Do Supply Chains Play a Corporate Governance Role?

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Abstract

The corporate governance literature typically focuses on the governance role played by shareholders, product market competition, and government entities. This literature largely ignores the role that supply chain entities may play in exerting corporate governance discipline. In this paper, we document novel empirical evidence that the supply chain provides a unique source of corporate governance discipline on firm managers. Using a detailed dataset of supplier-customer relationships, we show that downstream firms monitor their dependent upstream firms and respond to corporate governance inefficiencies such as earnings short-termism by severing supply chain relationships. We find that firms use trade credit to entrench their customers, especially the largest one, as means of strategically mitigating the impact of customer governance.

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1 Introduction

The corporate governance literature tends to focus on the governance functions performed by shareholders (e.g., Gillan and Starks (2000); Brav, Jiang, Partnoy, and Thomas (2008)), product market competition (e.g., Giroud and Mueller (2010); Giroud and Mueller (2011)), and government entities (e.g., La Porta, Lopez-de Silanes, Shleifer, and Vishny (1997); Larcker, Ormazabal, and Taylor (2011)). To date, the literature has largely overlooked the role that supply chain entities play in exerting corporate governance discipline. However, anecdotal evidence suggests that customers may play a significant role in disciplining their suppliers through "exiting" the supplier-customer relationships. For instance, in 2017, Boeing raised anti-competition concerns over a proposed M&A deal of one of its suppliers and threatened to cancel contracts.[1] Similarly, in 2019, Nestlé stopped buying from Cargill Inc. when the Brazilian-produced soybeans supplier failed to provide evidence that the oilseeds were not produced on converted land.[2]

Capturing customer monitoring in supply chains can be empirically challenging because customers' decision on relationship termination may be triggered by public events such as scandals or bankruptcies. Although this may be categorized as passive customer monitoring, it does not require actual monitoring effort from the customer side and the subsequent consequences are more of a direct result of public or regulatory inspections. It is therefore important to disentangle passive and active customer monitoring, where the identification requires a setting in which information regarding suppliers' behaviors is not easily accessible and requires costly efforts.

To overcome this challenge, we focus on one type of firms' corporate governance inefficiencies, earnings short-termism. We capture this earnings short-termism by exploiting firms' incentive to conduct share repurchases in order to meet their earnings targets. This setting satisfies our prerequisite of identifying active customer monitoring because the information regarding whether a firm has this specific type of short-term incentive or not is not easily accessible by the general public and requires customers to actively monitor their suppliers' financial statements.[3]

To study the governance role undertaken by downstream firms, we focus on the "exit" strategy exerted by customers. That is, we ask the question on whether customers terminate their relationships with suppliers that have earnings short-termism. As a supply chain fallout can be triggered by either trading partner, it is important to identify which entity takes the initiation because our argument of active customer monitoring rests on the initiation from the customer side. To do this, we propose and analyze the underlying supply-demand mechanism behind our setting. As a pervasive approach to boost short-term corporate earnings, EPS-driven repurchases exhaust firms' financing capacity and impair real investment (Almeida et al. (2016)), which may naturally lead to customer losses according to the supply-side mechanism. If the relationship breakdown is triggered by suppliers, we should see indiscriminate relationship breaks among all customers,

[1] See `https://www.wsj.com/articles/united-tech-ceo-defends-rockwell-deal-1504620748`.

[2] See `https://www.wsj.com/articles/brazils-shrinking-rainforest-prompts-nestle-h-m-others-to-shake-up-supply-ch`

[3] Almeida, Fos, and Kronlund (2016) find that firms that meet their EPS forecast using repurchases experience positive earnings announcement CAR, which is indistinguishable from the CAR of firms that just beat the forecast without using repurchases.

or among relatively unimportant minor customers. However, the demand-side mechanism predicts a different set of customer losses. According to the demand-side mechanism, customers actively monitor their suppliers' financial statements and are motivated to exit the relationship when suppliers are short-term oriented. In this case, we should observe customer losses that are concentrated in major customers, as they have stronger incentives and lower costs to monitor their dependent suppliers (Cen, Dasgupta, Elkamhi, and Pungaliya (2016)).

This paper provides evidence that the earnings short-termism triggers major customer losses, indicating that customers initiate the relationship breaks when their suppliers have the incentive to conduct share repurchases to boost their EPS. This leads to our main contribution to the literature: downstream firms in supply chains may exert governance discipline on their suppliers via "exiting" the supplier-customer relationships. In particular, the effect on major customer losses is concentrated in financially-constrained firms, indicating that firms' reduced financial capacity is one of the driving forces behind the relationship breakdowns. In addition, we find that major customers are more likely to sever the supply chain relationships when suppliers operate in competitive product markets and produce homogeneous products, which suggests that the consequences of customer monitoring can be mitigated when there are limited outside options. Contrary to the conventional view that corporate governance is more effective when competition is weak (Giroud and Mueller (2010)), our findings suggest that the governance discipline exerted by customers is complementary, instead of substitutional, to product market competition.

