Dual Holdings and Corporate Cash Holdings

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ABSTRACT

This study examines how simultaneous holdings of debt and equity by creditors ("dual holdings") affect firms' cash holding policies. Using a sample of U.S. firms with syndicated loans from 1995 to 2015, this paper finds that dual holdings lead to lower levels of cash holdings, especially for financially constrained firms. The evidence supports the view that dual holdings result in incentive alignment between shareholders and creditors, which reduces firms' precautionary cash saving motives. Further analyses suggest that dual-held firms have lower cash flow sensitivity of cash and are more likely to spend cash on capital investments. The presence of dual holdings is also associated with higher value of cash holdings. The results highlight the impact of dual holdings on corporate liquidity policies via reducing shareholder-creditor conflicts.

JEL Classifications: G21, G23, G32, G34
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1. Introduction

Corporate liquidity has received considerable attention from academics as well as practitioners in recent decades. Bates, Kahle and Stulz (2009) document the propensity of U.S. firms to accumulate high levels of cash – on average the amount of cash firms hold relative to their assets more than doubled between 1980 and 2006. The increasing trend of cash hoarding by large U.S. firms is also frequently reported in the news media[1]. In addition, financial flexibility is viewed as one of the top concerns for corporate capital structure decisions (Graham and Harvey, 2001), while corporate liquidity plays an important role in providing financial flexibility in corporate finance literature (Denis, 2011). As there are both benefits and costs associated with holding cash, the decision as to how much cash a firm should hold represents a trade-off among the interests of all stakeholders in a firm (Opler et al., 1999). On one hand, liquidity management is largely at the discretion of managers whose interests may diverge from shareholders (Jensen, 1986). On the other hand, creditors may use debt contracts to require firms to maintain excess liquidity in anticipation of expropriation (Smith and Warner, 1979). In this sense, it is ideal to examine agency conflicts among firms' stakeholders against the backdrop of corporate liquidity policy.

Despite a rich body of literature on the relation between manager-shareholder conflicts and corporate cash holdings (Dittmar, Mahrt-Smith and Servaes, 2003; Dittmar and Mahrt-Smith, 2007; Harford, Mansi and Maxwell, 2008), empirical evidence on the impact of shareholder-creditor conflicts has been limited (e.g. Kyröläinen, Tan and Karjalainen, 2013; Yung and Nafar, 2014). Based on the agency theory, conflicts of interest between shareholders and creditors arise due to differences in the nature of their cash flow claims (Jensen and Meckling, 1976). Equity holders have incentives to maximize the value of equity claims at the expense of creditors' wealth (Myers, 1977). Agency costs of debt will arise due to such expropriation, making external financing more expensive. Liquid assets such as cash become particularly valuable as they help mitigate costs of financial distress (Myers and Majluf, 1984). Thus, shareholder-creditor conflicts play an important role in corporate liquidity decisions. This paper explores the link between agency conflicts and cash holdings by utilising a growing trend in the syndicated loan market – creditors' simultaneous holdings of debt and equity ("dual holdings" hereafter).

[1] See, for example, "The Growing Corporate Cash Hoard", by Bruce Bartlett, *The New York Times*, February 12, 2013, https://economix.blogs.nytimes.com/2013/02/12/the-growing-corporate-cash-hoard/.

The repeal of the Glass-Steagall Act in 1999 blurred the lines between commercial and investment banking, allowing commercial banks to provide investment banking services (Jiang, Li and Shao, 2010). This leads to an increasing number of dual holders, which offers a unique setting to study the conflicts between shareholders and creditors. Unlike prior studies that focus on bankruptcy (Acharya, Amihud and Litov, 2011) or covenant violations (Chava and Roberts, 2008), dual holdings provide a measure of shareholder-creditor conflicts in the regular course of business. If shareholders are simultaneously creditors, they have incentives to maximize the overall value of equity and debt holdings (Bodnaruk and Rossi, 2016), in which case the agency conflicts between shareholders and creditors would be internalized. Alternatively, dual holdings may also serve a governance role of disciplining management behaviour, as dual holders have greater incentives and capability to monitor (Jiang, Li and Shao, 2010; Ivashina and Sun, 2011; Massoud et al., 2011). The objective of this paper is to investigate the impact of dual holdings on corporate cash holdings.

This study proposes two hypotheses for the relation between dual holdings and the level of cash holdings. The first hypothesis is referred to as the incentive alignment hypothesis. The literature on precautionary cash holdings suggests that firms tend to hold cash to mitigate risks of future financial distress (Opler et al., 1999; Bates, Kahle and Stulz, 2009). Dual holdings may lead to better shareholder-creditor incentive alignment and thus reduce the agency costs of debt (Jiang, Li and Shao, 2010; Chava, Wang and Zou, 2018). In such circumstance, firms have less difficulty in obtaining external financing and therefore have less need for precautionary cash saving. Alternatively, the enhanced monitoring hypothesis predicts a positive relation between dual holdings and cash. Entrenched managers are less likely to hoard cash but more likely to waste it on value-decreasing investments (Dittmar and Mahrt-Smith, 2007; Harford, Mansi and Maxwell, 2008). Dual holders are expected to have greater monitoring incentives and capabilities (Ivashina and Sun, 2011; Massoud et al., 2011). Therefore, firms with dual holders will engage in less cash dissipation and hold higher levels of cash. As two hypotheses above give opposite predictions, empirical analyses are conducted to identify how dual holdings affect the level of cash holdings.

Using a sample of U.S. firms that issue syndicated loans, this paper finds that firms with dual holders have significantly lower levels of cash than those without dual holders, providing support for the incentive alignment hypothesis. Under the incentive alignment hypothesis, the negative relation between dual holdings and cash should be stronger for financially constrained firms, which is also confirmed by this study. Consistent with the main results, I find that firms

with dual holders have a propensity to save less cash out of cash flows, indicating that these firms have less incentive for precautionary saving. In addition, smaller cash reserves kept by dual-held firms can be explained by greater investment in capital but not by increased distribution of dividends. Finally, results show a positive relation between dual holdings and the value of cash, suggesting that dual holdings lead to more optimal cash decisions from the perspective of shareholders.

This study contributes to the literature in the following ways. First, it adds to the recently growing literature on the impact of dual holdings in the U.S.. Prior studies mostly focus on the impact of dual holdings on loan pricing (Jiang, Li and Shao, 2010; Ferreira and Matos, 2012; Lim, Minton and Weisbach, 2014). Recent papers extend this line of research to corporate finance decisions, such as investment policies (Chava, Wang and Zou, 2018), innovation activities (Yang, 2017) and dividend payout (Chu, 2017). This study complements the above by examining how dual holdings influence corporate liquidity, which is another key corporate financial policy. Second, this study provides evidence on the role of shareholder-creditor conflicts in affecting cash holding policies. While previous studies (e.g. Kyröläinen, Tan and Karjalainen, 2013; Liu, Mauer and Zhang, 2014) mainly focused on mechanisms that exacerbate shareholder-creditor conflicts, the current study focuses on a setting in which the shareholder-creditor conflicts are mitigated as a result of dual holdings. It highlights the importance of coordination between shareholders and creditors in corporate liquidity decisions.

The remainder of the paper proceeds as follows. Section 2 provides a review of the literature on dual holdings and cash holdings, followed by the development of hypotheses. Section 3 describes the data and variables used in my analysis. Section 4 reports the empirical results. Section 5 concludes.

2. Literature and hypothesis development

2.1 Determinants of corporate cash holdings

2.1.1 Precautionary cash saving motive

Prior studies suggest that corporate cash holdings are predominantly driven by the precautionary saving motive (Opler et al., 1999; Bates, Kahle and Stulz, 2009), which states that firms tend to reserve cash to mitigate the risk of financial distress in the future. Due to information asymmetry between insiders and outsiders, raising external funds can be costly or difficult for firms (Myers, 1984). Based on the pecking order theory, in the presence of

financing frictions, liquid assets such as cash reserves serve as a buffer that allow firms to better exploit their value-enhancing investment opportunities (Myers and Majluf, 1984). Therefore, in anticipation of future cash flow shortfalls, firms have incentives to hold more cash to alleviate the negative consequences of underinvestment (Han and Qiu, 2007; Almeida, Campello and Weisbach, 2011).

The precautionary cash saving theory has been widely supported by empirical evidence. Opler et al. (1999) document that firms with greater access to capital markets, such as large firms and firms with credit ratings, hold lower levels of cash. Bates, Kahle and Stulz (2009) show that the increase in corporate cash holdings from 1980 to 2006 can be explained by greater cash flow risk and higher R&D expenditures. In addition, diversified firms are found to hold less cash, as these firms have less correlated cash flows and investment opportunities across different segments, which enhances the availability of internal capital and reduces the need for cash (Duchin, 2010; Subramaniam et al., 2011).

The precautionary cash saving motive can be driven by the presence of shareholder-creditor conflicts. Creditors, anticipating the expropriation incentives of shareholders, may use financial contracts to restrict such behaviour (Smith and Warner, 1979). Specifically, firms may be required to maintain a high level of liquidity by creditors in exchange for debt financing. Liu and Mauer (2011) find that CEO risk-taking incentives, as measured by vega, is positively related with firms' cash holdings. As greater risk-raking incentives by CEO align the interests of managers with shareholders, exacerbating the conflicts between shareholders and debtholders, debtholders may require additional cash to protect themselves against potential losses. Harford, Klasa and Maxwell (2014) provide evidence that firms with high refinancing risk have higher levels of cash holdings, and this relation is stronger under weak credit market conditions. It confirms that cash reserves are used to mitigate adverse shocks in credit markets. Acharya, Davydenko and Strebulaev (2012) find a positive correlation between cash holdings and credit risk, suggesting that firms with greater credit risk tend to increase their holdings of liquid assets to reduce the likelihood of future financial distress.

2.1.2 Managerial cash holding motive

Agency problems between managers and shareholders also play a crucial part in firms' cash holding decisions (Harford, 1999; Harford, Mansi and Maxwell, 2008). The literature builds on the free cash flow theory of Jensen (1986). Liquid assets like cash can be deployed at managerial discretion and converted to private benefits at lower cost (Myers and Rajan, 1998).

Hence, if left unmonitored, managers have a propensity to hoard excess cash for private benefits or spend it in a way not in shareholders' best interest, rather than distribute it to shareholders (Jensen, 1986).

Empirical research on managerial cash holding motives generates mixed results. International studies show that managers of firms with agency problems tend to engage in cash hoarding (Dittmar, Mahrt-Smith and Servaes, 2003; Kalcheva and Lins, 2007). In contrast, studies in the U.S. market do not find evidence that firms' accumulation of excess cash is due to shareholder-manager conflicts (Opler et al., 1999; Bates, Kahle and Stulz, 2009). Rather, the U.S. findings suggest that managerial incentives have influence on cash spending activities. Dittmar and Mahrt-Smith (2007) suggest that poorly-governed firms tend to dissipate excess cash more quickly in ways that hinder firms' operating performance. Similarly, Harford, Mansi and Maxwell (2008) find that managers in these firms prefer to spend the free cash on value-reducing activities rather than hoard it due to strong protection and enforcement of shareholder rights in the U.S., and therefore firms with weaker corporate governance structures have lower cash holdings.

2.2 Dual holdings

The repeal of the Glass-Steagall Act in 1999 relaxed the restrictions of U.S. commercial banks in entering the investment banking business, giving banks more opportunities to hold equity in nonfinancial firms through bank holding companies or financial holding companies (Barth, Brumbaugh and Wilcox, 2000; Santos and Rumble, 2006). This has led to the recently growing literature on the influence of institutional dual holdings in U.S. market. Santos and Wilson (2017) show that banks' control over borrowers through voting rights is beneficial for borrowers in the form of interest rate discounts. Jiang, Li and Shao (2010) focus on dual holdings by non-bank institutions and document that firms with dual holders have lower loan spreads. Moreover, these firms exhibit fewer risk-shifting problems and less deterioration in credit quality after loan origination. In contrast, Lim, Minton and Weisbach (2014), examining a sample of leveraged loan facilities, fail to find any significant difference in loan spread for firms with dual holdings. However, when the dual holder is a hedge fund or a private equity fund, the loan spread is significantly higher. They argue that hedge funds and private equity funds are regarded as lenders of last resort, especially when they are also equity holders, therefore can lend at a premium. Using a large sample of syndicated loans to firms in 42 countries, Ferreira and Matos (2012) find that banks with equity holdings in the borrowing firm

charge higher prices for loans during the credit boom. At the same time, these borrowers experience less decline in credit supply during financial crisis. These studies consistently show that dual holdings enhance firms' access to debt capital, nevertheless the findings on the cost of debt are mixed.

Some recent papers examine the impact of institutional dual holdings on corporate finance decisions. Chava, Wang and Zou (2018) explore the link between dual holdings and firms' investment policies from a debt contracting perspective. They find that borrowers with dual holdings have fewer capital expenditure restrictions in their loan agreements and experience less risk-shifting from shareholders to debtholders. These firms are also treated more favourably by lenders in the event of covenant violations. Yang (2017) shows that the simultaneous holdings of debt and equity reduce firms' risk-taking behaviour in the form of fewer but better quality innovation activities. Using mergers between lenders and equity holders of the same firm as a natural experiment, Chu (2017) finds that firms reduce their dividend payout when the interests of shareholders and creditors are more aligned. Bodnaruk and Rossi (2016) investigate target firms of takeover bids that have equity holders which simultaneously own bonds. They find that dual holders of targets are willing to accept lower equity premia as they benefit from larger abnormal bond returns in mergers and acquisitions (M&As). This paper builds on the above studies by exploring the relation between dual holdings and corporate cash policies.

2.3 Hypothesis Development

In this section, two competing hypotheses on the impact of dual holdings on the level of cash are developed: *the incentive alignment hypothesis* and *the enhanced monitoring hypothesis*, both of which will be discussed in detail below. Since two hypotheses lead to opposite predictions, the relation between dual holdings and cash holdings needs to be empirically examined.

2.3.1 Incentive alignment hypothesis

The conflicts of interest between shareholders and creditors may lead to risk-shifting activities by shareholders, which transfer wealth away from creditors (Smith and Warner, 1979). Assuming that all stakeholders are utility maximizers (Jensen and Meckling, 1976), the incentives of investors holding both equity and debt claims are expected to be different from those of pure equity or debt holders. Rather than maximizing the value of their equity or debt holdings only, dual holders aim to maximize the overall payoff of the portfolio holdings

(Bodnaruk and Rossi, 2016). More specifically, shareholders that simultaneously hold debt claims are less likely to engage in actions that expropriate creditors' wealth, as these actions are detrimental to the value of their debt claims. Therefore, dual holdings would lead to better incentive alignment between shareholders and creditors, which helps mitigate shareholder-creditor agency conflicts.

As discussed in *Section 2.1.1*, firms have greater precautionary motives to hold cash when agency costs of debt are high (Acharya, Davydenko and Strebulaev, 2012; Harford, Klasa and Maxwell, 2014). In the presence of dual holdings, agency costs of debt will be reduced as the incentives of shareholders are better aligned with creditors (Jiang, Li and Shao, 2010), in which case creditor wealth is likely to be expropriated by shareholders. Consequently, creditors may be willing to provide greater amount of external capital or provide funds at a lower cost (Jiang, Li and Shao, 2010; Chava, Wang and Zou, 2018). Based on the precautionary saving theory that firms tend to save cash against future cash shortfall risks, firms with dual holders have less need to hold cash for precautionary purposes. That leads to the following hypothesis:

H1a: The presence of dual holdings is associated with lower levels of cash holdings.

