Common Ownership and Customer Firm Financial Policies*

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Abstract

This paper investigates how customer firms' financial policies are affected by common ownership with their suppliers. Common institutional ownership enhances firms' relationships with their suppliers, increases the trade credit that customer firms obtain from suppliers, and improves inventory management efficiency. Consistent with these mechanisms, we find that (i) customer firms with higher common institutional ownership with their suppliers hold less cash as precautionary savings, (ii) that this effect is more pronounced for firms with limited access to external financing, and (iii) that firms with higher common ownership with their suppliers decrease their use of financial leverage and maintain a higher level of dividend payout. Regression analysis exploiting financial institution mergers as a quasi-natural experiment establishes the causality of the results.

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1 Introduction

Driven by the growth of asset management and consolidation in the asset-management sector, large institutional investors hold a growing proportion of corporate ownership.[1] One result of this trend has been more pronounced common ownership links in the product market. These ownership links can affect the firms' financial policies both directly and indirectly if the firms are economically linked, such as in a customer-supplier relationship. Corporate financial policies are first-order decisions. A large literature shows that firms adopt conservative financial policies to maintain financial flexibility. For example, firms may hold cash as a buffer in liquidity management, employ less financial leverage, and limit payout policy (see for example, Bates et al. (2009), Simintzi, Vig, and Volpin (2015), and Serfling (2016)). But there are opportunity costs and reduced tax benefits associated with such conservative financial policies.

In this paper, we investigate the impact of common ownership of customer-supplier firms on the *customer firm's* financial policies. We use the term *customer firm* to refer to firms who are customers in the supply chain relationship and have common institutional investors with their suppliers. There are several ways the common ownership links in the product market can affect customer firms' financial policies. First, existing evidence shows that firms in customer-supplier relationships hold additional cash as a precaution against supply chain risk and maintain lower leverage as a commitment to their supply chain partners (see for example, Itzkowitz (2013); Bae and Wang (2015)). In addition, He and Huang (2017) and Geng et al. (2017) find that common ownership promotes more possibilities for collaboration among cross-held firms. Both effects suggest, first, that a customer firm with higher common ownership with its suppliers tends to utilize more conservative financial policies. Second, the enhanced relations and cooperation between suppliers and customers by common ownership may increase their market concentration and reduce the market threat they face. Therefore, we expect that firms with higher common ownership with their suppliers hold less cash, employ more financial leverage, and maintain a higher level of dividend payout. Third, for firms in a supply chain relationship, suppliers can act as liquidity providers to customers by granting trade credits.[2] The use of trade credit constitutes

[1] As of December 2016, the largest institutional investor oversaw 6.3% of the total equity assets, and the top 10 investors managed 26.5% of these assets (Ben-David et al. (2016)).

[2] Rajan and Zingales (1993) report that accounts payable amounted to 15% of the assets for a sample of

a substantial part of firms' short-term funding and can be the substitution of bank loans (Cunat (2007)).[3] Bank loans and lines of credit can be a viable liquidity substitute for cash under some circumstances (Sufi (2009)). To the extent that common ownership enhances the opportunities for customer firms to extract liquidity from their suppliers, we predict that customer firms with higher common ownership with their suppliers would tend to reduce cash holdings and increase dividend payout. Our test results confirm this substitution effect between bank financing and trade credits (Cunat (2007)), showing that firms use less financial leverage as a result.

We construct our data sample using Compustat Segment customer data. SFAS No.14 requires firms to report all customer firms with 10% or more total sales. The customer identifiers are linked by historical CRSP and Compustat company names through a fuzzy name-matching algorithm and were verified manually in Cen et al. (2017) and Cohen et al. (2011). To proxy for common ownership, we use the measures proposed by Gilje et al. (2020) (hereafter GGL) in our analysis. The GGL measures were developed from a theoretical model and constructed to capture the impact of common institutional investors' attention on firms' managerial incentives and their influence on firms' decisions. Gilje et al. (2020) demonstrate that GGL measures can be used to predict the influence of common ownership on the target acquisitions that firms select. This evidence shows that common ownership strengthens the economic ties between firms. There are a few alternative measures used in the literature to proxy for common ownership. For example, the "modified Herfindahl-Hirschman index" (hereafter MHHI) introduced by Bresnahan and Salop (1986) and developed by O'Brien and Salop (2000), is widely used to investigate the anti-competitive effect of common ownership. The measure of MHHI was developed to investigate market concentration and competition, and is less relevant to investigations on vertical relations. The GGL measure, however, is constructed from the perspective of managers' attention, and it captures the extent to which supplier-customer relationships can be affected by common investors. The GGL measure features a variety of alternative attention functions, allowing the possibility that not all investors are attentive to managers' actions in the investor's portfolio (Gilje et al. (2020)). Throughout this paper the primary measure we use

non-financial U.S. firms on Global Vantage while debt in current liabilities accounted for just 7.4%.

[3]Trade credits account for roughly 1/4 of the total asset of a representative firm and about half of short-term debt in a sample of medium size UK firms and small US firms (Cunat (2007)).

builds on the assumption that managers have full attention: i.e., all investors contribute equally full attention to managers' incentives. We observe a negative relation between customer firms' cash holdings and the common institutional ownership, which is consistent with the view that common ownership extends the use of trade credit between suppliers and customers, improves financial cooperation, and thus reduces the customer firms' precautionary cash holdings. Our baseline results are robust to the use of GGL measures constructed using alternative attention functions.

Endogeneity concerns arise from the fact that fund managers make investment decisions based on firm characteristics. Common institutional investors of suppliers and customers may invest based on their relationship characteristics. For example, Simultin (2010) shows that firms with high cash holdings are more likely to generate a future return. Thus, institutional investors may selectively choose to hold firms with excess cash in their portfolios, and institutional ownership is positively associated with high cash holding. Since institutional ownership also suggests a higher likelihood of having common ownership, common ownership may be endogenously determined by the firm's cash holdings. Although this relation contradicts our hypothesis, it suggests that the relation between the common ownership of a customer firm with its suppliers and financial policies may be confounded by unobservable firm characteristics and supply chain pair characteristics. To address this concern, we rely on a quasi-natural experiment that produces exogenous variations on common ownership to provide a causal interpretation of our results.

We utilize a list of financial institutions' mergers to create an exogenous increment of common ownership for firms exposed to these mergers. Prior work has established a causal link between institutional cross-ownership and firms' product market performance by utilizing financial institution mergers as a natural experiment (see for example, He and Huang (2017); Lewellen and Lowry (2020)). This method relies on the assumption that financial institutions often merge for reasons unrelated to the fundamentals of their portfolio holdings (He and Huang (2017)). Lewellen and Lowry (2020) show that mergers are less likely motivated by policies or performance of the portfolio firms. Therefore, the increment of common ownership is considered to be exogenous to characteristics of firms in the portfolio. Following Lewellen and Lowry (2020), we use 59 mergers from 1986 to 2009 and estimate difference-in-differences model specifications.

Our results are consistent with the baseline analysis: that is, after the merger events, customer firms that experience an exogenous increase in common ownership due to financial institution mergers exhibit more reduction in cash holdings compared to other firms. This result is robust to excluding merges completed during the financial crisis.

Yegen (2019) expresses concern about using financial institution mergers as a quasi-natural experiment in generating an exogenous increase in common ownership. Yegen (2019) shows that 85% of treated firms stop being commonly held during the subsequent years as investors rebalance their portfolios. To address this concern, we restrict our difference-in-differences estimation window to two years. In addition to the financial institution mergers, we use the 2003 mutual funds scandal as an alternative identification strategy, as described in the Internet Appendix. The 2003 mutual funds scandal provides a plausible exogenous decrease in common ownership for firms exposed to this event because funds were forced to liquidate positions to meet large withdrawals. Taken collectively, the two identification strategies include both exogenous increase and decrease in common ownership, thus providing evidence from both directions. An exogenous increase in common ownership decreases customer firms' cash holdings, while an exogenous decrease in common ownership is associated with the increases in customer firms' cash holdings.

We further examine cross-sectional results along with heterogeneous economic conditions of firms. The set of tests sheds light on the channels through which common ownership affects the customer firms' financial policies. Existing studies find that common ownership enhances the financial cooperation of supplier-customer firms, extends the use of trade credits, and thus releases the pressure of customer firms to hold cash against financing and relation risk. If this effect is significant, we expect the impact on cash holdings to be more pronounced for firms with limited access to external financing. Indeed, we find that the negative relation between common ownership and cash holdings is stronger for financially constrained customer firms. We include three measures of financial constraints in our tests which reflect a firm's difficulty in accessing external financing. The first measure is a dummy variable whether a firm has an S&P credit rating (*creditrating*) to proxy for the firm's access to external capital. Second, following Sufi (2009), we construct a dummy variable *constrained* which equals one if a firm has no bank lines

of credit or the level of cash flow is below the median of the sample. Our third measure is the firm size. Small size customer firms are less likely to access external financing and thus need to extract liquidity from their suppliers. The *small size* dummy variable equals one if the customer firm's size is in the bottom quartile distribution of the sample.[4] Our findings confirm that common ownership enhances the supplier's role of liquidity providers to financially constrained customers. Constrained customer firms exhibit greater reduction in precautionary cash savings.

The negative impact of common ownership on customer firms' cash holdings is consistent with the mechanisms of financial cooperation between suppliers and customers, such as extended trade credit and enhanced inventory management efficiency. Trade credit serves as a substitution for customer firms' bank loans and thus reduces the need for customer firms to implement conservative financial policies. We demonstrate this mechanism by showing that common ownership with suppliers increases the customer's accounts payable and decreases the customer's accounts payables turnover. This impact is robust to the quasi-experiment analysis.