Our identification strategy relies on a discontinuity in firms' incentive to conduct EPS-boosting repurchases when they are about to miss the analysts' earnings forecast. With the goal of meeting the earnings target, firms whose *actual* EPS (EPS before manipulation) are only a few cents below the target are disproportionately more likely to engage in accretive share repurchases as a way of earnings management (Hribar, Jenkins, and Johnson (2006)). On the contrary, firms whose *actual* EPS are marginally above the target do not have this incentive. This allows us to adopt a research discontinuity design (RDD) setting where firms that are just about to miss analysts' forecast serve as the treated and firms that just meet the forecast serve as a counterfactual (Almeida et al. (2016)). Provided that the discontinuous jump in firms' incentive to buy back shares is the only discontinuity around the zero pre-repurchase EPS surprise threshold that directly affect the outcome variables, our tests measure the causal effect of the earnings short-termism on the stability of supplier-customer relationships.

We use FactSet Revere to extract the supplier-customer relationships between U.S. firms and their domestic as well as international customers from 2003 to 2019. FactSet Revere circumvents the inclusion limit of the conventional supply chain database and covers around 1 million global supply chain relationships.[4] We combine this dataset with the supply chain relationships covered by the Compustat Segment Customer File, where customers that represent more than 10% of the supplier's sales are disclosed. We identify customers that are reported by the Compustat Segment data as major customers, and identify the ones that are only

[4]For instance, Statement of Financial Accounting Standard (SFAS) No. 14 requires firms to report all customers that represent 10% or more of their total sales. The Compustat Segment Customer File collects information of the customers disclosed by suppliers. This restricts the coverage of Compustat Segment to include only major customers.

covered by FactSet Revere as minor customers. The combination of these two databases not only allows us to expand the scope of our research to include minor customers, but also provides us with a setting to identify which side initiates the supply chain fallout.

We start by showing that the incentive to conduct EPS-driven repurchases imposes an adverse impact on firm outcomes. We first replicate the analysis in Almeida et al. (2016) and find a significant reduction in corporate cash holdings, real investment, and sales caused by this incentive. We also find a deterioration in firms' financial condition as a result of their short-term incentives, which serves as a prior that motivates customer losses.

Our main findings show that firms tend to lose their major customers when subject to EPS-driven repurchases incentives. The economic magnitude of this effect is large - the incentive to conduct EPS-driven repurchases increases firms' probability of losing their major customers by 4.5 percentage points, which corresponds to an increase of 35.4% relative to the average probability of customer losses, and to around $38.32 million losses in annual sales. The fact that firms tend to lose major customers is particularly interesting because suppliers are normally reluctant to relinquish major customers as they rely on these customers to obtain future rents (e.g., Costello (2020) finds that suppliers prioritize their important customers when struck by negative liquidity shocks). The results thus indicate that the demand-side channel dominates the supply-side channel and that customers initiate the termination of the supplier-customer relationships. To provide further evidence on major customer monitoring, we show that firms are only prone to lose major customers when they have a history of having earnings short-termism. This suggests that major customers closely monitor their suppliers' current as well as previous financial statements and that they only sever the relationship if the perceived risk is high. Moreover, we find that the monitoring effect is mainly driven by the dependent customers, which suggests that the concern over the stability of future production serves as a motive for customers to monitor their suppliers' financial statements.

We perform a series of cross-sectional analysis to shed more light on the mechanisms behind the short-termism-incurred supply chain breaks. First, we show that the relationship breaks with major customers are concentrated only in financially-constrained firms. This indicates that the reduced financing capacity is the reason behind major customer losses, as financially-constrained suppliers are more likely to raise major customers' alarm regarding sustaining a stable future supply. Second, we document that major customers are more prone to leave if they face lower switching costs. In particular, we find that firms that operate in competitive product markets and that produce homogeneous products suffer from more severe major customer losses when faced with earnings short-termism. These results suggest that customers can be entrenched when there are limited outside options and they refrain from using the *exit* strategy. However, this does not infer that customers have less incentive to monitor their suppliers as they may exploit the *voice* strategy or even serve as a direct rescuer when suppliers experience difficulties.[5]

As the next step, we study how firms mitigate the costs brought by the monitoring and leaving of their

[5]For instance, in 2019, Apple agreed to shorten payment periods and to put up $200 million to help its distressed liquid crystal display (LCD) maker, Japan Display Inc. See `https://www.reuters.com/article/us-japan-display-funding-idUSKBN1YF2VE` for more details.

major customers. The *exit* governance strategy exerted by major customers can effectively hurt suppliers' future performance as customer concentration is associated with higher corporate profitability (Patatoukas (2012)). To examine how suppliers react to minimize the consequences of short-termism-incurred major customer losses, we exploit the heterogeneity of suppliers' sales dependence on different major customers under the assumption that suppliers have higher incentive to keep the customers that they are more dependent on. Building on this assumption, we argue that firms' profitability relies more on their largest customer as opposed to other major customers. When it gets difficult to preserve all major customers, firms may strategically prioritize their largest customer to minimize the cost of customer losses on their future performance. Our findings show that firms indeed lose their major - but not the largest - customers when they have the incentive to conduct EPS-driven repurchases. Following this logic, firms whose sales are more equally allocated across major and largest customers should have less incentive to maintain relationships with their largest customer at the expense of other major customers. As expected, our findings suggest that this *largest customer prioritization* is concentrated in firms whose sales rely more heavily on the largest customer compared with other major customers.

