartile of the sample year. All explanatory variables are lagged 1 year.  $I_{new}^e$  is winsorized at the 5th and 95th percentiles. All other nonlogged variables are winsorized at the 1st and 99th percentiles. Appendix 5 defines the variables in detail. The post-estimation tests provide the combined effect of the variables used for interactions. Standard errors are clustered at the firm level. *t*-statistics are displayed in parentheses. \* $p < .1$ ; \*\* $p < .05$ ; \*\*\* $p < .01$ .

higher magnitude than that in the OLS regression. This relationship is consistent across the two measures for the presence of non-CB dual holders. The results for firms subject to debt overhang are also consistent with those in Table 5. The effect of the presence of non-CB dual holders on mitigating overinvestment is weaker for firms with high leverage than those without (Column 3). The combined effect of non-CB dual holders in a high leverage environment even loses statistical power, suggesting that non-CB dual holders do not significantly affect overinvestment for

firms subject to debt overhang. This is not surprising given that such firms already overinvest significantly less than other firms.

Column 4 again shows that for highly levered firms, non-CB dual holders mitigate underinvestment by an average of 0.3% of total assets. However, for firms not subject to debt overhang, non-CB dual holders can overcorrect and lead to more underinvestment. Yet we have to interpret this result with caution, because the linear combination of the non-CB dual holder dummy and its interaction with *High Leverage* does not have enough statistical power ( $t$ -statistic =  $-0.772$ ). We can infer that, at least, non-CB dual holders are not increasing underinvestment for highly levered firms, whereas they do so to other firms. This can support the incentive alignment hypothesis, because the shareholder-creditor conflict is more severe in a debt overhang setting. The 2SLS results for the high growth opportunities setting are similar to Table 5. The effect of non-CB dual holders mitigating overinvestment does not significantly differ as growth prospects vary (Column 5). Based on Column 6, non-CB dual holders mitigates underinvestment for firms with high growth while increasing underinvestment for those with average or low growth. The combined effect of non-CB dual holders in a high growth environment remains statistically significant in this case, mitigating underinvestment by an average of 0.8% of total assets.

The evidence based on this instrumental variable shows that our main results are not mainly driven by investors with private information choosing to hold both the debt and equity of firms with more efficient investment policies. The 2SLS results support the causal inference that the increased presence of non-CB dual holders on average mitigates overinvestment. For firms prone to suffer from the agency cost of debt, non-CB dual holders also alleviate the underinvestment problem. Overall, we find evidence that the relationship between the presence of dual holders and improved investment efficiency is indeed rooted in a causal relationship.

#### 4.6 Additional analyses

In this section we first decompose firm investments into CAPEX and non-CAPEX investments to disentangle what types of investments are mitigated by the presence of dual holders. We repeat the estimation of deviations from expected investments using Equation (2) for CAPEX, cash acquisitions, and R&D, respectively. We then repeat our analyses on over/underinvestment with these measures. The results in Table 7 indicate first that non-CB dual holders have minimal effect on R&D inefficiencies. In CAPX dual holders do not appear to reduce overinvestment, but they do mitigate the underinvestment problem. Such evidence is consistent with the incentive alignment and monitoring hypotheses. In