There are possible alternative explanations. The literature suggests that product market threat is associated with corporate cash holdings (Hoberg et al. (2014)). Common ownership in supply chain relations may affect firms' cash holdings by affecting product market competition. There are debates in the literature about whether common ownership in the horizontal direction imposes an anti-competitive effect for competitor firms. The impact of common ownership in the vertical direction on up-stream and down-stream competition through supply chain relations is unclear. The enhanced relations and cooperation between suppliers and customers by common ownership may increase their market concentration and reduce the market threat they face. However, common ownership can also promote product market competition by improving efficiency and innovation. To rule out the possibility that our results reflect the reduction in competition for the customer firm, we conduct additional robustness analysis by controlling for various measures of product market competition. Following existing literature, we use product market fluidity proposed by Hoberg, Phillips, and Prabhala (2014) and the Herfindahl-Hirschman Index (HHI). The negative impact of common ownership on customer firms' cash

[4] A potential concern in our sample construction is that we could only observe big customer firms. Nevertheless, the idea still applies and we observe that relatively small firms in our sample exhibit greater reduction in cash holdings. Petersen and Rajan (1997) use a sample of small businesses and provide a better demonstration for this theory.

holdings remains robust after controlling for measures of market competition in both OLS and difference-in-differences regression models. Thus, the evidence suggests that our results are not solely driven by product market competition.

We extend our analysis to consider how common ownership in supply chain relationships influences customer firms' other corporate financial policies, such as the use of financial leverage and dividend payout policy. First, we expect a decrease in financial leverage due to the substitution effect of extended trade credits on bank loans. Second, we expect an increase in dividend payout, since customer firms have a lower incentive to save precautionary cash and are more likely to pay excess cash as dividends. The empirical analysis confirms our predictions. For example, a one-standard-deviation increase in common ownership is associated with a 6.24% decrease in book leverage. We also find that the common ownership is negatively associated with customer firms' debt issuance. Similarly, the common ownership in supply chain relationships is reliably correlated with dividend policy, where a one-standard-deviation increase in common ownership is associated with a 4.83% increase in common dividend payout relative to the sample mean. In sum, our findings suggest that common ownership in supply chain relations substantially affects the customer firms' financial policies.

This study makes several contributions to the literature. First, we shed light on the debate about whether common ownership affects firms in their portfolio.[5] Recent empirical work shows that common ownership in the airline industry increases ticket prices, reduces product market competition, and thus hurts the social welfare (Azar et al. (2018)). On the other hand, Freeman (2019) suggests a bright side to common ownership by showing that in vertical supply chain relations, common ownership lengthens customer-supplier relationships, fosters cooperation between the firms, and improves efficiency. However, the identification strategies used in these studies have been challenged by other studies including Hemphill and Kahan (2019), Koch et al. (2019), and Lewellen and Lowry (2020), to name a few. Using an identification strategy suggested by Lewellen and Lowry (2020), we provide additional evidence of the impact of common ownership on product market relations, by showing how common ownership affects customer firms' financial policies. Second, we add to the debate on the role of supply chain

[5]For example, Matvos and Ostrovsky (2008) find that common owners are more likely to vote for mergers with negative acquirer announcement returns.

relations on firms' financial policies. Second, we add to the debate on the role of supply chain relations on firms' financial policies. Existing evidence shows that the operational and financial interdependencies amplify the performance correlation between supply chain partners and the transmission of risks along the chain. Previous investigations have found that firms hold additional cash specifically as a precaution against supply chain risk and that firms maintain lower leverage as a commitment to their buyers/suppliers (see for example, Itzkowitz (2013); Bae and Wang (2015)). Our study provides new evidence that common ownership allows customer firms to relax financial conservatism through extracting liquidity from their suppliers. Third, this paper contributes to the literature in trade credit, highlighting the substitution effect between trade credit and bank loans. In addition to bank loans and corporate bonds, the use of trade credit is a substantial resource for a firm's short-term funding and this practice is understudied. The impact through trade credit will further affect the firm's debt financing. This influence is substantial and distinct from the impact of product market competition. While Semov (2016) documents the impact of common ownership on industry rivals' cash holdings through competition, our study is fundamentally different from Semov's (2016) by studying firms in supply chain relationships and exploring the mechanism of trade credit.

The remainder of the paper is organized as follows. Section 2 discusses the theoretical framework and develops our hypothesis. Section 3 describes the data and summary statistics. The empirical analysis and the identification strategy are presented in Section 4. Section 5 explores the mechanism and rules out the alternative explanations. Section 6 discusses the empirical evidence on other corporate financial policies and Section 7 concludes the work.

2 Theoretical Framework and Hypothesis Development

An extensive literature examines the determinants of corporate financial policies. Bates, Kahle, and Stulz (2009) find that firms hold cash as a buffer to protect themselves against adverse cash flow shocks. In contrast, other researchers document the cost of holding cash, i.e., the opportunity cost and the free cash problem (Azar, Kagy, and Schmalz (2016), Dittmar and Mahrt-Smith (2007) and Harford, Mansi, and Maxwell (2008)). Further, firms use conservative financial policies such as less financial leverage and limited dividend payout to add operating

flexibility (Serfling (2016) and He et al. (2020)). In this paper we consider the impact of common owners on the financial policies of buyer firms in vertical relationships. There are several effects at play.

The first potential channel is through the transmission of risks along the chain. Existing evidence shows that the operational and financial interdependencies amplify the performance correlation between supply chain partners and the transmission of risks along the chain.[6] Consistent with this view, the literature indicates that firms hold additional cash specifically as a precaution against supply chain risk and that firms maintain lower leverage as a commitment to their buyers/suppliers (see for example, Itzkowitz (2013); Bae and Wang (2015)). For tightly linked supply chains through common owners, risks from one firm can rapidly result in a significant adverse impact on the other firms in the chain (see for example, the risk propagation through vertical linkage in Hertzel et al. (2008)). A customer firm with higher common ownership with its suppliers, all else equal, is expected to utilize more conservative financial policies. Second, common ownership can affect firms' opportunities and ultimately affect firms' financial policies. For example, He and Huang (2017) and Geng et al. (2017) find that common ownership promotes more possibilities for collaboration among cross-held firms. This argument leads to hoarding of cash, less borrowing, and a lower level of dividend payout for buyer firms so that they have more flexibility to take advantage of better opportunities. Both effects described above lead to the following hypothesis.

Hypothesis 1: Firms with higher common ownership with their suppliers hold more cash, employ less financial leverage and maintain less dividend payout.

Third, common ownership in supply chain relations may reduce product market competition and lower firms' incentives to save precautionary cash.[7] There is debate in the literature around whether common ownership in the horizontal direction imposes an anti-competitive effect for

[6] For example, Cohen and Frazzini (2008) show that suppliers' stock returns are positively correlated with the customers' stock returns. Hertzel et al. (2008) show that bankruptcy risks diffuse along the supplier chain in stock prices.

[7] Hoberg et al. (2014) find that product market threat increases firms' propensity to save cash.

industry rivals. Azar et al. (2018) find that in the airline industry, common ownership increases firms' market concentration, reduces competition, and hurts social welfare. In contrast, Koch et al. (2020) argue that neither the positive nor the negative impact of common ownership on competition is robust, and regulations to limit intra-industry common ownership are not currently warranted. In the vertical direction, the effect of common ownership on upstream and downstream competition through supply chain relations is unclear. The enhanced ties and cooperation between suppliers and customers by common ownership may increase their market concentration and reduce the market threat they face. Thus, we expect that:

Hypothesis 2: Firms with higher common ownership with their suppliers hold less cash, employ more financial leverage, and maintain a higher level of dividend payout.

The last potential channel is through trade credit. Conservative financial policies serve as a hedge against cash flow shocks which might otherwise result in underinvestment. For customer firms, extended use of trade credits can reduce the motive for precautionary cash holdings and release the pressure for distressed firms. Theories of trade credits suggest several reasons why suppliers act like liquidity providers to their buyers (Petersen and Rajan (1997)). The financing advantage theory suggests that suppliers are better able to monitor, acquire information from customer firms, and force repayment. Moreover, suppliers have a long-term interest in the survival of the customer firm, and thus want to protect customers' value by providing temporary short-term financing. Further, trade credits can also help to reduce transaction costs in their relationships. Institutional investors who hold diversified portfolios have incentives to maximize the value of their portfolios. Hansen and Lott (1996) suggest that Japanese *keiretsu* may negotiate new contracts between the distressed firms and their suppliers to prevent the distressed firm from halting production. While *keiretsu* is a form of conglomeration, common institutional investors may have a similar incentive to increase the portfolio value as a whole by improving information transparency, protecting distressed firms, and reducing transaction costs. All these incentives are in line with the purpose for trade credit. Thus, it is reasonable to hypothesize that common ownership enhances the financial cooperation of supplier-customer

firms, extends the use of trade credits, and therefore releases the pressure of customer firms to hold cash against financing and relation risk. Indeed, Restrepo et al. (2019) and Amberg et al. (2016) find that firms manage liquidity shortfalls by increasing the amount of drawn credit from suppliers. Freeman (2019) finds that common ownership enhances cooperation between suppliers and customers. By improving customer firms' opportunities to extract liquidity from their suppliers, common owners could reduce the buyer firms' need to reserve cash as a buffer against shortfalls in liquidity. Since trade credits constitute a substantial source of short-term finance and can be used to substitute for bank loans, we expect that common ownership is associated with a decrease in customers' cash holdings:

Hypothesis 3: Firms with higher common ownership with their suppliers hold less cash, employ less leverage, and maintain a higher level of dividend payout.

