Stock Mispricing and Dual Holders' Loan Pricing

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Abstract

We investigate how dual holders who simultaneously hold loans and equity shares of a firm respond to stock mispricing of the firm. Using the fire-sales shock driven by mutual fund outflows as a measure of stock mispricing, we find that dual holders provide loans with lower spreads to the firms under the fire-sales shock. The result is driven by dual holders' incentive to support the firm as long-term investors. We establish causality by exploiting mergers between financial institutions. In a firm-level analysis, we find that dual holders' loan provisions offset the negative effects of the fire-sales shock on corporate investments.

JEL classification: G21, G23, G32
Keywords: Dual Holder, Loan Spread, Stock Mispricing, Corporate Investment

1. Introduction

Institutional investors hold a significant proportion of U.S. stocks with an increasing trend due in part to the growing popularity of passive investment strategies. In the last quarter of 2019, the average institutional ownership of non-financial firms in the Russell 3000 index is around 80% (Glossner et al. (2021)). An important concern in this regard is the potential risk induced by the fluctuation of mutual fund flows. Starting from Coval and Stafford (2007), the literature documents that mutual funds' asset sales driven by large outflows create a downward price pressure on stocks held by the funds, which is often called the "fire-sales pressure." The pressure generates a temporary stock mispricing that is not related to the fundamentals of firms. However, it has negative real effects on a variety of corporate policies, including firms' investment decisions as discussed by Derrien et al. (2013) and Lou and Wang (2018).

We explore the role of "dual holders" in mitigating the negative impacts of the fire-sales shock. Dual holders are financial institutions that hold equity shares and lend to a firm simultaneously. When considering the lender of a loan at the bank holding company level, it is quite common for the lender to hold equity shares of the borrower through the asset management divisions in the same financial conglomerate. Since the presence of dual holders reduces the shareholder-creditor conflict of interests within a firm, it has beneficial loan-level effects such as lower loan spread (Jiang et al. (2010)) and fewer restrictions on capital expenditure (Chava et al. (2019)). In this paper, we investigate how dual holders mitigate the negative effects of the fire-sale shock on investment of firms in which they hold equity, by providing loans with lower loan spreads to the firms.

Dual holders experience temporary capital losses from the fire-sales shock on their portfolio firms. Nevertheless, the dual holders would not charge higher loan spreads as a result of the shock as long as it does not increase the credit risks of the firms. Rather, they have the incentive to offer loans with *lower* spreads to support the firms in maintaining their corporate activities despite the fire-sales shock on the equity.

We employ the measure of fire-sales pressure driven by extreme mutual fund outflows in Edmans et al. (2012). To measure the fire-sales pressure, it captures hypothetical trades of mutual funds that have experienced outflows of more than 5% of the total assets. Our variable for the fire-sales shock is $Flow\ Shock$, which is an indicator variable that equals one if the fire-sales pressure measure is in the bottom decile of the distribution in each quarter. The variable reflects a temporary and unanticipated fire-sales shock that incurs stock mispricing and is also accompanied by higher equity financing costs for the firm.

To preview our main result, we find that dual holders provide cheaper loans to a firm when it is subject to the fire-sales shock on the equity side. In terms of the magnitude, dual holders lower the loan spreads of firms under the fire-sales shock by 0.121%p (12.1bp), which corresponds to 9.05% of one standard deviation of loan spreads. The result remains statistically significant after controlling for other firm-level and loan-level determinants of loan spreads. The results are robust to general variable definitions and alternative empirical specifications with firm$\times$year fixed effects that control for all time-varying firm-level characteristics. Moreover, the results are consistent across different loan types.

Among possible explanations of the dual holders' loan pricing, we argue that the incentive on the borrower's equity is the underlying mechanism. As the dual holders maintain their equity stakes after the fire-sales shock, they would support the borrower by reducing

its debt financing costs as long-term investors.[1] The incentive channel is confirmed as our results are driven by dual holders as lead lenders of the loan rather than the dual holders involved as participants of the loan. We also find that the loan spread after the fire-sales shock gets lower as the equity shares of the dual holders increase. Moreover, the results are stronger when the dual holders have a longer equity investment horizon for the borrower prior to the loan issuance. These all support the idea that the dual holders' loan pricing is explained by their motive to support the borrower firm as long-term investors.

We distinguish this mechanism from dual holders' prior lending relationships with the borrower. In a placebo test that replaces the dual holders' presence in a loan with the relationship lenders' presence, we do not find that relationship lenders provide cheaper loans to borrowers under the fire-sales shock. We also observe that dual holders with prior lending relationships offer lower loan spreads to the borrowers under the fire-sales shock, but the magnitudes are smaller than the loans issued by dual holders without prior lending relationships. Taken together, the results suggest that the dual holders' cheaper loan provision cannot be interpreted as a result of repeated lending relationships.

To further highlight the dual holders' incentive to support borrowers under the fire-sales shock, we examine the role of the borrowers' ex-ante financial constraints related to equity financing. The increased equity financing costs due to the fire-sales shock would be more crucial to financially constrained firms that indeed have plans to issue equity. Therefore, dual holders would have a stronger incentive to lower loan spreads for those firms. Relying on the measure of financial constraints based on textual analysis of 10-

[1] Figure 1 shows that, once the loan is issued, the change in equity shares of borrowers with the fire-sale shock held by dual holders is not statistically different from that of other borrowers.

K reports by Hoberg and Maksimovic (2015), we assess a firm's financial constraint and the intent to issue equity in the year before the loan issuance. Our analysis shows that dual holders provide more favorable loan spreads to firms with binding equity financial constraints under the fire-sales shock.

To address potential endogeneity in the dual-holding status, we exploit mergers between financial institutions to instrument the presence of dual holders in a loan. If a lender acquires an institutional investor, the lenders get equity holdings of the target's portfolio firms. The acquired equity holdings are plausibly exogenous because mergers between financial institutions are not driven by individual characteristics of the portfolio firms (He and Huang (2017)). We instrument the dual holders' presence by the target's significant equity stakes in the borrowers before the merger. In our first-stage regression, we find that the acquiring lenders are more likely to be dual holders of the borrowers in the post-merger period. And the results of the second-stage regression confirm our finding that dual holders provide cheaper loans to borrowers under the fire-sales shock.

We emphasize that the fire-sales shock is nonfundamental by nature and our results do not suggest that dual holders charge lower credit spreads to risky borrowers. We are well aware of the concern that the measure of fire-sales pressure that we use may not precisely capture a transitory and nonfundamental shock to stock prices (Wardlaw (2020)). To address this concern, we run our baseline regression controlling for different variables that capture firm-level financial risks and their interaction with the dual holders' presence. We obtain consistent results that dual holders support borrower firms with cheaper loan spreads in the horseracing regression.[2] Importantly, we find that dual holders do not pro-

[2]It is consistent with Gredil et al. (2022) who argue the validity of the Edmans et al. (2012) measure as

vide cheaper loans to high-risk borrowers.

We further support our argument by employing an alternative measure of flow-driven sales pressure suggested by Wardlaw (2020) to define our variable of fire-sales shock. The alternative measure is immune to the problem with the measure of Edmans et al. (2012) that the fire-sales pressure is correlated with the current return by construction. Substituting the shock variable with the alternative one, we continue to find that dual holders provide cheaper loans in response to the fire-sales shock on borrowers.

In the last part of the paper, we examine the effects of dual holders' favorable loan provisions on firm-level outcomes of the borrowers after the fire-sales shock. We first find that the firms that received loans from dual holders recover their stock returns more quickly than the matched control firms that received loans from other lenders. The faster return recovery strengthens the notion that dual holders are incentivized to provide cheaper loans to firms under the fire-sales shock.

Next, we find that firms that received loans from dual holders do not reduce their investment in capital expenditure. Although the fire-sales shock reduces future corporate investments on average, firms with dual holder loans offset the negative effects thanks to the lowered financing costs evidenced by our loan-level analyses. The offsetting effect of dual holders' loan provisions is robust across firms with varying degrees of equity financial constraints. Overall, dual holders prevent the fire-sales shock from affecting the firm's investment decisions by loan provisions.

This paper contributes to the growing literature on the role of dual ownership in re-

a transitory shock. They find that large outflow is associated with an immediate increase in CDS spreads, which reverses with the stock returns. Moreover, the outflow is associated with a lower probability of future defaults conditional on stock returns and firm characteristics.

solving shareholder-creditor conflicts within a firm. Prior studies find that firms held by dual holders reduce excessive dividend payments (Chu (2018)) and risk-taking (Chen et al. (2023); Yang (2021)), and increase their investment efficiency (Antón and Lin (2020)). At the loan level, dual holders charge lower loan spreads (Jiang et al. (2010)) and are less likely to impose restrictive covenants on capital expenditure (Chava et al. (2019)). In this paper, we analyze the shock-absorbing role of dual holders when there is a temporary shock on the equity financing cost of firms. We provide evidence that dual holders charge lower loan spreads to firms under the fire-sales shock on equity, which allows the firms to maintain their investments.

We also contribute to the literature on the fire-sales shock on stock prices driven by mutual funds (Coval and Stafford (2007); Edmans et al. (2012)) and its real effects. Although the sales pressure generates a temporary stock underpricing, it has been documented to have real effects on corporate policies including investment (Lou and Wang (2018); Hau and Lai (2013)), equity issuance (Derrien et al. (2013)), and R&D activities (Dong et al. (2021)). We show that dual holders' loan provision effectively mitigates the impact of the fire-sales shock on corporate investments. Through their loan provision, dual holders insulate the firms' investment decisions and growth prospects from the distortions caused by stock mispricing.

The remainder of the paper is organized as follows. In Section 2, we develop our research hypothesis. Section 3 introduces the data and describes how we identify dual holders and measure the fire-sales shock driven by mutual fund outflows. In Section 4, we provide analyses on dual holders' loan provisions to firms under the fire-sales shocks and additional robustness tests. Section 5 presents the firm-level effects of dual holders' loan

provisions on the borrowers. Section 6 concludes.

2. Hypothesis Development

Mutual funds that experience large outflows sell their portfolio shares to cover redemptions, which induces a sudden drop in the price of the stocks held by them. When a firm is under the "fire-sales shock," dual holders that hold the firm's equity shares experience capital loss. However, the shock induced by mutual fund outflows is nonfundamental and unrelated to the credit risk of the firm. Dual holders that are aware of such nature would not increase credit spreads for the firm.

Rather, they have an incentive to support the firm by charging lower credit spreads. Dual holders may reduce the firm's debt financing cost through the favorable loan provision, which can offset the increased equity financing cost resulting from the fire-sales shock. Jiang et al. (2010) provide evidence that dual holders are long-term investors of the firm, both before and after the loan issuance. As the dual holders plan to maintain their equity stakes in the firm after the fire-sales shock, they would try to mitigate the adverse effects of the shock on the firm.[3] Hence, we develop the following hypothesis.

Hypothesis 1. Dual holders would provide loans with lower spreads to firms that face the fire-sales shock on equity driven by mutual fund outflows.

The extent to which dual holders reduce the debt financing cost of the firm under the eq-

[3]In Section 3.3, we show that the fire-sales shock does not affect dual holders' equity shares of the borrower after the loan issuance.

uity fire-sales shock would vary across their equity stakes and investment horizons of the borrower. Also, dual holders would have a greater incentive to reduce loan spreads if the firm is constrained from making future investments due to the increased equity financing cost. As dual holders attenuate the firm's liquidity concerns with the favorable loan provision, the negative impact of the fire-sales shock on future investments would be offset. This leads to our second hypothesis.