**Table 7**  
**CAPEX versus Non-CAPEX investment measures**

	CAPEX		Acquisitions		R&D	
	OverI (1)	UnderI (2)	OverI (3)	UnderI (4)	OverI (5)	UnderI (6)
Non-CB dual holder	0.001 (0.408)	-0.006** (-1.986)	-0.005*** (-6.861)	0.001*** (3.536)	0.001 (1.406)	-0.001 (-1.472)
Sales growth	0.007*** (6.492)	-0.008*** (-4.754)	-0.000* (-1.794)	0.002*** (16.14)	-0.001*** (-5.306)	0.002*** (7.881)
Cash flow	-0.022*** (-4.553)	0.016* (1.770)	0.004*** (4.547)	0.002*** (3.041)	-0.005*** (-5.449)	0.003*** (2.582)
Tangibility	-0.242*** (-27.78)	0.045*** (3.253)	-0.004** (-2.480)	-0.001 (-1.320)	0.018*** (11.92)	-0.038*** (-20.89)
Loss	-0.003** (-2.054)	-0.011*** (-5.310)	-0.005*** (-16.89)	-0.001*** (-7.146)	0.001*** (3.702)	-0.001*** (-4.973)
Payout	-0.001 (-0.818)	-0.004* (-1.951)	0.001** (2.490)	-0.002*** (-9.207)	0.000 (0.783)	-0.001*** (-4.666)
Institutional ownership	-0.002 (-0.503)	-0.012* (-1.718)	0.007*** (5.914)	0.000 (0.475)	-0.006*** (-6.507)	0.004*** (3.766)
Blockholder	-0.001 (-0.439)	-0.006** (-2.477)	-0.000 (-0.292)	-0.001*** (-4.940)	0.001*** (4.830)	-0.001*** (-4.803)
z-score	0.001*** (4.791)	-0.003*** (-4.750)	0.000*** (9.007)	-0.000*** (-14.05)	-0.001*** (-14.94)	0.001*** (11.61)
Industry capital structure	0.017 (1.515)	-0.105*** (-6.446)	-0.026*** (-8.776)	-0.003* (-1.819)	0.008*** (4.864)	-0.012*** (-6.560)
N	76,195	76,195	76,292	76,292	76,292	76,292
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry×Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	.27	.52	.11	.43	.54	.65

This table presents analyses using decomposed investment measures as in Section 4.6. CAPEX is capital expenditure scaled by lagged fixed capital (PPE). Acquisitions and R&D expenditures are also scaled by lagged total assets. The dependent variables are residuals obtained based on Equation (2) using these three investment measures. *OverI* equals  $I_{new}^i$  when it is greater than zero and equals zero when  $I_{new}^i$  is smaller than zero. *UnderI* is the absolute value of  $I_{new}^i$  when it is less than zero and equals zero when  $I_{new}^i$  is greater than zero. The same list of controls from Table 2 are included. All explanatory variables are lagged 1 year. The new investment residual variables are winsorized at the 5th and 95th percentiles. All other nonlogged variables are winsorized at the 1st and 99th percentiles. Appendix 5 defines the variables in detail. Standard errors are clustered at the firm level. *t*-statistics are displayed in parentheses. \* $p < .1$ ; \*\* $p < .05$ ; \*\*\* $p < .01$ .

an underinvestment setting induced by debt overhang, firms tend to forgo safe investments with stable cash flows and even sometime bet for risky projects. Our finding that non-CB dual holders mitigate underinvestment only for CAPEX supports the incentive alignment notion that dual holders alleviate debt overhang because they can benefit from such safe investment through either debt or equity holdings, as long as it has a positive NPV. This is also consistent with the point made by Chu (2019) that debt overhang should mostly affect CAPEX instead of R&D and acquisitions.

On the other hand, cash acquisitions can reflect agency conflicts between managers and shareholders: empire-building acquisitions increase manager private benefits but destroy shareholder value (Jensen, 1986).