3 Sample Construction and Summary Statistics

3.1 Supply Chain Sample

We obtain the supply chain relationships from Compustat Segment customer data. SFAS No. 14 requires firms to report all customer firms with 10% or more total sales. Cen et al. (2017) and Cohen et al. (2011) link the customer identifiers by historical CRSP and Compustat company fields through a fuzzy name- matching algorithm and verify them manually. This match is obtained from WRDS Supply Chain with IDs provided by Cen et al. (2017) and Cohen et al. (2011). There are 26,187 supplier-customer pairs in the period of 1985-2013. Our sample includes 4,331 customer firms and 8,046 supplier firms. The median length of the supply chain relationship is two years. We merge the supply chain sample to the Compustat database to obtain firm-level control variables. Our final sample contains 81,998 pair-year observations from 1985-2013.

3.2 Common Ownership

We construct our primary measure for common ownership using institutional ownership, which captures the extent to which common ownership shifts managers' incentives to affect

a firm's decision to change the supply chain relation. The measure is proposed by Gilje et al. (2020) (GGL). It accounts for institutions' incentives and focuses on cross-ownership within firm-pairs. We sum up all pair-level common ownership for each customer firm with its suppliers to construct the firm-level proxy, defined as follows:

$$\mathrm{CO}_{j,t} = \Sigma_i \Sigma_k \alpha_{ik} \cdot g(\beta_{jk}) \cdot \alpha_{jk}$$

where j indexes the customer firm j, i indexes supplier i, k indexes investors, α_{ik} and α_{jk} represent the ownership of investor k in firms i and j, respectively. In fact, $\Sigma_k \alpha_{ik} \cdot g(\beta_{jk}) \cdot \alpha_{jk}$ is the pair-level common ownership defined in GGL and proxy for the common ownership between supplier i and customer j. This measure is constructed to capture the impact of common institutional investors' attention on firms' managerial incentives and their influence on firm j's decisions. $\mathrm{CO}_{j,t}$ is the customer firm j's common ownership with all its suppliers. $g(\beta_{jk})$ is the attention function, which measures the attention that investor k has in customer firm j. One feature of GGL common ownership measure is that it accounts for the possibility that institutional investors do not pay equally full attention to all firms in their portfolio. Let β_{jk} be the proportion of firm j in investor k's portfolio, which represents the amount of attention institutional investors pay to the firm. $g(\cdot)$ has several forms. Full attention assumption assumes that $g(\beta_{jk}) \equiv 1$. In this paper our primary measure is constructed with the assumption of full attention of investors. Robustness checks using alternative attention functions are shown in the Internet Appendix. Alternative measures assume linear, convex, concave, and fitted function forms of $g(\cdot)$(i.e., Gilje et al. (2020)). Linear attention assumes $g(\beta) = \beta$. Convex attention assumes $g(\beta) = \beta^2$. Concave attention assumes $g(\beta) = \sqrt{\beta}$. The fitted attention function is obtained using a non-parametric estimation using voting data.

One concern is that the impact of common ownership on a firm's cash holdings can purely be driven by the institutional ownership itself, and we want to disentangle the effect caused by common ownership and institutional ownership. We therefore add the firm's institutional ownership (IO) as a control variable in the analysis and also use the following measure:

$$\mathrm{CO\_IO}_{j,t} = \frac{\mathrm{CO}_{j,t}}{\mathrm{IO}_{j.t}}$$

This ratio highlights common ownership scaled by total institutional ownership, providing an alternative measure to assess the impact of common ownership on customer firms.

3.3 Financial Variables

The main dependent variables in the baseline analysis are the corporate financial policy variables, including cash holdings, financial leverage, and dividend payout. *Cash holdings* is defined as the ratio of cash and short-term investments to total assets. In terms of the control variables in cash holdings analysis, we follow Bates, Kahle, and Stulz (2009) and include the standard set of determinants of cash holdings. Our primary measures of leverage include book leverage and debt issuance. Following Rajan and Zingales (1996) and Frank and Goyal (2009), we include a standard set of control variables in the capital structure analysis, such as size, asset tangibility, profitability, cash flow, market to book, and industry cash flow volatility. To measure a firm's dividend payout, we use common dividends and total dividends, both scaled by total assets. We also control a set of relationship variables in the model specifications. Following Freeman (2019) and Schiller (2018), we control for age of the relation, sale percentage of customer firms (%sale customer, equals sales generated by a particular pair divided by the customer's cost of goods sold), relative firm size (customer size / supplier size), customer age and supplier age. In addition, we include the number of suppliers that a customer has (Nsupp), number of customers that a supplier has (Ncust), sale percentage of supplier firms (%sale supplier, equals sales generated by a particular pair divided by the supplier's net sales) as controls to proxy for market concentration and bargaining power for both parties.

3.4 Summary Statistics

[Insert Table 1]

Table 1 reports the summary statistics of our sample. The mean and median cash holdings are 10% and 6%, respectively. The ratios are lower than those reported in Bates, Kahle, and Stulz (2009), since customers have suppliers as liquidity providers and tend to hold less cash than average firms. The average book leverage is 0.253, and the average market leverage is 0.276. The unit of common ownership (CO, assuming full attention) is $\%^2$ in the GGL dataset,

which we scale by 10^4 for reporting purposes. Other GGL measures are scaled by 10^5. The mean and standard deviation of CO (assuming full attention) are 0.037 and 0.067, respectively, with the 10th percentile of the distribution at 0 and the 90th percentile at 0.12. The CO_IO ratio takes a mean of 0.105 and a standard deviation of 0.189. The average number of suppliers that a customer has is around 20, and the average number of customers that a supplier has is 3.2. Customers are, in general, larger than suppliers. Customer firms' average age is 31.4 years, while the average age of suppliers is 14. The average ratio of sales generated by a pair to the customer's cost of goods sold (sale percentage of customers) is 0.02 while the average sales percentage of the supplier's is 0.195.

4 Empirical Results

4.1 OLS Estimation: Baseline Results

In this section, we estimate the empirical relation between the common ownership of a customer firm with its suppliers and the customer's cash holdings, controlling for the observable firm characteristics. Specifically, we estimate the following ordinary least squares (OLS) specification:

$$\mathrm{Y}_{j,t} = \alpha + \beta \cdot \text{CO measures}_{j,t-1} + \gamma \cdot \mathrm{PX}_{i,j,t} + \rho_j \cdot \mathrm{X}_{j,t} + \gamma_{i,j} + \theta_t + \epsilon_{i,j,t} \tag{1}$$

where i indexes supplier firms and j indexes customer firms; $\mathrm{Y}_{j,t}$ are the cash-to-assets ratio (Cash) of firm j in year t; CO measures$_{j,t-1}$ include $\mathrm{CO}_{j,t-1}$, $\log(1+\mathrm{CO}_{j,t-1})$, and $\mathrm{CO\_IO}_{j,t-1}$, where $\mathrm{CO}_{j,t-1}$ is the firm level GGL measure for common ownership of firm i with its supplier in year t-1; X is a vector of customer firm-level determinants of cash holdings identified by existing literature; and vector PX is the set of pair-level control variables commonly included in the literature. We include year fixed effects and pair fixed effects to strip out unobservable differences across relations. Standard errors are clustered at the relationship level in all regressions.

[Insert Table 2]

The estimation results are reported in Table 2. The control variables enter with expected signs. The coefficient estimates of common ownership are negative and significant for specifications in columns (1), (3) and (5), suggesting that higher common ownership of a customer with

its suppliers is associated with lower cash holdings. The results are robust to using *changes in CO* as the independent variable in the model. The economic magnitude is sizeable. For example, a one-standard-deviation increase in *CO* is associated with a decrease of 0.64% in the cash ratio (column 1), a 6.4% reduction relative to the sample mean.

We then use changes in cash holdings as the dependent variable in the model following Bates et al. (2009) and present the results in columns (2), (4) and (6). Overall, the baseline regressions suggest that common owners could reduce the buyer firms' need to reserve cash as a buffer against shortfalls in liquidity by enhancing customer firms' opportunities to extract liquidity from their suppliers.

In Table A1 of the Internet Appendix, we verify that the findings are robust to alternative measures of common ownership, which are constructed following Gilje et al. (2020) and assume linear, convex, concave, and fitted function forms of attention function, respectively. We find a consistent negative relation between the common ownership of a customer with its suppliers and the customer firm's cash holdings. For example, a one-standard-deviation increase in *CO* (assuming linear, convex, concave, fitted attention function) predicts about 5.38%, 4.24%, 7.3%, and 6.6% reduction of cash holdings relative to the sample mean.[8]

In Table A4 of the Internet Appendix, we show additional robustness estimation using customer firm fixed effects. Panel A reports the estimation results similar to Table 2, but with customer fixed effects for all columns. The coefficients estimated for CO, log(1+CO), and CO_fitted are significant and negative. Control variables are identical to those used in Table 2. Standard errors are clustered at customer firm level. Panel B reports the estimation results on a sample of customer firms after aggregating the pair sample. Control variables include all the firm controls, and customer firm fixed effects are included. Standard errors are clustered at firm level. The coefficients estimated are significant and robust across all specifications. The results suggest that the negative association between CO and cash holding is neither driven by pair fixed effect nor the large pair-level sample. In the rest of the paper, we stick to pair sample because it allows us to include the pair-level control variables, which are crucial since they proxy for the relations between the supply-chain pairs.