How do suppliers persuade their largest customer to stay? We next explore one potential commitment tool firms may use as means of preserving their largest customer: trade credit. Trade credit is often used in financial contracting between trading partners to enhance the stability of supply chains and facilitate trade (Ersahin, Giannetti, and Huang (2021); Breza and Liberman (2017)). Our findings suggest that when having earnings short-term incentives, firms do not change their trade credit provisions at the firm level but strategically re-allocate trade credit across customers. In particular, firms extend more trade credit to their largest customer and cut the trade credit provision to other major customers that they cannot afford to preserve at the same time.

This paper contributes to the corporate governance literature by highlighting the monitoring role customers play regarding suppliers' governance inefficiency on earnings short-termism. Existing studies in the corporate governance literature typically focus on understanding the governance role played by shareholders, product market competition, as well as legislative and regulatory actions. For instance, Brav et al. (2008) document that hedge fund activism achieve significant benefits for shareholders. Giroud and Mueller (2010) show that weakened corporate governance does not bring about significantly negative performance in competitive industries, indicating that product market competition exerts effective governance discipline. Bertrand and Mullainathan (2003) focus on the governance role played by legislative changes by showing that when states adopt antitakeover laws, managers tend to enjoy the "quiet life" which is value-destroying for firms. Our paper adds value to this literature by providing novel empirical evidence that corporate customers actively monitor their suppliers' financial statements and exert governance discipline via severing the supplier-customer relationship when suppliers are short-term oriented.

This paper is also related to the literature on corporate short-termism, especially to the recent studies that focus on short-termist share repurchases. Almeida et al. (2016) find that firms experience a decline in employment, investment, and cash holdings if they conduct share repurchases to meet their earnings forecast.

Interestingly, they show that the market does not punish firms that boost their EPS using share repurchases as opposed to firms that have met the earnings targets without manipulation. Building on this work, Almeida, Ersahin, Fos, Irani, and Kronlund (2019) finds an adverse impact of the incentive to conduct EPS-driven repurchases on firms' long-term productivity. We contribute to this field by showing that although the market seems to be oblivious of the EPS-driven share repurchases, corporate customers closely monitor their suppliers and sever the trading relationships with those that have the earnings short-term incentives. Additionally, we provide evidence that the impact of corporate myopia is not confined by firm boundaries and highlight that earnings short-termism exerts real consequences on firms' customer base.

This paper also adds value to the literature regarding the indirect costs of financial distress. An aspect of the indirect costs of financial distress is the resultant lost sales when customers perceive that default is likely (Altman (1984)). Opler and Titman (1994) find that highly leveraged firms lose market share to their less leveraged competitors in industry downturns. However, it is difficult to identify if the incurred market share loss is driven by rival firms' aggressive competing strategies, customers' reluctance to continue trading, or managers' effort to downsize seeking higher efficiency. A recent study by Custódio, Ferreira, and Garcia-Appendini (2022) revisited the issue and find that customers buy less from financially-distressed suppliers and that this effect is customer-initiated. Our paper contributes to this literature by showing that by restraining firms' financing capacity, earnings short-termism can also impose the indirect costs of financial distress via customer monitoring. The richness of our supply chain data allows us to unveil that the effect is concentrated in major customers as opposed to the minor ones, which sheds more light on the monitoring role of principle customers documented by the literature (e.g., Cen et al. (2016); Cai and Zhu (2020)).

Finally, our paper contributes to the literature on trade credit and its role in supply chains. Ersahin et al. (2021) find that when firms are struck by natural disasters, they both obtain and extend more trade credit in order to stabilize the supply chains. Furthermore, trade credit is found to facilitate trade and establish new supplier-customer relationships. Breza and Liberman (2017) show that restrictions on trade credit extensions reduce the likelihood of trade, and induce firms to shift away from affected suppliers. Similarly, Beaumont and Lenoir (2019) find that suppliers affected by a French reform that puts a limit on accounts receivable days enjoy an expansion in their customer base. Our paper confirms the supply-chain-relationship-preserving role of trade credit and provides evidence that firms actively use it as means of preserving customers when they face the threat of relationship termination triggered by earnings short-termism.

The rest of the paper proceeds as follows. Section 2 presents the data and the empirical methodology. Section 3 shows the main empirical results. Section 4 reports firms' response to major customers' monitoring and leaving. Section 5 contains additional analyses and robustness checks. Section 6 concludes. We describe the definition of variables and the ancillary results in the Appendix.

2 Data and Methodology

2.1 Data and sample construction

We consider a large panel of U.S. public firms from 2003 to 2020 and study the impact of firms' short-term incentives to conduct repurchases on their supply chain relationships. We combine four datasets to construct our final sample: we collect the accounting data and international stock returns data from Compustat, the supply-chain networks data from FactSet Revere and Compustat Segment, stock returns of the U.S. firms from CRSP, and analysts' earnings forecasts as well as the actual earnings information from I/B/E/S. Our final sample relies on the overlapped coverage of these four datasets.