**Table 8**  
**Equity value increase with the presence of non-CB dual holders**

Model	Q			
	OLS		2SLS	
	(1)	(2)	(3)	(4)
Non-CB dual holder	0.107*** (3.816)		0.515*** (3.807)	
# of non-CB dual holders		0.071*** (2.774)		0.343*** (3.725)
Leverage	0.155** (2.213)	0.158** (2.256)	0.142** (2.025)	0.157** (2.242)
Cash holdings	0.840*** (9.801)	0.840*** (9.802)	0.834*** (9.734)	0.834*** (9.734)
log(Total assets)	-0.527*** (-26.63)	-0.527*** (-26.65)	-0.543*** (-25.66)	-0.543*** (-25.58)
ROA	-0.0506 (-0.905)	-0.0501 (-0.896)	-0.050 (-0.891)	-0.047 (-0.846)
Institutional Ownership	0.709*** (12.52)	0.713*** (12.59)	0.694*** (12.22)	0.713*** (12.47)
z-score	-0.0269*** (-4.664)	-0.0270*** (-4.671)	-0.026*** (-4.525)	-0.026*** (-4.560)
CAPEX	0.0757 (1.639)	0.0758 (1.638)	0.082* (1.744)	0.082* (1.737)
Acquisitions	-0.0275 (-1.361)	-0.0275 (-1.364)	-0.022 (-1.089)	-0.023 (-1.102)
R&D intensity	0.272*** (3.399)	0.272*** (3.400)	0.272*** (3.396)	0.272*** (3.398)
Merger			0.419*** (27.64)	0.630*** (23.02)
N	77,237	77,237	77,237	77,237
Firm FE	Yes	Yes	Yes	Yes
Industry×Year FE	Yes	Yes	Yes	Yes
Adj. R-squared	.57	.57		
F-statistic			763.99	530.11

This table presents the relationship between Tobin's q and the non-CB dual holder dummy, as well as the logarithm of  $1 +$  number of non-CB dual holders as in Section 4.6. Tobin's q is calculated as the sum of book value of total debt and market value of equity divided by book value of total assets. Cash holdings is cash and short-term investments divided by total assets. ROA is obtained by dividing net income with total sales. CAPEX is capital expenditure minus sales of PPE scaled by lagged total assets. Acquisitions and R&D expenditures are also scaled by lagged total assets. *Merger* is a dummy variable that equals one if there is an increase in the presence of dual holders caused by a merger between two financial institutions in a firm-year observation. All explanatory variables are lagged 1 year. Standard errors are clustered at the firm level. *t*-statistics are displayed in parentheses. \* $p < .1$ ; \*\* $p < .05$ ; \*\*\* $p < .01$ .

Moreover, they also reflect conflicts between managers and creditors because they can increase cash flow risk. Nini, Smith, and Sufi (2012) show that after a loan covenant violation, creditors pressure management to cut cash acquisitions in the quarters to follow. The presence of non-CB dual holders serves as a "mutual friend" to help shareholders and creditors tackle such a "common enemy," the agency cost of free cash flow. In Column 3 we indeed observe that the presence of dual holders alleviates the overinvestment problem induced by managers. This evidence provides support to the improved monitoring effectiveness

induced by dual holders. The effect seems to be so strong that we observe an "overcorrection"; that is, dual holders exacerbate underinvestment. This overcorrection identified in our baseline results appears to be driven mainly by cash acquisitions. Empirical evidence in prior literature has indicated that acquisitions are on average value destroying to both acquirer shareholders (Moeller, Schlingemann, and Stulz, 2005) and creditors (Billett, King, and Mauer, 2004). Therefore, it is likely that dual holders are willing to risk forgoing some good acquisitions by a small scale in order to restrict overinvestment in value-destroying acquisitions.

Finally, while the evidence so far supports the notion that dual holders lower risk for creditors by improving investment efficiency, we examine the value creation of the presence of dual holders for all shareholders (including non-CB dual holders). We regress market value of firm equity, proxied by Tobin's  $q$ , on the presence of non-CB dual holders. As shown in Columns 1 and 2 of Table 8, having non-CB dual holders increases value for shareholders and this effect is amplified as the number of non-CB dual holders increases. We then use mergers between financial institutions again as an IV to instrument the presence of non-CB dual holders as in Section 4.5.<sup>11</sup> The 2SLS regression results reported in Columns 3 and 4 provide support to the notion that non-CB dual holders increase firm market value, instead of self-selecting into dual holding equity and debt of high market value firms. The results of this analysis suggest that dual holders not only make creditor investments safer but also create value for shareholders.