[8]The baseline result is robust to using pair level common ownership measures.

4.2 Identification Strategy

A concern with our analysis is the potential endogeneity of common ownership. A customer firm's cash holdings are not independent of its institutional ownership. For example, Simultin (2010) finds a positive relation between corporate excess cash holdings and future stock returns. The institutional shareholders may tend to invest in firms with excess cash holdings since excess cash holdings proxy for growth options. Thus, the relation between the common ownership of a customer firm with its suppliers and its financial policies may be confounded by unobservable firm characteristics. To reinforce the causal interpretation of our results, we exploit a difference-in-differences identification approach using a list of financial institution mergers as a quasi-natural experiment. Mergers among financial institutions provide an excellent laboratory for shocks to the cross-ownership status of a firm and are exogenous to the firm's corporate policies. Previous research has established a causal link between institutional cross-ownership and firms' product market performance by utilizing financial institution mergers as a natural experiment (see for example, He and Huang (2017); Lewellen and Lowry (2020)).

We obtain the sample of financial institution mergers from Lewellen and Lowry (2020), who summarize four types of events to identify exogenous changes in common ownership in the literature: a list of mergers between financial institutions, the Blackrock/BGI merger, additions to the S&P 500, and reconstitutions of Russell 1000/2000 indices. They argue that the list of mergers offers many advantages as a source of identification and are less sensitive to issues such as the effects associated with financial crisis. The broad list of mergers is shown to be a potentially viable method among the identifications known to the literature. The customer firm is likely to experience an increase in its common ownership status when both the buyer firm and its supplier were block-held by the merging institutions prior to the event. Following Lewellen and Lowry (2020), we utilize 59 mergers for the period of 1986-2009.

We identify treated supplier-customer pairs as follows: in a merger between institution A and B, the supplier is held by institution A and is not held by institution B, and the customer is held by institution B and is not held by institution A. Control groups are the pairs in our sample that are unaffected by the treatment. The merger of A and B creates an exogenous

increment of common ownership between the supplier and the customer.[9] We estimate the following difference-in-differences model specification:

$$\mathrm{Y}_{j,t} = \alpha + \beta_1 \cdot \mathrm{Treat} \cdot \mathrm{Post} + \beta_2 \cdot \mathrm{Post} + \beta_3 \cdot \mathrm{Treat} + \psi \cdot \mathrm{X}_{j,t} + \delta \cdot \mathrm{PX}_{i,j,t} + \theta_t + \gamma_{i,j} + \epsilon_{i,j,t} \quad (2)$$

where i indexes supplier firms and j indexes customer firms. *Treat* is a dummy variable that takes the value of one if the pair of firms in the supply chain is exposed to any mergers of their institutional shareholders during the year. *Post* is an indicator variable which takes the value of one for the post-merger period and zero for the pre-merger period. We aggregate events that happen in the same year as one treatment and identify the treated supplier-customer pairs for each treatment. We include the same set of controls as in Table 2, year and pair fixed effects across all specifications. We define the dummy variable *Post* as follows:

$$\mathrm{post} = \begin{cases} 1 & \text{if year t is 1 or 2 years later than treat year} \\ 0 & \text{if year t is 1 or 2 years before the treat year} \\ . & \text{otherwise} \end{cases}$$

Before estimating the relation between financial institution mergers and the post-merger outcomes of firms, we check whether our outcome variables exhibit "parallel trends" , which is a critical assumption to ensure the internal validity of the difference-in-differences model. First, we compare trends of changes in customer firms' cash holdings for the period of 1 to 3 years before the treatment (i.e., the merger completion) and present the estimation results in Panel A of Table A2 in the Internet Appendix. We find that treatment samples and control samples exhibit a similar trend in outcome variables in the pre-merger period. Second we perform a placebo test by defining year t-2 or t-1 as the "pseudo-event" year and then estimate the difference-in-differences model as equation (2). The results of the analysis are reported in Panel B of Table A2 in the Internet Appendix. We find that the coefficients of the interaction terms are insignificant in the placebo test, suggesting that the parallel trends assumption is likely to

[9] We also use a different method to identify treated pairs. A pair is marked as "treated" if the customer is already commonly held by the two institutional investors, and the supplier is exposed to the merger. The reason of doing this is to rule out the possibility that the reduction of cash holding is purely driven by the increased institutional ownership since there is no significant increase of institutional ownership for customer firms in this method. Out test results are robust for both methods.

hold.

Table 3 shows the results of the estimation using equation (2). Columns (1)-(2) report the estimates using mergers for the period of 1986-2009. Across all specifications, the coefficient estimate on the interaction term is negative and significant at the conventional level. Column (1) reports that firms exposed to the merger events exhibit a 11% reduction in cash holdings relative to the sample mean. One potential concern in using mergers in this period is that the mergers during the 2008 financial crisis may drive most of the results. Therefore, in columns (3) - (4) we repeat the difference-in-differences tests restricted to mergers completed for the period of 1986 to 2006 to exclude the influence of the financial crisis. Using the restricted sample, we find that post the event, treated firms exhibit a 12% decrease in cash holdings relative to control firms (column 3). The exogenous increase in common ownership generated by the mergers explains a significant decrease for treated customer firms' cash holdings.

[Insert Table 3]

Overall, our findings suggest that treated firms, those experience an increase in common ownership due to financial institution mergers exhibit a reduction in cash holdings.

Yegen (2019) argues that institutional investors will rebalance their portfolio after the merger event. A majority of treated firms will stop being commonly held during the subsequent three years. This finding in Yegen (2019) undermines the validity of using financial mergers as an identification strategy. We address this issue by using the two-year window (shorter than three years after the merger). To further alleviate this concern, we conduct additional analysis by exploiting the 2003 mutual fund scandal. Mutual funds exposed to the scandal were forced to liquidate positions to meet the large withdrawals caused by the scandal; thus the 2003 mutual fund scandal creates a plausible exogenous decrease in common ownership. We expect an increase in the level of cash holdings following a decrease in common ownership, i.e. a positive coefficient of the interaction term. The advantage of using the mutual fund scandal is that it has an external change in a different direction (i.e., decrease in common ownership) compared to financial institution mergers and thus produces positive coefficients on interaction terms. The estimation results are reported in Table A3 in the Internet Appendix. This result reinforces

our conjecture that an exogenous increase in a firm's cross-ownership leads to a decrease in its precautionary cash holdings.

4.3 Heterogeneous Effects

In this section, we investigate the heterogeneous impact of common ownership on firms across different economic conditions. Cunat (2007) shows that trade credit is a substitution for external financing. Petersen and Rajan (1997) argue that businesses without access to bank financing rely more on trade credits. Financially constrained firms face higher friction on the capital market and more difficulty in raising external capital and thus, all else equal, tend to hold more precautionary cash. Common owners allow customer firms to extract liquidity from their suppliers;, therefore, the common ownership is more valuable in reducing the need for buyer firms to reserve cash when customer firms are financially constrained. We use three measures to capture the financial constraint that the firm is facing. The first measure is the absence of an S&P credit rating, following Faulkender and Petersen (2006), to proxy for the firm's access to external capital. The dummy variable *creditrating* equals 1 if a firm does not have a credit rating. Our second measure is defined following Sufi (2009), who provides a measure to capture whether a firm has access to bank lines of credit. We therefore define the second dummy *constrained* to be one if the firm has no bank lines of credit and the cash flow is below medium. The third dummy, *small dummy* equals one if the firm size is below the 25th percentile distribution of the sample. A small firm is more likely to face higher capital market friction thus has more difficulties in external financing. The test results are reported in Table 4.

[Insert Table 4]

As expected, financial constraints have a significant and negative impact on the relation between common ownership and the cash policies of customers. The estimated negative link between common ownership and cash holdings is more pronounced for firms that are financially constrained.

The estimation results of the heterogeneous tests in this section are consistent with the prediction that suppliers provide liquidity to customers and allow customers to pay even af-

ter the agreed repayment date of the trade credit contract, especially when customer firms are financially constrained (Cunat (2007), Petersen and Rajan (1997)). Common institutional ownership improves supplier-customer cooperation and enhances this economic tie. Customer firms with higher common ownership with suppliers are able to obtain extended trade credits and decrease the payable turnover. Hence the pressure on customer firms to hold precautionary cash is relaxed, and this is reflected in the decrease of cash holdings for the customer firms with an increase in common ownership.

4.4 Mechanism: Trade Credit and Financial Cooperation

The negative impact of common ownership on cash holdings is consistent with the hypothesis that common ownership enhances the financial cooperation between customers and suppliers, such as the increased use of trade credit. In this section, we confirm this mechanism using two variables, customers' accounts payable and payable turnover, to provide direct evidence on the use of trade credit. Dependent variables are accounts payable scaled by total asset and accounts payable turnover, respectively. Results by estimating the OLS model are presented in Table 5. Across all model specifications, we find that, with a greater level of common ownership, customers have more accounts payables on their balance sheets and lower turnover. A one-standard-deviation increase in CO predicts about a 1.51% increase in accounts payable scaled by total assets (column (1)) and a 2.92% decrease in payable turnover (column (3)).

[Insert Tables 5]

Table 6 presents the results by estimating the difference-in-differences model. The model specifications are identical to those in Table 5, and the coefficient estimate on the interaction term is negative and significant at the conventional level. The analysis uses mergers for the period of 1986-2006 to exclude the mergers overlapping with financial crisis years. Post the merger event, treated firms exhibit a 5.64% increase in accounts payable and a 6.79% decrease in payable turnover compared to control firms.