Hypothesis 2. Firms that received loans from dual holders would not reduce their investments after the fire-sales shock on equity driven by mutual fund outflows.

3. Data and Key Variables

3.1. Sample Construction and Identification of Dual Holders

For our analysis, we use the information on syndicated loans from Loan Pricing Corporation's (LPC) DealScan database. We focus on loans issued to public firms in the U.S. from 1987 to 2019 and match the borrowers' financial information from Compustat by using a link table extended from Chava and Roberts (2008).[4] We exclude loans issued to financial firms (SIC codes 6000-6999) and utilities (SIC codes 4900-4999) in our sample. For the lenders, we match the ultimate parent (bank holding company) by the link table from Schwert (2018). Thus, our sample includes lenders that acted as lead arrangers on at

[4]The current link table provided by Chava and Roberts (2008) covers matches between DealScan borrowers and Compustat GVKEY by the end of 2017. We extend the 2017 link table by 1) tracking the GVKEY for borrowers in the table and 2) matching the DealScan borrower names to company names in Compustat using a fuzzy matching algorithm and manual checks for borrowers not in the table.

least 50 loans or at least $10 billion in volume during the sample period and their related subsidiaries.

We use DealScan and Thomson 13F institutional holdings data from Thomson Reuters to identify dual holders. As the first step, we match lender names in Dealscan and manager names in 13F data by using a fuzzy matching algorithm and manual checks. We aggregate the match between a lender and 13F institutions by the lender's ultimate parent level. Thus, the equity holdings of 13F institutions matched with the parent's subsidiaries are considered as the lender's equity positions.[5] Then we define each lender of a loan facility as a dual holder if it holds at least 1% of the borrower's equity stakes in the last quarter before the loan origination date. For each loan facility, $Dual\ Hold$ is an indicator variable that equals one if the loan facility has at least one dual holder.

Table 1 reports the summary statistics of our sample. The sample consists of 30,382 loan facilities issued for 4,682 borrowing firms. 41.6% of the loan facilities in our sample have dual holder(s) as the lenders. In Section 4.2, we further decompose the indicator for the presence of dual holder(s) by the dual holder's lender role, equity shares of the borrower, and prior lending relationship with the borrower. All variables are defined in Table A.1.

3.2. Mutual Fund Flow Pressure

We use the sales pressure driven by mutual fund outflows to identify nonfundamental and temporary negative shocks on equity prices. This has also been called the "fire-sales pressure" in previous studies following the analysis of Coval and Stafford (2007). More specifically, our shock variable is based on the measure of Edmans et al. (2012) that uses

[5]We search for the 10-K filings of the lenders' ultimate parents to obtain the names of their subsidiaries.

hypothetical trades of mutual funds with extreme outflows. It measures the fraction of outflow-induced trading volume to the total trading volume of a stock, under the assumption that funds with outflows sell each stock in proportion to their beginning-of-quarter shares of that stock. The intuition of using hypothetical (proportional) trades is to exclude information effects that may exist in the sales decision of mutual funds. Following the notation of Edmans et al. (2012) and Wardlaw (2020), the measure can be expressed as follows. Indices i, j, and t denote firm, fund, and quarter, respectively.

$$
\begin{aligned}
s_{i,j,t-1} &= \frac{SHARES_{i,j,t-1} \times PRC_{i,t-1}}{TA_{j,t-1}} \\
MFFlow_{i,t} &= \sum_{j=1}^{m} \left(\frac{F_{j,t} s_{i,j,t-1}}{VOL_{i,t}} \right) \times \mathbb{I} \left(\frac{F_{j,t}}{TA_{j,t-1}} < -0.05 \right) \\
&= \sum_{j=1}^{m} \left(\frac{F_{j,t} \times SHARES_{i,j,t-1} \times PRC_{i,t-1}}{TA_{j,t-1} \times VOL_{i,t}} \right) \times \mathbb{I} \left(\frac{F_{j,t}}{TA_{j,t-1}} < -0.05 \right) \qquad (1)
\end{aligned}
$$

$s_{i,j,t-1}$ denotes the value of shares of a firm i that the mutual fund j holds in quarter $t-1$ expressed as a fraction of the fund j's total assets. $F_{j,t}$ denotes the net dollar flow of mutual fund j in quarter t and $VOL_{i,t}$ denotes the traded dollar volume of stock i in quarter t. $MFFlow_{i,t}$ aggregates the flow-induced trades of funds that have experienced extreme outflows of greater than 5% of the total assets $\left(\frac{F_{j,t}}{TA_{j,t-1}} < -0.05 \right)$, because they are most likely to fire-sale their shares. Note that $MFFlow_{i,t}$ is negative by construction, and a larger magnitude of $MFFlow_{i,t}$ implies that the stock is subject to a higher fire-sale pressure.

The data sources to construct $MFFlow$ are the same as in Edmans et al. (2012) and Wardlaw (2020). We obtain information on fund assets, returns, and flows from CRSP

Survivor-Bias-Free US Mutual Funds database. We focus on are US domestic equity funds excluding sector funds. Quarterly holdings data of mutual funds are from Thomson Mutual Fund Holdings Database (formerly known as CDA/Spectrum). We merge the two databases by MFLINKS table and calculate $MFFlow$.

We define our measure of fire-sales shock, $Flow\ Shock_{i,t}$, as the indicator variable that equals one if $MFFlow_{i,t}$ is in the bottom decile of the distribution in quarter t, which is the last quarter before the loan origination date. Using the threshold of the bottom decile ensures that firms under the fire-sales shock experience a substantial drop in stock prices, which eventually reverses to the level before the shock.[6] The short-lived nature of the price effect suggests that the shock is a temporary and nonfundamental one.

While the measure of Edmans et al. (2012) is considered to capture the short-term price effect of mutual fund outflows, it is directly related to the current return by construction, raising concerns about the identification of nonfundamental shocks (Wardlaw (2020)). Hence, we also employ an alternative measure of flow pressure suggested by Wardlaw (2020) to define the $Flow\ Shock$ variable and check the robustness of our results. The alternative measure is defined as follows.

$$Flow\text{-}to\text{-}Volume_{i,t} = \sum_{j=1}^{m} \left(\frac{F_{j,t}}{TA_{j,t-1}} \times \frac{SHARES_{i,j,t-1}}{SHARE\_VOL_{i,t}} \right) \times \mathbb{I} \left(\frac{F_{j,t}}{TA_{j,t-1}} < -0.05 \right) \quad (2)$$

$SHARE\_VOL_{i,t}$ is is the number of firm i's shares traded in quarter t. Intuitively, $Flow\text{-}to\text{-}Volume_{i,t}$ scales the outflow-induced sales of a stock by its traded share volume

[6]Our goal is to identify firms with a sharp decline in stock prices due to the fund outflows, rather than using the $MFFlow$ as an instrumental variable for stock prices as in Edmans et al. (2012). In Table A.2, we check the robustness of our main results with the percentile rank of $MFFlow$ for each quarter.

rather than the traded dollar volume. In Section 4.4, we use $Flow\ Shock\ (Flow\text{-}to\text{-}Volume)_{i,t}$, the indicator variable that equals one if $Flow\text{-}to\text{-}Volume_{i,t}$ is in the bottom decile of the distribution in quarter t, to check the robustness of the main analysis.

Table 1 reports the summary statistics of $MFFlow_{i,t}$ and $Flow\text{-}to\text{-}Volume_{i,t}$. The two measures of mutual fund flow pressure are correlated by definition, with a correlation coefficient of 97.5%. The $Flow\ Shock_{i,t}$ variables constructed from the two measures are also highly correlated, with a correlation coefficient of 88.4%.

3.3. Flow Shock and Dual Holders' Equity Shares

We first check whether the fire-sales shock driven by mutual fund outflows affects dual holders' equity shares of the borrower after the loan issuance. As we build upon the idea that dual holders are long-term investors, it is important to ensure that their incentive on the borrower's equity does not decline after the fire-sales shock. To this end, we compare the cumulative change in dual holders' equity shares of firms experiencing and not experiencing the fire-sales shock by the following regression model (3):

$$\Delta Share_{i,l,t,t+k} = \beta Flow\ Shock_{i,t} + \alpha_i + \alpha_l + \alpha_t + \epsilon_{i,l,t,t+k} \tag{3}$$

where i, l, and t indicate the firm, lender, and quarter, respectively. $\Delta Share_{i,l,t,t+k}$ is the cumulative change in dual holder l's equity shares of firm i up to k quarters after t, where t is the last quarter before the loan origination date. $Flow\ Shock_{i,t}$ is the indicator variable that equals one if $MFFlow_{i,t}$ is in the bottom decile of the distribution in quarter t and zero otherwise. α_i, α_l, and α_t denote firm, lender, and year-quarter fixed effects, respectively.

Figure 1 displays estimates of β for up to 8 quarters after the fire-sales shock. The estimated coefficients are close to zero with corresponding 95% confidence intervals around zero, indicating that there is no statistically significant difference between firms with and without the fire-sales shock. Once the loan is issued, dual holders do not tend to sell their equity shares of the shocked borrower more compared to the equity shares of the borrowers without the shock. The results support our hypothesis that dual holders alleviate the temporary shock on the borrower's equity as long-term investors.

4. Empirical Results

4.1. Effect of Mutual Fund Flow Pressure on Dual Holders' Loan Pricing

To investigate the effects of dual holders' participation and mutual fund flow pressure on loan pricing, we estimate the following regression model (4):

$$\begin{aligned} Loan\ Spread_{f,i,t} = \beta_1(Dual\ Hold_{f,i,t} \times Flow\ Shock_{i,t}) + \beta_2 Dual\ Hold_{f,i,t} + \beta_3 Flow\ Shock_{i,t} \\ + \gamma X_{i,t} + \delta W_{f,i,t} + \alpha_i + \alpha_t + \epsilon_{f,i,t} \end{aligned} \tag{4}$$

where f, i, and t indicate the loan facility, firm, and time, respectively. $Loan\ Spread_{f,i,t}$ is the all-in-drawn loan spread over the LIBOR rate of loan facility f in percentage terms. $Dual\ Hold_{f,i,t}$ is the indicator variable that equals one if the loan facility f has at least one dual holder and zero otherwise. $Flow\ Shock_{i,t}$ is the indicator variable that equals one if the mutual fund flow pressure for firm i at quarter t is in the bottom decile of the distribution in quarter t and zero otherwise, where the quarter t is the last quarter before

the loan origination date.[7] $X_{i,t}$ is a set of firm-level control variables and $W_{f,i,t}$ is a set of loan-level control variables. We also include firm and year fixed effects to control for all time-invariant characteristics of the borrowing firms and macro trends that may affect the loan spreads.[8] Standard errors are clustered at the firm and year level.