The incentive alignment hypothesis predicts a negative relation between dual holdings and firms' cash holdings. If that holds, the negative relation is expected to be stronger for firms with financial constraints. As a financially constrained firm may not have adequate capacity to finance all of its investment needs, it is more likely to reserve internal resources for possible value-increasing investments in the future (Han and Qiu, 2007). Thus, financially constrained firms have greater incentives for precautionary cash holding. Given that dual holdings lower agency costs of debt and thus improve firms' access to external capital (Jiang, Li and Shao, 2010; Chava, Wang and Zou, 2018), constrained firms with dual holders will have less precautionary demand for holding cash and more incentives to fulfill current investment needs. This effect should be stronger for constrained firms than for unconstrained firms, as firms with sufficient external funds have less reason to adjust their cash holding policies depending on their access to capital markets.

2.3.2 Enhanced monitoring hypothesis

An alternative argument is that dual holdings may exert influence via more effective monitoring of management behaviour. On one hand, as dual holders' incentives are better aligned with creditors as compared with pure equity holders, they are expected to put more effort into monitoring the expropriation behaviour of managers and shareholders to protect

their own interests. Consistent with this argument, Jiang, Li and Shao (2010) find that dual holders exhibit longer investment horizons and stronger lending relationships with borrowing firms, indicating that they monitor intensively on both equity and debt sides. On the other hand, participation in both debt and equity gives dual holders access to privileged information about the firms. Institutional shareholders, especially those with significant shareholdings, have greater information acquiring ability due to their research efforts and access to management (Chen, Harford and Li, 2007; Schnatterly, Shaw and Jennings, 2008). Moreover, lenders participating in syndicated loans obtain private information from the borrowers (Ivashina and Sun, 2011; Massoud et al., 2011), such as information on financial disclosure, covenant compliance and financial projections (Standard and Poor's, 2011). The information advantage provides dual holders greater capabilities in disciplining management behaviour.

The U.S. evidence on managerial cash motives suggests that entrenched managers tend to dissipate cash quickly rather than hoard it (Dittmar and Mahrt-Smith, 2007; Harford, Mansi and Maxwell, 2008). As dual holders have greater incentives and are better positioned to monitor the expropriation behaviour of managers, opportunistic cash spending activities will be more effectively regulated. Consequently, managers in dual-held firms will be less likely to spend cash for their private benefits. Based on the enhanced monitoring hypothesis, dual holdings are predicted to have a positive relation with cash holdings of a firm. And the positive effect should be more pronounced for firms with weak corporate governance, in which the managerial agency problems are more severe. The hypothesis is presented below:

H1b: The presence of dual holdings is associated with higher levels of cash holdings.

3. Data and summary statistics

3.1 Sample and data

The initial sample includes 123,566 syndicated loan facilities provided to U.S. firms between 1995 and 2015[2]. The syndicated loan data is obtained from the Reuters Loan Pricing Corporation's (LPC) DealScan database. Firms' financial statement data is from Compustat. To identify loans borrowed by firms that are available in Compustat, I match the

[2] Data for non-financial firms is available from 1996 to 2016. As this study investigates how dual holdings impact firms' future cash holding decisions, one-year lagged dual holding data is used, which is collected from 1995 to 2015.

borrower/borrower's parent names in Dealscan with Compustat with careful manual check[3]. There are 61,512 loan facilities by firms with a match in Compustat. Borrowing firms in financial and utility industries (with SIC codes 6000-6999 and 4900-4999 respectively) are excluded as these firms are highly regulated in relation to their cash holding policies, reducing the sample to 47,968 loan facilities. I exclude borrowers with missing financial statement data in Compustat, which leads to 19,585 loan facilities. The sample firms are further required to have available corporate governance and loan facility data. The above screening process results in a sample of 9,497 loan facilities associated with 7,071 loan deals and 1,337 borrowing firms, and a total of 5,801 firm-year observations.

To identify simultaneous holdings of debt and equity, I collect the institutional equity holding data from the Thomson Reuters Institutional Holdings database (13F), which compiles the information on institutional shareholdings disclosed in 13F filings. Lenders in Dealscan are matched with institutional investors in 13F by institution name and year of loan origination. Corporate governance data is obtained from the Institutional Shareholder Services (formerly RiskMetrics) database. Stock price data is from the Center for Research in Security Prices (CRSP).

3.2 Variables

3.2.1 Dual holdings

To construct the dual holding variable, I examine whether lenders in Dealscan also report equity holdings in 13F filings in the same year. A firm is defined to have dual holders if at least one lender has "significant" equity holdings in the borrowing firm in the year of loan origination. Consistent with Jiang, Li and Shao (2010), the threshold of "significant" level is one of the following: the position must either exceed 1% of the borrower's common stock outstanding or exceed the value of $2 million in 2016 constant dollars. As institutional equity holdings in 13F are reported on a quarterly basis, the average of quarterly holdings over a year is taken as the equity position in that year. In identifying dual holders, I also take into account the possibility that an institution can hold firms' equity through its subsidiaries. I have checked lenders' 10K filings in various years if available and obtained a list of reported subsidiaries[4]. If either the parent lender or any of its subsidiaries can be matched with 13F data and identified

[3] In matching firms that issue loans prior to Aug 2012, I also refer to the Dealscan-Compustat link table provided by Professor Michael R. Roberts, originally used in Chava and Roberts (2008).
[4] Please see Appendix A for a description of the checking process.

as a significant equity holder of a firm, the borrowing firm is defined as dual-held (Jiang, Li and Shao, 2010; Chava, Wang and Zou, 2018).

In addition to the indicator variable, a continuous measure is also employed following Chava, Wang and Zou (2018), which gauges the extent to which the incentives of shareholders and creditors are aligned. I first calculate the total proportion of a borrowing firm's equity held by its lenders in the year of loan origination, referred to as *DH equity ownership*. To reduce the skewness of the data, the continuous dual holding variable is defined as $log(1 + DH\ equity\ ownership)$. The intuition is that given the level of debt exposure, larger equity stakes held by the dual holders lead to better incentive alignment and greater monitoring ability (Chava, Wang and Zou, 2018).

3.2.2 Cash

The literature has a variety of measures for the level of cash holdings. Opler et al. (1999) scale liquid assets by total assets net of liquid assets, as they argue that firms' ability to generate profits depends on its assets in place. Bates, Kahle and Stulz (2009) use cash to assets ratio instead of cash to net assets because the latter generates significant outliers. Following Bates, Kahle and Stulz (2009), this study uses cash to assets ratio, calculated as cash and marketable securities divided by total assets[5].

3.2.3 Control variables

I control for those factors commonly documented to affect cash holdings. The selection of firm characteristic variables largely follows Opler et al. (1999) and Bates, Kahle and Stulz (2009). *Market-to-book ratio* is viewed as a proxy for investment opportunities (Smith and Watts, 1992). Firms with better investment opportunities are expected to hold more cash as the cost of financial constraint is higher. *Firm size* is measured by the natural logarithm of book assets in 2016 constant dollars. Larger firms enjoy the benefit of economies of scale, thus having lower transaction motives for holding cash (Vogel and Maddala, 1967). *Leverage* is calculated by the ratio of total debt to book assets. Firms can choose to use their internal funds to either accumulate cash or pay back debt, which indicates a negative relation between leverage and cash holdings (Opler et al., 1999). On the other hand, firms with higher leverage often face higher risks of financial distress costs, which provides them incentives to hold more cash. Firms' cash saving may be related to the amount of cash flow generated by firms (Almeida, Campello

[5] Results are robust to alternative measures of cash, such as cash to net assets or the logarithm of cash to assets.

and Weisbach, 2004), therefore I control for *Cash flow to assets*, which is measured by earnings after interest, dividend and taxes but before depreciation divided by assets. Firms with more volatile cash flows have more precautionary need to hold cash. *Cash flow volatility* is measured using the industry-level cash flow risk, computed by the average of firm cash flow standard deviation across each two-digit SIC code.

Since other liquid assets such as working capital can substitute for cash, I include *Net working capital to assets*, which is measured by working capital net of cash divided by total assets. A negative relation between net working capital and cash is expected. *Capital expenditure to assets* can be a proxy for investment opportunities, which is positively related to cash. On the other hand, however, capital expenditure may create more collateral which increases debt capacity and reduces cash saving demand (Bates, Kahle and Stulz, 2009). *R&D to sales* is added as a proxy for growth opportunities and financial distress costs. *Dividend payout* is a dummy variable equal to one in years in which a firm pays a common dividend and zero otherwise. Dividend-paying firms are less likely to be constrained and may hold less cash.

A few corporate governance variables are included to control for managerial cash holding incentives. Antitakeover indices are commonly used in the literature as a measure of managerial entrenchment. Gompers, Ishii, and Metrick (2003) construct a governance index (*G-Index*) based on a total of twenty-four possible antitakeover provisions in five groups, including delay, voting, protection, state and other[6]. Bebchuk, Cohen and Ferrell (2009) propose an alternative entrenchment index (*E-Index*) by selecting six provisions that are most related to firm value from the G-Index[7]. Higher values of the indices show that managers have more ways to limit shareholders' control of firms, and thus there are more severe agency problems. Based on Harford, Mansi and Maxwell (2008), the G-Index and E-Index are expected to be negatively related with cash holdings. As suggested in Jensen (1993), managers' equity holdings help align their incentives with shareholders, which reduce managerial agency problems. Therefore I control for *Insider share ownership*, which is measured as the percentage of shares held by the board of directors. Institutional investors play an important role in monitoring and influencing management decision. Total equity ownership by institutional

[6] Data for G-Index was provided by the Investor Responsibility Research Center (IRRC) for the years 1990, 1993, 1995, 1998, 2000, 2002, 2004 and 2006. If the index data is not available in a given year, the latest index available is used as the index value for that year. The IRRC data collection ceased after 2006. Therefore, due to data availability, this variable is invariant at the firm level after year 2006.

[7] Data for E-Index prior to 2007 was provided by IRRC and obtainable from the RiskMetrics database. From 2007, only the individual provision data is available. In this study, E-Index from 2007 is manually calculated based on the individual provision data from the ISS database.

investors is included and a positive coefficient is predicted. I use board characteristic variables such as *Board size* and *Board independence* to control for the effect of the board on corporate decisions.

To exclude the possibility that corporate liquidity is affected by the issuance of loans rather than dual holdings, I include several variables on loan facility characteristics. *Number of facilities* is the number of loan facilities a firm borrows in a year. *Average facility amount* and *Average maturity* are the average amount and maturity of loan facilities borrowed by a firm each year[8]. I also control for the purpose of the loan, which is measured by a set of indicator variables based on whether the loan is primarily for corporate purposes, refinancing, working capital, backup line, takeover or others. All continuous variables are winsorized at the 1st and 99th percentiles to reduce the impact of outliers.

3.3 Summary statistics

Panel A of Table 1 presents summary statistics for key variables of firm and facility characteristics. As shown in the table, the presence of dual holdings is prevalent among the sample firms, with 72.3% of the firms having at least one dual holder. The average (median) equity ownership by dual holders is 1.9% (0.9%), suggesting that dual holders usually do not hold significantly large proportions of shares in firms. On average, cash held by firms is 9.3% of total assets, although the median cash holding is only 5.8%. The level of cash held by sample firms is substantially lower compared to Bates, Kahle and Stulz (2009)[9], however it is comparable to the average cash ratio by firms in the top size quintile of their sample[10]. As firms with syndicated loans are on the large side in the

universe of all listed firms, the result is consistent with the notion that larger firms tend to hold less cash. The average inflation-adjusted firm size is $9.68 million, much larger than Opler et al. (1999) ($4.59 million), confirming that firms in my sample are generally larger. The sample firms have an average market-to-book ratio of 1.86 and leverage ratio of 26.5%. In addition, the average number of loan facilities issued by the sample firms each year is 1.6 with an average facility amount of $688 million, and each facility is participated by 10.5 lenders.

[8] As firms may borrow multiple numbers of facilities in a year and most of the analyses in this study are on an annual basis, I use the yearly average facility amount and maturity as control variables in regression models. I also use the maximum facility amount and maturity as alternative measures and the results are not affected materially.
[9] Bates, Kahle and Stulz (2009) report an increase of average cash ratio from 10.5% in 1980 to 23.2% in 2006.
[10] Please refer to Figure 1 of Bates, Kahle and Stulz (2009).

Results for the univariate mean and median tests suggest that dual-held and non-dual-held firms have distinct firm and loan characteristics. Compared to non-dual-held firms, dual-held firms have greater market-to-book ratio (1.94 vs. 1.64) and larger firm size ($9.97 million vs. $8.93 million). Dual-held firms also have more volatile cash flows and are more likely to pay dividends. In terms of corporate governance, firms with dual holders have lower inside share ownership, smaller but more independent boards, and higher institutional ownership. Some of the results are supported by prior studies. For instance, Jiang, Li and Shao (2010) find that dual holders prefer to invest in larger firms and firms with higher institutional holdings. On the loan facility level, loans participated by dual holders are in greater amount ($843 million vs. $324 million) and provided by syndicates with greater number of lenders (12.3 vs. 6.3). The results are consistent with Jiang, Li and Shao (2010) and Chava, Wang and Zou (2018) that dual holders have preference for larger loans and loans from larger syndicates. Moreover, loan facilities with dual holders are more likely to be revolver loans, less likely to be term loans and less likely to be secured.

Panel B of Table 1 reports the Pearson correlation coefficients among the firm variables. As seen from the table, cash to assets ratio is negatively correlated with dual holding variables, although the correlation is not significant for dual holding dummy. The correlation coefficient needs to be interpreted with caution, as it does not take in to account the correlation between cash and other firm characteristic variables. Consistent with expectation, cash is positively related to market-to-book ratio, R&D to sales and cash flow volatility, and negatively related to size. The correlations between dual holding variables and control variables are largely consistent with the univariate analysis in Panel A. Finally, none of the correlation coefficients between independent variables is greater than 0.5, indicating no major concern for multicollinearity.

4. Empirical Results

4.1 Dual holdings and level of cash holdings

4.1.1 Methodology

The summary statistics from Table 1 suggest that dual-held and non-dual-held firms differ substantially in a variety of aspects, which indicates that dual holding decisions might depend on firm characteristics. For instance, firms may hold large cash because they anticipate higher risks in the future, and financial institutions may avoid holding debt and equity stakes

simultaneously in these firms. In addition, there might be some unobservable factors that impact both institutional dual holdings and corporate liquidity. As a result, an OLS regression approach may suffer from endogeneity problems[11]. To address the potential endogeneity concern, I employ an instrumental variable approach to examine the relation between dual holdings and the level of cash.

The selection of instruments follows Chava, Wang and Zou (2018). The first instrument is the number of lenders in a loan syndicate that are publicly listed. Ferreira and Matos (2012) suggest that privately held financial institutions face more constraints than public ones in holding equity stakes. Therefore, given the loan participation, the number of public lenders in the loan is expected to have a positive relation with the level of equity holdings by these lenders. As the focus of this study is on U.S. market, it is expected that lenders are more likely to be dual holders if they are publicly listed in the U.S.. Therefore, in constructing this instrument, I define public lenders as financial institutions that are publicly listed in U.S. market or the subsidiaries of these institutions. The second instrument is the average incidence of dual holder presence in the industry of the borrowing firm[12]. Choi and Sias (2009) document that institutional investors exhibit a strong herding trend in the form of following each other into and out of the same industries. The assumption is that an institution's propensity of being a dual holder of a firm is positively correlated with the incidence of its peers being dual holders of firms in the same industry. And the listing status of lenders and the industry-level investment trend by financial institutions are not expected to directly affect firm-level liquidity policies.