[Insert Table 6]

5 Alternative Explanations

So far, we have shown a negative relation between common ownership and customers' financial conservatism. In this section, we evaluate the robustness of our findings. While our results are consistent with a view that common ownership enhances supplier-customer cooperation, there are several possible alternative explanations. First, omitted variables could drive the customer's financial policy and be correlated with its common ownership status. For example, common ownership can affect firms' opportunities and ultimately affect their financial policy. It is also possible that cross-ownership intensifies the transmission of risks along the chain, resulting in a significant adverse impact on the customer firms. However, these effects favor a positive relationship between common ownership and cash holdings and are unlikely to explain the observed negative relation.

Another possible explanation for our results is that common ownership in the supply chain relation reduces the product market competition and reduces the need for the buyer firms to reserve cash. There is debate over whether common ownership reduces the competition between industry rivals. Azar et al. (2018) find that common ownership raises ticket prices in the airline industry, reduces competition, and hurts social welfare. However, Dennis et al. (2019) suggest that the evidence supporting the anti-competitive effect is not driven by common ownership but by an endogenous market share component. Kini et al. (2019) argue that common ownership has a pro-competitive effect for industries with potential investment spillovers. In contrast, Koch et al. (2020) conclude that neither the positive nor the negative impact of common ownership on competition is robust, and regulations to limit intra-industry common ownership are not currently warranted.

Despite the controversy over product market competition, research on the impact of common ownership in vertical supply chain relations and how it alters the competition through this vertical direction is, however, scarce.[10] Industry competition can be affected through changes in the upstream or downstream along the supply chain. On the one hand, the enhanced supplier-customer relationship may increase firms' market concentration and reduce the market threat

[10]Semov (2017) documents that common ownership decreases the competitive threat that a firm faces and firms thus maintain lower financial flexibility. However, his study is silent on the effect of competition along the supply chain relationship on corporate financial policy.

they face. Moreover, a decrease in competition tends to lower a firm's need to reserve cash (Hoberg, et al. (2014)). On the other hand, supplier and customer firms can enhance their financial cooperation through common ownership, by improving efficiency and innovation diffusion, thus promoting competition for both upstream and downstream industries.

To rule out the possibility that our estimates reflect the decreased product market competition through cross-ownership in the supply chain, we control two measures for product market competition in the model specifications, including product market fluidity developed by Hoberg et al. (2014) and the Herfindahl-Hirschman Index (HHI).

[Insert Tables 7]

Panel A in Table 7 summarizes the results estimating the impact of common ownership on cash holdings using the OLS model. The coefficient estimate on *market fluidity* is positive while the coefficient estimate on *HHI* is negative, suggesting that product market competition is positively related to cash holdings. Notably, the relation between common ownership and cash holdings remains robust across all model specifications. Panel B in Table 7 presents the estimation results of the difference-in-differences model using mergers for the period of 1986-2006 as a quasi-natural experiment. Coefficient estimates on the interaction term between *treat* and *post* are negative and significant at the conventional level while we control for the measures for product market competition. In sum, our findings suggest that the observed negative relation between common ownership in the supply chain relation and observed financial conservatism is not driven by product market competition.

6 Financial Decisions and Dividend Policies

We extend our analysis to consider how common ownership influences customer firms' other corporate financial policies, such as the use of debt and dividend payout. We expect an impact of common ownership on a firm's financial leverage, debt issuance, and dividend payout for two reasons. First, the use of trade credit serves as a substitution for bank loans, and the extended use of trade credit due to common ownership will decrease the firm's financial leverage. Second, common ownership with their suppliers enhances firms' relationships and financial cooperation,

as reflected in a relaxed pressure on precautionary cash holdings. To the extent that common ownership enhances customer firms' opportunities to extract liquidity from their suppliers, we predict that, all else equal, firms with higher common ownership with their suppliers tend to maintain a higher level of dividend payout. Table 8 presents the estimation results on financial

leverage. In addition to the standard set of firm-level determinants of financial leverage, we further control for institutional ownership (IO) in the model following Bathala et. al (1994). The coefficient estimate of common ownership is negative and statistically significant in column (1), indicating that customer firms that have a higher level of common ownership with their suppliers tend to use less financial leverage. For instance, a one-standard-deviation increase in common ownership translates to a decrease of 6.24% in book leverage (column (1)). We further investigate the impact of common ownership on firms' debt issuance in columns (3) and (4), including debt issuance (long term debt issuance over assets) and the logarithm of debt issuance. Extended use of trade credit substitutes for customer firms' debt financing; hence, we expect the common ownership to be negatively associated with customer firms' debt issuance. As expected, the coefficient estimates in columns (3) and (4) are negative and statistically significant, suggesting that customer firms that have a higher level of common ownership with their suppliers rely less on debt financing.

[Insert Tables 8]

We next consider how common ownership affects the customer firms' dividend policy. Following He et al. (2020), we measure a firm's dividend payout policy using both common dividends and total dividends. Table 9 summarizes our results by estimating the OLS model. Consistent with our prediction, there is a robust and positive relation between common ownership and dividend payout. For instance, the coefficient of common ownership in column (1) indicates that a one-standard-deviation increase in common ownership is associated with a 4.83% increase in common dividends relative to the sample mean. Our results are robust to all four measures of dividends. In sum, we find that the common ownership of a customer with its suppliers is an important determinant of its corporate financial policies including precautionary cash holdings, the use of debt, and dividend payout.

[Insert Tables 9]

7 Conclusion

This paper provides robust evidence that cross ownership in the supply chain relation reduces customer firms' precautionary cash holdings. Building on a growing literature that suggests that common institutional ownership enhances the financial cooperation between customers and suppliers, we hypothesized that, all else equal, customers with a higher level of common ownership with suppliers tend to hold less cash. We proposed that common ownership with suppliers increases the use trade credits, which constitute a substantial part of customer firms' short-term financing and substitutes for bank loans in liquidity management. Consistent with this hypothesis, the OLS regression estimation reveals that customers' cash holdings are negatively associated with the level of common ownership or the changes in common ownership. We extend our analysis of financial policies to consider how common ownership influences customer firms' use of debt and dividend payout. Our findings suggest that firms with higher common ownership with their suppliers tend to use fewer bank loans and maintain a higher level of dividend payout.

To reinforce the causal interpretation of our results, we incorporate an identification strategy that utilizes financial institution mergers as a quasi-natural experiment. Mergers among financial institutions impart exogenous shocks to the cross-ownership status of a firm and are exogenous to the firm's corporate policies. Our evidence suggests that treatment firms, those that experience an increase in common ownership due to financial institution mergers, exhibit a greater reduction in cash holdings compared to the control groups.

Consistent with the literature on trade credits, we find that the negative impact of common ownership on customer firms' cash holding is more pronounced for distressed firms, i.e., those that have limited access to external financing. Firms facing capital market frictions are more likely to extract liquidity from suppliers; thus, the reduction of precautionary cash holdings is more pronounced than that for less constrained firms. We show that our findings are not driven

by changes through product market competition.

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Appendix A: Variable Definitions

Panel A: Relationship characteristics	
Variable	Description
CO	The aggregated common ownership of a customer with its suppliers. Common ownership is calculated using the GGL common ownership measure assuming full attention: $$\mathrm{CO}_{j,t} = \Sigma_i \Sigma_k \alpha_{ik} \cdot g(\beta_{jk}) \cdot \alpha_{jk}$$ where j indexes the customer firm j, i indexes supplier i, k indexes investors, α_{ik}, α_{jk} represent the ownership of investor k in supplier/customer firms, respectively. $g(\beta_{jk})$ is the attention of investor k in customer j, and the full attention measure assumes $g(\beta_{jk}) \equiv 1$. β_{jk} is the proportion of firm j in investor k's portfolio.
CO_linear, convex, concave, fitted	Alternative GGL common ownership measures by using different forms of $g(\beta_{jk})$.
CO_IO	The ratio of CO and total institutional ownership IO year t-1.
Nsupp	Number of suppliers that a customer has.
Ncust	Number of customers that a supplier has
%_Sale customer	Salecs (sales generated by a particular pair) divided by COGS (cost of good sold) of a customer.
%_Sale supplier	Salecs (sales generated by a particular pair) divided by total sale of a supplier.
Relative size	The ratio of customer size to supplier size.
Customer age	Ages of customer firms.
Supplier age	Ages of supplier firms.
Relation age	Ages of the supplier-customer relations.
Relation length	Length of supplier-customer relations.

Panel B: Dependent variables	
Cash	The ratio of cash and short-term investments (che) to total assets (at).
Δ*Cash*	Cash holding at year t minus cash holding at year t-1.
Accounts payable	Accounts payable (ap) scaled by total assets (at).
Accounts payable turnover	Net sales (sale) divided by average accounts payables of year t and year t-1.
Leverage	Total debt (dltt+dlc) scaled by total assets (at).
Debt Issue	Long term debt issuance (dltis) scaled by total assets (at).
Common dividends/Asset	Common dividends (dvc) scaled by total assets (at).
Total dividends/Asset	Total dividends (dvc+dvp) scaled by total assets (at).