Table 2 reports the estimated coefficients in the regression model. In Column (1), we find that the estimated coefficient on $Dual\ Hold_{f,i,t} \times Flow\ Shock_{i,t}$ is negative and statistically significant without the control variables. In terms of economic significance, dual holders lower the loan spreads of firms under the fire-sales shock by 0.121%p (12.1bp), which corresponds to 9.05% of one standard deviation of loan spreads. The estimated coefficient on $Dual\ Hold_{f,i,t}$ is also negative and statistically significant, consistent with prior studies that examine the effect of dual holders' participation on loan spread (Jiang et al. (2010); Chava et al. (2019)). The estimated coefficient on $Flow\ Shock_{i,t}$ is positive but not statistically significant at the 10% level.[9]

In Column (2), we control for firm-level characteristics that are possibly related to loan spreads, such as total assets, ROA, leverage ratio, the ratio of tangible assets, and book-to-market ratio. The estimated coefficients on the firm-level control variables are generally in line with prior studies. For example, firms with high leverage ratio pay higher loan spreads and firms with high profitability pay lower loan spreads. We continue to find

[7]We match $Dual\ Hold$ and $Flow\ Shock$ defined in the last quarter before the loan origination date to account for the time lag between the determination of loan terms and the facility start date recorded in DealScan. For example, we match the lenders' equity shares and the borrower's fire-sales shock in 4Q 2015 to the loan facility starting on February 1, 2016. The one-quarter lag is consistent with prior studies such as Murfin (2012).

[8]We get similar results if we include year-quarter fixed effects instead of year fixed effects.

[9]Although we do not hypothesize about the effect of $Flow\ Shock$ on loan spreads, the sign on the estimated coefficient is consistent with the literature. For example, Xiao (2020) shows that nonfundamental price volatility driven by mutual fund flows is positively associated with the firm's loan spreads, as it may increase the lenders' perceived level of risk on that firm.

that the estimated coefficient on $Dual\ Hold_{f,i,t} \times Flow\ Shock_{i,t}$ is negative and statistically significant.

In Column (3), we additionally control for loan-level characteristics, such as loan amount, loan maturity, number of lenders in the loan syndicate, and loan covenants. Column (4) add loan type fixed effects in the regression. The results are consistent after controlling for the loan-level variables.[10] In Column (4), we find that the estimated coefficient on $Dual\ Hold_{f,i,t} \times Flow\ Shock_{i,t}$ is negative and statistically significant at the 1% level. The magnitude of the coefficient in the full specification (-12.7bp) is higher than the one without control variables in Column (1) (-12.1bp).

We further show that the results are robust to continuous measures of dual holders' presence and fire-sales shock. In Table A.3, we replicate Column (4) of Table 2 with the sum of the lenders' equity shares of the borrower ($Dual\ Shares_{f,i,t}$) and the borrower's percentile rank of the fire-selling pressure in the quarter ($MFFlow\ pctl_{i,t}$).[11] The results are consistent with Table 2, suggesting that the lower loan spreads are not entirely driven by specific thresholds of dual holders' presence and the fire-sales shock.

In Table A.4, we also get consistent results after controlling for all time-varying firm-level characteristics by including firm×year fixed effects in (4). Although the results in Table A.4 should be interpreted with caution because they are based on the limited sample of borrowers receiving multiple loans within a year, they suggest that our main results are not driven by unobserved differences in firm-level fundamentals.

Next, we examine whether the effect of fire-sales shock on dual holders' loan pricing is

[10] In Table A.2, we find that $Dual\ Hold_{f,i,t} \times Flow\ Shock_{i,t}$ does not have statistically significant associations with the non-pricing loan terms.

[11] A higher $MFFlow\ pctl$ corresponds to a lower value of $MFFlow$, which implies a stronger downward price pressure.

different across loan types. Specifically, we estimate the regression model in Column (4) of Table 2 for subsamples of Term Loan A, Term Loan B, and revolver (credit line). Term Loan As and revolvers are generally held by the originating lenders, while Term Loan Bs are likely to be sold to nonbank investors (Fleckenstein et al. (2020); Bruche et al. (2020)). If dual holders sell loans in the secondary market after the origination, they are no longer the creditors of the loans. However, they still have the incentive to provide lower loan spreads as long as they hold the borrowers' equity stakes.

In Table 3, the estimated coefficients on $Dual\ Hold_{f,i,t} \times Flow\ Shock_{i,t}$ are negative and statistically significant for all subsamples, indicating that dual holders offer cheaper loans to firms under the shock across different loan types. In terms of economic significance, the estimated coefficients correspond to 24.15%, 26.38%, and 7.02% of one standard deviation of loan spreads for Term Loan A, Term Loan B, and Revolver, respectively. The magnitudes are similar between Term Loan A and Term Loan B, suggesting that the dual holders' incentive to support the borrowers does not depend on the probability of loan sales.

4.2. Dual Holders' Incentive Alignment Channel

In this section, we explore the mechanism behind dual holders' loan pricing for firms under the fire-sales shock. There are two possible channels: (1) incentive on the borrowers' equity, and (2) lending relationships with the borrowers. Dual holders have an incentive to support a borrower under the fire-sales shock as they maintain their equity stakes in the borrower. On the other hand, dual holders may support the borrower because they have prior lending relationships with the borrower and value their repeated relationships.

We test the two channels in our framework and conclude that the incentive channel explains dual holders' providing cheaper loans in response to the temporary shock on the borrowers' equity prices.

To test the incentive channel, we first separate $Dual\ Hold_{f,i,t}$ by whether the dual holder is a lead lender of a loan or not.[12] In a syndicated loan, the lead lenders negotiate with the borrower to set initial loan terms and solicit participation from other lenders to fund the required loan amount. Moreover, they tend to maintain a strong relationship with the borrower to the loan maturity as they are responsible for due diligence and monitoring (Sufi (2007)). Therefore, we hypothesize that dual holders are more likely to lower the loan spread when they are lead lenders. We define $Dual\ Hold\ (Lead)_{f,i,t}$ as the indicator that equals one if the loan facility f has at least one dual holder as a lead lender and zero otherwise. And $Dual\ Hold\ (Participant)_{f,i,t}$ is the indicator variable that equals one if $Dual\ Hold_{f,i,t}$ is one but all dual holder(s) are not lead lenders, and zero otherwise.

We also separate $Dual\ Hold_{f,i,t}$ based on the level of the dual holder's equity stakes in the firm. Dual holders with higher equity stakes in the firm get a larger (unrealized) loss in their portfolio from the fire-sales shock on the firm. Thus, they have a stronger incentive to support the firm by providing cheaper loans. We define $Dual\ Hold\ (High\ Share)_{f,i,t}$ as the indicator variable that equals one if the sum of dual holders' equity shares of the borrower is in the top quartile of the distribution and zero otherwise. And $Dual\ Hold\ (Low\ Share)_{f,i,t}$ is the indicator variable that equals one if $Dual\ Hold_{f,i,t}$ is one but the sum of dual holders' equity shares of the borrower is below the top quartile of the distribution, and zero

[12]We define a lender as a lead lender if the "Lead Arranger Credit" field is "Yes" or if the lender role is one of the following: administrative agent, agent, arranger, lead arranger, or lead bank.

otherwise.

Lastly, we separate $Dual\ Hold_{f,i,t}$ based on the dual holder(s)' equity investment horizon of the borrower using the measure of Jiang et al. (2010).[13] Dual holders are more incentivized to support the borrower when they are long-term investors of the borrower. Specifically, we separate $Dual\ Hold_{f,i,t}$ by whether the dual holder(s)' average investment horizon for the borrower is in the top quartile of the sample distribution or not, defined as $Dual\ Hold\ (Long\ Horizon)_{f,i,t}$ and $Dual\ Hold\ (Short\ Horizon)_{f,i,t}$.

We estimate the model (4) by replacing the $Dual\ Hold_{f,i,t}$ with the separated variables. Table 4 reports the estimated coefficients. In Column (1), we find that the estimated coefficient on $Dual\ Hold\ (Lead)_{f,i,t} \times Flow\ Shock_{f,i,t}$ is negative and statistically significant, with a larger magnitude than the coefficient on $Dual\ Hold\ (Participant)_{f,i,t} \times Flow\ Shock_{f,i,t}$. The estimated coefficient on $Dual\ Hold\ (Participant)_{f,i,t} \times Flow\ Shock_{f,i,t}$ is negative but not statistically significant. In Columns (2) and (3), the estimated coefficients on the interaction terms are all negative and statistically significant. But as expected, the magnitude of the coefficient on $Dual\ Hold\ (High\ Share)_{f,i,t} \times Flow\ Shock_{f,i,t}$ (Column (2)) and $Dual\ Hold\ (Long\ Horizon)_{f,i,t}$ (Column (3)) is larger than that of the coefficient on $Dual\ Hold\ (Low\ Share)_{f,i,t} \times Flow\ Shock_{f,i,t}$ and $Dual\ Hold\ (Short\ Horizon)_{f,i,t}$, respectively.[14] Overall, the results in Table 4 suggest that the dual holders' loan pricing is explained by their incentive on the borrower's equity side.

Next, we test the relationship lending channel. Prior studies such as Berger and Udell

[13]For each dual holder in a loan facility, the investment horizon is the length of time between the first quarter that the dual holder holds at least 1% of the borrower's equity and the last quarter before the origination date.

[14]We get similar results when we control for the equity investment horizon in Column (2) and control for the sum of dual holders' equity shares of the borrower in Column (3), respectively.

(1995) and Bharath et al. (2011) argue that lending relationship gives the lender an information advantage on the borrower. Therefore, lenders that value the repeated lending relationship would support the borrowers under a negative shock. We first conduct a placebo test by replacing the indicator for dual holders' presence in a loan with the indicator for relationship lenders' presence ($Relationship_{f,i,t}$), which equals one if the loan facility f has at least one lead lender that has been a lead lender of the borrower's loans in the past five years and zero otherwise (Bharath et al. (2011)).

We also separate $Dual\ Hold\ (Lead)_{f,i,t}$ by whether the dual holder (as a lead lender) is a relationship lender or not. In our setting, dual holders with prior lending relationships are expected to be better informed about the borrower and tend to support the borrower with favorable loan terms for the continuation of relationships.

In Column (1) of Table 5, we observe that the estimated coefficient interaction term $Relationship_{f,i,t} \times Flow\ Shock_{i,t}$ are not statistically insignificant, contrary to the estimated coefficient on $Relationship_{f,i,t}$. In Column (2), we find that the estimated coefficient on interaction term between $Dual\ Hold\ (Lead)$ and $Flow\ Shock$ is negative and statistically significant regardless of whether the dual holder(s) have prior lending relationships with the borrower or not. Moreover, the magnitude of the interaction term is larger when all of the dual holders are not relationship lenders of the borrower. The results in Table 5 suggest that our results on dual holders' loan pricing when the borrowers are under the fire-sales shock are not driven by relationship lenders' support for the borrowers.

4.3. Equity Financial Constraints and Dual Holders' Loan Pricing

We have shown that dual holders provide cheaper loans to firms with increased equity financing costs due to mutual fund outflows. Such liquidity provisions would be more crucial to the firms that have binding financial constraints and plan to acquire more liquidity via equity issuance because the shock on stock prices would directly affect their equity financing conditions. Therefore, dual holders would be more incentivized to support those firms by lowering loan spreads.

To assess the borrower's financial constraint and the intent to issue equity, we use the equity financial constraint measure based on textual analysis of 10-K reports by Hoberg and Maksimovic (2015). The measure ($equitydelaycon$) captures the degree of financial constraint and the intent to issue equity by searching for related words in the Liquidity and Capitalization Resource Subsection of Management's Discussion and Analysis (MD&A) in the 10-K. Firms with higher equity financial constraints are more likely to delay or curtail investments due to liquidity issues and mention plans to issue equity to address the liquidity concerns.[15]

We estimate our baseline model (4) for subsamples depending on whether the borrower's lagged equity financial constraint is higher than the top quartile of the distribution in the year or not. Note that the full sample in this analysis is smaller than our main sample due to the availability of the constraint measure.[16] In Table 6, the estimated coefficient on $Dual\ Hold_{f,i,t} \times Flow\ Shock_{i,t}$ is greater in magnitude for the constrained firms. The loan spreads associated with $Dual\ Hold_{f,i,t} \times Flow\ Shock_{i,t}$ is lower by 0.287%p (28.7bp) for the

[15]See Hoberg and Maksimovic (2015) for more details in the construction of the measure.