In the first stage, I estimate a Probit (or Tobit) regression model of dual holdings on the two instruments as well as all control variables in the second stage, and obtain the fitted value of the dual holding variable. In the second stage, the following regression is performed:

$$Cash_{i,t} = \alpha + \beta Fitted\ DH_{i,t-1} + \gamma X_{i,t} + \varepsilon_{i,t} \quad (1)$$

where the dependent variable is the level of cash for firm i in year t, and the independent variable of interest is the fitted value of the dual holding variable, as measured by an indicator (*DH dummy*) or continuous variable (*DH Cont*), from the first stage[13]. $X_{i,t}$ includes a set of

[11] Results for OLS regressions are reported in Table B1 of the Appendix.
[12] If the dual holding variable is measured using equity ownership, the second instrument is also continuous, measured by the average equity holdings by lenders in the borrowers' industry.
[13] Here I use the one-year lagged dual holdings as the independent variable. The contemporaneous regressions provide virtually similar results.

firm and facility control variables[14] that may affect firms' cash holdings, as discussed in *Section 3.2.3*. The standard errors are corrected for heteroscedasticity and clustering at the firm level. The incentive alignment hypothesis predicts that the coefficient on dual holdings (β) is negative, whereas the enhanced monitoring hypothesis predicts β to be positive.

4.1.2 Baseline results

Table 2 reports the results for the first stage of the 2SLS regression analysis. It shows that both instruments, *Industry average DH presence* (or *Industry average DH equity ownership*) and *Number of listed lenders*, are positive related with the dual holding variables, and the coefficients are statistically significant at 1% level. It is consistent with the assumption that both instruments are relevant. To examine whether the variable of dual holding is endogenous, a Hausman test is performed where the null hypothesis states that the variable can be treated as exogenous. From Table 2, both p-values are smaller than 0.01, confirming that the dual holding variable is indeed endogenous to cash holdings and thus an instrumental variable approach should be employed rather than an OLS approach. In addition, I run a Sargan-Hansen test to assess whether the instruments suffer from overidentification problems. The null hypothesis of the Sargan-Hansen test states that the instruments are uncorrelated with the second-stage error. Large p-values in both models suggest that the null cannot be rejected, which shows that the instruments are exogenous. Finally, for the weak identification test, large Kleibergen-Paap rk Wald F-statistics[15] show that the null hypothesis of weak instruments can be rejected. The above analysis suggests that the selected instruments are valid and suitable for investigating the impact of dual holdings on cash holdings.

Table 3 presents the results for the second stage of the 2SLS regressions. Column 1 reports the basic model with dual holdings proxied by an indicator variable and financial statement control variables included. As shown in Column 1, the coefficient on *DH dummy* is negative (-0.018) and significant at 1% level, which suggests that firms with dual holders have lower levels of cash holdings. In Column 2 and 3, corporate governance and loan facility controls are added[16], and the coefficients on *DH dummy* remain virtually unchanged. In Column 4 to 6, a continuous measure based on dual holders' equity ownership is used for dual holdings. As shown in

[14] Following Harford, Mansi and Maxwell (2008), I include the one-year lagged cash variable as an additional control. Excluding this variable does not affect my results materially.
[15] The models used in this analysis assume that the standard errors are not i.i.d. (i.e. they may be heteroscedastic or clustered). In such case the Cragg-Donald Wald statistics are no long valid (Kleibergen and Paap, 2006). Therefore I use Kleibergen-Paap rk Wald F-statistic as a weak identification test instead.
[16] Due to data availability, the inclusion of corporate governance variables significantly reduces the sample size.

Column 4, the coefficient on *DH cont* is still significantly negative. Although the magnitude of the coefficient is reduced (from 0.26 to 0.16) after the additional control variables are included, it remains consistently negative and significant at 1% level. It suggests that the effect of dual holdings on cash holdings become more pronounced as the proportion of equity held by dual holders increases. The results are not only statistically but also economically significant. From Model 3, on average firms with dual holders maintain a cash level 20.4% lower than firms without dual holders (based on a sample mean of 0.093). From Model 6, a one-standard-deviation increase in *DH cont* leads to a decrease of cash by 0.004, which is 4.6%[17] of the average cash level. As discussed in *Section 2.3*, the incentive alignment hypothesis predicts a negative relation between dual holdings and cash holdings while the enhanced monitoring hypothesis indicates a positive relation. The results shown are in favour of the incentive alignment hypothesis, which suggests that dual holdings lead to better shareholder-creditor incentive alignment and thus less need for precautionary cash saving.

As for the control variables, the coefficient on market-to-book ratio is not significant in the baseline models, but becomes positive in full specifications. It shows that firms with better growth opportunities tend to hold more cash due to higher demand (Opler et al., 1999; Bates, Kahle and Stulz, 2009). Firm size does not affect cash significantly in models with dual holding dummy. And although it has a positive coefficient in models with continuous dual holding measure, the magnitude is negligible. This is inconsistent with prior studies that generally find a negative relationship between firm size and cash (Opler et al., 1999; Bates, Kahle and Stulz, 2009; Liu and Mauer, 2011). One possible explanation is that the sample in this study only includes firms that issue syndicated loans, which are generally larger among all publicly listed firms (Jiang, Li and Shao, 2010). In such circumstance, firms in the sample exhibit little variation in size, which may reduce the importance of firm size in determining the level of cash. The coefficient on CAPEX to assets is significantly negative. As suggested by Bates, Kahle and Stulz (2009), the reason might be that greater capital expenditures lead to more collateral assets, which can increase firms' debt capacity and reduce the demand for cash. Firms with higher leverage and dividend-paying firms tend to have lower levels of cash.

In terms of corporate governance, firms with smaller board size have higher levels of cash. The positive relationship between institutional holdings and cash only exists when dual holding is measured by an indicator variable. The rest of corporate governance variables do not have a

[17] Calculated as $(0.027 \times 0.16)/0.093$.

significant effect on cash holdings[18]. Given that there have been mixed findings regarding the effect of corporate governance on cash holdings[19], the differences in results may be attributed to varying sample selection criteria. Moreover, facility characteristics do not appear to play an important role in explaining firms' level of cash holdings.

The results provide complementary evidence to Chava, Wang and Zou (2018) and Chu (2017) in terms of how dual holdings influence corporate decisions. Chava, Wang and Zou (2018) document that dual-held firms are less likely to have CAPEX restriction covenants in their loan contracts and experience less decline in CAPEX investment following covenant violations. Chu (2017) shows that, as dual holdings mitigate shareholder-creditor conflicts, firms with dual holders pay less dividend to shareholders. Both studies, as well as this paper, consistently show that the incentive alignment between shareholders and creditors can have substantial impact on corporate financial policies. The effect of dual holdings on firms' allocation of internal capital will be further examined in *Section 4.6*.

4.2 Impact of financial constraint

The analysis in the previous section reveals a negative relation between dual holdings and level of cash holdings, providing support for the incentive alignment hypothesis. It suggests that the presence of dual holdings mitigates the agency conflicts between shareholders and creditors, and therefore reduces the precautionary cash saving motives of firms. Based on the incentive alignment hypothesis, the effect of dual holdings on cash holdings should be stronger for financially constrained firms as these firms have greater precautionary demand for cash (Denis and Sibilkov, 2010; Han and Qiu, 2007). To examine the role of financial constraints in the relation between dual holdings and level of cash, I interact the dual holding variable with variables that proxy for financial constraints, and reperform the regression as specified in Equation (1)[20]. Negative coefficients on the interaction terms would indicate that dual holdings have a greater negative impact on the level of cash for firms that are financially constrained.

[18] Due to the data limitation for G-Index, in the main tests I include E-index instead of G-Index. Alternative tests using G-Index provide similar results.

[19] For example, the coefficient on E-Index is insignificant in Harford, Mansi and Maxwell (2008) and significantly negative in Liu and Mauer (2011). The coefficient on institutional ownership is insignificant in Harford, Mansi and Maxwell (2008) and significantly positive in Pham, Simpson and Nguyen (2017).

[20] For analyses in this section, I use the following four variables as instruments: *Industry average DH presence* (or *Industry average DH equity ownership*), *Number of listed lenders*, *Industry average DH presence*Financial constraint* (or *Industry average DH equity ownership*Financial constraint*), and *Number of listed lenders*Financial constraint*.

Following previous studies (Denis and Sibilkov, 2010; Liu and Mauer, 2011; Pham, Simpson and Nguyen, 2017), five different measures are used to proxy for the level of financial constraints. Prior studies such as Whited (1992) and Gilchrist and Himmelberg (1995) classify firms with long-term credit ratings as financially unconstrained. The indicator variable *No rating* is equal to one if a firm reports positive debt in a given year but does not have a long-term credit rating or has a rating below the BBB grade. Financially constrained firms tend to have lower dividend payout ratios (Fazzari, Hubbard and Petersen, 1988) and smaller size (Gilchrist and Himmelberg, 1995). A firm is defined as financially constrained if its dividend payout ratio (or book value of assets) is below the median in a given year. In addition, I employ two financial constraint indices that are commonly used in the literature: the Whited and Wu (2006) (WW) index and the size-age (SA) index by Hadlock and Pierce (2010)[21]. For both indices, a high value indicates that a firm is financially constrained.

Table 4 reports regressions of level of cash on dual holdings where the dual holding variable is interacted with various financial constraint measures[22]. Across all five measures of financial constraints, the coefficients on the interaction between dual holding and financial constraint are negative and statistically significant at 1% or 5% level. When financial constraint is measured using dividend payout (Column 2) and size (Column 3), the effect of dual holdings on cash is fully subsumed by the interaction term, indicating that the negative effect only exists in constrained firms. In addition, the impact of dual holdings is also economically significant. For instance, in Column 1, for firms that do not have a credit rating above the BBB grade, one standard deviation increase of *DH cont* leads to 2%[23] decrease of cash holdings.

The results suggest that the negative effect of dual holdings on the level of cash is more pronounced for financially constrained firms than for unconstrained firms, which provides further evidence for the incentive alignment hypothesis. Firms are expected to reduce their precautionary cash holdings in response to mitigated conflict of interest between shareholders and creditors. The change should be more evident in constrained firms which had greater incentives for precautionary cash holdings. The finding is in line with Duchin (2010) that the

[21] The WW index is given by $-0.091CF - 0.062DIVPOS + 0.021TLTD - 0.044LNTA + 0.102ISG - 0.035SG$, where *CF* is cash flow to assets, *DIVPOS* is the dividend dummy, *TLTD* is the long-term debt to total assets ratio, *LNTA* is the log of total assets, *ISG* is the firm's 3-digit industry sales growth, and *SG* is firm's sales growth. The SA index is calculated as $(-0.737*Adjusted\ size) + (0.043*Adjusted\ size^2) - (0.040*Age)$, where *Adjusted size* is the log of inflation-adjusted book assets, and *Age* is the number of years the firm is listed with a non-missing stock price on Compustat.

[22] In the reported results, the presence of dual holdings is measured by dual holders' equity ownership. Results using an indicator variable are qualitatively similar.

[23] Computed as (-0.115*0.027) + (-0.659*0.027*1) = -0.02.

coinsurance effect of corporate diversification, which allows firms to hold less cash, is stronger in financially constrained firms, as unconstrained firms are able to tap external capital markets at little cost.

4.3 Impact of corporate governance

Results in *Section 4.1.2* show no evidence of the enhanced monitoring hypothesis. In this section I further investigate whether dual holdings can influence cash holdings through better monitoring for firms with weak corporate governance. Prior studies on managerial motives of cash holdings (Dittmar and Mahrt-Smith, 2007; Harford, Mansi and Maxwell, 2008) show that poorly-governed firms in the U.S. tend to hold lower levels of cash, since entrenched managers prefer to spend cash quickly rather than hoard it. Therefore, to the extent that dual holders play a role in monitoring managers' opportunistic behaviour, dual holdings should have a positive effect on cash for firms with poor corporate governance.

Following Harford, Mansi and Maxwell (2008), I define poor corporate governance based on three variables: insider share ownership, E-Index and G-Index. As an increased managerial equity ownership help mitigate the agency problems between managers and shareholders (Jensen, 1993), a firm is defined as poorly-governed if its insider share ownership ratio falls in the bottom quartile in a given year. Since E-Index and G-Index measures the extent of manager entrenchment based on the number of anti-takeover provisions that may limit shareholders' control of the firm, lower values of E-Index or G-Index represent better corporate governance. I define a firm as poorly-governed if the value of E-Index (or G-Index) is in the top quartile in a given year.

Table 5 presents the results for level of cash regressions with dual holdings interacted with corporate governance variables. As shown from the table, most of the coefficients on the interaction term are either insignificant or significantly positive but not large enough to offset the negative impact of dual holdings on cash. For example, in Column 1 the effect of dual holdings on cash for poor-governed firms is -0.008 (-0.020+0.012), which is still negative. The only exception is Column 6, which has a net coefficient of 0.016 (-0.190+0.206). However, the Wald test suggests that the net coefficient is not significantly different from zero. On the other hand, the coefficients on dual holding variables are all negative and significant, suggesting a consistently negative relation between dual holdings and cash holdings for well-governed firms. The results indicate that for firms with good corporate governance, the presence of dual holdings negatively impact the level of cash mainly through reducing firms' precautionary

saving motive. Whereas for firms with poor corporate governance, dual holdings might have an offsetting positive effect on cash by mitigating managers' cash dissipation behaviour, although the effect is not strong enough to turn the net effect to positive. Overall, there is no adequate support for the enhanced monitoring hypothesis.

4.4 Difference-in-differences analysis

The main analysis in *Section 4.1.2* examines the relation between dual holdings and cash holdings using an instrumental variable approach. In this section, an alternative test is conducted using the difference-in-differences (DiD) approach. The DiD analysis is based on the initiation of dual holdings following Chava, Wang and Zou (2018). To identify treatment group, I focus on firms that have not been dual-held before and gain the dual holding status for the first time during the period 1998 – 2014[24]. The treated firms are matched with potential control firms that issue syndicated loans in the same year as the treated firms but have never been dual-held throughout the sample period.

The matching process is as follows. First, a probit regression on a group of firm and loan characteristics is estimated to generate the predicted probability of a firm being dual-held. The matching variables are measured by averages over the pre-treatment period. I control for firm characteristics that may affect dual holding decisions, such as firm size, market-to-book ratio, leverage, cash flow to assets and industry (measured by 1-digit SIC). As suggested in Jiang, Li and Shao (2010), dual holders prefer firms with better past stock performance, greater analyst coverage and higher institutional ownership. Therefore I include industry-adjusted stock return, number of analysts following and the percentage of institutional holdings. To control for the effect of new financing on changes in cash level due to loan issuance, total facility amount issued by a firm in a year is also added into the probit model.