Panel C: Firm characteristics	
Variable	Description
Lag Δ*cash*	One year lagged changes in cash holdings.
Lag cash	One year lagged cash holdings.
Leverage	Long-term debt (dltt) plus debt in current liabilities (dlc), scaled by total assets (at).
Leverage	Total debt (dltt+dlc) scaled by total assets (at).
Cash Flow	Earnings after interest, dividends, and tax but before depreciation (oibdp-xint-txt-dvc), scaled by total assets (at).
Net working capital	Working capital (wcap) minus cash (che), scaled by total assets (at).
Capital expenditures	The ratio of capital expenditures (capx) to total assets (at).
Market to book	Book value of assets (at) plus the market value of common equity (prcc_f $\times$ csho) minus the book value of common equity (ceq), scaled by the book value of assets (at).
Acquisitions	The ratio of acquisitions (aqc) to total assets (at).
Size	The logarithm of the book value of assets (at) in 1999 dollars.
Ind. CF volatility	We calculate for each firm-year the standard deviation of (firm-level) cash flow to assets for the previous five years. Industry cash flow volatility (Ind. CF volatility) is then calculated as the average of the firm-level cash flow standard deviations for each industry, classified by two-digit SIC codes.
R&D expenditures	The ratio of R&D expenses (xrd) to net sales (sale); it is equal to zero when R&D expenses (xrd) are missing.
Dividend dummy	A dummy variable which takes the value of one in years in which a firm pays common dividends (dvc), and zero otherwise.
IO	Customer firms' total institutional ownership.
Tangibility	The ratio of the net value of property, plant, and equipment (ppent) to total assets (at).
Creditrating	A dummy variable which takes the value of one in years in which a firm does not have corporate a bond rating, and zero otherwise.
Constrained	A dummy variable which takes the value of one if the firm does not have a line of credit or cash flow is below medium (Sufi (2007)).
Small firm	A dummy variable that equals one if the customer firm size is in the bottom quartile distribution of the sample, and zero otherwise.
HHI	The Herfindahl-Hirschman Index, which assesses the static competition levels within each Fama and French 48 industry.
Market fluidity	A measure for product market competitive threat, which assesses the degree of competitive threat and product market change surrounding a firm, based on Hoberg, Phillips, and Prabhala (2014).
Profitability	Operating income before depreciation (oibdp) scaled by total assets (at).

Table 1. Descriptive statistics of main variables

This table reports summary statistics for relation characteristics in Panel A, dependent variables in Panel B, and firm characteristics in Panel C. The definitions of all variables are provided in the Appendix A.

	Obs.	Mean	Std.Dev.	P10	P50	P90
Panel A: Relation characteristics						
CO ($\times 10^{-4}$)	81,998	373.2	669	0	73.47	1,184
CO_concave ($\times 10^{-5}$)	81,998	2,868	5,461	0	335.9	9,629
CO_fitted ($\times 10^{-5}$)	81,998	1,939	3,629	0	307.0	6,011
CO_convex ($\times 10^{-5}$)	81,998	10.46	47.63	0	0.088	17.46
CO_linear ($\times 10^{-5}$)	81,998	299.7	630.1	0	18.35	1,101
Nsupp	81,998	20.24	30.97	1	7	56
Ncust	81,998	3.241	3.561	1	2	6
%_Sale customer	41,876	0.021	0.074	0	0.002	0.038
%_Sale supplier	44,546	0.195	0.188	0.034	0.138	0.414
Supplier size	81,278	5.069	2.289	2.095	5.014	8.117
Customer age	77,207	31.39	17.02	8	33	54
Supplier age	81,339	14.36	12.37	3	10	33
CO_IO	41,525	0.105	0.189	0	0.0276	0.312

	Obs.	Mean	Std.Dev.	P10	P50	P90
Panel B: Dependent variables						
Cash	76,510	0.10	0.115	0.008	0.060	0.248
ΔCash	75,837	-0.000	0.048	-0.047	0	0.046
Accounts payable turnover	74,766	8.825	5.425	3.359	8.022	14.62
Accounts payable	76,059	0.124	0.117	0.028	0.088	0.238
Debt issue	73,511	0.0684	0.113	0	0.0353	0.158
Common dividends/Assets	76,032	0.018	0.037	0	0.012	0.039
Total dividends/Assets	76,032	0.018	0.038	0	0.012	0.04
Leverage	76,561	0.253	0.156	0.0570	0.242	0.461

	Obs.	Mean	Std.Dev.	P10	P50	P90
Panel C: Firm characteristics						
Net working capital	67,986	0.033	0.130	-0.098	0.009	0.216
Capital expenditures	75,327	0.065	0.046	0.014	0.057	0.124
Leverage	76,561	0.253	0.156	0.0570	0.242	0.461
Acquisition	67,152	0.016	0.039	0	0	0.045
Market to book	72,911	1.777	1.065	1.000	1.407	2.981
Size	76,561	9.521	2.039	6.754	9.781	12.01
R&D expenditures	76,426	0.035	0.057	0	0.004	0.117
Dividend dummy	76,561	0.760	0.427	0	1	1
Ind. CF volatility	76,561	0.785	1.579	0.029	0.153	2.038
Creditrating	74,139	0.178	0.383	0	0	1
Constrained	13,734	0.543	0.498	0	1	1
Market fluidity	36,276	6.882	3.570	2.779	6.235	12.05
HHI	71,044	0.077	0.077	0.023	0.053	0.167
IO	41,525	0.593	0.219	0.309	0.592	0.872
Tangibility	76,260	0.332	0.224	0.0616	0.290	0.658
Profitability	75,844	0.135	0.0786	0.0544	0.134	0.230

Table 2. Common ownership and cash holdings: OLS estimation

This table reports the OLS regression estimates on the relation between the common ownership of a customer with its suppliers and the firm's cash holdings. We estimate the following specification:

$$\mathrm{Y}_{j,t} = \alpha + \beta \cdot \mathrm{CO}_{j,t-1} + \gamma \cdot \mathrm{PX}_{i,j,t} + \rho \cdot \mathrm{X}_{j,t} + \gamma_{i,j} + \theta_t + \epsilon_{i,j,t}$$

where $\mathrm{CO}_{j,t-1}$ is our measure for common ownership of firm j with its suppliers in year t-1. We also use alternative measures such as $\log(1 + CO_{j,t-1})$, and $CO\_IO_{j,t-1}$ which is defined as $CO_{j,t-1}/IO_{j,t-1}$; vector PX is the set of pair-level control variables commonly included in the literature; and $\gamma_{i,j}$ and θ_t are a full set of pair and year fixed effects. $\mathrm{Y}_{j,t}$ is cash holdings for columns (1), (3) and (5) and changes in cash holdings for columns (2), (4) and (6). The definitions of all variables are provided in the Appendix A. Standard errors are clustered at the pair level. T-statistics are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1) Cash	(2) Δ Cash	(3) Cash	(4) Δ Cash	(5) Cash	(6) Δ Cash
CO	-0.095***	-0.086***				
	(-3.900)	(-3.985)				
log(1+CO)			-0.107***	-0.097***		
			(-3.718)	(-3.797)		
CO_IO					-0.020**	-0.017**
					(-2.341)	(-2.267)
IO	0.011	0.007	0.011	0.007	0.005	0.001
	(1.251)	(0.899)	(1.263)	(0.913)	(0.448)	(0.126)
%Sale customer	0.039	0.029	0.039	0.029	0.041	0.031
	(0.808)	(0.725)	(0.811)	(0.729)	(0.839)	(0.762)
%Sale supplier	-0.001	-0.000	-0.001	-0.000	-0.002	-0.001
	(-0.261)	(-0.072)	(-0.269)	(-0.080)	(-0.339)	(-0.154)
Customer age	0.038***	0.036***	0.038***	0.036***	0.037***	0.036***
	(9.168)	(9.975)	(9.272)	(10.085)	(8.923)	(9.705)
Supplier age	-0.038***	-0.037***	-0.039***	-0.037***	-0.038***	-0.037***
	(-8.826)	(-9.551)	(-8.915)	(-9.643)	(-8.542)	(-9.241)
Relation age	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
	(-1.391)	(-1.543)	(-1.406)	(-1.559)	(-1.440)	(-1.592)
Relative size	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(-0.127)	(-0.210)	(-0.125)	(-0.208)	(-0.113)	(-0.196)
Nsupp	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(-0.641)	(-0.222)	(-0.643)	(-0.232)	(-1.556)	(-1.253)
Ncust	0.000	0.000	0.000	0.000	0.000	0.000
	(0.112)	(0.213)	(0.115)	(0.216)	(0.052)	(0.154)
Cash flow	0.004	-0.009	0.004	-0.009	0.001	-0.012
	(0.151)	(-0.331)	(0.141)	(-0.342)	(0.042)	(-0.448)
Net working capital	-0.297***	-0.257***	-0.296***	-0.256***	-0.293***	-0.253***
	(-18.016)	(-18.451)	(-17.981)	(-18.416)	(-17.699)	(-18.197)
Capital expenditures	-0.373***	-0.361***	-0.374***	-0.361***	-0.365***	-0.354***
	(-10.422)	(-12.041)	(-10.421)	(-12.039)	(-10.210)	(-11.802)
Leverage	-0.052***	-0.035***	-0.052***	-0.035***	-0.051***	-0.035***
	(-3.391)	(-2.642)	(-3.397)	(-2.648)	(-3.370)	(-2.617)
Acquisitions	-0.338***	-0.304***	-0.337***	-0.304***	-0.340***	-0.306***
	(-14.671)	(-16.768)	(-14.662)	(-16.760)	(-14.790)	(-16.903)
Market_to_book	0.007***	0.008***	0.007***	0.008***	0.007***	0.007***
	(4.567)	(5.655)	(4.567)	(5.655)	(4.438)	(5.510)
Size	-0.000	0.001	-0.000	0.001	-0.000	0.001
	(-0.004)	(0.212)	(-0.011)	(0.204)	(-0.009)	(0.205)