[16]The lagged equity financial constraint measure is available from 1998 to 2016 for firms that have machine-readable Capitalization Resource Subsection of the MD&A.

constrained firms than the unconstrained firms, and the difference is statistically significant (t=1.83). In Column (3), we also report that the baseline result in Table 2 also holds for the full sample with the equity financial constraint measure.

Overall, the results suggest that dual holders provide more favorable loan spreads to firms with binding equity financial constraints when there is a fire-sales shock on the equity side, consistent with the notion that dual holders are "friends in need."

4.4. Instrumental Variable Analysis using Financial Institution Mergers

In the previous analyses, we find that borrowers get cheaper loans from dual holders when they are under the fire-sales shock. The results are explained by the dual holders' incentive on the borrower's equity side rather than prior lending relationships with the borrower. However, there still remains a concern that the dual-holding status is endogenously determined by unobservable firm characteristics. For example, investors may simultaneously choose to hold equity stakes and provide cheaper loans when the firms have solid business prospects despite the temporary fire-sales shock.

In this section, we exploit mergers of financial institutions to address potential endogeneity in the dual-holding status. Specifically, we instrument the dual holders' presence in a loan by the target institution's equity holdings of the borrower before the merger. If a lender acquires an institutional investor, it also gains the equity stakes in the firms that the institutional investor held before the merger. Then the lender becomes a dual holder when it participates in loans issued to the firms after the merger. Since mergers between financial institutions are not driven by individual characteristics of their portfolio firms (He and

Huang (2017)), the merger-induced equity holdings of acquiring lenders are unrelated to the fundamentals of the borrowers or the lender's private information on them.

We obtain merger information from the SDC mergers and acquisitions database. We focus on merger events for which the acquirer (or its parent firm) is an ultimate lender parent in the DealScan database and the target is an institutional investor in the Thomson 13F database.[17] Following He and Huang (2017), we require that the merger is completed within one year after the announcement date and that the target 13F investor stops filing 13F forms within one year after the effective date. There are 80 mergers of 33 acquiring lenders during our sample period.

For each merger event, we collect the target institution's equity holdings in the last quarter before the merger announcement date. Then we predict dual holders' presence in loans for the portfolio firms issued within one year after the merger by the equity holdings of the target. The instrumental variable for dual holders' presence, $Target\ Hold$, is an indicator variable that equals one if the target (not the acquirer) holds at least 1% of the borrower's equity stakes in the pre-merger announcement quarter and the loan origination date is within one year after the merger effective date.[18] Our identifying assumption is that lenders do not sell the acquired equity holdings right after the merger is completed.

Table 7 reports the estimated coefficients from two-stage least squares regression for our main empirical model (4). Columns (1)-(2) show the estimated coefficients from the first-stage regression of $Dual\ Hold$ and $Dual\ Hold \times Flow\ Shock$ on $Target\ Hold$ and $Target\ Hold \times\ Flow\ Shock$. The estimated coefficient on $Target\ Hold$ is positive and

[17] We use CUSIP numbers to match acquirers in SDC to lenders in DealScan. For the target institutions, we manually match the target names in SDC to manager names in 13F.

[18] Importantly, we restrict $Target\ Hold$ to equal zero if the acquiring lender also holds at least 1% of the borrower's equity stakes in the pre-merger announcement quarter.

statistically significant at the 1% level (t=5.19) in Column (1), suggesting that lenders are more likely to be dual holders for the firms of which they get equity stakes by the merger. The result is consistent with our identifying assumption. The Cragg-Donald F-statistic for weak instrument test is 18.5, well above the Stock and Yogo (2005) critical value for 10% maximum Wald test size distortion (7.03). Column (3) reports estimated coefficients from the second-stage regression, where $Dual\ Hold$ and $Dual\ Hold \times Flow\ Shock$ are instrumented by $Target\ Hold$ and $Target\ Hold \times Flow\ Shock$. The estimated coefficient on $Dual\ Hold \times Flow\ Shock$ is negative and statistically significant at the 5% level. Overall, the instrumental variable analysis based on financial institution mergers corroborates our finding that dual holders provide cheaper loans to borrowers under fire-sales shocks driven by mutual fund outflows.

4.5. Robustness Tests

There is a concern about the outflow measure of Edmans et al. (2012) that it is affected by firm fundamentals and does not precisely capture a temporary and nonfundamental shock to stock prices. For example, Wardlaw (2020) shows that the measure is a direct function of the stock's return during the quarter, which is a significant driver of the return variation associated with the measure. If the $Flow\ Shock$ variable in our analysis identifies firms with low returns due to bad fundamentals, the results so far would be interpreted as dual holders bearing costs from borrowers' weak performance and financial distress.

To address this concern, we first conduct robustness tests to validate that the differences in firm risks do not drive our main results. Specifically, we consider four measures of risk in

the last quarter before loan origination - stock return, DGTW characteristic-adjusted return (Daniel et al. (1997)), S&P long-term credit rating, and 5-year CDS spread.[19][20] For each measure, we construct an indicator variable that equals one if the borrower's risk level is higher than the top quartile of the distribution in the quarter. We include the indicator variable and its interaction term with $Dual\ Hold$ in (4) and examine whether the results in Table 2 are affected.[21]

Table 8 reports the results. We find that the estimated coefficients on $Dual\ Hold \times Flow\ Shock$ are negative and statistically significant after controlling for different risk indicators and their interaction terms with dual holders' presence. The results are robust in terms of economic significance. As expected, the estimated coefficients on the risk indicators are positive and statistically significant. However, the estimated coefficients on the interaction terms between $Dual\ Hold$ and risk indicators are neither statistically nor economically significant, which suggests that dual holders do not provide cheaper loans to risky borrowers in general.[22]

In addition to the robustness tests, we use an alternative measure of outflow suggested by Wardlaw (2020) to define the $Flow\ Shock$ variable. The alternative measure changes the traded dollar volume $VOL_{i,t}$ in Equation (1) by $VOL^*_{i,t} = PRC_{i,t-1} \times SHARE\_VOL_{i,t}$, where $SHARE\_VOL_{i,t}$ is the number of firm i's shares traded in quarter t, and it is equiv-

[19] We obtain daily 5-year CDS spreads from Markit following Lee et al. (2018) and average them by quarter.

[20] There are sample reductions except for raw stock returns because the other risk measures are not perfectly matched with our sample. DGTW-adjusted returns are not available for stock returns before the first formation date of the benchmark portfolio. And not all firms in our sample have credit ratings or credit default swaps.

[21] We get similar results when we change the threshold by top quintile or decile and when we substitute the indicator variable with the risk measure itself.

[22] The estimated coefficients on the interaction terms are still insignificant when we estimate regression models in Table 8 without $Flow\ Shock$ and $Dual\ Hold \times Flow\ Shock$.

alent to the measure defined by Equation (2). By using this alternative measure, we can avoid a mechanical relation between the current quarter's return and the outflow measure.

In Table 9, we replicate the results in Table 2 by using the alternative measure of fire-sales shock. We find that the estimated coefficients on $Dual\ Hold \times Flow\ Shock$ are consistent with the ones in Table 2. In Column (1), the magnitude of the coefficient (-12.9bp) is similar to the one in Table 2 (-12.7bp). And in Column (4), the estimated coefficient is statistically significant at the 1% level under the full specification. The results further support our main hypothesis that dual holders provide cheaper loans in response to temporary and nonfundamental shocks in the borrowers' stock prices.

5. Firm-Level Effects of Dual Holders' Loan Provisions

5.1. Effects on Stock Returns

In this section, we investigate the effects of dual holders' loan provisions on firm-level outcomes of the borrowers after the fire-sales shock. We first examine how the stock returns of the borrowers respond to the favorable loan provision by dual holders. Specifically, we focus on the monthly cumulative average abnormal returns (CAAR) over the characteristic-matched benchmark portfolio (DGTW portfolio) by Daniel et al. (1997).

First, we take the sample of firms under the fire-sales shock driven by mutual fund outflows from our loan-level sample. Then we compare the DGTW-adjusted CAAR of the firms that get loan(s) from dual holders in the next quarter after the shock with the CAAR of control firms. We require that the control firms get loan(s) from lenders other than dual

holders in the same quarter. Among them, we select the firms that have similar firm-level attributes for five quarters prior to the shock via propensity score matching.[23]

Figure 2 shows the monthly CAAR of the two groups of firms from 5 quarters prior to the shock to 8 quarters after the shock. We find that the CAAR of the two groups drop by a similar magnitude when the fire-sales shock arrives. However, the returns of firms that get loans from dual holders recover to the pre-shock level more quickly. The CAAR of these firms is higher on average until 24 months after the shock. Hence, firms that receive loans from dual holders experience both faster recovery and long-term growth in stock returns. Put another way, dual holders facilitate the recovery of their capital loss from the fire-sales shock by favorable loan provisions.

5.2. Effects on Corporate Investment

The literature documents that the stock mispricing driven by mutual funds has negative real effects. In particular, it is associated with a reduction in investments (Hau and Lai (2013), Lou and Wang (2018)). Therefore, we examine whether the dual holders' loan provision attenuates the negative effect of fire-sales shock on firms' investment decisions. To this end, we construct a firm-quarter panel from our loan-level sample and estimate the following regression model:

$$CAPEX_{i,t+k} = \beta_1(Dual\ Loan_{i,t} \times Flow\ Shock_{i,t}) + \beta_2 Dual\ Loan_{i,t} + \beta_3 Flow\ Shock_{i,t} + \gamma X_{it} + \alpha_i + \alpha_t + \epsilon_{i,t} \quad (5)$$

[23]We use size, ROA, leverage, tangibility, and book-to-market ratio as in our loan-level regression. We pick the best match that minimizes Mahalanobis distance of the controls for each firm that received dual holder loans.

where i and t indicate the firm and quarter, respectively. $CAPEX_{i,t+k}$ is firm i's capital expenditure (scaled by lagged total assets) after k quarters from the shock at quarter t. $Dual\ Loan_{i,t}$ is the indicator variable that equals one if the firm i received a loan by dual holders in quarter t and zero otherwise. $Flow\ Shock_{i,t}$ is the indicator variable that equals one if the price pressure by mutual fund outflows ($MFFlow_{i,t}$) is in the bottom decile of the distribution in quarter t and zero otherwise. $X_{i,t}$ is a set of firm-level control variables as in our loan-level analyses. We include firm and year-quarter fixed effects denoted by α_i and α_t, respectively. Standard errors are clustered at the firm and year-quarter level.