2.1.1 Firm level data

We collect the accounting data of U.S. firms from Compustat North America (NA). We first extract firm-quarter observations from the Compustat Quarterly database to construct the adjusted earnings per share and the repurchase measures. We exclude highly-regulated utility firms (SIC 4900-4999) and financial firms (SIC 6000-6999) as well as firm-quarters with missing or non-positive assets. As our relationship-level analysis is at the annual level, we retrieve the firm-level accounting data from Compustat Annual and merge it with the annualized EPS data. Regarding the stock return data, we extract it from CRSP and focus on common stocks with the share class code of 10 or 11. The richness of our supply chain data allows us to also examine firms' relationships with their international suppliers and customers. To obtain the accounting and stock return data for the international trading partners, we use Compustat Global as our data source.[6] We convert accounting variables denominated in foreign currencies into USD using the exchange rates at the end of each calendar year reported by the Compustat Conversion File.

2.1.2 Pre-repurchase EPS surprise

We calculate the pre-repurchase EPS surprises following Almeida et al. (2016).[7] The pre-repurchase earnings surprise for firm i at quarter q, denoted as $Sue\_adj_{i,q}$, is defined as the quarterly difference between the repurchase-adjusted EPS and the median value of analysts' forecasted EPS,[8] standardized by the end-of-quarter stock price:

$$Sue\_adj_{i,q} = \frac{EPS\_adj_{i,q} - Median\_EPS_{i,q}}{Price_{i,q}} \tag{1}$$

[6] We additionally compare the coverage offered by Datastream and Worldscope for our international sample. We find Compustat Global has the largest coverage among these three datasets with the largest number of non-missing accounting variables. The difference in coverage is attributed to the greater coverage on large firms in FactSet Revere, and Compustat Global has the best data availability for large international firms as reported by Dai (2012). To ensure the consistency in data collection method, we solely rely on Compustat Global for our international sample.

[7] This method is also used in Almeida et al. (2019) and Almeida, Fos, Hsu, Kronlund, and Tseng (2020).

[8] When there are multiple forecasts, we take the analysts' median EPS forecast closest to the announcement day of each quarter.

The repurchase-adjusted EPS is computed as:

$$EPS\_adj_{i,q} = \frac{E\_adj_{i,q}}{S\_adj_{i,q}} = \frac{(E_{i,q} + I_{i,q})}{(S_{i,q} + \Delta S_{i,q})} \tag{2}$$

where E is the reported earning calculated as the actual earnings per share times the number of shares outstanding; I is the estimated forgone interest due to the repurchases and is calculated as the after-tax return a firm would have obtained if it invested the repurchase stock in a 3-month T-bill; S is the number of shares outstanding at the end of each quarter, and ΔS is the estimated number of shares repurchased calculated as the repurchase amount divided by the average daily stock price. $Sue\_adj_{i,q}$ measures what the earnings surprises would have been in the absence of share repurchases.

Building on this, we further define a negative pre-repurchase EPS surprise dummy and an accretive repurchase dummy. The negative pre-repurchase EPS surprise dummy equals one if the pre-repurchase EPS surprise $Sue\_adj_{i,q}$ is negative, zero otherwise. The accretive repurchase dummy equals one if the repurchase increases EPS by at least one cent, zero otherwise.

2.1.3 Supply chain data

We use FactSet Revere to build the supply chain relationships between suppliers and customers.[9] FactSet Revere is a specialized dataset that describes vertical and horizontal relationships of large and mostly listed firms. It includes around 1 million global supply chain relationships starting from 2003. This data has been used in finance and economics studies such as Ding et al. (2021) and Boehm and Sonntag (2020), and is also widely adopted in the supply chain management literature such as Son, Chae, and Kocabasoglu-Hillmer (2021).

FactSet Revere exploits its proprietary research method to collect the supply-chain relationship information at an annual basis through companies' 10-K fillings, websites, investor presentations, news releases and press coverage, etc. The coverage of FactSet Revere is noticeably broader than the Compustat Segment Customer File, which only covers the information of a firm's major customer collected from its 10-K fillings.[10]

This data collection procedure yields not only a wide coverage of firms and relationships, but also very detailed information regarding each documented relationship. FactSet Revere reports thirteen types of supply chain relationships, and for each relationship, it reports the start date, end date, relationship type and firm identifiers. We limit our scope focusing only on the supplier-customer relationships.

As our study is at the annual level, we follow the literature and annualize the relationship data: when the distance between the start date and end date of a relationship is longer than one calendar day, we treat the relationship as active in that year. To merge the supply-chain data with other data we have, we use CUSIP to link it with CRSP and I/B/E/S, and further use CRSP/Compustat link table to merge the data

[9] See Boehm and Sonntag (2020) and Ding, Levine, Lin, and Xie (2021) for a detailed discussion on the coverage and structure of FactSet Revere.