Table 2 (Cont'd). Common ownership and cash holdings: OLS estimation

Ind. CF volatility	0.000	0.000	0.000	0.000	0.000	0.000
	(0.857)	(1.295)	(0.869)	(1.306)	(0.519)	(0.990)
R&D expenditures	-0.332***	-0.205***	-0.332***	-0.205***	-0.335***	-0.208***
	(-4.004)	(-2.937)	(-4.000)	(-2.934)	(-4.023)	(-2.955)
Dividend dummy	-0.015**	-0.011**	-0.015**	-0.011**	-0.015**	-0.011**
	(-2.179)	(-2.004)	(-2.169)	(-1.992)	(-2.169)	(-1.986)
Lag Δcash	0.336***	-0.578***	0.336***	-0.578***	0.337***	-0.577***
	(13.619)	(-21.820)	(13.620)	(-21.822)	(13.580)	(-21.683)
Lag cash		0.017		0.017		0.017
		(0.977)		(0.978)		(0.979)
Observations	17,054	17,039	17,054	17,039	17,054	17,039
R-squared	0.926	0.626	0.926	0.626	0.926	0.625
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Pair FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 3. Common ownership and cash holdings: DiD estimation analysis

This table reports estimation from the difference-in-differences (DiD) regression in equation (2). *Treat* is a dummy variable that takes the value of one if the pair of firms in supply chain is exposed to any mergers of their institutional shareholders during the year. *Post* is an indicator variable which takes the value of one for the post-merger period (two years post deal completion), and zero for the pre-merger period (two years prior to deal completion). We present the estimation analysis in columns (1)-(2) using merger events from 1985-2009 and in columns (3)-(4) for mergers from 1985-2006 to exclude those mergers overlapping with financial crisis years. We include the same set of controls as in Table 2, year and pair fixed effects across all specifications. The definitions of all variables are provided in the Appendix A. Standard errors are clustered at the pair level. T-statistics are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1) Cash	(2) Δ Cash	(3) Cash	(4) Δ Cash
Treat*Post	-0.011*	-0.010*	-0.012*	-0.010*
	(-1.769)	(-1.880)	(-1.773)	(-1.827)
Treat	0.005	0.005	0.005	0.005
	(1.262)	(1.561)	(1.167)	(1.285)
Post	0.001***	0.001***	0.001***	0.001***
	(3.763)	(3.377)	(4.065)	(3.689)
Observations	60,097	59,711	52,190	51,814
R-squared	0.905	0.574	0.906	0.583
Pair Controls	Yes	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Pair FE	Yes	Yes	Yes	Yes

Table 4. Heterogeneity by firm characteristics

This table reports how the effect of the common ownership on cash holdings varies with the firm's financial constraint. *Creditrating* is a dummy variable that equals 1 if a firm does not have a credit rating. *Constrained* is a dummy variable that accesses whether a firm is "constrained" as defined by Sufi (2007). *Small firm* equals one if the customer firm size is in the bottom quartile distribution of the sample. We include the same set of controls as in Table 2, year and pair fixed effects across all specifications. The definitions of all variables are provided in the Appendix A. Standard errors are clustered at the pair level. T-statistics are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1) Cash	(2) Δ Cash	(3) Cash	(4) Δ Cash	(5) Cash	(6) Δ Cash
CO	-0.085***	-0.078***	0.236	0.216	-0.090***	-0.082***
	(-3.564)	(-3.655)	(1.273)	(1.329)	(-3.669)	(-3.785)
Creditrating*CO	-0.400**	-0.422***				
	(-2.292)	(-2.817)				
Constrained*CO			-0.299*	-0.262*		
			(-1.697)	(-1.689)		
Small firm*CO					-0.166*	-0.177**
					(-1.764)	(-1.965)
Creditrating	-0.006	-0.005				
	(-0.848)	(-0.812)				
Constrained			0.004	0.003		
			(0.624)	(0.399)		
Small firm					-0.002	0.000
					(-0.294)	(0.023)
Observations	16,808	16,802	4,078	4,078	17,054	17,039
R-squared	0.926	0.626	0.950	0.734	0.926	0.626
Pair Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Pair FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 5. Common ownership and trade credit: OLS estimation

This table presents the relation between the common ownership of a customer with its suppliers and the firm's trade credit. Dependent variables are customer firms' accounts payable (log(1+ accounts payable)) and payable turnover (log(1+payable turnover)). Control variables include size, firm age, number of suppliers, leverage and profitability. The definitions of all variables are provided in the Appendix A. Standard errors are clustered at pair level. T-statistics are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)
	Account payable	log(1+ payable)	Payable turnover	log(1+payable turnover)
CO	0.028**	0.018**	-3.858***	-0.247***
	(2.522)	(2.060)	(-6.021)	(-4.125)
Customer age	0.001***	0.000***	-0.044***	-0.006***
	(3.863)	(3.608)	(-3.252)	(-5.268)
Nsupp	0.000***	0.000***	0.023***	0.002***
	(3.298)	(3.196)	(8.669)	(8.112)
Leverage	-0.077***	-0.064***	-1.037***	-0.095***
	(-14.259)	(-14.442)	(-2.954)	(-2.943)
Size	-0.016***	-0.014***	-0.412***	-0.041***
	(-9.027)	(-9.659)	(-3.186)	(-3.655)
Profitability	0.006	0.010*	4.619***	0.448***
	(0.968)	(1.808)	(7.091)	(7.632)
Observations	75,286	75,286	74,121	74,121
R-squared	0.968	0.966	0.910	0.928
Year FE	Yes	Yes	Yes	Yes
Pair FE	Yes	Yes	Yes	Yes

Table 6. Common ownership and trade credit: DiD estimation analysis

This table reports estimation from the difference-in-differences (DiD) regression for impact of common ownership on trade credits. The definitions of *Treat* and *Post* are identical to Table 3. We present the estimation analysis using merger events from 1985-2006 to exclude those mergers overlapping with financial crisis years. We include the same set of controls as in Table 5, year and pair fixed effects across all specifications. The definitions of all variables are provided in the Appendix A. Standard errors are clustered at the pair level. T-statistics are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)
	Account payable	log(1+ payable)	Payable turnover	log(1+payable turnover)
Treat*Post	0.007**	0.005**	-0.599***	-0.034**
	(2.056)	(2.025)	(-2.826)	(-2.133)
Treat	-0.003	-0.002	0.261*	0.011
	(-1.378)	(-1.119)	(1.729)	(0.908)
Post	0.000*	0.000*	0.003	0.000
	(1.917)	(1.899)	(0.211)	(0.076)
Customer age	-0.000	-0.000	-0.058***	-0.006***
	(-0.333)	(-0.737)	(-3.833)	(-4.515)
Nsupp	0.000***	0.000***	0.017***	0.002***
	(3.349)	(3.456)	(6.705)	(7.097)
Leverage	-0.076***	-0.064***	-1.552***	-0.146***
	(-13.881)	(-13.983)	(-3.937)	(-4.370)
Size	-0.013***	-0.011***	-0.375**	-0.041***
	(-6.375)	(-6.957)	(-2.474)	(-3.198)
Profitability	0.019**	0.021***	4.868***	0.519***
	(2.401)	(3.241)	(7.772)	(9.012)
Observations	116,764	116,764	115,063	115,063
R-squared	0.961	0.959	0.897	0.911
Year FE	Yes	Yes	Yes	Yes
Pair FE	Yes	Yes	Yes	Yes

Table 7. Common ownership and cash holdings: alternative explanations

Panel A presents the OLS regression between common ownership and cash holdings while controlling for various measures of market competition, while panel B presents the estimation of the difference-in-differences (DiD) regression. The merger events are from 1985-2006 to exclude the years overlapping with financial crisis. We include the same set of controls as in Table 2, year and pair fixed effects across all specifications. The definitions of all variables are provided in the Appendix A. Standard errors are clustered at the pair level. T-statistics are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: OLS estimation

	(1) Cash	(2) Δ Cash	(3) Cash	(4) Δ Cash
CO	-0.080***	-0.073***	-0.036	-0.042*
	(-3.264)	(-3.305)	(-1.393)	(-1.780)
HHI	-0.058**	-0.052**		
	(-2.158)	(-2.144)		
Fluidity			0.000	0.000
			(0.096)	(0.744)
Observations	16,365	16,357	11,261	11,258
R-squared	0.926	0.628	0.933	0.635
Pair Controls	Yes	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Pair FE	Yes	Yes	Yes	Yes

Panel B: DiD estimation

	(1) Cash	(2) Δ Cash	(3) Cash	(4) Δ Cash
Treat * Post	-0.012*	-0.011*	-0.034***	-0.029***
	(-1.802)	(-1.853)	(-2.610)	(-2.641)
Treat	0.005	0.005	0.014*	0.013*
	(1.178)	(1.288)	(1.895)	(1.919)
Post	0.001***	0.001***	0.001***	0.001***
	(3.999)	(3.569)	(3.295)	(3.223)
HHI	-0.008	-0.014		
	(-0.400)	(-0.823)		
Fluidity			0.003***	0.002***
			(3.552)	(3.746)
Observations	50,202	49,841	20,640	20,618
R-squared	0.907	0.584	0.925	0.621
Pair Controls	Yes	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Pair FE	Yes	Yes	Yes	Yes