## 5. Concluding remarks

Firms overinvest due to managerial discretion or shareholder risk shifting, which increases the risk of their creditors' investments. This paper empirically shows that when creditors also hold equity stakes, such overinvestment is largely mitigated. These dual holders are more incentivized to monitor against managerial overinvestment as they have more skin in the game by investing in both debt and equity. Dual holders are also more likely to discourage risk-shifting projects, which would shift risk from the left pocket to the right pocket. Furthermore, dual holders are better equipped to mitigate overinvestment, because they can utilize information and control power from both debt and equity channels. The average dual holding period in our sample is 7.63 years, indicating that

<sup>11</sup> A merger between the firm's shareholder and lender should not directly affect the market value of its equity based on the idea that the newly merged institution does not significantly rebalance its holdings in the firm right after the merger, because of transaction cost and liquidity concerns, as argued by the prior literature using this shock for external validity (Azar, Schmalz, and Tecu, 2018; Chu, 2017; He and Huang, 2017).

dual holders are usually engaged with firms for a long investment horizon and have the incentives to monitor.

Our results support that dual holders, particularly non-CB dual holders, improve investment efficiency by reducing overinvestment. Under the watch of dual holders, firm investment deviates less over expected level based on growth opportunities and capital structure. This effect is stronger as the number of dual holders, percentage of equity held by dual holders, and loan participation by dual holders increase. Interests of different dual holders within a firm appear to be generally aligned. Additional analyses show that dual holders most significantly affect overinvestment in acquisitions, a finding that supports the idea that dual holders are acting as a mutual friend to both shareholders and creditors. Managers tend to overinvest in acquisitions because of empire-building or overconfidence. Dual holders help mitigate such managerial agency costs. Although relatively weaker in statistical and economic significance compared to the effect on overinvestment, we further find some evidence that non-CB dual holders also mitigate underinvestment specifically for firms with debt overhang and high growth. Such alleviation of underinvestment is mostly reflected in CAPEX investments.

We use mergers between financial institutions to obtain external validity to our results. An increase in the presence of dual holders induced by mergers of an original lender and shareholder of the firm can help rule out the reverse causality concern that investors choose to invest in both the debt and the equity of firms with more efficient investment policies. The instrumental variable approach based on this shock provides results that lend support to the idea that the link identified between the presence of dual holders and investment efficiency is indeed rooted in a causal relationship. Finally, we show that market value of equity increases at the presence of dual holders.

Overall, our results support the hypothesis proposed by Jiang, Li, and Shao (2010) which argues that dual holders can facilitate incentive alignment between shareholders and creditors, as well as better editor monitoring capacity reducing firm risk. Whereas Chu (2017) shows the real effect of the presence of dual holders on reduced payouts, we show that dual holders improve investment efficiency, leading to benefits for both shareholders and creditors. This sheds light on an additional channel through which the presence of a dual holder leads to better loan terms and improved credit conditions evidenced by Jiang, Li, and Shao (2010) and Chava, Wang, and Zou (2017). Some prior studies have proposed potential regulatory implications as they show evidence of some dual holders exploiting material nonpublic information obtained through their debt channels to trade on the equity side. However, information-driven trades are associated with short-term abnormal stock returns which are not necessarily destructive to long-term firm growth. We



provide evidence that such information transmission and decision coordination within financial conglomerates can facilitate more efficient firm growth for the portfolio firms and more stable investments for the investors.