[10] We compare the Compustat Segment Customer File with FactSet Revere, and find that 97% of the customer relationship in Compustat with an disclosed ID has been recorded in FactSet Revere.

with Compustat NA. When merging FactSet Revere with Compustat Global, we use the ISIN code.

To measure the supplier-customer relationship breaks, We define a dummy variable *Relationship Break*$_{i,j,t}$ that equals one if the supplier-customer relationship is active in year t but no longer active in year $t+1$. The identification of relationship break further limits our sample period to 2003 -2019. Consistent with our sample of suppliers, we exclude customers that operate in the utility industry (SIC 4900-4999) or financial industry (SIC 6000-6999). We define a customer to be a major customer if the Compustat Segment data also reports the supplier-customer relationship in the same year. That is, if the customer represents more than 10% of the supplier's sales. We define the largest customer to be the customer firm that accounts for the highest sales proportion of the supplier as reported in Compustat Segment File.

2.2 Identification strategy

We exploit a fuzzy research discontinuity design to establish the causal effect following Almeida et al. (2016). The underlying idea of this identification strategy is that firms have strong incentives to meet or beat the analysts' EPS forecasts - they may use share buybacks to raise their EPS if they are only a few cents away from meeting the analysts' forecasts.[11] This empirical strategy allows us to identify firms with the incentive to conduct short-termist share repurchases and provides a counterfactual in the absence of such an incentive, which enables us to obtain the causal effect of the short-term incentives on supply chain relationships.

To establish the discontinuity design, we first calculate the pre-repurchase EPS surprise using the method discussed in 2.1.2. We then show that firms with negative pre-repurchase EPS surprises are discontinuously more likely to conduct short-termist accretive share buybacks compared with firms that have positive pre-repurchase EPS surprises. The results are presented in Table B.1.[12]

In our main analysis, we adopt this regression discontinuity framework to examine the effect of firms' incentives to carry out short-termist repurchases on the stability of their supply chain relationships. Specifically, we estimate the reduced-form fuzzy RDD regression using the formula below:

$$\begin{aligned} Y_{i,j,t} = \alpha &+ \beta_1 I_{Negative\,Sue\_adj_{i,t}} + \beta_2 Sue\_adj_{i,t} + \beta_3 Sue\_adj_{i,t} I_{Negative\,Sue\_adj_{i,t}} \\ &+ \beta_4 I_{Negative\,Sue\_adj_{i,t}} Major\,Customer_{i,j,t} + \beta_5 Sue\_adj_{i,t} Major\,Customer_{i,j,t} \\ &+ \beta_6 Sue\_adj_{i,t} I_{Negative\,Sue\_adj_{i,t}} Major\,Customer_{i,j,t} + \beta_7 Major\,Customer_{i,j,t} \\ &+ \beta_8 X_{i,t} + \theta_{j,t} + \eta_{i,j} + \gamma_{ind_i ind_j,t} + \epsilon_{i,j,t}, \end{aligned} \tag{3}$$

where i and j index firms and their customers respectively. $Y_{i,j,t}$ is the outcome variable *Relationship Break*$_{i,j,t}$, which equals one if the relationship between firm i and firm j is active in year t but inactive in year $t+1$, zero otherwise. $I_{Negative\,Sue\_adj_{i,t}}$ is our independent variable of interest, which is an indicator that equals one if a firm has an annualized negative pre-repurchase EPS surprise. $Sue\_adj_{i,t}$ is the annualized

[11] See Bhojraj, Hribar, Picconi, and McInnis (2009) and Almeida et al. (2016) for a detailed discussion and an example on how firms use repurchases to boost their earnings per share.

[12] We provide the graphical evidence using an RDD plot in Figure C.1. Similar to Almeida et al. (2016), we find no evidence of any discontinuity in the probability of decretive share repurchases around the zero earnings surprise threshold (Figure C.2).

pre-repurchase EPS surprise. X is a vector of controls of suppliers. We saturate our regressions with fixed effects to control for the unobservable characteristics at different levels. Specifically, we include the firm-pair fixed effects to control for the time-invariant supplier-customer-level factors. We also include customer-year and industry-pair-year fixed effects to control for time-varying heterogeneities.

Given that our supply-chain data is at the annual level whilst the EPS data is at quarterly level, we follow Almeida et al. (2019) and limit our analysis only to the earnings in the fourth quarter of a firm's fiscal year. We limit the sample to a small window where $-0.003 \leq Sue_{adj} \leq 0.003$ to eliminate the potential biases driven by the differences across firms around the zero EPS surprise threshold.

2.3 Summary statistics

Table 1 reports the summary statistics at both firm and relationship levels. These descriptive statistics are calculated using firms whose pre-repurchase earnings surprise are within (-0.003, 0.003). We report the statistics for both the full sample as well as the split sample where firms with slightly negative pre-repurchase earnings surprises (treated firms) are separated from the ones with slightly positive earnings surprises (control firms). Our measure of relationship stability is at the relationship level, of which the unconditional mean is 12.7%, regardless of the incentive to conduct EPS-driven share repurchases. When limiting the relationships to only include the major customers, the average probability of a relationship break is dropped to 2.7%. However, for treated firms, the average probability of relationship breaks is 3.3%, which is higher than the mean of 2.4% of the control firms.