Table 8. Common ownership and financing decisions

This table reports the relation between common ownership of a customer with its suppliers and the firm's financial decisions. The dependent variables are book level of leverage, logarithm of book value of leverage, debt issue and logarithm of debt issue. Year and pair fixed effects are included in all specifications. The definitions of all variables are provided in the Appendix A. Standard errors are clustered at the pair level. T-statistics are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1) Leverage	(2) log (Leverage)	(3) Debt Issue	(4) log(Debt Issue)
CO	-0.129***	-0.101***	-0.050*	-0.045*
	(-3.799)	(-3.706)	(-1.654)	(-1.870)
Tangibility	-0.137***	-0.097***	-0.074***	-0.061***
	(-5.416)	(-4.966)	(-3.991)	(-4.061)
Size	0.041***	0.031***	0.020***	0.018***
	(7.527)	(7.273)	(4.758)	(5.393)
Market to book	-0.015***	-0.013***	-0.001	-0.001
	(-9.467)	(-9.938)	(-0.919)	(-0.965)
Profitability	-0.005	-0.011	-0.087*	-0.072*
	(-0.141)	(-0.376)	(-1.884)	(-1.947)
Ind. CF volatility	-0.000	-0.000	-0.002***	-0.002***
	(-0.954)	(-1.212)	(-4.464)	(-4.454)
Cash Flow	-0.374***	-0.290***	-0.123**	-0.092**
	(-7.584)	(-7.446)	(-2.329)	(-2.164)
IO	-0.027***	-0.021***	-0.034***	-0.027***
	(-2.600)	(-2.604)	(-2.948)	(-2.929)
Observations	38,070	38,070	36,807	36,807
R-squared	0.900	0.900	0.691	0.685
Year FE	Yes	Yes	Yes	Yes
Pair FE	Yes	Yes	Yes	Yes

Table 9. Common ownership and dividend policies

This table reports the relation between common ownership of a customer with its suppliers and the customer firm's dividend policies. Year and pair fixed effects are included in all specifications. The definitions of all variables are provided in the Appendix A. Standard errors are clustered at the pair level. T-statistics are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1) Common dividend /Asset	(2) log(Common dividend/Asset)	(3) Total dividend /Asset	(4) log(Total dividend/Asset)
CO	0.013***	1.331***	0.014***	1.289***
	(3.938)	(3.248)	(4.366)	(3.190)
Size	-0.003***	0.715***	-0.003***	0.702***
	(-4.759)	(14.396)	(-4.671)	(13.835)
Market to book	-0.000**	-0.082***	-0.000*	-0.072***
	(-2.012)	(-3.967)	(-1.825)	(-3.644)
Ind. CF volatility	0.000	-0.020**	0.000	-0.022***
	(0.788)	(-2.378)	(0.910)	(-2.661)
Cash flow	-0.310***	-9.947***	-0.313***	-10.093***
	(-6.287)	(-12.082)	(-6.347)	(-12.429)
IO	-0.000	-0.341**	-0.002	-0.545***
	(-0.040)	(-2.476)	(-0.949)	(-3.974)
Tangibility	0.000***	0.000	0.000***	0.000*
	(2.833)	(1.181)	(3.089)	(1.762)
Profitability	0.239***	8.522***	0.240***	8.583***
	(7.199)	(13.877)	(7.251)	(14.215)
Observations	38,122	38,122	38,122	38,122
R-squared	0.863	0.963	0.859	0.962
Year FE	Yes	Yes	Yes	Yes
Pair FE	Yes	Yes	Yes	Yes

Internet Appendix: Additional Tables

Table A1. Common ownership and cash holdings: robustness check

This table reports the robustness checks of the baseline results using alternative measures for common ownership from GGL measures, which take different assumptions in attention $g(\cdot)$. Dependent variables are cash holdings and changes in cash holdings. We include the same set of controls as in Table 2, year and pair fixed effects across all specifications.[11] Standard errors are clustered at the pair level. T-statistics are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1) Cash	(2) Cash	(3) Cash	(4) Cash
CO linear	-0.853***			
	(-4.458)			
CO convex		-8.919***		
		(-3.236)		
CO concave			-0.134***	
			(-4.436)	
CO fitted				-0.182***
				(-4.273)
Observations	17,054	17,054	17,054	17,054
R-squared	0.926	0.926	0.926	0.926
Pair Controls	Yes	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Pair FE	Yes	Yes	Yes	Yes

[11] The result is also robust to ΔCash.

Table A2. Parallel trend assumption verification

This table reports tests to verify parallel trends assumptions. Panel A reports the mean and median change in cash holdings for customer firms in the treated and control groups, from t -3 to year t, where t is the year for financial institutions mergers. Panel B reports placebo tests. The dummy *plac* represents "pseudo-events" using t -2. We include the same set of controls as in Table 4 and include year and pair fixed effect across all specifications. Columns (1)-(2) report mergers from 1985 to 2009, and columns (3) -(4) report mergers from 1985 to 2006. Standard errors are clustered at the pair level. T-statistics are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Trends in change of cash for treatment and control customer firms

Δ Cash	Treat	Treat	Control	Control	Control minus Treat	Control minus Treat
	mean	median	mean	median	t-stat	p-value
t-3 to t-2	0.002	0.0002	0.0005	0	-0.2753	0.3915
t-2 to t-1	-0.0005	-0.0003	-0.0005	-0.0001	1.1854	0.8821
t-1 to t	0.0009	0.0000	-0.0003	0.0006	-0.028	0.4888

Panel B: Placebo tests

	(1) Cash	(2) ΔCash	(3) Cash	(4) ΔCash
Treat*Plac	-0.008	-0.007	-0.005	-0.006
	(-1.054)	(-1.017)	(-0.711)	(-0.832)
Treat	0.010**	0.010**	0.008*	0.009*
	(2.242)	(2.348)	(1.748)	(1.897)
Plac	0.000**	0.000**	0.000**	0.000**
	(2.184)	(2.212)	(2.126)	(1.991)
Observations	34,547	34,291	29,906	29,654
R-squared	0.914	0.617	0.919	0.643
Firm Control	Yes	Yes	Yes	Yes
Pair Control	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Pair FE	Yes	Yes	Yes	Yes

Table A3. Mutual fund scandal

This table reports difference-in-differences regression estimates using the 2003 mutual fund scandal as a quasi-natural experiment. The dummy *mfs* equals 1 if the pair is exposed to the scandal and 0 otherwise. *Post* is an indicator variable which takes the value of one for the post-event period (two years post year 2003), and zero for the pre-merger period (two years prior to year 2003). We include the same set of controls as Table 2. In columns (4)-(6) we control for additional competition measures. Standard errors are clustered at the pair level. T-statistics are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Cash	Δ Cash	Cash	Δ Cash	Cash	Δ Cash
Post * mfs	0.008**	0.007**	0.008**	0.007**	0.014***	0.010**
	(2.480)	(2.457)	(2.497)	(2.508)	(2.809)	(2.351)
mfs	-0.000	-0.001	-0.000	-0.001	-0.002	-0.001
	(-0.061)	(-0.246)	(-0.169)	(-0.386)	(-0.679)	(-0.383)
HHI			0.036	0.026		
			(1.084)	(0.916)		
Fluidity					0.004***	0.003***
					(5.494)	(4.860)
Observations	6,333	6,323	6,310	6,302	5,029	5,025
R-squared	0.927	0.591	0.927	0.592	0.932	0.609
Firm Control	Yes	Yes	Yes	Yes	Yes	Yes
Pair Control	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Pair FE	Yes	Yes	Yes	Yes	Yes	Yes

Table A4. Robustness check with customer firm fixed effects.

This table reports the robustness check of baseline estimation using customer fixed effects. Panel A reports the regression results on the pair sample. Dependent variables and control variables are identical to Table 2. Panel B reports the regression estimations on the customer-only sample. Dependent variables include firm controls. Columns (1)-(2) report for CO. Columns (3)-(4) report for logarithm of one plus CO. Columns (5)-(6) report for CO using fitted attention from GGL measures. Customer firm fixed effects are included in all columns for both panels. Standard errors are clustered at the customer firm level. T-statistics are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Pair sample

	(1) Cash	(2) Δ Cash	(3) Cash	(4) Δ Cash	(5) Cash	(6) Δ Cash
CO	-0.148***	-0.126***				
	(-4.376)	(-4.178)				
log(1+CO)			-0.169***	-0.143***		
			(-4.170)	(-3.962)		
CO_fitted					-0.271***	-0.234***
					(-4.679)	(-4.691)
Observations	17,054	17,039	17,054	17,039	17,054	17,039
R-squared	0.889	0.450	0.889	0.450	0.889	0.450
Firm Control	Yes	Yes	Yes	Yes	Yes	Yes
Pair Control	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Customer FE	Yes	Yes	Yes	Yes	Yes	Yes

Panel B: Customer sample

	(1) Cash	(2) Δ Cash	(3) Cash	(4) Δ Cash	(5) Cash	(6) Δ Cash
CO	-0.111**	-0.106**				
	(-2.236)	(-2.441)				
log(1+CO)			-0.120**	-0.115**		
			(-2.101)	(-2.307)		
CO_fitted					-0.204*	-0.210**
					(-1.922)	(-2.304)
Observations	8,516	8,476	8,516	8,476	8,516	8,476
R-squared	0.903	0.516	0.903	0.516	0.903	0.516
Firm Control	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Customer FE	Yes	Yes	Yes	Yes	Yes	Yes