## Appendix

**Table A.1**  
**Variable definitions**

Variables	Description
<b>Dual holder</b>	A dummy variable indicating whether at least one dual holder is present in the firm during the year
<b># of dual holders</b>	The log of 1 + number of dual holders in the firm during the year
<b>% held by dual holders</b>	The log of 1 + the aggregated ownership shares held by all dual holders in the firm during the year
<b>Sales growth</b>	Annual growth of revenue from the prior year
<b>Cash flow</b>	Operating cash flow scaled by lagged total assets
<b>Leverage</b>	The sum of debt in current liabilities and long-term debt divided by total assets
<b>Size</b>	The log of total assets
<b>Age</b>	The log of firm listed age on Compustat
<b>Book-to-market</b>	Book asset value divided by the sum of market value of equity and book value of total debt
<b>Stock return</b>	Annual cumulative return of the firm's stock based on CRSP
<b>ROA</b>	Return on assets as net income divided by total assets
<b>Loss</b>	A dummy variable that equals one if ROA is negative
<b>Payout</b>	A dummy variable that equals one if the firm makes any form of shareholder payouts during the year
<b>Tangibility</b>	Net property, plant, and equipment divided by total assets at the prior fiscal year end
<b>z-score</b>	Firm distance to default measure. $Z = 1.2 \times (\text{working capital} / \text{total assets}) + 1.4 \times (\text{retained earnings} / \text{total assets}) + 3.3 \times (\text{EBIT} / \text{total assets}) + 0.6 \times (\text{shareholder equity} / \text{debt}) + 1.0 \times (\text{sales} / \text{total assets})$
<b>Institutional ownership</b>	Total percentage of shares outstanding held by institutional investors
<b>Blockholder</b>	A dummy that equals one if the borrower firm has a blockholder during the sample year
<b>Industry capital structure</b>	Average leverage ratio of the Fama-French 48 industry the firm is in

**Table A.2**  
**Dual holder and loan spread**

Sample	All-in-drawn spread					
	All (1)	All (2)	Low z (3)	High z (4)	Low leverage (5)	High leverage (6)
Dual holder	-14.41*** (-6.150)		-18.36*** (-4.179)	-7.978** (-2.575)	-6.342* (-1.779)	-15.52*** (-3.689)
# of dual holders		-11.96*** (-8.169)				
Institutional ownership	-26.47*** (-5.697)	-30.65*** (-6.837)	-17.38** (-2.124)	-25.56*** (-4.136)	-19.55*** (-3.060)	-22.85*** (-2.760)
HHI	-20.98*** (-2.815)	-21.06*** (-2.820)	-51.31*** (-3.349)	-5.702 (-0.459)	-31.49** (-2.547)	-9.349 (-0.616)
ln(Total assets)	-16.45*** (-14.61)	-13.98*** (-11.51)	-14.25*** (-7.254)	-24.46*** (-15.52)	-24.74*** (-16.13)	-11.37*** (-5.830)
Leverage	86.09*** (12.53)	84.15*** (12.35)	73.59*** (6.600)	60.80*** (4.551)	61.48** (2.573)	73.39*** (5.287)
Market-to-book	-5.085*** (-4.234)	-4.362*** (-3.619)	-13.76*** (-5.097)	-4.038*** (-2.730)	-2.949* (-1.861)	-12.36*** (-4.712)
ROA	-147.4*** (-10.22)	-145.0*** (-10.11)	-113.4*** (-4.058)	-124.3*** (-6.420)	-128.5*** (-6.858)	-118.5*** (-3.790)
Tangibility	-23.88*** (-2.583)	-24.98*** (-2.718)	-4.245 (-0.297)	-21.98 (-1.616)	-2.733 (-0.175)	-23.47 (-1.603)
z-score	-7.275*** (-6.576)	-7.315*** (-6.635)	-17.72*** (-5.123)	-3.437** (-2.243)	-5.247*** (-4.105)	-15.14*** (-4.958)
Cash flow volatility	218.8*** (8.222)	216.6*** (8.155)	59.07 (1.597)	278.0*** (5.901)	218.5*** (5.460)	85.30* (1.954)
S&P rating	8.596*** (8.867)	7.599*** (7.824)	17.29*** (8.582)	-2.161* (-1.729)	0.284 (0.234)	16.10*** (9.072)
Loan size	-36.67*** (-9.723)	-35.42*** (-9.391)	-52.53*** (-8.104)	-20.09*** (-3.629)	-31.18*** (-5.230)	-49.01*** (-8.292)
log(Loan maturity)	-2.982 (-1.422)	-3.378 (-1.626)	-6.862* (-1.671)	-0.975 (-0.339)	-1.075 (-0.336)	-4.717 (-1.296)
N	22,689	22,689	7,539	7,550	7,547	7,540
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Deal purpose FE	Yes	Yes	Yes	Yes	Yes	Yes
Loan type FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	.57	.57	.58	.57	.57	.56