We then collapse our relationship-level data to the firm level and calculate the corresponding descriptive statistics. Treated firms have higher unconditional means of repurchase amount as well as the probability of conducting accretive repurchases as opposed to control firms. Regarding the number of customers, the average number of customers each firm has in each year is 13, and 1 out of 13 is identified as the major customer. Firms on average have two major customers each year when we limit the sample to only include firms with at least one major customer.

We present the distribution of firms whose pre-repurchase earnings surprises fall within the $-0.003 \leq Sue\_adj \leq 0.003$ window as well as that of their customers at the Fama-French 17 industry level in Table A.2. As is shown in the table, a large proportion of firms operate in the industry "Other", followed by "Machinery and Business Equipment" as the second largest industry accounting for 23.44% of the full sample. The industry distribution of customer firms exhibits similar trends, where the largest industry is still "Other" and it accounts for 41.86% of the customer firm sample. As expected, the "Retail Stores" industry accounts for 2.48% of the supplier sample but 9.81% of the customer sample, since the "Retail Stores" industry sells directly to the final customer and is less likely to act as an upstream industry. In the same logic, we observe a relatively small proportion of customer firms in the "Machinery and Business Equipment" industry, as this industry sits more at the upstream of supply chains. We also display the country/region distribution for our customer firm sample in the same table, where 37.29% of our customer firms are from the U.S. and Japan has the largest number of customer firms among all the other countries.

We show the time trend of our sample in Table A.3. Since our analysis focuses on the small EPS surprise window to ensure the comparability of firms, there is no clear trend in the number of firms. Nevertheless, we observe an increasing trend in the number of customer firms due to the expansion of FactSet Revere's coverage. As a result, a large proportion of the supplier-customer relationships as well as their breaks are recorded in 2019. Notably, our sample includes 487 suppliers and 959 customers in 2008, with 708 customer breaks recorded in the same year. This abnormally high proportion of relationship breaks can be one of the many consequences of the 2008 financial crisis.[13]

3 Empirical Evidence

3.1 Short-term incentives and reduced financing capacity

One underlying assumption we make so far is that the incentive to conduct EPS-driven share repurchases exerts negative impacts on firm outcomes, especially on firms' financing capacity. The reason behind this assumption is that it is expensive to boost EPS using share buybacks. To finance the repurchases, firms may need to drain their cash holdings or cut real investment (Almeida et al. (2016)). As a result, firms may suffer from weakened financial muscle and the subsequent indirect costs of financial distress.

To test this assumption, we conduct firm-level analysis investigating whether the EPS-driven repurchase incentive has an adverse impact on corporate outcomes and report the supporting evidence in Table 2. Consistent with Almeida et al. (2016), we find firms that have the incentive to carry out EPS-driven repurchases suffer from a drop in cash holdings and future investment. There is also a reduction in firms' interest coverage, suggesting that their ability to pay for the interest expenses deteriorates. Furthermore, we observe a significant reduction in firms' future sales, which indicates that the cut in real investment feeds into production and may effectively affect their relationships with customers.

3.2 Major customer losses

Having established the validity of our underlying assumption, we next explore whether firms' short-term incentives lead to customer losses. On the one hand, firms suffer from sales reduction, which may impair their capacity to meet customers' demand and trigger the relationship termination with customers. If this is the case, firms are more likely to sacrifice their minor customers as customer concentration is associated with higher profitability (Campello and Gao (2017)). On the other hand, customers may observe suppliers' short-term incentives and decide to switch to other suppliers that focus on long-term value. If the supplier-customer relationship breaks are initiated by customers, we should see customer losses concentrated in major instead of minor customers, as major customers have stronger incentive to monitor their suppliers (Cen et al. (2016)).

[13]To alleviate the concern that our results are driven by the relationship breaks during the 2008 Financial Crisis, we carry out a robustness test excluding observations during the crisis. Our results survive both qualitatively and quantitatively, and are shown in Table 10.

Table 3 reports the results of the baseline reduced form regression stated in Equation 3. We find that the incentive to conduct EPS-driven repurchases significantly increases firms' risk of losing major customers. This suggests that the short-termism-incurred supplier-customer relationship breaks are initiated by customers. As is shown in column 2 and 3, when firms conduct short-termist share buybacks, there is a 4.3 (4.5) percentage point increase in the likelihood of a relationship break with their major customers in the following year without (with) control variables. The economic magnitude of this effect is non-negligible, representing approximately 35.4% relative to the average probability of a supplier-customer relationship break in our sample. Furthermore, our back-of-the-envelope calculation suggests that suppliers' earnings short-termism leads to around $38.32 million losses in annual sales (we arrive at this number by multiplying the average sales proportion a major customer represents (17.8%), the average annual sales of the firms in our sample ($4784.15 million) and the increase in the probability of relationship breaks with major customers (column 3 in Table 3)).