Panel A of Table 10 reports the estimated coefficients in the above regression model. Columns (1) through (4) present the effects on capital expenditure up to 4 quarters after the fire-sales shock. The estimated coefficients on $Flow\ Shock_{i,t}$ are negative and statistically significant from 2 to 4 quarters after the shock, but it is not statistically significant immediately after the shock.[24] For the quarters $t+2$ to $t+4$, the fire-sales shock is associated with a reduction in capital expenditure by 0.18% on average, which corresponds to 9.76% of one standard deviation of capital expenditure. However, such negative effects are offset for firms with dual holders' loan provisions. The estimated coefficients on $Dual\ Loan_{i,t} \times Flow\ Shock_{i,t}$ are positive and statistically significant for quarters $t+2$ to $t+4$ with similar magnitudes with the coefficient on $Flow\ Shock_{i,t}$.[25] The results are graphically illustrated in Panel A of Figure 3. We also find that the sum of the two coefficients is not statistically different from zero for each quarter, indicating that firms receiving loans from dual holders under the fire-sales shock do not reduce their capital expenditures (untabu-

[24]The effects of $Flow\ Shock_{i,t}$ on capital expenditure after 5 quarters are not statistically significant, suggesting that the fire-sale shock is not a persistent shock driven by firm fundamentals.

[25]$Dual\ Loan_{i,t} \times Flow\ Shock_{i,t}$ is associated with an increase in capital expenditure by 0.15% on average, which corresponds to 8.09% of one standard deviation of capital expenditure.

lated).

Next, we use the sample with available equity financial constraint measure of Hoberg and Maksimovic (2015) to conduct a subsample analysis for (5) based on the firm's equity financial constraint. As in Section 4.3, we divide the sample depending on whether the firm's lagged equity financial constraint is higher than the top quartile of the distribution in the year or not.

Panels B and C of Table 10 report the results for firms with high and low constraints. We observe that the estimated coefficient on $Flow\ Shock_{i,t}$ is negative and statistically significant starting from quarter $t+1$ for firms with high equity financial constraints, while it is statistically significant only in quarter $t+2$ and $t+3$ for the unconstrained firms. The estimated coefficients are also greater in magnitude for the constrained firms. The immediate and substantial response of firms in Panel B is because they have already indicated to curtail investment due to liquidity issues and issue equity accordingly, which makes them suffer more from the increased equity financing costs.

We continue to find that dual holders' loan provisions offset the reduction in future capital expenditures. In Panel B, the estimated coefficient of $Dual\ Loan_{i,t} \times Flow\ Shock_{i,t}$ is positive and statistically significant in quarter $t+1$, suggesting the quick recovery from the liquidity issues of the constrained firms. In Panel C, the estimated coefficient is positive and statistically significant in quarters $t+2$ and $t+3$ similar to the coefficient on $Flow\ Shock_{i,t}$. The magnitudes of coefficients on $Dual\ Loan_{i,t} \times Flow\ Shock_{i,t}$ are greater in Panel B, reflecting the lower loan spreads provided for the constrained firms as in Table 6.[26] Again, the sum of coefficients on $Dual\ Loan_{i,t} \times Flow\ Shock_{i,t}$ and $Flow\ Shock_{i,t}$ is not

[26]The magnitudes of coefficients are illustrated in Panel B of Figure 3.

statistically different from zero for each specification.

Taken together, the results in Table 10 show that dual holders help the firms maintain their investments in the face of fire-sales shocks. The favorable loan provisions by dual holders prevent the stock mispricing shocks from affecting the firms' investment decisions and growth prospects.

6. Conclusion

We have shown that dual holders provide lower loan spreads to firms that experience the fire-sales shock on equity driven by mutual fund outflows. We empirically verify that the favorable loan provision depends on the dual holders' equity shares of the borrower and the borrower's binding financial constraints. Our result is robust through different validity checks, including the instrumental variable analysis using mergers between financial institutions. We then show that the loan provisions by dual holders offset the negative effects of the fire-sales shock on firms' investment in capital expenditure. We argue that dual holders' loan provisions motivated by their incentives as long-term investors play an important role in mitigating the potential real effects of temporary and nonfundamental shocks in the capital market.

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Figure 1: Flow Shock and Dual Holders' Change in Equity Shares

This figure plots the cumulative change in dual holders' equity shares of the borrower after the fire-sales shock driven by mutual fund outflows. We plot the coefficient estimates and the corresponding 95% confidence intervals from regressions of cumulative change in dual holders' equity shares on the indicator of fire-sales shock with firm, lender, and year-quarter fixed effects. The fire-sales shock indicator equals one if the outflow-driven pressure by Edmans et al. (2012) is in the bottom decile of the quarter and zero otherwise. Standard errors are clustered at the lender and year-quarter level.

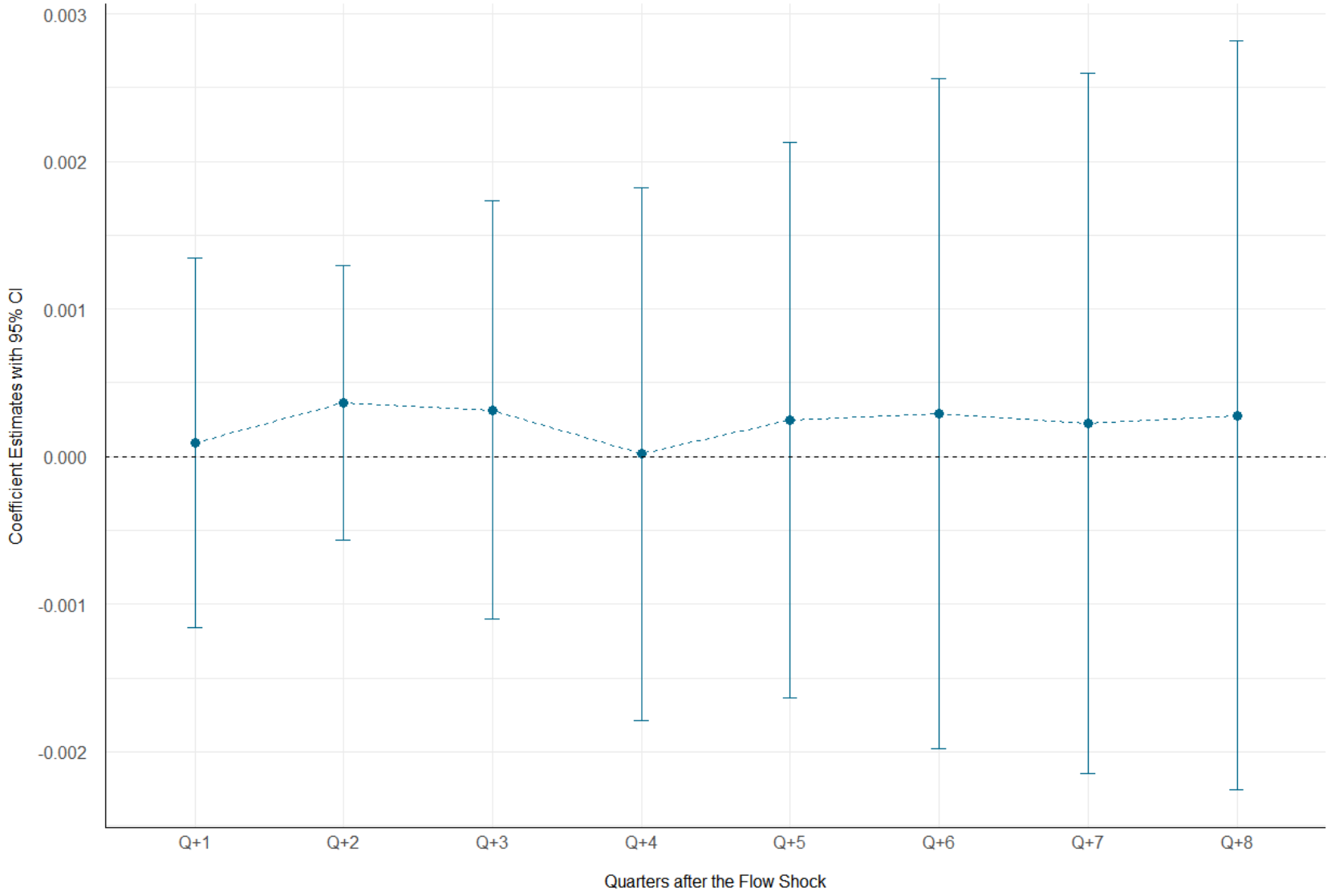


Figure 2: Exposure to Dual Holder Loans and Stock Returns after the Flow Shock

This figure plots the monthly cumulative average abnormal returns (CAAR) over the characteristic-matched benchmark portfolio by Daniel et al. (1997) for the firms under the fire-sales shock driven by mutual fund outflows. For each quarter, firms in the bottom decile of the $MFflow$ measure by Edmans et al. (2012) are defined to have the fire-sales shock. We first get cross-sectional average returns for each quarter and average across quarters. The red line plots the CAAR of firms that take a loan from dual holders in the next quarter of the fire-sales shock. The blue line plots the CAAR of matched control firms that take a loan from other lenders in the next quarter of the fire-sales shock.