This table presents the regression of the log of all-in-drawn spread on dual holder measures. Dual holder is a dummy which equals one if the borrower firm has a dual holder at the quarter prior to loan issuance. # of Dual holders is the logarithm of one plus the number of dual holders. *HHI* is based on 4-digit SIC. Cash flow volatility is the ratio of the standard deviation of the past eight earnings changes to the average book asset size over the past eight quarters. The low *z* (leverage) sample includes only firms with a *z*-score (leverage) at the bottom tercile of the full sample. Vice versa, the high *z* (leverage) sample includes only firms with a *z*-score (leverage) at the top tercile of the full sample. All nonlog control variables are winsorized at the 1% and 99% level. Standard errors are clustered at the firm level. *t*-statistics are displayed in parentheses. \**p* < .1; \*\**p* < .05; \*\*\**p* < .01.

**Table A.3**  
**Top dual holders**

Top dual holders based on number of dual holding loans involved

CB dual holders		Non-CB dual holders	
Ranking	Name	Ranking	Name
1	Bank of America Merrill Lynch	1	Credit Suisse First Boston
2	JP Morgan Chase	2	UBS Securities
3	Wells Fargo	3	Merrill Lynch
4	Bank of New York Mellon	4	Morgan Stanley
5	Barclays	5	JP Morgan
6	US Bancorp	6	Allianz
7	Northern Trust	7	Goldman Sachs
8	Deutsche Bank AG	8	Deutsche Bank Securities (Alex Brown)
9	Citigroup	9	Oppenheimer (CIBC World Markets)
10	Royal Bank of Scotland (RBS)	10	Natixis

This table presents the top dual holders in our sample based on number of loans in dual holding. To be identified as a dual holder, a financial institution has to participate in a syndicated loan and simultaneously hold at least 1%, or \$2 million of equity of the borrower firm. Holdings of first-level subsidiaries are aggregated into the conglomerate level following prior dual holder literature Jiang, Li, and Shao (2010). Dual holders are classified as commercial bank (CB) and noncommercial bank (non-CB) based on whether they have major commercial banking business.

**Table A.4**  
**Expected investments**

	$I_{new}$		
	(1)	(2)	(3)
Book-to-market	-0.220*** (-78.84)		-0.122*** (-38.63)
Leverage		-0.010** (-2.067)	-0.007 (-1.313)
Cash holdings		0.177*** (32.11)	0.138*** (25.04)
Age		-0.017*** (-11.64)	-0.011*** (-7.916)
Size		-0.009*** (-16.33)	-0.011*** (-20.79)
Stock return		0.020*** (21.87)	0.012*** (12.88)
$I_{new,t-1}$		0.101*** (43.70)	0.124*** (46.86)
N	90,761	80,896	80,805
Industry FE	No	Yes	Yes
Year FE	No	Yes	Yes
Adjusted $R$ -squared	.06	.13	.16

This table presents the regression of new investment on growth opportunities and other firm characteristics based on Equation (2). The residuals of this regression,  $I_{new,s}$ , are then used as the dependent variable in Equation (3) for the baseline analyses. Book-to-Market is book asset value divided by the sum of market value of equity and book value of total debt. Leverage is total debt divided by total assets. Cash holdings is cash and short-term investments divided by total assets. Age is the natural logarithm of listed age. Size is the natural logarithm of total assets. Stock return is the annual cumulative return. All independent variables are lagged 1 year. All nonlogged control variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered at the firm level.  $t$ -statistics are displayed in parentheses. \* $p < .1$ ; \*\* $p < .05$ ; \*\*\* $p < .01$ .