We next exploit the Cox Hazard Model in our analysis given that our variable of interest measures the relationship survival. In these analyses, we allow the baseline hazard to differ across industries, year, and supplier-customer industry pairs in lieu of fixed effects. Column 4-7 of Table 3 report the estimated results. Reassuringly, we find consistent results as in our OLS analysis - firms with short-term incentives suffer from an increased risk of losing their major customers.

3.2.1 Pre-trend analysis

The key identifying assumption of our empirical strategy is that firms' incentive to conduct EPS-driven share buybacks is the only discontinuity around the zero threshold of earnings surprises. This requires that firms do not have discontinuous changes in other corporate policies or characteristics that could directly affect the supply chain relationships. To control for this, we have saturated our regressions with fixed effects controlling for time-invariant supplier-customer-level characteristics as well as time-varying customer-level and industry-pair-level heterogeneities. Therefore, a violation to our key assumption requires an unobservable time-varying variable of a firm to not only have a discontinuity jump at the zero earnings surprise threshold, but also affects our outcome variables.

In order to test this, we follow Almeida et al. (2016) and examine whether there are pre-existing trends of supply chain relationship breaks in firms that fall within the small EPS surprise window. To perform the test, we examine whether firms' incentive to conduct short-termist share repurchases in the current year has any impact on the supply chain relationship breaks i years ago and report the results in Table B.2. When we compare the supply chain relationship stability of firms with small negative and positive pre-repurchase earnings surprises, firms on either side of the zero earnings surprise threshold have very similar relationship stability trends prior to having the EPS-driven repurchase incentives. This validates our no pre-trend assumption and supports our use of the regression discontinuity design framework.

3.3 Suppliers' previous earnings short-termism

For customers that actively monitor suppliers' financial statements, the first time that a supplier has a negative pre-repurchase earnings surprise may not be as alarming as when there are previous negative surprises. To the extent that this negative earnings surprise does not permanently convert firms into short-term oriented, major customers may be reluctant to sever the relationship. However, when firms have a history of having negative pre-repurchase earnings surprises, their major customers may be more likely to get concerned over their long-run performance and their capability of sustaining a stable future supply. To examine this, we categorize the negative pre-repurchase earnings surprises into two groups depending on whether it is the first time that a firm is having the negative surprise. We then perform our baseline regression analysis using these two subsamples where firms that have slightly positive earnings surprises are used as controls. The results are presented in Table 4.

Interestingly, suppliers tend to lose customers indiscriminately when it is the first time a supplier is having a negative pre-repurchase earnings surprise. This suggests that major customers are not particularly concerned about their suppliers' performance if the short-term incentive may happen only once. The fact that firms are more likely to lose customers in general shows that the supply-side mechanism is the dominating effect under this circumstance, as firms still suffer from reduction in investment and sales growth. On the contrary, if a supplier has had negative pre-repurchase earnings surprises before, they are more likely to lose major customers as opposed to minor customer, indicating that the demand-side mechanism outweighs the supply-side mechanism. In addition, we observe a reduced likelihood of minor customer losses. There are two potential reasons: first, minor customers do not know or do not care about their suppliers' financial conditions as they are not dependent on these suppliers, or they may underestimate the consequences as there are previous cases of negative earnings surprises; and second, discounts or other benefits may be offered to minor customers as they would be easier to preserve compared with major customers that have higher bargaining power. These two possible explanations are not mutually exclusive and both lend support to our argument that major customers actively monitor their suppliers' financial statements.

3.4 Dependent customers

The incentive to monitor suppliers' corporate governance inefficiencies such as earnings short-termism may vary across different customers with respect to their dependence on the corresponding suppliers. Customers that buy a fairly large proportion of inputs from a specific supplier are expected to have higher incentives to monitor the supplier and further take the *exit* strategy if the supplier is short-term oriented. To measure whether a customer is a dependent customer, we first calculate a customer's input dependence on a supplier using the supplier-customer pair-level sales volume divided by the customer's COGS. Next, we define *Dependent Customer* as a dummy variable that equals one if the input dependence is above the sample median, and zero otherwise. We also adopt a stricter proxy *Dependent Customer1* where an additional requirement is imposed that the supplier needs to be one of the top 3 suppliers to the customer regarding the input

dependence in our sample.

Table 5 reports the results on the heterogeneity in customers' incentive to sever the supply chain relationships based on their input dependence on suppliers. Column 1-2 focus on a small sample where only major customers are included. We find that among all the major customers, only the dependent ones exert governance disciplines on their short-termist suppliers. We then re-perform the baseline analysis in column 3-4 using the full sample, where the major customer dummy is replaced with the dependent customer dummy. The coefficients on the dependent customer dummies capture the monitoring effect of dependent customers on their dependent suppliers. These findings suggest that our results are mainly driven by the dependent customers and that the concern over the stability of future production can serve as a motive to monitor suppliers.

3.5 Heterogeneities regarding customers' incentive to leave

Having established that the supplier-customer relationship breaks caused by firms' short-term incentives are customer-driven due to concerns over suppliers' worsened financial status, we proceed to explore when customers care more about their suppliers' financial policies by performing a set of sub-sample analyses. In particular, we perform the tests from three perspectives: suppliers' ex-ante financial conditions, product market competition, and product specificity.