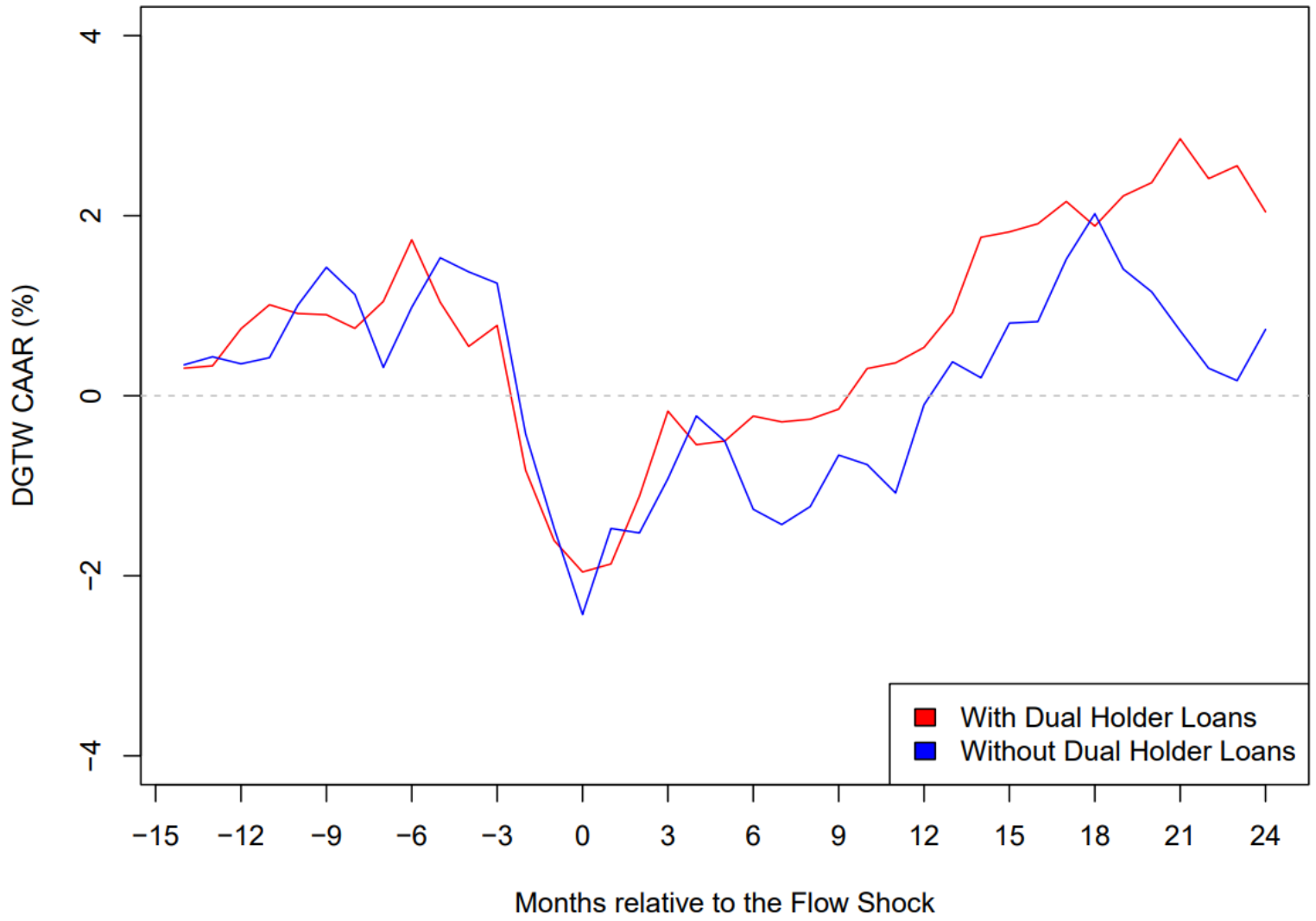
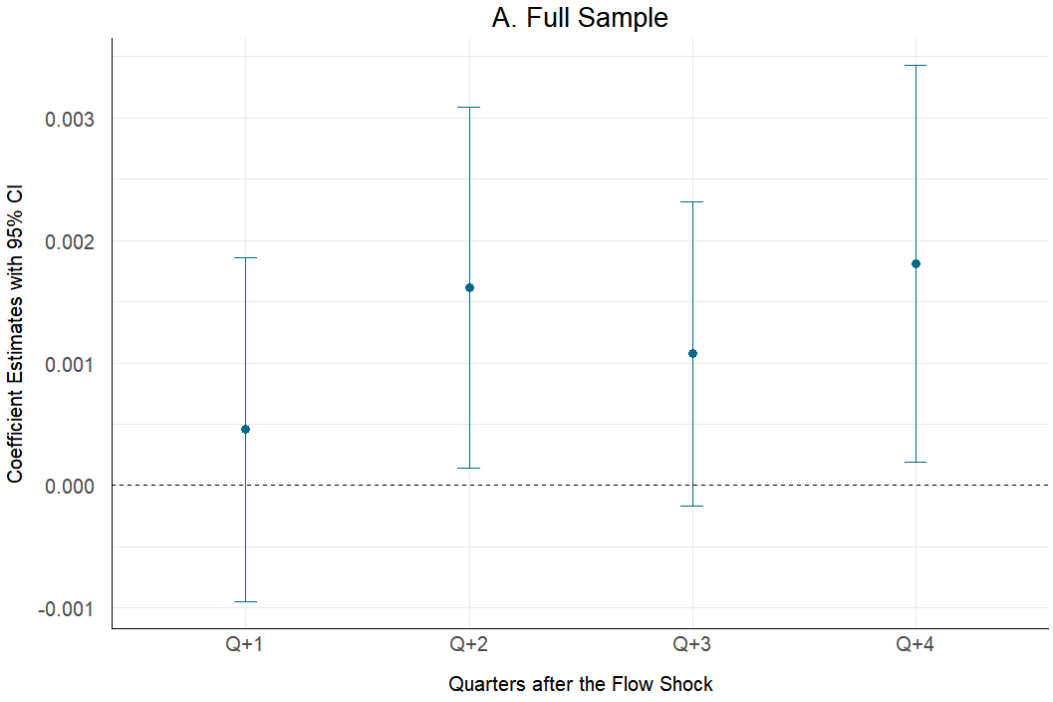


Figure 3: Effects on Corporate Investment

This figure plots the coefficient estimates of $Dual\ Loan \times Flow\ Shock$ and the corresponding 95% confidence intervals for the regression models in Table 10. We report the effect on future capital expenditures in the 1, 2, 3, and 4 quarters after the fire-sales shock driven by mutual fund outflows. Panel A reports the full sample results, and Panel B reports the results of the sample with equity financial constraint measure by Hoberg and Maksimovic (2015). Panel B divides the sample depending on whether the borrower's lagged equity financing constraint is higher than the top quartile of the distribution in the year (red line) or not (blue line).



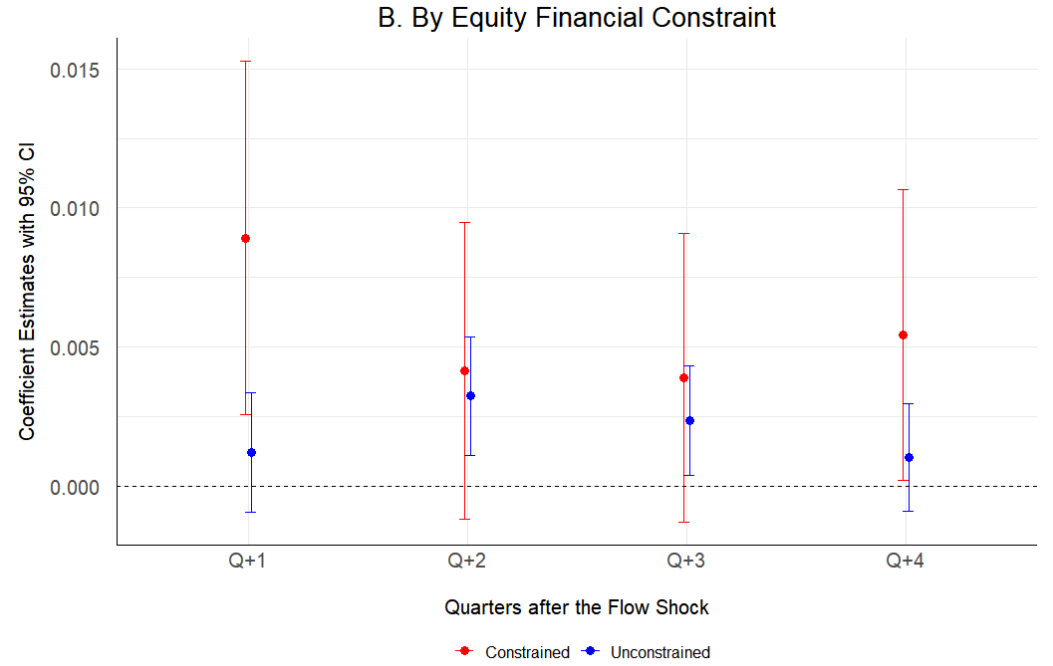


Table 1: Summary Statistics

This table reports the summary statistics for variables used in the analysis. The sample consists of 30,382 loan facilities issued for 4,682 borrowing firms. The sample period is from 1987 to 2019. All variables are defined in Table A.1. All continuous variables are winsorized at 1% and 99% levels.

	N	Mean	Std.Dev	10th Perc	Median	90th Perc
Loan Spread	30,382	2.002	1.332	0.500	1.750	3.750
Dual Hold	30,382	0.416	0.493	0.000	0.000	1.000
Flow Shock	30,382	0.098	0.298	0.000	0.000	0.000
Flow Shock (Flow-to-Volume)	30,382	0.099	0.299	0.000	0.000	0.000
MFFlow	30,382	-0.531	0.973	-1.269	-0.213	0.000
Flow-to-Volume	30,382	-0.515	0.894	-1.259	-0.217	0.000
Size	30,382	6.952	1.812	4.586	6.918	9.336
ROA	30,382	0.035	0.087	-0.046	0.044	0.115
Leverage	30,382	0.303	0.210	0.027	0.281	0.577
Tangibility	30,382	0.290	0.225	0.053	0.227	0.643
Book-to-Market	30,382	0.555	0.518	0.125	0.455	1.119
Loan Amount	30,382	18.732	1.619	16.524	18.826	20.723
Loan Maturity	30,382	3.732	0.650	2.485	4.094	4.304
Syndicate Size	30,382	1.394	0.926	0.000	1.609	2.565
Secured	30,382	0.530	0.499	0.000	1.000	1.000
Covenant Index	30,382	3.129	2.960	0.000	2.000	8.000
Performance Pricing	30,382	0.395	0.489	0.000	0.000	1.000
Dual Hold (Lead)	30,382	0.236	0.425	0.000	0.000	1.000
Dual Hold (Participant)	30,382	0.179	0.384	0.000	0.000	1.000
Dual Hold (High Share)	30,382	0.114	0.318	0.000	0.000	1.000
Dual Hold (Low Share)	30,382	0.302	0.459	0.000	0.000	1.000
Dual Hold (Long Horizon)	30,382	0.104	0.306	0.000	0.000	1.000
Dual Hold (Short Horizon)	30,382	0.311	0.463	0.000	0.000	1.000
Dual Hold (Lead, Reln)	30,382	0.152	0.359	0.000	0.000	1.000
Dual Hold (Lead, No Reln)	30,382	0.085	0.279	0.000	0.000	0.000
Target Hold	30,382	0.004	0.066	0.000	0.000	0.000
Raw Return	30,382	0.043	0.235	-0.226	0.031	0.312
DGTW-Adjusted Return	27,680	0.010	0.199	-0.215	0.007	0.239
Credit Rating	15,022	10.432	3.328	6.583	10.000	15.000
CDS Spread	4,193	0.016	0.019	0.002	0.009	0.036
Dual Shares	30,382	0.022	0.037	0.000	0.000	0.076
MFFlow pctl	30,382	0.472	0.314	0.000	0.489	0.895
Relationship	30,382	0.571	0.495	0.000	1.000	1.000

Table 2: Mutual Fund Flow Pressure and Dual Holders' Loan Pricing

This table reports the coefficient estimates from regressions of loan spreads on the indicator of dual holder presence and the indicator of fire-sales shock driven by mutual fund outflows. All variables are defined in Table A.1. t-statistics are reported in parentheses and are based on standard errors clustered at the firm and year level. ***, **, and * denote statistical significance at the 1%, 5%, and 10%, respectively.

	(1)	(2)	(3)	(4)
	Dep.var = Loan Spread			
Dual Hold × Flow Shock	-0.121**	-0.148***	-0.156***	-0.127***
	(-2.55)	(-3.01)	(-3.37)	(-2.88)
Dual Hold	-0.337***	-0.268***	-0.081***	-0.070***
	(-14.34)	(-11.58)	(-3.53)	(-3.22)
Flow Shock	0.062	0.073	0.083**	0.072*
	(1.55)	(1.68)	(2.09)	(1.90)
Size		-0.246***	-0.098***	-0.099***
		(-10.88)	(-4.14)	(-4.53)
ROA		-1.846***	-1.421***	-1.558***
		(-9.53)	(-8.00)	(-9.03)
Leverage		1.009***	0.832***	0.744***
		(10.84)	(9.58)	(9.46)
Tangibility		-0.169	-0.011	0.033
		(-1.43)	(-0.09)	(0.30)
Book-to-Market		0.333***	0.260***	0.247***
		(11.57)	(9.11)	(8.89)
Loan Amount			-0.133***	-0.171***
			(-7.89)	(-13.31)
Loan Maturity			0.071**	0.079*
			(2.60)	(1.92)
Syndicate Size			-0.181***	-0.085***
			(-7.14)	(-4.03)
Secured			0.473***	0.419***
			(15.63)	(15.37)
Covenant Index			0.022**	0.009
			(2.48)	(1.17)
Performance Pricing			-0.341***	-0.246***
			(-8.57)	(-7.53)
Observations	30,382	30,382	30,382	30,382
R^2	0.604	0.628	0.673	0.707
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Loan Type FE	No	No	No	Yes

Table 3: Different Loan Types

This table replicates Column (3) of Table 2 for subsamples of different loan types. Term Loan A includes "Term Loan" and "Term Loan A." Term Loan B includes "Term Loan B" to "Term Loan I." Revolver includes "Revolver/Line $<$ 1 Yr.", "Revolver/Line $>=$ 1 Yr.", and "Revolver/Term Loan." All variables are defined in Table A.1. t-statistics are reported in parentheses and are based on standard errors clustered at the firm and year level. ***, **, and * denote statistical significance at the 1%, 5%, and 10%, respectively.