**Table A.5**  
**IV estimation with continuous dual holder measure**

	OverI (1)	UnderI (2)	OverI (3)	UnderI (4)	OverI (5)	UnderI (6)
<i>Second stage:</i>						
# of non-CB dual holders	-0.010*** (-2.773)	0.002 (0.902)	-0.013*** (-3.617)	0.004* (1.771)	-0.010*** (-2.973)	0.005** (2.108)
# of non-CB dual holders× High leverage			0.009 (1.623)	-0.006** (-2.161)		
High leverage			-0.021*** (-17.84)	0.012*** (14.59)		
# of non-CB dual holders× High growth					0.002 (0.488)	-0.010*** (-3.510)
High growth					-0.001* (-1.677)	0.006*** (9.615)
<i>First stage:</i>						
Merger	0.638*** (23.12)		0.761*** (21.30)		0.684*** (22.36)	
Merger×High leverage			0.361*** (20.24)			
Merger×High growth					1.243*** (24.99)	
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	76,292	76,292	76,292	76,292	76,292	76,292
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry×Year FE	Yes	Yes	Yes	Yes	Yes	Yes
F-statistic	534.64	534.64	250.71	250.71	252.61	252.61
Post-estimation tests					OverI	UnderI
(1) # of non-CB + # of non-CB×High leverage					-0.004 (-0.621)	-0.002 (-0.783)
(2) # of non-CB + # of non-CB×High growth					-0.008 (-1.530)	-0.005* (-1.663)

This table presents the two-stage least squares (2SLS) regressions in Section 4.5, with the continuous dual holder measure, *# of Non – CB Dual holders* instead of the dummy variable *Non – CB Dual holder*. *# of Non – CB Dual holders* is the log of one plus number of non-CB dual holders a firm has in the given year. *Merger* is a dummy variable that equals one if there is an increase in the presence of dual holders caused by a merger between two financial institutions in a firm-year observation. *OverI* equals  $I_{new}^*$  when it is greater than zero, and equals zero when  $I_{new}^*$  is smaller than zero. *UnderI* is the absolute value of  $I_{new}^*$  when it is less than zero and equals zero when  $I_{new}^*$  is greater than zero. The same list of controls from Table 2 are included. *High Leverage* is a dummy variable that equals one if the firm-year observation has a leverage in the top quartile of the sample year. *High Growth* is a dummy variable that equals one if the firm-year observation has a sales growth in the top quartile of the sample year. All explanatory variables are lagged 1 year.  $I_{new}^*$  is winsorized at the 5th and 95th percentiles. All other nonlogged variables are winsorized at the 1st and 99th percentiles. Appendix 5 defines the variables in detail. The post-estimation tests provide the combined effect of the variables used for interactions. Standard errors are clustered at the firm level. *t*-statistics are displayed in parentheses. \* $p < .1$ ; \*\* $p < .05$ ; \*\*\* $p < .01$ .