Second, based on the propensity scores, I perform a one-to-one nearest-neighbour matching with replacement. Specifically, for each treated firm, firm with loans issued in the same year and the closest propensity score is selected as the matched control firm. Due to small size of the control group, each control firm maybe selected multiple times as a match for different

[24] Consistent with the main tests, the period in which data for all control variables are available is from 1996 to 2016. In the DiD analysis, I focus on firms from 1998 to 2014 because I need to examine firms' cash holdings two years prior to and after the initiation of dual holdings. For a seven-year time window, the sample period is from 1999 to 2013.

treated firms. The studied time period is two (or three) years prior to and after the year in which the dual holding is initiated, with the initiation year excluded from the analysis.

Panel A of Table 6 presents the comparison of main variables between treatment and control groups before and after matching. As shown in the table, the treatment group differs substantially from the control group in multiple dimensions before matching. Out of 403 treated firms, 323 can be successfully matched with 153 control firms based on the matching approach above. The matching process helps reduce the differences across two groups to a large extent however does not completely remove them, as there are limited control firms to select from. Firms in the treatment and control groups are still significantly different after matching along several characteristics, such as firm size and total facility amount, although the magnitude of the differences has been diminished. I further require both treated and control firms to have at least one-year financial data available both prior to and after the initiation year. That leaves a sample of 288 treated and 102 control firms [25] for the regression analysis in the next step.

I then estimate the following DiD regression:

$$Cash_{i,t} = \alpha + \beta_1 Treated + \beta_2 Post + \beta_3 Post * Treated + \gamma X_{i,t} + \varepsilon_{i,t} \quad (2)$$

where $Treated$ is a dummy variable equal to one for firms in the treatment group as defined above and zero for those in the control group. $Post$ is a dummy variable equal to one for years after the initiation of dual holdings and zero for years prior to the initiation year. Firm-level control variables as defined in *Section 3.2.3* as well as industry and year fixed effects are included in the regression. The standard errors are corrected for heteroscedasticity and clustering at the firm level. The coefficient on $Post * Treated$ captures the effect of the initiation of dual holdings on cash holdings.

Results for the DiD analysis are reported in Panel B of Table 6. From Model 1, after the initiation of dual holdings, the treated firms experience a decrease in cash level by 2.1% compared to firms with no change in dual holding status. The negative effect remains significant at the 10% level when the impact of corporate governance variables is control for. Tests based on a seven-year window (in Column 3 and 4) produce similar results.

To further mitigate the concern that the results might be driven by other firm characteristics that lead to both the selection of dual holdings and the change in cash level, I conduct a counterfactual analysis using the same treatment and control samples. If the decrease in firms'

[25] This is based on a five-year window. For a seven-year window there are 291 treated and 102 control firms.

cash level is driven by other factors which also lead to institutional investors' dual holding decisions, the results should be observed prior to the initiation of dual holdings. Therefore, for each firm in the sample, I select year $t-3$ (t is the year of dual holding initiation) as the counterfactual event year[26] and reperform the tests. As shown in Column 5 to 8, there is no difference in cash holdings between treated and control firms after the counterfactual event. It suggests that the results cannot be explained by unobservable factors that determine both firms' dual holding status and the level of cash. To sum up, the DiD analysis complements the main finding in *Section 4.1.2*. It shows that the negative relation between dual holdings and cash holdings is not driven by the use of the specific instrument variable estimation approach.

4.5 Dual holdings and cash flow sensitivity of cash

To further examine the incentive alignment hypothesis, an additional test is conducted following Harford, Klasa and Maxwell (2014), which focuses on the impact of dual holdings on firms' propensity to save cash out of cash flows. The incentive alignment hypothesis states that in the presence of dual holdings, firms face lower agency costs of debt and therefore have less precautionary cash saving motives. Almeida, Campello and Weisbach (2004) suggest that precautionary cash savings can be captured by firms' propensity to save cash out of cash flows, which they refer to as the cash flow sensitivity of cash. If dual holdings reduce precautionary savings, the prediction is that firms with dual holders have lower cash flow sensitivity of cash.

To measure the cash flow sensitivity of cash, I employ the Almeida, Campello and Weisbach (2004) model, which regresses the change in cash holdings on cash flow and control variables, and augment it with dual holdings and the interaction between dual holdings and cash flow. The regression is specified as follows:

$$\begin{aligned}\Delta Cash_{i,t} = {} & \alpha + \beta_1 CashFlow_{i,t} + \beta_2 DH_{i,t-1} + \beta_3 CashFlow_{i,t} * DH_{i,t-1} + \beta_4 MBRatio_{i,t} \\ & + \beta_5 Size_{i,t} + \beta_6 CAPEX_{i,t} + \beta_7 Acquisitions_{i,t} + \beta_8 \Delta NWC_{i,t} \\ & + \beta_9 \Delta ShortDebt_{i,t} + \varepsilon_{i,t} \qquad (3)\end{aligned}$$

In estimating Equation (3), I perform both OLS and 2SLS regressions with instruments used in *Section 4.1.2* to address the endogeneity concern. For 2SLS regressions, the calculated fitted value of the dual holding variable is included as an independent variable. The control variables include market-to-book ratio, firm size, CAPEX to assets, acquisition expenses to assets,

[26] I choose year t-3 as the counterfactual event year to ensure that the post-event period does not overlap with the post-event period of the DiD analysis.

change in noncash net working capital to assets, and change in short-term debt to assets. The coefficient on cash flow to assets represents the propensity of a firm to save cash out of current cash flows. Therefore, β_3 represents the effect of dual holdings on the cash flow sensitivity of cash and is expected to be negative.

The baseline model reported in Column 1 of Table 7 shows that on average the sample firms save 14.9 cents out of each dollar of cash flow. The OLS regressions show a negative and significant coefficient on the interaction between dual holdings and cash flow, suggesting that firms with dual holders tend to save less cash out of their cash flows compared to those without dual holders. As shown in Column 2, non-dual-held firms save around 16.5% from each dollar of cash flow, whereas dual-held firms only save 4.8% (= 0.165 - 0.117). The results become more economically and statistically significant after the potential endogeneity of dual holdings is controlled for. The finding that firms with dual holdings have lower cash flow sensitivity of cash provides additional support for the hypothesis that the incentive alignment between shareholders and creditors reduces firms' need for precautionary cash savings.

4.6 Dual holdings and allocation of internal capital

Previous analysis shows that dual-held firms hold lower level of cash. When internal capital is ample, managers have several ways to deploy cash: increase distribution to equity holders, hold as cash reserves, or spend on capital investments (Faulkender and Wang, 2006; Harford, Mansi and Maxwell, 2008). In this section, I further examine how dual holdings affect firms' allocation of internal funds. Specifically, I focus on firms' investment and dividend payout decisions. The conjecture is that, as dual holdings align incentives of shareholders with creditors, firms will be more likely to spend cash on investments rather than distribute it in the form of dividends. As dual holding decisions and investment/dividend policies may be jointly determined, I follow Harford, Mansi and Maxwell (2008) and focus on changes of firm's investment and dividend payout. Moreover, given the long-term nature of investment and dividend policies, both dual holding and cash variables are measured using one-year lagged value.

In the first two models of Table 8, the dependent variable is defined as change in investment scaled by average total assets, where investment is the sum of capital expenditures, acquisition expenses, R&D expenses and advertising expenses (Faulkender and Petersen, 2012). To examine how the relation between dual holdings and cash affects investment decisions, I interact dual holding variables with cash holdings in the regressions. Consistent with

Faulkender and Petersen (2012), control variables include preinvestment earnings to assets[27], firm size and market-to-book ratio. I also include leverage, net working capital to assets and sales growth as additional controls.

The positive coefficient on cash in Model 1 of Table 8 indicates that a greater level of cash holdings is associated with an increase in firm investment in the future. The interaction between dual holdings and cash is also positive and significant, which shows that firms with dual holders increase their investment level to a greater extent as cash reserves increase. Economically, a one-standard-deviation increase in cash leads to non-dual-held firms investing 1.2%[28] more into capital; while for dual-held firms, the level of investment increases by 3.5%. Model 2 with a continuous dual holding variable provides qualitatively similar result. The results suggest that one explanation for dual-held firms holding less cash is that they are more inclined to spend excess cash on capital investments.

Results for dividend payout decisions are reported in Column 3 and 4 of Table 8. Following Chu (2017), the dividend variable is defined as total dividend payout (cash dividend plus share repurchase) divided by the average market value of common equity. As shown in Model 3 and 4, the coefficient on dual holdings has a negative sign, which is consistent with Chu (2017), although not statistically significant. The coefficient on the interaction term is insignificant in both models, providing no adequate evidence that dual-held firms are more likely to distribute dividends to equity holders.

Overall, the above analysis suggests that dual holdings have impact on firms' allocation of internal capital. Lower levels of cash kept by dual-held firms can be attributed to higher spending on capital investments rather than greater dividend distributions to shareholders. This is consistent with prior studies such as Jiang, Li and Shao (2010) and Chava, Wang and Zou (2018), which find that firms engage in fewer risk-shifting activities after loan origination. As the presence of dual holders internalizes the shareholder-creditor conflicts, firms are unlikely to distribute cash to shareholders in a way that undermines creditor value. Rather, they would prefer to invest cash into projects that enhance the wealth of both shareholders and creditors.

4.7 Dual holdings and value of cash holdings

[27] Preinvestment earnings are calculated as earnings before interest, taxes and depreciation plus R&D and advertising expenses.
[28] The standard deviation of cash for the sample in Model 1 of Table 8 is 0.104.

In this section, I focus on how dual holdings affect the value of cash holdings. Previous studies suggest that when shareholder-creditor conflicts are exacerbated, cash held by firms becomes less valuable to shareholders, as the additional level of cash is more likely to benefit creditors (Liu and Mauer, 2011; Liu, Mauer and Zhang, 2014). Given that dual holdings lead to better incentive alignment between shareholders and creditors, creditors will be less likely to require firms to hold cash at the expense of shareholders' interests. In such case, firms' cash holdings are expected to have higher value to shareholders.

To examine the influence of dual holdings on value of cash, I employ the model developed by Faulkender and Wang (2006), which regresses the excess stock return on change in cash holdings and other firm-specific characteristics, and augment it to include dual holdings and an interaction between dual holdings and change in cash holdings:

$$\begin{aligned} r_{i,t} - R_{i,t}^{B} = {} & \gamma_0 + \gamma_1 \frac{\Delta C_{i,t}}{M_{i,t-1}} + \gamma_2 \frac{\Delta E_{i,t}}{M_{i,t-1}} + \gamma_3 \frac{\Delta NA_{i,t}}{M_{i,t-1}} + \gamma_4 \frac{\Delta RD_{i,t}}{M_{i,t-1}} + \gamma_5 \frac{\Delta I_{i,t}}{M_{i,t-1}} + \gamma_6 \frac{\Delta D_{i,t}}{M_{i,t-1}} \\ & + \gamma_7 \frac{C_{i,t-1}}{M_{i,t-1}} + \gamma_8 L_{i,t} + \gamma_9 \frac{NF_{i,t}}{M_{i,t-1}} + \gamma_{10} \frac{C_{i,t-1}}{M_{i,t-1}} * \frac{\Delta C_{i,t}}{M_{i,t-1}} + \gamma_{11} L_{i,t} * \frac{\Delta C_{i,t}}{M_{i,t-1}} \\ & + \gamma_{12} DH_{i,t} + \gamma_{13} DH_{i,t} * \frac{\Delta C_{i,t}}{M_{i,t-1}} + \varepsilon_{i,t} \end{aligned} \quad (4)$$

where the dependent variable is firm i's excess stock return in fiscal year t, calculated as firm i's stock return during fiscal year t ($r_{i,t}$) less the benchmark portfolio return ($R_{i,t}^{B}$) during fiscal year t. The benchmark portfolios are the Fama and French (1993) 25 portfolios formed on size and book-to-market[29]. For independent variables, $\Delta X_{i,t}$ represents changes in variable X for firm i from year $t-1$ to year t. Control variables include firm-specific factors that are potentially associated with change in cash holdings which may also impact firm value, such as profitability, financing policy and investment policy. Following Faulkender and Wang (2006), I control for earnings before extraordinary items ($E_{i,t}$), total assets net of cash ($NA_{i,t}$), R&D expenditures ($RD_{i,t}$), interest expense ($I_{i,t}$), common dividends ($D_{i,t}$), leverage ($L_{i,t}$) and net financing ($NF_{i,t}$). All independent variables (except leverage) are scaled by one-year lagged market value of equity ($M_{i,t-1}$). The method is similar to a long-term event study where the

[29] As discussed in Faulkender and Wang (2006), the Fama and French portfolios are formed at the end of each June, while firms' fiscal year may end in any month. Following Faulkender and Wang (2006), the portfolio to which a firm belongs is readjusted at the end of each June. For example, if a firm's fiscal year ends in October in year t-1. From October of year t-1 to June of year t, the firm is grouped into the portfolio based on size and BM breakpoints of year t-1. From July to October of year t, it belongs to the portfolio based on size and BM breakpoints in year t. The benchmark return is calculated as the annualized monthly return of the portfolio it is grouped into every month.

event of interest is the unexpected change in cash holdings, and the focus is on how the change in cash holdings affect stock returns when other firm-specific factors are controlled for.

As variables on both sides of Equation (4) are scaled by the lagged market value of equity, the coefficient on the change in cash can be interpreted as the dollar change in shareholder value resulting from one dollar change in the amount of cash holdings, i.e. the marginal value of cash holdings (Faulkender and Wang, 2006). The coefficient on the interaction of dual holdings with change in cash (γ_{13}) measures the effect of dual holdings on the marginal value of cash.

Table 9 reports regressions of excess stock returns on change in cash, firm-specific variables and dual holdings. Column 1 presents a baseline Faulkender and Wang (2006) regression with the sample used in this study. It shows that the estimated marginal value of cash for a firm with zero cash and zero leverage is \$1.34, which is comparable to the result in Faulkender and Wang (2006) (\$1.47) despite different sample size and period. Consistent with Faulkender and Wang (2006), the coefficients on $C_{t-1} * \Delta C_t$ and $L_t * \Delta C_t$ are both significantly negative, which indicates that firms' marginal value of cash holdings decreases as their original cash level and market leverage increase. Column 2 reports result for the baseline regression augmented with dual holdings measured by a dummy variable. The coefficient on the interaction between dual holdings and change in cash ($DH\ dummy * \Delta C_t$) is positive and statistically significant at the 10% level. As Dittmar and Mahrt-Smith (2007) find that corporate governance has a positive impact on value of cash holdings, I include two corporate governance measures, E-index and G-index, in Column 3 and 4 respectively. After controlling for corporate governance, the coefficient on dual holdings interacted with change in cash becomes positively significant at 5% level.

Column 5 to 7 reproduce the regression in Column 2 to 4 using dual holders' equity ownership as a proxy for dual holdings. The coefficients on the interaction remain positive but becomes statistically insignificant when the continuous measure is used. In Column 8 and 9, the firm fixed effects model is employed to control for the effect of unobserved firm-specific characteristics, which provides results similar to OLS regressions. The 2SLS regression is performed in Column 10 and 11 using the number of listed lenders and the industry average of dual holdings as instruments. Similarly, the coefficients on dual holdings interacted with ΔC_t have a positive sign but are statistically insignificant. Overall, results from Table 9 provide modest evidence that dual holdings have a positive relation with the value of cash, which is consistent with the incentive alignment hypothesis.