Loan Type:	Term Loan A	Term Loan B	Revolver
	(1)	(2)	(3)
	Dep.var = Loan Spread		
Dual Hold $\times$ Flow Shock	-0.349***	-0.321**	-0.078**
	(-3.01)	(-2.59)	(-2.04)
Dual Hold	-0.046	-0.018	-0.045**
	(-1.00)	(-0.37)	(-2.14)
Flow Shock	0.152*	0.021	0.046
	(1.86)	(0.26)	(1.40)
Observations	5,396	3,001	18,148
R^2	0.796	0.782	0.740
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Table 4: Incentive Alignment Channel

This table replicates Column (4) of Table 2 by separating the indicator of dual holder presence by whether the dual holder is a lead lender of a loan or not (Column 1), whether the sum of dual holders' equity shares of the borrower is in the top quartile of the distribution or not (Column 2), and whether the dual holders' average investment horizon of the borrower is in the top quartile of the distribution or not (Column 3). All variables are defined in Table A.1. t-statistics are reported in parentheses and are based on standard errors clustered at the firm and year level. ***, **, and * denote statistical significance at the 1%, 5%, and 10%, respectively.

	(1)	(2)	(3)
	Dep.var = Loan Spread		
Dual Hold (Lead) × Flow Shock	-0.173***		
	(-3.21)		
Dual Hold (Participant) × Flow Shock	-0.077		
	(-1.40)		
Dual Hold (Lead)	-0.080***		
	(-2.87)		
Dual Hold (Participant)	-0.060***		
	(-2.79)		
Dual Hold (High Share) × Flow Shock		-0.188***	
		(-3.35)	
Dual Hold (Low Share) × Flow Shock		-0.101*	
		(-2.03)	
Dual Hold (High Share)		-0.102***	
		(-3.16)	
Dual Hold (Low Share)		-0.065***	
		(-2.94)	
Dual Hold (Long Horizon) × Flow Shock			-0.181***
			(-3.09)
Dual Hold (Short Horizon) × Flow Shock			-0.107**
			(-2.14)
Dual Hold (Long Horizon)			-0.101***
			(-3.63)
Dual Hold (Short Horizon)			-0.064***
			(-2.77)
Flow Shock	0.072*	0.072*	0.072*
	(1.92)	(1.90)	(1.91)
Observations	30,382	30,382	30,382
R^2	0.707	0.707	0.707
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Loan Type FE	Yes	Yes	Yes

Table 5: Alternative Hypothesis - The Role of Relationship Lending

This table examines the role of relationship lending in the results reported in Column (4) of Table 2. Column (1) replaces the indicator of dual holder presence with the indicator for the presence of a relationship lender as a lead lender. A relationship lender is a lender that has lead-arranged a loan for the borrower in the past five years (Bharath et al. (2011)). Column (2) separates the indicator of dual holder as a lead lender by whether the dual holder is a relationship lender or not. All variables are defined in Table A.1. t-statistics are reported in parentheses and are based on standard errors clustered at the firm and year level. ***, **, and * denote statistical significance at the 1%, 5%, and 10%, respectively.

	(1)	(2)
	Dep.var = Loan Spread	
Relationship × Flow Shock	-0.026	
	(-0.63)	
Relationship	-0.125***	
	(-6.19)	
Dual Hold (Lead, Reln) × Flow Shock		-0.135**
		(-2.71)
Dual Hold (Lead, No Reln) × Flow Shock		-0.190**
		(-2.65)
Dual Hold (Lead, Reln)		-0.101***
		(-4.00)
Dual Hold (Lead, No Reln)		0.024
		(0.81)
Flow Shock	0.038	0.052*
	(1.21)	(1.74)
Observations	30,382	30,382
R^2	0.718	0.707
Controls	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
Loan Type FE	Yes	Yes

Table 6: The Role of Equity Financial Constraint

This table replicates Column (4) of Table 2 for subsamples based on the borrower's equity financial constraint by Hoberg and Maksimovic (2015), which measures the borrower's plans to issue equity to address liquidity concerns. We report the results from the sample where the equity financial constraint measure is available. Columns (1) and (2) divide the sample depending on whether the borrower's lagged equity financing constraint is higher than the top quartile of the distribution in the year or not. Column (3) reports the results from the full sample. All variables are defined in Table A.1. *t*-statistics are reported in parentheses and are based on standard errors clustered at the firm and year level. ***, **, and * denote statistical significance at the 1%, 5%, and 10%, respectively.

Sample:	Constrained	Not Constrained	Full Sample
	(1)	(2)	(3)
	Dep.var = Loan Spread		
Dual Hold × Flow Shock	-0.399**	-0.113	-0.163**
	(-2.59)	(-1.67)	(-2.71)
Dual Hold	-0.048	-0.058*	-0.047
	(-0.59)	(-1.96)	(-1.50)
Flow Shock	0.248**	0.056	0.084
	(2.27)	(0.91)	(1.44)
Observations	4,020	11,987	16,007
R^2	0.791	0.737	0.723
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Loan Type FE	Yes	Yes	Yes
Difference in		-0.287*	
Dual Hold × Flow Shock		(1.83)	

Table 7: IV Regression

This table reports the two-stage least squares results with full specification as in column (4) of Table 2. Columns (1)-(2) report coefficient estimates from the first-stage regression of Dual Hold and Dual Hold × Flow Shock on Target Hold and Target Hold × Flow Shock, where Target Hold is the indicator of whether the target of the merger (not the acquirer) holds at least 1% of the borrower's equity shares in the last quarter before the announcement of merger and the loan origination date is within one year after the merger effective date. Column (3) reports coefficient estimates from the second-stage regression, where Dual Hold and Dual Hold × Flow Shock are instrumented by Target Hold and Target Hold × Flow Shock. All variables are defined in Table A.1. t-statistics are reported in parentheses and are based on standard errors clustered at the firm and year level. ***, **, and * denote statistical significance at the 1%, 5%, and 10%, respectively.

	First Stage	First Stage	Second Stage
	(1)	(2)	(3)
Dep. var =	Dual Hold	Dual Hold × Flow Shock	Loan Spread
Target Hold	0.196***	-0.018	
	(5.19)	(-1.34)	
Target Hold × Flow Shock	0.165**	0.527***	
	(2.39)	(15.37)	
$\widehat{Dual\ Hold} \times Flow\ Shock$			-0.450**
			(-2.33)
$\widehat{Dual\ Hold}$			-0.135
			(-0.39)
Flow Shock	0.009	0.424***	0.211**
	(0.86)	(16.31)	(2.37)
Cragg-Donald F-statistic			18.5
Observations	30,382	30,382	30,382
R^2	0.547	0.545	0.706
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Loan Type FE	Yes	Yes	Yes

Table 8: Robustness Tests for the Mutual Fund Flow Pressure

This table reports the coefficient estimates from regressions of loan spreads on the dual holder indicator and the fire-sales shock indicator with measures of firm risk. For each measure, we use the indicator of whether the borrower's risk level is higher than the top quartile of the distribution in the quarter. All variables are defined in Table A.1. t-statistics are reported in parentheses and are based on standard errors clustered at the firm and year level. ***, **, and * denote statistical significance at the 1%, 5%, and 10%, respectively.

	(1)	(2)	(3)	(4)
	Dep.var = Loan Spread			
Dual Hold × Flow Shock	-0.124***	-0.116**	-0.292***	-0.383***
	(-2.80)	(-2.56)	(-3.87)	(-2.66)
Dual Hold × Low Return	-0.024			
	(-0.76)			
Dual Hold × Low Excess Return		-0.011		
		(-0.35)		
Dual Hold × Low Credit Rating			-0.001	
			(-0.02)	
Dual Hold × High CDS				-0.009
				(-0.11)
Low Return	0.067***			
	(2.97)			
Low Excess Return		0.065***		
		(2.74)		
Low Credit Rating			0.251***	
			(5.61)	
High CDS				0.235***
				(2.90)
Dual Hold	-0.065***	-0.066***	-0.007	0.030
	(-3.08)	(-3.02)	(-0.27)	(0.67)
Flow Shock	0.066**	0.068**	0.155**	0.337**
	(1.99)	(1.98)	(2.47)	(2.56)
Observations	30,382	27,680	15,022	4,193
R^2	0.707	0.712	0.740	0.736
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Loan Type FE	Yes	Yes	Yes	Yes

Table 9: Alternative Measure of Mutual Fund Flow Pressure

This table reports the coefficient estimates from regressions of loan spreads on the indicator for the presence of dual holders and the fire-sales shock indicator defined by Flow-to-Volume measure in Wardlaw (2020). All variables are defined in Table A.1. t-statistics are reported in parentheses and are based on standard errors clustered at the firm and year level. ***, **, and * denote statistical significance at the 1%, 5%, and 10%, respectively.

	(1)	(2)	(3)	(4)
	Dep.var = Loan Spread			
Dual Hold × Flow Shock (Flow-to-Volume)	-0.129**	-0.141***	-0.139***	-0.118***
	(-2.44)	(-2.74)	(-3.07)	(-2.75)
Dual Hold	-0.336***	-0.268***	-0.082***	-0.071***
	(-14.22)	(-11.62)	(-3.56)	(-3.23)
Flow Shock (Flow-to-Volume)	0.056	0.058	0.066	0.059
	(1.33)	(1.28)	(1.65)	(1.55)
Size		-0.245***	-0.098***	-0.099***
		(-10.85)	(-4.12)	(-4.51)
ROA		-1.842***	-1.417***	-1.555***
		(-9.52)	(-8.00)	(-9.03)
Leverage		1.008***	0.832***	0.743***
		(10.85)	(9.60)	(9.47)
Tangibility		-0.172	-0.013	0.032
		(-1.45)	(-0.11)	(0.28)
Book-to-Market		0.334***	0.260***	0.247***
		(11.59)	(9.14)	(8.90)
Loan Amount			-0.133***	-0.171***
			(-7.90)	(-13.32)
Loan Maturity			0.071**	0.079*
			(2.60)	(1.92)
Syndicate Size			-0.181***	-0.085***
			(-7.13)	(-4.02)
Secured			0.473***	0.419***
			(15.62)	(15.36)
Covenant Index			0.022**	0.009
			(2.47)	(1.16)
Performance Pricing			-0.341***	-0.246***
			(-8.56)	(-7.52)
Observations	30,382	30,382	30,382	30,382
R^2	0.604	0.628	0.673	0.707
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Loan Type FE	No	No	No	Yes

Table 10: Effects on Corporate Investment

This table reports the coefficient estimates from the panel regressions of future capital expenditures in the 1, 2, 3, and 4 quarters on the exposure to the dual holder(s) and the fire-sales shock indicator. Dual Loan is the indicator variable that equals one if the firm i received a loan by dual holders in quarter t and zero otherwise. Panel A reports the full sample results. Panel B and C report the results from the sample where the equity financial constraint measure of Hoberg and Maksimovic (2015) is available. Panel B and C divide the sample depending on whether the borrower's lagged equity financing constraint is higher than the top quartile of the distribution in the year or not. t-statistics are reported in parentheses and are based on standard errors clustered at the firm and year-quarter level. ***, **, and * denote statistical significance at the 1%, 5%, and 10%, respectively.