## References

- Angrist, J. D., A. B. Krueger. 2001. Instrumental variables and the search for identification: From supply and demand to natural experiments. *Journal of Economic Perspective* 15.4:69–85.
- Azar, J., M. Schmalz, and T. Isabel. 2018. Anticompetitive effects of common ownership. *Journal of Finance* 73:1513–65.
- Biddle, G. C., G. Hilary, and R. S. Verdi. 2009. How does financial reporting quality relate to investment efficiency? *Journal of Accounting and Economics* 48:112–31.
- Billett, M. T., T.-H. D. King, and D. C. Mauer. 2004. Bondholder wealth effects in mergers and acquisitions: New evidence from the 1980s and 1990s. *Journal of Finance* 59:107–35.
- Bushee, B. J. 1998. The influence of institutional investors on myopic R&D investment behavior. *Accounting Review*:305–33.
- Chava, S., R. Wang, and H. Zou. 2017. Covenants, Creditors Simultaneous Equity Holdings, and Firm Investment Policies. *Journal of Financial and Quantitative Analysis*:1–70.
- Chu, Y. 2017. Shareholder-creditor conflict and payout policy: Evidence from mergers between lenders and shareholders. *Review of Financial Studies* 31:3098–121.
- . 2019. Debt renegotiation and debt overhang: Evidence from lender mergers. *Journal of Financial and Quantitative Analysis*. Advance Access published September 26, 2019, 10.1017/S0022109019000760.
- Denis, D. J., and J. Wang. 2014. Debt covenant renegotiations and creditor control rights. *Journal of Financial Economics* 113:348–67.
- Edmans, A. 2009. Blockholder trading, market efficiency, and managerial myopia. *Journal of Finance* 64:2481–513.
- Gaspar, J.-M., M. Massa, and P. Matos. 2006. Favoritism in mutual fund families? Evidence on strategic cross-fund subsidization. *Journal of Finance* 61:73–104.
- . 2003. Financial intermediation. In *Handbook of the economics of finance*, eds. G. M. Constantinides, M. Harris, and R. M. Stulz, 431–552. Amsterdam, the Netherlands: Elsevier.
- He, J. J., and J. Huang. 2017. Product market competition in a world of cross-ownership: Evidence from institutional blockholdings. *Review of Financial Studies* 30:2674–718.
- Ivashina, V., and Z. Sun. 2011. Institutional stock trading on loan market information. *Journal of Financial Economics* 100:284–303.
- Jensen, M. C. 1986. Agency costs of free cash flow, corporate finance, and takeovers. *American Economic Review* 76:323–29.
- Jensen, M. C., and W. H. Meckling. 1976. Theory of the firm: Managerial Behavior, Agency Costs and Ownership Structure. *Journal of Financial Economics* 3:305–60.
- Jiang, W., K. Li, and P. Shao. 2010. When shareholders are creditors: Effects of the simultaneous holding of equity and debt by non-commercial banking institutions. *The Review of Financial Studies* 23:3595–637.
- Malmendier, U., and G. Tate. 2008. Who makes acquisitions? CEO overconfidence and the markets reaction. *Journal of Financial Economics* 89:20–43.
- Massa, M., and Z. Rehman. 2008. Information flows within financial conglomerates: Evidence from the bank mutual funds relation. *Journal of Financial Economics* 89:288–306.
- Massoud, N., D. Nandy, A. Saunders, and K. Song. 2011. Do hedge funds trade on private information? Evidence from syndicated lending and short-selling. *Journal of Financial Economics* 99:477–99.
- Moeller, S. B., F. P. Schlingemann, and R. M. Stulz. 2005. Wealth destruction on a massive scale? A study of acquiring-firm returns in the recent merger wave. *Journal of Finance* 60:757–82.
- Myers, S. C. 1977. Determinants of corporate borrowing. *Journal of Financial Economics* 5:147–75.

- Myers, S. C., and N. S. Majluf. 1984. Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics* 13:187–221.
- Nini, G., D. C. Smith, and A. Sufi. 2009. Creditor control rights and firm investment policy. *Journal of Financial Economics* 92:400–420.
- . 2012. Creditor control rights, corporate governance, and firm value. *The Review of Financial Studies* 25:1713–61.
- Richardson, S. A. 2012. Over-investment of free cash flow. *Review of Accounting Studies* 11:159–89.
- Santos, J. A. C., and K. E. Wilson. 2008. Does banks corporate control benefit firms? Evidence from US banks control over firmsvoting rights. *Working Paper, Harvard Business School, Harvard University*.
- Schleifer, A., and R. W. Vishny. 1986. Large shareholders and corporate control. *Journal of Political Economy* 94:461–88.
- Stulz, R. M. 1990. Managerial discretion and optimal financing policies. *Journal of Financial Economics* 26:3–27.