5. Conclusion

This paper examines the impact of creditors' simultaneous holdings of debt and equity on corporate cash holdings. Based on the incentive alignment hypothesis, incentives of shareholders and creditors are better aligned in the presence of dual holdings, which leads to lower agency costs of debt. As a result, firms with dual holders have less need for precautionary cash holding. Alternatively, under the enhanced monitoring hypothesis, managers that are not fully monitored are more likely to dissipate cash quickly and reserve lower levels of cash. To the extent that dual holders serve as monitors of managers' opportunistic behaviour, firms with dual holders are less likely to waste cash and tend to hold more cash. I empirically test these two opposing hypotheses and find that the presence of dual holdings leads to lower level of cash holdings. This negative relation is particularly stronger for firms with financial constraints. The results provide support for the incentive alignment hypothesis, suggesting that dual holdings affect firms' level of cash by reducing precautionary cash saving motives.

Additional tests document that firms with dual holders are less likely to save cash out of their cash flows. Moreover, dual-held firms are more inclined to spend cash on capital investments rather than distribute it to shareholders through dividends. These results further confirm the incentive alignment hypothesis. There is also evidence that the value of cash is higher for dual-held firms, which indicates that shareholders will perceive cash holdings to be more valuable when their interests are more aligned with creditors.

The study has implications for both investors and regulators. In a world where investors increasingly hold multiple types of securities claims, shareholders and creditors should not be simply viewed as two groups with conflicting interests. As shown in this paper, the mitigation of shareholder-creditor conflicts has real impact on corporate liquidity policies. Despite the concerns that simultaneous holdings of equity and debt may induce improper use of private information in insider trading (Ivashina and Sun, 2011; Massoud et al., 2011), findings in this study suggest that the presence of dual holdings is beneficial from a corporate finance perspective, as it leads to firms optimally holding less cash.

References

Acharya, V., Amihud, Y. and Litov, L., 2011. Creditor rights and corporate risk-taking. *Journal of Financial Economics*, *102*(1), pp.150-166.

Acharya, V., Davydenko, S., and Strebulaev, I., 2012. Cash Holdings and Credit Risk. *The Review of Financial Studies*, *25*(12), pp.3572-3609.

Almeida, H., Campello, M. and Weisbach, M.S., 2004. The cash flow sensitivity of cash. *The Journal of Finance*, *59*(4), pp.1777-1804.

Almeida, H., Campello, M. and Weisbach, M.S., 2011. Corporate financial and investment policies when future financing is not frictionless. *Journal of Corporate Finance*, *17*(3), pp.675-693.

Altman, E. I., 1968. Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. *The Journal of Finance*, *23*(4), pp.589-609.

Barth, J.R., Brumbaugh, R.D. and Wilcox, J.A., 2000. Policy Watch: The repeal of Glass-Steagall and the advent of broad banking. *The Journal of Economic Perspectives*, *14*(2), pp.191-204.

Bates, T.W., Kahle, K.M. and Stulz, R.M., 2009. Why do US firms hold so much more cash than they used to?. *The Journal of Finance*, *64*(5), pp.1985-2021.

Bebchuk, L., Cohen, A. and Ferrell, A., 2009. What matters in corporate governance?. *The Review of Financial Studies*, *22*(2), pp.783-827.

Bodnaruk, A. and Rossi, M., 2016. Dual ownership, returns, and voting in mergers. *Journal of Financial Economics*, *120*(1), pp.58-80.

Bodnaruk, A. and Rossi, M., 2017. Shareholders as creditors of first resort. Working Paper.

Chava, S. and Roberts, M.R., 2008. How does financing impact investment? The role of debt covenants. *The Journal of Finance*, *63*(5), pp.2085-2121.

Chava, S., Wang, E.R. and Zou, H., 2018. Covenants, creditors' simultaneous equity holdings, and firm investment policies. *Journal of Financial and Quantitative Analysis*, forthcoming.

Chen, X., Harford, J. and Li, K., 2007. Monitoring: Which institutions matter?. *Journal of Financial Economics*, *86*(2), pp.279-305.

Choi, N. and Sias, R.W., 2009. Institutional industry herding. *Journal of Financial Economics*, *94*(3), pp.469-491.

Chu, Y., 2017. Shareholder-creditor conflict and payout policy: Evidence from mergers between lenders and shareholders. *The Review of Financial Studies*, *31*(8), pp. 3098-3121.

Denis, D. J., 2011. Financial flexibility and corporate liquidity. *Journal of Corporate Finance*, *17*(3), pp.667-674.

Denis, D.J. and Sibilkov, V., 2010. Financial constraints, investment, and the value of cash holdings. *The Review of Financial Studies*, *23*(1), pp.247-269.

Dittmar, A. and Mahrt-Smith, J., 2007. Corporate governance and the value of cash holdings. *Journal of Financial Economics*, *83*(3), pp.599-634.

Dittmar, A., Mahrt-Smith, J. and Servaes, H., 2003. International corporate governance and corporate cash holdings. *Journal of Financial and Quantitative Analysis*, *38*(01), pp.111-133.

Duchin, R., 2010. Cash holdings and corporate diversification. *The Journal of Finance*, *65*(3), pp.955-992.

Faulkender, M. and Wang, R., 2006. Corporate financial policy and the value of cash. *The Journal of Finance*, *61*(4), pp.1957-1990.

Faulkender, M. and Petersen, M., 2012. Investment and capital constraints: repatriations under the American Jobs Creation Act. *The Review of Financial Studies*, *25*(11), pp.3351-3388.

Fazzari, S.M., Hubbard, R.G., Petersen, and B.C., 1988. Financing constraints and corporate investment. *Brookings Papers on Economic Activity*, *1988*(1), pp.141-206.

Ferreira, M.A. and Matos, P., 2012. Universal banks and corporate control: Evidence from the global syndicated loan market. *The Review of Financial Studies*, *25*(9), pp.2703-2744.

Gilchrist, S. and Himmelberg, C.P., 1995. Evidence on the role of cash flow for investment. *Journal of Monetary Economics*, *36*(3), pp.541-572.

Gompers, P., Ishii, J. and Metrick, A., 2003. Corporate governance and equity prices. *The Quarterly Journal of Economics*, *118*(1), pp.107-156.

Graham, J.R. and Harvey, C.R., 2001. The theory and practice of corporate finance: Evidence from the field. *Journal of Financial Economics*, *60*(2), pp.187-243.

Hadlock, C. J. and Pierce, J. R., 2010. New evidence on measuring financial constraints: Moving beyond the KZ index. *The Review of Financial Studies*, *23*(5), pp.1909-1940.

Han, S. and Qiu, J., 2007. Corporate precautionary cash holdings. *Journal of Corporate Finance*, *13*(1), pp.43-57.

Harford, J., 1999. Corporate cash reserves and acquisitions. *The Journal of Finance*, *54*(6), pp.1969-1997.

Harford, J., Klasa, S. and Maxwell, W. F., 2014. Refinancing risk and cash holdings. *The Journal of Finance*, *69*(3), pp.975-1012.

Harford, J., Mansi, S. and Maxwell, W., 2008. Corporate governance and firm cash holdings in the US. *Journal of Financial Economics*, *87*(3), pp.535-555.

He, J. and Huang, J., 2017. Product market competition in a world of cross-ownership: Evidence from institutional blockholdings. *The Review of Financial Studies*, *30*(8), pp.2674-2718.

Ivashina, V., 2009. Asymmetric information effects on loan spreads. *Journal of Financial Economics*, *92*(2), pp.300-319.

Ivashina, V. and Sun, Z., 2011. Institutional stock trading on loan market information. *Journal of Financial Economics*, *100*(2), pp.284-303.

Jensen, M.C., 1986. Agency costs of free cash flow, corporate finance, and takeovers. *The American Economic Review*, *76*(2), pp.323-329.

Jensen, M. C., 1993. The modern industrial revolution, exit, and the failure of internal control systems. *The Journal of Finance*, *48*(3), pp.831-880.

Jensen, M.C. and Meckling, W.H., 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, *3*(4), pp.305-360.

Jiang, W., Li, K. and Shao, P., 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*(10), pp.3595-3637.

Kalcheva, I. and Lins, K.V., 2007. International evidence on cash holdings and expected managerial agency problems. *The Review of Financial Studies*, *20*(4), pp.1087-1112.

Kleibergen, F. and Paap, R., 2006. Generalized reduced rank tests using the singular value decomposition. *Journal of Econometrics*, *133*(1), pp.97-126.

Kyröläinen, P., Tan, I. and Karjalainen, P., 2013. How creditor rights affect the value of cash: a cross-country study. *Journal of Corporate Finance*, *22*, pp.278-298.

Lim, J., Minton, B.A. and Weisbach, M.S., 2014. Syndicated loan spreads and the composition of the syndicate. *Journal of Financial Economics*, *111*(1), pp.45-69.

Liu, Y. and Mauer, D.C., 2011. Corporate cash holdings and CEO compensation incentives. *Journal of Financial Economics*, *102*(1), pp.183-198.

Liu, Y., Mauer, D.C. and Zhang, Y., 2014. Firm cash holdings and CEO inside debt. *Journal of Banking & Finance*, *42*, pp.83-100.

Massoud, N., Nandy, D., Saunders, A. and Song, K., 2011. Do hedge funds trade on private information? Evidence from syndicated lending and short-selling. *Journal of Financial Economics*, *99*(3), pp.477-499.

Mikkelson, W. H. and Partch, M. M., 2003. Do persistent large cash reserves hinder performance?. *Journal of Financial and Quantitative Analysis*, *38*(2), pp.275-294.

Myers, S.C., 1977. Determinants of corporate borrowing. *Journal of Financial Economics*, *5*(2), pp.147-175.

Myers, S.C., 1984. The capital structure puzzle. *The Journal of Finance*, *39*(3), pp.574-592.

Myers, S.C. and Majluf, N.S., 1984. Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, *13*(2), pp.187-221.

Myers, S. C. and Rajan, R. G., 1998. The paradox of liquidity. *The Quarterly Journal of Economics*, *113*(3), pp.733-771.

Opler, T., Pinkowitz, L., Stulz, R. and Williamson, R., 1999. The determinants and implications of corporate cash holdings. *Journal of Financial Economics*, *52*(1), pp.3-46.

Santos, J.A. and Rumble, A.S., 2006. The American keiretsu and universal banks: Investing, voting and sitting on nonfinancials' corporate boards. *Journal of Financial Economics*, *80*(2), pp.419-454.

Santos, J. A. and Wilson, K. E., 2017. Does Banks' Corporate Control Lower Funding Costs? Evidence from US Banks' Control Over Firms' Voting Rights. *Journal of Financial Services Research*, *51*(3), pp.283-311.

Schnatterly, K., Shaw, K.W. and Jennings, W.W., 2008. Information advantages of large institutional owners. *Strategic Management Journal*, *29*(2), pp.219-227.

Smith, C.W. and Warner, J.B., 1979. On financial contracting: An analysis of bond covenants. *Journal of Financial Economics*, *7*(2), pp.117-161.

Smith, C.W. and Watts, R.L., 1992. The investment opportunity set and corporate financing, dividend, and compensation policies. *Journal of Financial Economics*, *32*(3), pp.263-292.

Standard &Poor's, 2011. A Guide to the Loan Market. Standard & Poor's, New York.

Subramaniam, V., Tang, T.T., Yue, H. and Zhou, X., 2011. Firm structure and corporate cash holdings. *Journal of Corporate Finance*, *17*(3), pp.759-773.

Vogel, R.C. and Maddala, G.S., 1967. Cross-section estimates of liquid asset demand by manufacturing corporations. *The Journal of Finance*, *22*(4), pp.557-575.

Whited, T.M., 1992. Debt, liquidity constraints, and corporate investment: Evidence from panel data. *The Journal of Finance*, *47*(4), pp.1425-1460.

Whited, T. M. and Wu, G., 2006. Financial constraints risk. *The Review of Financial Studies*, *19*(2), pp.531-559.

Yang, H., 2017. Institutional dual holdings and risk shifting: evidence from corporate innovation. Working Paper.

Yung, K. and Nafar, N.A., 2014. Creditor rights and corporate cash holdings: International evidence. *International Review of Economics & Finance*, *33*, pp.111-127.

Table 1

Sample overview

This table presents the summary statistics and correlation coefficients of the main variables for a sample of U.S. listed firms from 1996 to 2016. Dual holding and facility-level variables are constructed based on loans originated from 1995 to 2015. Panel A reports the statistics of firm characteristics and facility variables. Panel B reports the Pearson correlation coefficients among the firm variables. *DH dummy* is an indicator variable equal to one if at least one lender has significant average equity holdings in the borrowing firm in the year of loan origination, and zero otherwise. *DH equity ownership* is the total proportion of a borrowing firm's equity held by its lenders in the year of loan origination. *DH cont* is calculated as *log(1+DH equity ownership%). Cash to assets* is the ratio of cash and marketable securities to book value of assets. *Market-to-book ratio* is calculated as (book value of assets - book value of equity + market value of equity)/book value of assets. *Firm size* is the natural logarithm of book assets in 2016 constant dollars. *Leverage* is long-term debt plus current debt divided by book value of assets. *Cash flow to assets* is the ratio of earnings after interest, dividends, taxes but before depreciation to book value of assets. *NWC to assets* is working capital net of cash and marketable securities divided by book value of assets. *R&D to sales* is research and development expense divided by sales, and is set to zero if the research and development expense data is missing. *CAPEX to assets* is capital expenditures divided by book value of assets. *Cash flow volatility* is the industry-level cash flow risk, computed by the average of firm cash flow standard deviation across each two-digit SIC code. *Dividend dummy* is an indicator variable equal to one if the firm pays a common dividend in the current year, and zero otherwise. *Insider share ownership* is the percentage of shares held by the board of directors. *Board size* is total number of directors on the board divided by log of book assets. *Board independence* is number of independent directors divided by total number of directors on the board. *Institutional holdings* is the total proportion of shares held by institutional investors. *E-Index* is an entrenchment index constructed by Bebchuk, Cohen and Ferrell (2009) based on six antitakeover provisions and is measured by a score from 0 to 6. *G-Index* is a corporate governance index constructed by Gompers, Ishii, and Metrick (2003) based on twenty-four antitakeover provisions and is measured by a score from 0 to 24. *Number of facilities* is the number of loan facilities borrowed by a firm each year. *Facility amount* is the amount of a loan facility in millions. *Maturity* is the maturity of a loan facility in months. *Number of lenders* is the total number of lenders participated in a loan syndicate. *Revolver dummy* is an indicator variable equal to one if the loan is a revolving loan and zero otherwise. *Term loan dummy* is an indicator variable equal to one if the loan is a term loan and zero otherwise. *Secure loan dummy* is an indicator variable equal to one if the loan is secured and zero otherwise. All continuous variables are winsorized at the 1st and 99th percentiles. The tests of mean difference between dual-held and non-dual-held groups are conducted based on t-tests. The tests of difference in median are based on nonparametric 2-sample equality-of-medians tests. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels respectively.