Panel A: Full Sample				
	(1)	(2)	(3)	(4)
Dep.var=	$CAPEX_{t+1}$	$CAPEX_{t+2}$	$CAPEX_{t+3}$	$CAPEX_{t+4}$
Dual Loan × Flow Shock	0.0005	0.0016**	0.0011*	0.0018**
	(0.64)	(2.15)	(1.70)	(2.19)
Dual Loan	0.0009***	0.0006**	0.0005**	0.0002
	(3.01)	(2.49)	(2.44)	(0.94)
Flow Shock	-0.0008	-0.0018***	-0.0014***	-0.0022***
	(-1.47)	(-3.08)	(-2.75)	(-3.62)
Size	-0.0028***	-0.0027***	-0.0027***	-0.0031***
	(-6.94)	(-7.99)	(-8.49)	(-9.40)
ROA	0.0163***	0.0124***	0.0092***	0.0070***
	(7.22)	(5.74)	(3.60)	(3.18)
Leverage	-0.0110***	-0.0079***	-0.0081***	-0.0063***
	(-6.03)	(-4.76)	(-5.20)	(-4.15)
Tangibility	0.0079	0.0047	0.0027	0.0010
	(1.60)	(1.21)	(0.78)	(0.24)
Book-to-Market	-0.0035***	-0.0035***	-0.0029***	-0.0024***
	(-7.07)	(-7.84)	(-7.77)	(-5.89)
Observations	16,898	16,898	16,898	16,898
R^2	0.700	0.713	0.703	0.690
Firm FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes

Table 10 continues

Panel B: Firms with High Equity Financial Constraints				
	(1)	(2)	(3)	(4)
Dep.var=	$CAPEX_{t+1}$	$CAPEX_{t+2}$	$CAPEX_{t+3}$	$CAPEX_{t+4}$
Dual Loan × Flow Shock	0.0089***	0.0041	0.0039	0.0054**
	(2.75)	(1.52)	(1.47)	(2.04)
Dual Loan	-0.0003	0.0003	0.0004	-0.0006
	(-0.25)	(0.24)	(0.48)	(-0.73)
Flow Shock	-0.0081***	-0.0050***	-0.0037*	-0.0043**
	(-3.56)	(-2.65)	(-1.85)	(-2.60)
Observations	2,217	2,217	2,217	2,217
R^2	0.848	0.859	0.855	0.849
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes

Panel C: Firms with Low Equity Financial Constraints				
	(1)	(2)	(3)	(4)
Dep.var=	$CAPEX_{t+1}$	$CAPEX_{t+2}$	$CAPEX_{t+3}$	$CAPEX_{t+4}$
Dual Loan × Flow Shock	0.0012	0.0032***	0.0024**	0.0010
	(1.10)	(2.98)	(2.34)	(1.05)
Dual Loan	0.0009**	0.0006	0.0004	0.0005
	(2.13)	(1.26)	(1.11)	(1.17)
Flow Shock	-0.0001	-0.0024***	-0.0018**	-0.0009
	(-0.10)	(-2.82)	(-2.60)	(-1.15)
Observations	6,654	6,654	6,654	6,654
R^2	0.767	0.782	0.777	0.767
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes

Table A.1: Variable Definitions

Variable	Description
Main variables	
Loan Spread	The All-In-Drawn Spread (in percentage terms) that the borrower pays over LIBOR for each dollar drawn down.
Dual Hold	Indicator that equals one if the loan facility has at least one dual holder. A lender is a dual holder if it holds at least 1% of the borrower's equity stakes in the last quarter before the loan origination date.
MFFlow	Price pressure of a stock by mutual fund outflows, scaled by dollar value of traded share volume (Edmans et al. (2012)).
Flow-to-Volume	Price pressure of a stock by mutual fund outflows, scaled by number of traded share volume (Wardlaw (2020)).
Flow Shock	Indicator that equals one if MFFlow is in the bottom decile of the distribution in the quarter.
Flow Shock (Flow-to-Volume)	Indicator that equals one if Flow-to-Volume is in the bottom decile of the distribution in the quarter.
Firm characteristics	
Size	Log of total assets.
ROA	Net income divided by total assets.
Leverage	Total debt divided by total assets.
Tangibility	Net property, plant, and equipment divided by total assets.
Book-to-Market	Book value of equity over market value of equity.
Loan characteristics	
Loan Amount	Log of loan facility amount in dollars.
Loan Maturity	Log of loan maturity in months.
Syndicate Size	Log of the number of lenders in the syndicate of the loan facility.
Secured	Indicator that equals one if the loan facility is secured by collateral.
Covenant index	Index of covenant tightness (Bradley and Roberts (2015)).
Performance Pricing	Indicator that equals one if the loan facility contains a performance pricing provision.

Table A.1: Variable Definitions (Cont'd.)

Variable	Description
Heterogeneity in Dual Hold	
Dual Hold (Lead)	Indicator that equals one if the loan facility has at least one dual holder as a lead lender.
Dual Hold (Participant)	Indicator that equals one if Dual Hold is one but all dual holder(s) are not lead lenders.
Dual Hold (High Share)	Indicator that equals one if the sum of the dual holders' equity shares of the borrower is in the top quartile of the distribution.
Dual Hold (Low Share)	Indicator that equals one if Dual Hold is one but Dual Hold (High Share) is zero.
Dual Hold (Long Horizon)	Indicator that equals one if the average investment horizon of dual holders in the loan facility is in the top quartile of the distribution. The investment horizon is the length of time between the first quarter that a dual holder holds at least 1% of the borrower's equity and the last quarter before the loan origination date (Jiang et al. (2010)).
Dual Hold (Short Horizon)	Indicator that equals one if Dual Hold is one but Dual Hold (Long) is zero.
Dual Hold (Lead, Reln)	Indicator that equals one if the loan facility has at least one dual holder as a lead lender that has been a lead lender of the borrower's loans in the past five years.
Dual Hold (Lead, No Reln)	Indicator that equals one if Dual Hold (Lead) is one but all dual-lead lenders have not been a lead lender of the borrower's loans in the past five years.
Instrumental variable	
Target Hold	Indicator that equals one if the target of the merger (not the acquirer) holds at least 1% of the borrower's equity shares in the last quarter before the merger announcement and the loan origination date is within one year after the merger effective date.
Variables for Robustness Tests	
Raw Return	Borrower's stock return in the last quarter before loan origination.
DGTW-Adjusted Return	Borrower's DGTW-characteristic adjusted stock return in the last quarter before loan origination (Daniel et al. (1997)).
Credit Rating	Borrower's average long-term S&P credit rating in the last quarter before loan origination, increasing by one from 0 (C or below) to 20 (AAA) for each rating symbol.
CDS Spread	Borrower's average 5-year CDS spread in the last quarter before loan origination.
Dual Shares	Sum of the lenders' equity shares of the borrower in the last quarter before the loan origination date.
MFFlow pctl	Percentile rank of MFFlow in the quarter. A higher MFFlow pctl corresponds to a lower value of MFFlow.
Relationship	Indicator that equals one if the loan facility has at least one lead lender that has been a lead lender of the borrower's loans in the past five years.

Table A.2: Non-Pricing Loan Terms

This table reports the coefficient estimates from regressions of loan amount, loan maturity, existence of collateral, and covenant index on the indicator for the presence of relationship lender and the indicator of fire-sales shock. We control for other firm-level and loan-level variables as in Column (4) of Table 2. All variables are defined in Table A.1. t-statistics are reported in parentheses and are based on standard errors clustered at the firm and year level. ***, **, and * denote statistical significance at the 1%, 5%, and 10%, respectively.

	(1)	(2)	(3)	(4)
Dep.var =	Loan Amount	Loan Maturity	Secured	Covenant Index
Dual Hold × Flow Shock	0.027	-0.008	0.017	0.112
	(0.71)	(-0.40)	(0.97)	(1.12)
Dual Hold	0.043**	0.001	-0.017**	0.012
	(2.33)	(0.11)	(-2.29)	(0.23)
Flow Shock	-0.023	0.000	-0.013	-0.041
	(-0.78)	(0.02)	(-1.16)	(-0.61)
Observations	30,382	30,382	30,382	30,382
R^2	0.797	0.760	0.668	0.728
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Loan Type FE	Yes	Yes	Yes	Yes

Table A.3: Robustness Tests with Continuous Measures

This table replicates Column (4) of Table 2 with continuous measures of dual holder presence and fire-sales pressure. Column (1) replaces the indicator of dual holder presence by the sum of the lenders' equity shares of the borrower, and Column (2) replaces the fire-sales shock indicator by the percentile rank of fire-sales pressure in the quarter. Column (3) uses both continuous measures in the regression. All variables are defined in Table A.1. t-statistics are reported in parentheses and are based on standard errors clustered at the firm and year level. ***, **, and * denote statistical significance at the 1%, 5%, and 10%, respectively.

	(1)	(2)	(3)
	Dep.var = Loan Spread		
Dual Shares × Flow Shock	-1.200**		
	(-2.70)		
Dual Hold × MFFlow pctl		-0.126**	
		(-2.52)	
Dual Shares × MFFlow pctl			-1.120**
			(-2.21)
Dual Shares	-0.631***		-0.243
	(-3.26)		(-0.97)
Flow Shock	0.046		
	(1.61)		
Dual Hold		-0.015	
		(-0.40)	
MFFlow pctl		-0.035	-0.061*
		(-0.92)	(-1.90)
Observations	30,382	30,382	30,382
R^2	0.707	0.707	0.707
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Loan Type FE	Yes	Yes	Yes

Table A.4: Within Firm-Year Analyses

This table replicates Table 2 using firm × year fixed effects in the estimation of the regression model (4). The sample consists of borrowers that have multiple loan packages issued within a given year. All variables are defined in Table A.1. t-statistics are reported in parentheses and are based on standard errors clustered at the firm-year level. ***, **, and * denote statistical significance at the 1%, 5%, and 10%, respectively.

	(1)	(2)	(3)
	Dep.var = Loan Spread		
Dual Hold × Flow Shock	-0.325**	-0.289**	-0.248**
	(-2.30)	(-2.25)	(-1.96)
Dual Hold	-0.574***	-0.225***	-0.187***
	(-10.29)	(-4.03)	(-3.64)
Flow Shock	0.182*	0.165*	0.153*
	(1.82)	(1.79)	(1.79)
Loan Amount		-0.121***	-0.200***
		(-7.33)	(-12.35)
Loan Maturity		0.025	0.178***
		(0.92)	(4.57)
Syndicate Size		-0.232***	-0.106***
		(-8.00)	(-3.73)
Secured		0.212***	0.213***
		(3.24)	(3.58)
Covenant Index		0.023**	0.008
		(2.13)	(0.85)
Performance Pricing		-0.432***	-0.266***
		(-9.57)	(-6.27)
Observations	7,543	7,543	7,543
R^2	0.751	0.776	0.807
Firm × Year FE	Yes	Yes	Yes
Loan Type FE	No	No	Yes