Panel A: Summary statistics

Variable	N	Mean	Std. Dev.	25^{th} percentile	Median	75^{th} percentile	Mean (median) for dual-held firms	Mean (median) for non-dual-held firms	Mean (median) difference
Firm Characteristic Variables									
DH dummy	5,801	0.723	0.448	0	1	1			
DH equity ownership	5,801	0.019	0.028	0	0.009	0.026			
DH cont	5,801	0.018	0.027	0	0.009	0.026			
Cash to assets	5,801	0.093	0.103	0.022	0.058	0.128	0.093 (0.059)	0.095 (0.053)	-0.003 (0.006*)
Market-to-book ratio	5,801	1.858	0.980	1.249	1.580	2.152	1.944 (1.655)	1.636 (1.418)	0.308*** (0.237***)
Firm size	5,801	9.681	1.925	8.226	9.475	11.020	9.970 (9.790)	8.928 (8.578)	1.042*** (1.211***)

Table 1 Continued

Variable	N	Mean	Std. Dev.	25th percentile	Median	75th percentile	Mean (median) for dual-held firms	Mean (median) for non-dual-held firms	Mean (median) difference
Leverage	5,801	0.265	0.164	0.156	0.252	0.355	0.265 (0.251)	0.266 (0.252)	-0.001 (-0.001)
Cash flow to assets	5,801	0.086	0.066	0.059	0.085	0.115	0.089 (0.088)	0.077 (0.078)	0.012*** (0.010***)
NWC to assets	5,801	0.071	0.138	-0.016	0.060	0.152	0.060 (0.051)	0.099 (0.091)	-0.039*** (-0.040***)
R&D to sales	5,801	0.027	0.057	0	0.001	0.028	0.028 (0.003)	0.025 (0)	0.003** (0.003***)
CAPEX to assets	5,801	0.054	0.052	0.023	0.039	0.067	0.053 (0.038)	0.059 (0.040)	-0.006*** (-0.002)
Cash flow volatility	5,801	1.203	1.836	0.072	0.393	1.387	1.274 (0.449)	1.019 (0.231)	0.255*** (0.219***)
Dividend dummy	5,801	0.678	0.467	0	1	1	0.741 (1)	0.514 (1)	0.226*** (0)
Insider share ownership	5,801	0.063	0.117	0.006	0.018	0.056	0.057(0.016)	0.079 (0.030)	-0.021*** (-0.013***)
Board size	5,801	1.219	0.252	1.046	1.198	1.364	1.196(1.176)	1.279 (1.262)	-0.082*** (-0.085***)
Board independence	5,801	0.741	0.156	0.667	0.778	0.875	0.763(0.8)	0.686 (0.714)	0.077*** (0.086***)
Institutional holdings	5,801	0.760	0.171	0.661	0.780	0.885	0.776(0.791)	0.720 (0.743)	0.056*** (0.048***)
E-Index	5,801	2.802	1.582	2	3	4	2.904(3)	2.537 (2)	0.367*** (1***)
G-Index	5,216	9.598	2.580	8	10	11	9.690(10)	9.332 (9)	0.358*** (1***)
Facility Variables									
Number of facilities	5,801	1.637	1.109	1	1	2	1.670(1)	1.552 (1)	0.117*** (0***)
Facility amount	9,497	688.121	1334.986	125	300	750	843.117(400)	324.259 (131.137)	518.859*** (268.863***)
Maturity	9,272	48.298	26.410	34	60	60	46.938(60)	51.565 (60)	-4.626*** (0***)
Number of lenders	9,497	10.476	8.972	4	8	14	12.276(10)	6.251 (4)	6.025*** (6***)
Revolver dummy	9,497	0.716	0.451	0	1	1	0.744(1)	0.651 (1)	0.093*** (0)
Term loan dummy	9,497	0.189	0.392	0	0	0	0.178(0)	0.216 (0)	-0.037*** (0)
Secured loan dummy	5,931	0.493	0.500	0	0	1	0.418(0)	0.665 (1)	-0.247*** (-1***)

Table 1 Continued

Panel B: Pearson correlation matrix

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Cash to assets	1																
2	DH dummy	-0.01	1															
3	DH cont	-0.05***	0.42***	1														
4	Market-to-book ratio	0.28***	0.14***	0.05***	1													
5	Size	-0.16***	0.24***	0.31***	0.05***	1												
6	Leverage	-0.30***	0.00	0.00	-0.11***	0.11***	1											
7	Cash flow to assets	0.06***	0.08***	0.02	0.36***	-0.01	-0.19***	1										
8	NWC to assets	-0.12***	-0.13***	-0.01***	-0.17***	-0.27***	-0.21***	-0.03**	1									
9	R&D to sales	0.45***	0.03**	-0.03**	0.27***	0.02	-0.15***	0.01	-0.09***	1								
10	CAPEX to assets	-0.17***	-0.05***	-0.03***	0.03**	0.09***	0.03**	0.14***	-0.16***	-0.14***	1							
11	Cash flow volatility	0.06***	0.06***	0.04***	-0.01	0.00	0.02*	-0.09***	-0.06***	0.13***	-0.05***	1						
12	Dividend dummy	-0.15***	0.22***	0.20***	0.07***	0.28***	-0.05***	0.01	-0.03**	-0.17***	-0.02*	0.01	1					
13	Insider share ownership	-0.03***	-0.08***	-0.04***	-0.02	-0.12***	0.05***	-0.04***	0.02	-0.11***	0.00	-0.07***	-0.07***	1				
14	Board size	-0.01***	-0.15***	-0.07***	0.00	-0.11***	-0.02*	-0.01	0.12***	-0.11***	-0.04***	-0.10***	0.12***	0.11***	1			
15	Board independence	0.10***	0.22***	0.11***	0.02	-0.10***	-0.03*	0.02*	-0.13***	0.06***	-0.10***	0.16***	0.11***	-0.31***	-0.14***	1		
16	Institutional holdings	0.08***	0.15***	0.05***	-0.02	-0.19***	-0.10***	0.10***	0.04***	-0.01	0.00	0.07***	-0.12***	-0.23***	-0.18***	0.24***	1	
17	E-index	0.06***	0.10***	-0.04***	-0.07***	-0.40***	0.01	-0.04***	-0.01	0.00	-0.05***	0.11***	-0.02	-0.14***	-0.10***	0.39***	0.22***	1

Table 2

Dual holdings and level of cash holdings - 2SLS regression, first stage

This table reports the results of the first-stage probit (or tobit) model based on the instrumental variable approach. Two instruments in Model (1) are *Industry average DH presence* and *Number of listed lenders*. Two instruments in Model (2) are *Industry average DH equity ownership* and *Number of listed lenders*. *Industry average DH presence* is the average incidence of dual holder presence in the industry of the borrowing firm. *Industry average DH equity ownership* is the average equity holdings by lenders in the industry of the borrowing firm. *Number of listed lenders* is the number of lenders in a loan syndicate that are publicly listed in U.S. market. All firm and facility control variables in the second stage are included. All continuous variables are winsorized at the 1st and 99th percentiles. The Housman endogeneity test is used to test whether the instrumented variable is indeed endogenous. The Sargan-Hansen test for overidentifying restrictions is used to test whether the instruments are uncorrelated with the error terms. The Kleibergen-Paap rk Wald F-statistic is used to assess whether the instruments are weak in the presence of heteroscedasticity or clustered standard errors. t-Statistics in parentheses are corrected for heteroscedasticity and clustering at the firm level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels respectively.

	DH dummy	DH cont
	(1)	(2)
Industry average DH presence	0.543***	
	(10.960)	
Industry average DH equity ownership		0.821***
		(6.302)
Number of listed lenders	0.017***	0.002***
	(13.189)	(20.198)
Firm and facility controls	YES	YES
Hausman endogeneity test p-value	0.006	0.005
Sargan-Hansen test p-value	0.497	0.589
Kleibergen-Paap rk Wald F-statistic	151.644***	210.046***
No. of observations	5,801	5,801

Table 3

Dual holdings and level of cash holdings - 2SLS regression, second stage

This table presents the second-stage results regressing level of cash holdings on the instrumented dual holding variables. The dependent variable is the ratio of cash and marketable securities to assets. *DH dummy* is an indicator variable equal to one if at least one lender has significant average equity holdings in the borrowing firm in the year of loan origination, and zero otherwise. *DH cont* is calculated as *log(1+DH equity ownership)* where *DH equity ownership* is the total proportion of a borrowing firm's equity held by its lenders in the year of loan origination. *Market-to-book ratio* is calculated as (book value of assets - book value of equity + market value of equity)/book value of assets. *Firm size* is the natural logarithm of book assets in 2016 constant dollars. *Leverage* is long-term debt plus current debt divided by book value of assets. *Cash flow to assets* is the ratio of earnings after interest, dividends, taxes but before depreciation to book value of assets. *NWC to assets* is working capital net of cash and marketable securities divided by book value of assets. *R&D to sales* is research and development expense divided by sales, and is set to zero if the research and development expense data is missing. *CAPEX to assets* is capital expenditures divided by book value of assets. *Cash flow volatility* is the industry-level cash flow risk, computed by the average of firm cash flow standard deviation across each two-digit SIC code. *Dividend dummy* is an indicator variable equal to one if the firm pays a common dividend in the current year, and zero otherwise. *Insider share ownership* is the percentage of shares held by the board of directors. *Board size* is total number of directors on the board divided by log of book assets. *Board independence* is number of independent directors divided by total number of directors on the board. *Institutional holdings* is the total proportion of shares held by institutional investors. *E-index* is an entrenchment index constructed by Bebchuk, Cohen and Ferrell (2009) based on six antitakeover provisions and is measured by a score from 0 to 6. *Number of facilities* is the number of loan facilities borrowed by a firm. *Average facility amount* is the average amount of loan facilities borrowed by a firm. *Average facility maturity* is the average maturity of loan facilities borrowed by a firm. All continuous variables are winsorized at the 1st and 99th percentiles. Industry and year fixed effects are included. Industry dummies are based on two-digit SIC codes. t-Statistics in parentheses are corrected for heteroscedasticity and clustering at the firm level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels respectively.

Dependent Variable: Cash to assets	(1)	(2)	(3)	(4)	(5)	(6)
DH $dummy_{t-1}$	-0.018***	-0.019***	-0.019***			
	(-3.776)	(-3.206)	(-3.016)			
DH $cont_{t-1}$				-0.256***	-0.159***	-0.160***
				(-3.828)	(-2.710)	(-2.598)
Cash to $assets_{t-1}$	0.779***	0.769***	0.762***	0.778***	0.770***	0.763***
	(53.995)	(41.338)	(39.666)	(54.194)	(41.723)	(39.973)
Market-to-book ratio	0.002	0.006***	0.005***	0.002	0.005***	0.005***
	(1.241)	(5.190)	(4.609)	(1.261)	(4.742)	(4.192)
Firm size	0.000	-0.001	-0.001	-0.001*	-0.002***	-0.002***
	(0.065)	(-1.071)	(-1.016)	(-1.777)	(-2.770)	(-2.676)
Leverage	-0.058***	-0.054***	-0.051***	-0.056***	-0.054***	-0.050***
	(-13.382)	(-7.984)	(-7.398)	(-13.109)	(-7.994)	(-7.359)
Cash flow to assets	0.017	-0.018	-0.013	0.014	-0.024	-0.019
	(1.527)	(-1.046)	(-0.755)	(1.319)	(-1.385)	(-1.094)
NWC to assets	-0.059***	-0.058***	-0.060***	-0.058***	-0.058***	-0.060***
	(-10.383)	(-6.553)	(-6.644)	(-10.236)	(-6.484)	(-6.522)
R&D to sales	0.001	0.057*	0.062*	0.001	0.053*	0.058*
	(0.092)	(1.747)	(1.888)	(0.079)	(1.651)	(1.785)
CAPEX to assets	-0.137***	-0.138***	-0.142***	-0.139***	-0.138***	-0.142***
	(-9.716)	(-7.446)	(-7.496)	(-10.078)	(-7.596)	(-7.617)
Cash flow volatility	0.000	-0.000	-0.000	0.000	-0.000	-0.000
	(0.751)	(-0.582)	(-0.381)	(0.814)	(-0.447)	(-0.344)

Table 3 Continued

Dividend dummy	-0.005***	-0.005**	-0.006***	-0.007***	-0.007***	-0.007***
	(-3.799)	(-2.538)	(-2.711)	(-4.874)	(-3.287)	(-3.456)
Insider share ownership		0.005	0.005		0.005	0.006
		(0.606)	(0.674)		(0.668)	(0.723)
Board size		-0.009***	-0.008***		-0.009***	-0.008**
		(-2.818)	(-2.622)		(-2.671)	(-2.537)
Board independence		0.007	0.006		0.006	0.005
		(1.393)	(1.185)		(1.234)	(1.011)
Institutional holdings		0.012**	0.012**		0.008	0.009
		(2.065)	(2.128)		(1.371)	(1.593)
E-index		-0.000	-0.000		-0.001	-0.001
		(-0.478)	(-0.392)		(-0.869)	(-0.723)
Number of facilities$_{t-1}$			-0.000			-0.000
			(-0.516)			(-0.700)
Average facility amount$_{t-1}$			-0.000			0.000
			(-0.372)			(0.215)
Average facility maturity$_{t-1}$			-0.000			-0.000
			(-1.358)			(-1.409)
Industry	YES	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES	YES
Loan purpose			YES			YES
No. of observations	11,759	6,041	5,801	11,759	6,041	5,801
No. of firms	2,951	1,353	1,337	2,951	1,353	1,337
Adj. R-squared	0.679	0.730	0.728	0.681	0.732	0.731

Table 4

Dual holdings and level of cash holdings - interacted with financial constraint

This table reports the results for regressions of cash on dual holdings and financial constraints using the instrumental variable approach. The dependent variable is the ratio of cash and marketable securities to assets. The first instrument is *Industry average DH equity ownership*. The second instrument is *Number of listed lenders*. The third instrument is *Industry average DH equity ownership* interacted with each of the financial constraint variables. The fourth instrument is *Number of listed lenders* interacted with each of the financial constraint variables. *DH cont* is calculated as *log(1+DH equity ownership)* where *DH equity ownership* is the total proportion of a borrowing firm's equity held by its lenders in the year of loan origination. *No rating* is an indicator variable equal to one if a firm reports positive debt in a given year but does not have a long-term credit rating or has a rating below the BBB grade, and zero otherwise. *Low dividend* is an indicator variable equal to one if a firm's dividend payout ratio is below the median in a given year, and zero otherwise. *Small size* is an indicator variable equal to one if a firm's book value of assets is below the median in a given year, and zero otherwise. *WW index* is the Whited and Wu (2006) index, computed as $WW = -0.091CF - 0.062DIVPOS + 0.021TLTD - 0.044LNTA + 0.102ISG - 0.035SG$, where *CF* is cash flow to assets, *DIVPOS* is the dividend dummy, *TLTD* is the long-term debt to total assets ratio, *LNTA* is the log of total assets, *ISG* is the firm's 3-digit industry sales growth, and *SG* is firm's sales growth. *SA index* is the size-age index developed by Hadlock and Pierce (2010), calculated as $SA = (-0.737*Adjusted\ size) + (0.043*Adjusted\ size^2) - (0.040*Age)$, where *Adjusted size* is the log of inflation-adjusted book assets, and *Age* is the number of years the firm is listed with a non-missing stock price on Compustat. All other firm and facility control variables in Table 3 are included in the regressions. All continuous variables are winsorized at the 1st and 99th percentiles. Industry and year fixed effects are included. Industry dummies are based on two-digit SIC codes. t-Statistics in parentheses are corrected for heteroscedasticity and clustering at the firm level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels respectively.

Dependent Variable: Cash to assets	(1)	(2)	(3)	(4)	(5)
DH $cont_{t-1}$	-0.115*	-0.039	-0.052	-1.608***	-2.783***
	(-1.935)	(-0.639)	(-0.905)	(-3.667)	(-2.868)
No rating	0.002				
	(0.603)				
DH $cont_{t-1}$*No rating	-0.659**				
	(-2.015)				
Low dividend		0.012***			
		(4.042)			
DH $cont_{t-1}$*Low dividend		-0.286**			
		(-2.334)			
Small size			0.004		
			(0.959)		
DH $cont_{t-1}$*Small size			-0.519***		
			(-2.629)		
WW index				0.143***	
				(3.228)	
DH $cont_{t-1}$*WW index				-3.237***	
				(-3.541)	
SA index					0.013*
					(1.728)
DH $cont_{t-1}$*SA index					-0.695***
					(-2.770)
Firm and facility controls	YES	YES	YES	YES	YES
No. of observations	5,769	5,515	5,801	5,769	5,769
No. of firms	1,331	1,302	1,337	1,331	1,331
Adj. R-squared	0.728	0.737	0.727	0.726	0.729

Table 5

Dual holdings and level of cash holdings - interacted with corporate governance

This table reports the results for regressions of cash on dual holdings and corporate governance using the instrumental variable approach. The dependent variable is the ratio of cash and marketable securities to assets. The first instrument is *Industry average DH presence* (or *Industry average DH equity ownership* for continuous measure *DH cont)*. The second instrument is *Number of listed lenders*. The third instrument is *Industry average DH presence* (or *Industry average DH equity ownership* for continuous measure *DH cont)* interacted with each of the corporate governance variables. The fourth instrument is *Number of listed lenders* interacted with each of the corporate governance variables. *DH dummy* is an indicator variable equal to one if at least one lender has significant average equity holdings in the borrowing firm in the year of loan origination, and zero otherwise. *DH cont* is calculated as *log(1+DH equity ownership)* where *DH equity ownership* is the total proportion of a borrowing firm's equity held by its lenders in the year of loan origination. *Insider ownership bottom quartile* is an indicator variable equal to one if the insider share ownership ratio of a firm is in the bottom quartile in a given year, and zero otherwise. *E-index top quartile* is an indicator variable equal to one if the E-index of a firm is in the top quartile in a given year, and zero otherwise. *G-index top quartile* is an indicator variable equal to one if the G-index of a firm is in the top quartile in a given year, and zero otherwise. All other firm and facility control variables in Table 3 are included in the regressions. All continuous variables are winsorized at the 1st and 99th percentiles. Industry and year fixed effects are included. Industry dummies are based on two-digit SIC codes. t-Statistics in parentheses are corrected for heteroscedasticity and clustering at the firm level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels respectively.

Dependent Variable: Cash to assets	(1)	(2)	(3)	(4)	(5)	(6)
DH dummy$_{t-1}$	-0.020***		-0.015**		-0.016**	
	(-3.423)		(-2.461)		(-2.571)	
DH dummy$_{t-1}$*Insider ownership bottom quartile	0.012*					
	(1.712)					
DH dummy$_{t-1}$*E-index top quartile			-0.005			
			(-0.587)			
DH dummy$_{t-1}$*G-index top quartile					0.009	
					(1.128)	
DH cont$_{t-1}$		-0.278***		-0.145**		-0.190***
		(-3.061)		(-2.218)		(-2.686)
DH cont$_{t-1}$*Insider ownership bottom quartile		0.203*				
		(1.942)				
DH cont$_{t-1}$*E-index top quartile				0.018		
				(0.135)		
DH cont$_{t-1}$*G-index top quartile						0.206**
						(1.987)
Insider ownership bottom quartile	-0.007	-0.002				
	(-1.513)	(-0.707)				
E-index top quartile			0.007	0.004		
			(1.131)	(1.058)		
G-index top quartile					-0.007	-0.004
					(-1.065)	(-1.255)
Firm and Facility controls	YES	YES	YES	YES	YES	YES
Industry	YES	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES	YES
No. of observations	7,843	7,843	6,410	6,410	6,181	6,181
No. of firms	1,557	1,557	1,464	1,464	1,267	1,267
Adj. R-squared	0.706	0.707	0.727	0.729	0.733	0.734

Table 6

Difference-in-differences analysis based on the initiation of dual holdings

This table reports the results for difference-in-differences regressions. Panel A compares the treatment and control groups along main firm characteristics before and after matching. *Total facility amount* is the average amount of loan facilities borrowed by a firm in a year. *Industry-adjusted stock return* is a firm's stock return in excess of the corresponding 3-digit SIC industry return. *Number of analysts* is the total number of analysts following. All other variables are defined in Table 3. t-Statistics for the t-tests are reported. Panel B presents the regression results. *Post* is an indicator variable equal to one for years after the initiation of dual holdings, and zero for years prior to the initiation of dual holdings. *Treated* is an indicator variable equal to one if a firm has not been dual-held before and gain the dual holding status for the first time in a given year, and zero if a firm has never been dual-held throughout the sample period and issue syndicated loans in the same year as treated firms. Models (1) to (4) present the difference-in-differences regressions. Models (5) to (8) present the counterfactual analysis with year t-3 as the counterfactual event year. Models (1), (2), (5) and (6) are based on a five-year window around the initiation of dual holdings. Models (3), (4), (7) and (8) are based on a seven-year window around the initiation of dual holdings. In Model (2), (4), (6) and (8), all corporate governance variables in Table 3 are included as additional control. All continuous variables are winsorized at the 1st and 99th percentiles. Industry and year fixed effects are included. Industry dummies are based on two-digit SIC codes. t-Statistics in parentheses are corrected for heteroscedasticity and clustering at the firm level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels respectively.

Panel A: Pre- and Post-match comparisons

	Pre-Match				Post-Match			
Variables	Treatment	Control	Diff.	T-Diff.	Treatment	Control	Diff.	T-Diff.
Market-to-book ratio	2.062	1.491	0.571	7.13***	2.015	1.985	0.029	0.21
Firm size	9.480	7.857	1.623	12.86***	9.409	8.513	0.896	4.18***
Leverage	0.209	0.256	-0.048	-3.28***	0.206	0.233	-0.028	-1.08
Cash flow to assets	0.098	0.071	0.027	4.70***	0.099	0.092	0.008	0.69
Institutional holdings	0.726	0.656	0.070	4.51***	0.721	0.689	0.032	1.14
Total facility amount	735m	270m	465m	5.62***	577m	370m	207m	2.27**
Industry-adjusted stock return	0.017	-0.091	0.108	2.70***	0.003	-0.056	0.059	0.83
Number of analysts	6.011	1.965	4.047	10.30***	6.127	3.556	2.571	4.51***
No. of firms	403	385			323	153		

Table 6 Continued

Panel B: Regression results

	DiD regressions				Counterfactual analysis			
	Five-year window		Seven-year window		Five-year window		Seven-year window	
Dependent Variable: Cash to assets	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post	0.010	0.010	0.007	0.007	-0.015	-0.022**	-0.017*	-0.023**
	(1.039)	(0.875)	(0.672)	(0.594)	(-1.608)	(-2.082)	(-1.805)	(-2.224)
Treated	0.002	0.001	0.007	0.004	0.007	0.000	0.006	0.005
	(0.171)	(0.121)	(0.573)	(0.323)	(0.471)	(0.028)	(0.413)	(0.312)
Post*Treated	-0.021**	-0.023*	-0.028***	-0.027**	-0.007	0.001	-0.009	-0.007
	(-2.061)	(-1.949)	(-2.591)	(-2.109)	(-0.567)	(0.061)	(-0.695)	(-0.517)
Maket-to-book ratio	0.025***	0.015***	0.025***	0.017***	0.022***	0.022***	0.024***	0.019***
	(5.058)	(3.104)	(5.519)	(3.552)	(3.088)	(2.880)	(3.987)	(2.999)
Size	-0.012***	-0.013***	-0.012***	-0.013***	-0.009**	-0.013***	-0.010**	-0.014***
	(-2.993)	(-3.255)	(-3.504)	(-3.619)	(-2.209)	(-2.803)	(-2.343)	(-3.146)
Leverage	-0.243***	-0.235***	-0.241***	-0.242***	-0.239***	-0.233***	-0.249***	-0.242***
	(-8.862)	(-7.688)	(-9.286)	(-8.090)	(-8.182)	(-6.452)	(-9.206)	(-7.674)
Cash flow to assets	-0.107	0.029	-0.087	-0.004	-0.009	-0.012	-0.012	0.024
	(-1.307)	(0.296)	(-1.049)	(-0.047)	(-0.097)	(-0.114)	(-0.172)	(0.300)
NWC to assets	-0.151***	-0.159***	-0.153***	-0.161***	-0.132***	-0.164***	-0.148***	-0.173***
	(-4.035)	(-3.676)	(-4.328)	(-3.942)	(-3.211)	(-3.608)	(-3.811)	(-4.224)
R&D to sales	0.030***	0.460***	0.022***	0.475***	0.305***	0.314*	0.164**	0.367**
	(5.272)	(4.534)	(5.577)	(4.249)	(2.950)	(1.921)	(2.340)	(2.340)
CAPEX to assets	-0.203*	-0.399***	-0.285***	-0.394***	-0.347***	-0.409***	-0.372***	-0.419***
	(-1.828)	(-3.397)	(-2.690)	(-3.864)	(-2.907)	(-3.277)	(-3.552)	(-4.134)
Cash flow volatility	-0.003	-0.004	-0.002	-0.004	-0.003	-0.006	-0.002	-0.005
	(-0.916)	(-1.445)	(-0.847)	(-1.577)	(-0.785)	(-1.450)	(-0.742)	(-1.436)
Dividend ratio	0.001	0.000	0.002	0.001	-0.001	-0.002	0.001	-0.001
	(0.311)	(0.039)	(1.180)	(0.684)	(-0.281)	(-0.733)	(0.311)	(-0.253)
Institutional holdings	0.075***	0.061**	0.078***	0.064***	0.075***	0.081***	0.065***	0.073***
	(3.485)	(2.367)	(3.920)	(2.654)	(3.231)	(2.993)	(2.995)	(2.675)
Constant	0.174***	0.316***	0.203***	0.317***	0.152**	0.282***	0.164***	0.285***
	(3.047)	(4.543)	(3.525)	(4.627)	(2.433)	(3.745)	(2.934)	(4.287)
Industry	YES	YES	YES	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES	YES	YES	YES
Corp gov controls		YES		YES		YES		YES
No. of observations	1,516	1,322	2,107	1,807	1,185	1,004	1,757	1,483
No. of firms	390	371	393	377	389	371	389	375
Adj. R-squared	0.402	0.451	0.409	0.469	0.453	0.461	0.423	0.462

Table 7
Dual holdings and cash flow sensitivity of cash

This table reports regressions of change in cash holdings on cash flow, dual holdings and other firm characteristics. The dependent variable is change in cash and marketable securities to assets. *DH dummy* is an indicator variable equal to one if at least one lender has significant average equity holdings in the borrowing firm in the year of loan origination, and zero otherwise. *DH cont* is calculated as *log(1+DH equity ownership)* where *DH equity ownership* is the total proportion of a borrowing firm's equity held by its lenders in the year of loan origination. *Cash flow to assets* is the ratio of earnings after interest, dividends, taxes but before depreciation to book value of assets. *Market-to-book ratio* is calculated as (book value of assets - book value of equity + market value of equity)/book value of assets. *Firm size* is the natural logarithm of book assets in 2016 constant dollars. *CAPEX to assets* is capital expenditures divided by book value of assets. *Acquisitions* is acquisition expenses divided by book assets. *ΔNWC* is change in working capital net of cash and marketable securities to book assets. *ΔShortDebt* is change in short-term debt to book assets. Model (1) is the baseline model in Almeida, Campello and Weisbach (2004). Models (2) and (3) are pooled OLS regressions. Models (4) and (5) are 2SLS regressions using the instrumental variable approach, where instruments used are defined in Table 3. All continuous variables are winsorized at the 1st and 99th percentiles. Industry and year fixed effects are included. Industry dummies are based on two-digit SIC codes. t-Statistics in parentheses are corrected for heteroscedasticity and clustering at the firm level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels respectively.

	Baseline	OLS		2SLS	
Dependent Variable: ΔCash to assets	(1)	(2)	(3)	(4)	(5)
DH $dummy_{t-1}$		0.005		0.012	
		(1.610)		(1.613)	
DH $dummy_{t-1}$*Cash flow to assets		-0.117***		-0.283***	
		(-3.637)		(-3.987)	
DH $cont_{t-1}$			0.066		0.733**
			(0.966)		(2.506)
DH $cont_{t-1}$*Cash flow to assets			-1.463*		-11.656***
			(-1.935)		(-3.384)
Cash flow to assets	0.149***	0.165***	0.153***	0.187***	0.176***
	(6.935)	(6.648)	(6.804)	(6.864)	(6.717)
Market-to-book ratio	0.006***	0.007***	0.006***	0.008***	0.008***
	(5.162)	(5.252)	(5.194)	(4.873)	(4.948)
Firm size	-0.000	0.000	-0.000	0.000	0.000
	(-0.760)	(0.168)	(-0.303)	(0.621)	(0.578)
CAPEX to assets	-0.170***	-0.165***	-0.169***	-0.159***	-0.164***
	(-9.265)	(-9.310)	(-9.300)	(-8.996)	(-9.083)
Acquisitions	-0.146***	-0.146***	-0.146***	-0.147***	-0.147***
	(-10.731)	(-10.786)	(-10.731)	(-10.849)	(-10.681)
ΔNWC	-0.133***	-0.137***	-0.133***	-0.143***	-0.139***
	(-4.392)	(-4.497)	(-4.417)	(-4.632)	(-4.572)
ΔShortDebt	-0.108***	-0.110***	-0.109***	-0.114***	-0.113***
	(-3.286)	(-3.328)	(-3.302)	(-3.404)	(-3.405)
Industry	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES
No. of observations	11,025	11,025	11,025	11,025	11,025
No. of firms	2,887	2,887	2,887	2,887	2,887
Adj. R-squared	0.096	0.100	0.097	0.092	0.065

Table 8

Dual holdings, cash, and firm investment/dividend payout

This table examines the relation between dual holdings, cash holdings and firms' investment and dividend payout decisions using the instrumental variable approach. In Model (1) and (2), the dependent variable *ΔInvestment* is change in investment scaled by average total assets, where investment is the sum of capital expenditures, acquisition expenses, R&D expenses and advertising expenses. In Model (3) and (4), the dependent variable *ΔDividend payout* is change in total dividend payout (cash dividend plus share repurchase) divided by the average market value of common equity. *DH dummy* is an indicator variable equal to one if at least one lender has significant average equity holdings in the borrowing firm in the year of loan origination, and zero otherwise. *DH cont* is calculated as *log(1+DH equity ownership)* where *DH equity ownership* is the total proportion of a borrowing firm's equity held by its lenders in the year of loan origination. *Cash to assets* is the ratio of cash and marketable securities to assets. *Preinvestment earnings to assets* is the sum of earnings before interest, taxes and depreciation, R&D expenses and advertising expenses divided by book assets. *Market-to-book ratio* is calculated as (book value of assets - book value of equity + market value of equity)/book value of assets. *Firm size* is the natural logarithm of book assets in 2016 constant dollars. *Leverage* is long-term debt plus current debt divided by book value of assets. *NWC to assets* is working capital net of cash and marketable securities divided by book value of assets. Sales growth is the average growth of sales revenue over the past three years. Instruments used are defined in Table 3. All continuous variables are winsorized at the 1st and 99th percentiles. Industry and year fixed effects are included. Industry dummies are based on two-digit SIC codes. t-Statistics in parentheses are corrected for heteroscedasticity and clustering at the firm level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels respectively.

	Δ Investment		Δ Dividend payout	
	(1)	(2)	(3)	(4)
DH dummy_t-1	-0.051***		-0.005	
	(-4.336)		(-1.219)	
DH dummy_t-1*Cash to assets_t-1	0.214***		0.009	
	(4.050)		(0.622)	
DH cont_t-1		-1.186***		-0.096
		(-5.072)		(-1.351)
DH cont_t-1*Cash to assets_t-1		7.203***		0.499
		(4.153)		(1.128)
Cash to assets_t-1	0.118***	0.145***	0.001	0.001
	(4.208)	(6.335)	(0.136)	(0.116)
Preinvestment earnings to assets	0.010	0.006	0.011**	0.009**
	(0.606)	(0.365)	(2.177)	(1.979)
Market-to-book ratio	0.005**	0.004**	0.000	0.000
	(2.523)	(2.413)	(1.518)	(1.590)
Firm size	0.008***	0.007***	0.001**	0.001***
	(6.887)	(9.042)	(2.324)	(2.844)
Leverage	0.012*	0.015**	-0.013***	-0.013***
	(1.705)	(2.232)	(-4.032)	(-4.022)
NWC to assets	0.062***	0.063***	-0.002	-0.002
	(6.766)	(6.955)	(-0.762)	(-0.697)
Sales growth	-0.003	-0.003	0.002***	0.002***
	(-0.618)	(-0.686)	(2.685)	(2.659)
Constant	-0.107***	-0.117***	-0.020**	-0.021**
	(-6.885)	(-8.145)	(-2.405)	(-2.421)
Industry	YES	YES	YES	YES
Year	YES	YES	YES	YES
No. of observations	10,779	10,779	10,828	10,828
No. of firms	2,870	2,870	2,823	2,823
Adj. R-squared	0.045	0.043	0.036	0.037

Table 9

Dual holdings and value of cash holdings

This table reports the regression of excess stock returns, $r_{i,t} - R^B_{i,t}$, on dual holdings and changes in firm characteristics over the fiscal year. The dependent variable is $r_{i,t} - R^B_{i,t}$, defined as firm *i*'s stock return during fiscal year *t* minus the benchmark portfolio return $R^B_{i,t}$ during fiscal year t, where the benchmark portfolios are the Fama and French (1993) 25 size and book-to-market portfolios. *DH dummy* is an indicator variable equal to one if at least one lender has significant average equity holdings in the borrowing firm in the year of loan origination, and zero otherwise. *DH cont* is calculated as *log(1+DH equity ownership)* where *DH equity ownership* is the total proportion of a borrowing firm's equity held by its lenders in the year of loan origination. *E-Index* is an entrenchment index constructed by Bebchuk, Cohen and Ferrell (2009) based on six antitakeover provisions and is measured by a score from 0 to 6. *G-Index* is a corporate governance index constructed by Gompers, Ishii, and Metrick (2003) based on twenty-four antitakeover provisions and is measured by a score from 0 to 24. Δ is the notation for one-year change from year t-1 to year t. All independent variables, except dual holdings, corporate governance and leverage, are scaled by one-year lagged market value of equity. C_t is cash plus marketable securities. E_t is earnings before extraordinary items plus interest, deferred tax credits, and investment tax credits. NA_t is total assets net of cash. RD_t is research and development expense, and is set to zero if the research and development expense data is missing. I_t is interest expense. D_t is total dividends, measured as common dividends paid. L_t is market leverage, calculated as total debt divided by the sum of total debt and market value of equity. NF_t is net financing, calculated as (total equity issuance - repurchases + debt issuance - debt redemption). All continuous variables are winsorized at the 1st and 99th percentiles. Model (1) is the baseline Faulkender and Wang (2006) model. Models (2)-(7) are pooled OLS regressions. Models (8) and (9) are firm fixed effects regressions. Models (10) and (11) are 2SLS regressions using the instrumental variable approach, where instruments used are defined in Table 3. Industry dummies are based on two-digit SIC codes. t-Statistics in parentheses are corrected for heteroscedasticity and clustering at the firm level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels respectively.

Dependent Variable: Excess stock return	FW Model	OLS						Firm Fixed Effects		2SLS	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
ΔC_t	1.337***	1.259***	1.222***	1.268***	1.311***	1.360***	1.462***	1.078***	1.143***	1.253***	1.196***
	(7.964)	(6.840)	(3.561)	(2.666)	(7.753)	(4.466)	(3.347)	(4.931)	(5.770)	(6.099)	(6.178)
DH dummy		-0.049***	-0.005	-0.003				-0.062***		-0.079***	
		(-4.320)	(-0.370)	(-0.161)				(-2.856)		(-3.681)	
DH dummy*ΔC_t		0.301*	0.583**	0.564**				0.427*		0.315	
		(1.666)	(2.142)	(2.038)				(1.682)		(0.849)	
DH cont					-0.777***	-0.121	-0.266		-0.732**		-1.924***
					(-4.489)	(-0.621)	(-1.269)		(-2.414)		(-3.728)
DH cont*ΔC_t					5.409	11.378	11.867		8.071		25.233
					(1.324)	(1.431)	(1.494)		(1.330)		(1.641)
E-index			0.001			0.001					
			(0.212)			(0.120)					
E-index*ΔC_t			-0.048			-0.016					
			(-0.644)			(-0.212)					
G-index				0.003			0.003				
				(1.171)			(1.172)				

Table 9 Continued

G-index*ΔC_t				-0.012			-0.013				
				(-0.324)			(-0.340)				
ΔE_t	0.184***	0.184***	0.267***	0.162***	0.182***	0.269***	0.165***	0.146***	0.146***	0.184***	0.182***
	(5.863)	(5.887)	(6.273)	(3.524)	(5.830)	(6.327)	(3.591)	(3.757)	(3.761)	(5.932)	(5.757)
ΔNA_t	0.134***	0.136***	0.151***	0.178***	0.134***	0.153***	0.180***	0.122***	0.119***	0.137***	0.135***
	(5.389)	(5.534)	(4.906)	(4.853)	(5.398)	(4.891)	(4.913)	(3.795)	(3.650)	(5.545)	(5.462)
ΔRD_t	-1.558**	-1.491**	-2.196**	-2.352**	-1.515**	-2.190**	-2.313**	-2.170*	-2.196**	-1.484**	-1.457**
	(-2.108)	(-2.019)	(-2.049)	(-2.202)	(-2.049)	(-2.082)	(-2.190)	(-1.942)	(-1.961)	(-2.013)	(-1.961)
ΔI_t	-0.134	-0.153	-0.105	0.086	-0.109	-0.059	0.117	0.039	0.107	-0.158	-0.111
	(-0.341)	(-0.391)	(-0.154)	(0.143)	(-0.278)	(-0.088)	(0.196)	(0.075)	(0.204)	(-0.402)	(-0.284)
ΔD_t	-1.299*	-1.244*	-1.016	-0.998	-1.300*	-0.963	-0.904	-1.484*	-1.463*	-1.173	-1.111
	(-1.745)	(-1.666)	(-1.149)	(-0.792)	(-1.743)	(-1.105)	(-0.716)	(-1.685)	(-1.660)	(-1.573)	(-1.474)
C_{t-1}	0.256***	0.261***	0.444***	0.389***	0.266***	0.434***	0.375***	0.477***	0.474***	0.253***	0.267***
	(4.437)	(4.487)	(5.688)	(4.526)	(4.561)	(5.498)	(4.350)	(4.408)	(4.398)	(4.303)	(4.538)
L_t	-0.500***	-0.525***	-0.431***	-0.369***	-0.515***	-0.431***	-0.370***	-1.195***	-1.193***	-0.533***	-0.523***
	(-14.074)	(-14.588)	(-10.779)	(-8.697)	(-14.384)	(-10.697)	(-8.680)	(-16.282)	(-16.247)	(-14.773)	(-14.427)
NF_t	-0.012	-0.020	-0.169**	-0.256***	-0.018	-0.172***	-0.262***	-0.007	-0.006	-0.021	-0.019
	(-0.247)	(-0.415)	(-2.574)	(-3.669)	(-0.364)	(-2.612)	(-3.635)	(-0.112)	(-0.101)	(-0.443)	(-0.396)
C_{t-1}*ΔC_t	-0.364***	-0.355***	-0.993***	-0.519**	-0.355***	-1.028***	-0.564**	-0.268	-0.258	-0.355***	-0.330***
	(-3.033)	(-2.980)	(-4.275)	(-2.074)	(-2.956)	(-4.269)	(-2.283)	(-1.545)	(-1.479)	(-2.966)	(-2.627)
L_t*ΔC_t	-0.922***	-0.889***	-0.756	-1.133**	-0.922***	-0.873*	-1.228**	-0.529	-0.562	-0.883***	-0.907***
	(-2.909)	(-2.789)	(-1.516)	(-2.212)	(-2.918)	(-1.761)	(-2.550)	(-1.498)	(-1.622)	(-2.793)	(-2.833)
Firm								YES	YES		
Industry		YES	YES	YES	YES	YES	YES			YES	YES
Year		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
No. of observations	8,173	8,173	4,156	3,794	8,173	4,156	3,794	8,173	8,173	8,173	8,173
No. of firms	2,853	2,853	1,247	1,034	2,853	1,247	1,034	2,853	2,853	2,853	2,853
Adj. R-squared	0.146	0.150	0.193	0.168	0.149	0.192	0.168	0.179	0.178	0.149	0.140

Appendix A. Identification Process of Subsidiaries

The identification of lenders' subsidiaries in this study largely relies on the 10K SEC filings reported by listed institutions. Publicly listed firms are required to disclose a list of their subsidiaries in Exhibit 21 of their 10K reports, which can be obtained from the Electronic Data Gathering, Analysis and Retrieval system (EDGAR) database. I start with all loan facilities with available data as specified in Section 4.1, from which I get the names of lenders that participate in these loans. I then obtain a list of firms that are required to file 10K reports from the SEC website. The Dealscan lenders in my sample are matched with the firms with 10K reports by institution name. After obtaining a list of lenders with available 10K filings, I manually download Exhibit 21 of their 10K reports in year 1995, 2000, 2005, 2010 and 2015[31] (years are randomly selected). For years in which the subsidiary list is not downloaded, it is assumed that the subsidiaries of an institution remain the same as the latest year when the information is collected.

In the next step, I extract the names of subsidiaries from Exhibit 21 downloaded above, and match them with institutional investors in 13F database by institution name and year. To enhance the accuracy of matching, all non-alphanumeric characters (such as *"("*, *")"*, "*", "_", "&", "~") in institution names are removed and all letters are converted to uppercase when the matching is performed. Following Jiang, Li and Shao (2010), an institution is defined as a dual holder if either the parent lender or any of its subsidiaries holds "significant" level of equity in the year of loan origination.

[31] Due to time constraints, I did not download the 10K reports of listed lenders for all sample years. However, I did that for a small sample of ten institutions and performed a careful check of the composition of reported subsidiaries, and found little variation throughout time.

Appendix B. Appendix Tables

Table B1
Dual holdings and level of cash holdings - OLS regression

This table presents the results for OLS regressions of cash holdings on dual holdings. The dependent variable is the ratio of cash and marketable securities to assets. Variables are defined in Table 3. All continuous variables are winsorized at the 1st and 99th percentiles. Industry and year fixed effects are included. Industry dummies are based on two-digit SIC codes. t-Statistics in parentheses are corrected for heteroscedasticity and clustering at the firm level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels respectively.

Dependent Variable: Cash to assets	(1)	(2)	(3)	(4)	(5)	(6)
DH dummy$_{t-1}$	-0.001	-0.003	-0.002			
	(-0.577)	(-1.600)	(-1.184)			
DH cont$_{t-1}$				-0.009	-0.011	-0.009
				(-0.439)	(-0.500)	(-0.399)
Cash to assets$_{t-1}$	0.779***	0.771***	0.764***	0.779***	0.772***	0.764***
	(54.452)	(41.612)	(39.816)	(54.442)	(41.681)	(39.872)
Market-to-book ratio	0.002	0.005***	0.005***	0.002	0.005***	0.004***
	(1.269)	(4.679)	(4.131)	(1.272)	(4.563)	(4.050)
Firm size	-0.001***	-0.003***	-0.003***	-0.001***	-0.003***	-0.003***
	(-3.859)	(-4.084)	(-3.605)	(-4.097)	(-4.383)	(-3.831)
Leverage	-0.056***	-0.054***	-0.050***	-0.056***	-0.054***	-0.050***
	(-13.013)	(-7.961)	(-7.327)	(-12.977)	(-7.947)	(-7.315)
Cash flow to assets	0.015	-0.022	-0.018	0.015	-0.023	-0.018
	(1.387)	(-1.298)	(-1.018)	(1.381)	(-1.346)	(-1.056)
NWC to assets	-0.057***	-0.059***	-0.061***	-0.057***	-0.059***	-0.061***
	(-10.173)	(-6.614)	(-6.664)	(-10.159)	(-6.601)	(-6.648)
R&D to sales	0.001	0.056*	0.061*	0.001	0.055*	0.061*
	(0.074)	(1.721)	(1.857)	(0.073)	(1.713)	(1.850)
CAPEX to assets	-0.138***	-0.136***	-0.140***	-0.138***	-0.136***	-0.140***
	(-9.962)	(-7.511)	(-7.544)	(-9.967)	(-7.508)	(-7.542)
Cash flow volatility	0.000	-0.000	-0.000	0.000	-0.000	-0.000
	(0.928)	(-0.320)	(-0.167)	(0.931)	(-0.281)	(-0.147)
Dividend dummy	-0.008***	-0.007***	-0.007***	-0.008***	-0.007***	-0.008***
	(-5.742)	(-3.464)	(-3.636)	(-5.804)	(-3.610)	(-3.749)
Insider share ownership		0.005	0.006		0.005	0.006
		(0.640)	(0.702)		(0.647)	(0.706)
Board size		-0.009***	-0.009***		-0.009***	-0.009***
		(-2.825)	(-2.664)		(-2.811)	(-2.661)
Board independence		0.006	0.005		0.005	0.005
		(1.124)	(0.957)		(1.078)	(0.925)
Institutional holdings		0.007	0.008		0.007	0.008
		(1.340)	(1.442)		(1.214)	(1.357)
E-index		-0.001	-0.000		-0.001	-0.000
		(-0.749)	(-0.657)		(-0.804)	(-0.695)
Number of facilities$_{t-1}$			-0.000			-0.000
			(-0.629)			(-0.648)
Average facility amount$_{t-1}$			-0.000			-0.000
			(-0.091)			(-0.035)
Average facility maturity$_{t-1}$			-0.000			-0.000
			(-1.410)			(-1.416)
Industry	YES	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES	YES

Loan Purpose			YES			YES
No. of observations	11,759	6,041	5,801	11,759	6,041	5,801
No. of firms	2,951	1,353	1,337	2,951	1,353	1,337
Adj. R-squared	0.683	0.733	0.732	0.683	0.733	0.732