3.5.1 Financial constraints

First, we examine how firms' ex-ante financial status affects their relationship with customers in the presence of short-term incentives. In the previous section, we have shown that the incentive to conduct EPS-driven repurchases reduces firms' financing capacity, which may result in an indirect cost of financial distress. From the customers' perspective, suppliers' default risk should be higher if they are ex-ante financially constrained and therefore should lead to higher incentives for customers to leave. To evaluate this, we conduct a cross-sectional analysis exploiting the heterogeneities in firms' financial conditions prior to having the short-term incentives. If the major customer losses are indirect costs of financial distress, we should observe more supply chain relationship breaks in firms that are ex-ante financially-constrained.

We adopt two proxies to measure whether a firm is financially constrained: the Hadlock-Pierce and Whited-Wu indices developed by Hadlock and Pierce (2010) and Whited and Wu (2006). We split the sample using the sample medians of these proxies and conduct our baseline analyses on these sub-samples. The results reported in Panel A of Table 6 show that the customer losses are concentrated in relatively constrained firms. This finding holds across our different financial constraint measures, which lends support to our argument that the negative impact of firms' short-term incentives on their customer base is one of the indirect costs of financial distress.[14]

[14]In an untabulated analysis, we also use firms' interest coverage ratio (calculated as the ratio of a firm's EBIT divided by its interest expenses) as the financial condition proxy. We find that firms with ex-ante lower interest coverage suffer more from major customer losses.

3.5.2 Product market competition

We then explore customers' incentive to leave from the angle of suppliers' product market competition. There are multiple forces at play regarding how customers exert their *exit* strategy when suppliers have the earnings short-termism. On the one hand, the corporate governance literature documents a stronger effect of governance when there is limited product market competition (e.g., Giroud and Mueller (2010)). As a result, customers may have less incentive to monitor their suppliers when the competition is fierce and thus less likely to sever the relationship when the supplier is short-term focused. On the other hand, switching costs may play an important role in customers' decision on supply chain relationship termination (Ersahin et al. (2021)). When firms operate in competitive product markets, it may be cheaper for their customers to switch to other suppliers given the relatively high number of outside options. Following this line of argument, we should expect to see more major customer losses in short-termist firms that are faced with intense market competition.

To examine which effect is the dominating effect in our case, we construct two proxies for the extent of competition a firm faces in its product market. The first proxy counts the number of competitors each supplier has in each year disclosed by FactSet Revere. The second proxy is the suppliers' industry HHI developed by Hoberg and Phillips (2016). Both proxies measure the competitive environment of the supplier.

We perform a cross-sectional analysis exploiting these two proxies on product market competition. Specifically, we split the sample into firms that face high/low competition using the sample median. Panel B of Table 6 reports the regression results. We find that the short-termism-incurred major customer losses are concentrated only in firms that operate in competitive markets. This suggests that product market competition is complementary to customer monitoring, and that customers take switching costs into consideration when deciding whether to sever the relationships with their short-termist suppliers.

3.5.3 Product specificity

Another factor that may affect customers' decision to leave is suppliers' product specificity. Similar to product market competition, the access to alternative options may shape customers' incentive to monitor and sever the corresponding supply chain relationships. Although customers may be more motivated to monitor the specific input providers, it is also more difficult for them to find alternative suppliers they can switch to (e.g., Barrot and Sauvagnat (2016); Custódio et al. (2022)). To study this, we follow the literature and use firms' R&D expenditure as our first proxy for product specificity and split the sample into firms with high/low innovation expenditure based on the sample median. Column 1-2 in Panel C of Table 6 report the regression results. We find that major customer losses only happen to firms that produce more homogeneous products, which provides further evidence that high switching costs can mitigate the monitoring effect and entrench customers.

Our second proxy for product specificity rests on Banerjee, Dasgupta, and Kim (2008), where they argue that firms in durable sectors produce differentiated products that are more specific to each individual cus-

tomer, especially to major customers. From the perspective of product specificity, firms operating in durable sectors should be less likely to lose their major customers when having short-term incentives. However, due to the complex nature of durable goods, there may be other forces at play. For instance, durable goods are more likely to require warranty or post-purchase service as opposed to non-durable goods. Customers are thus more likely to be concerned about their suppliers' financial conditions with respect to the ability to provide such services, especially when there might be a drop in product quality due to the short-termism-incurred deteriorated financial capacity (Maksimovic and Titman (1991)). In this line of argument, customers should be more likely to sever their relationships with suppliers that have the incentive to conduct EPS-driven repurchases. It is therefore *a priori* unclear how the relationships between customers and their suppliers for durable goods are affected when these suppliers have short-term incentives.

To evaluate this, we follow the literature and categorize firms whose SIC codes are between 3400 and 4000 as durable goods producers, and those whose SIC codes are between 2000 and 3400 as non-durable goods producers (e.g., Titman and Wessels (1988)). Column 3-4 in Panel C of Table 6 show that the short-termism-incurred major customer losses are concentrated in firms operating in non-durable sectors. Our results differ from that of Custódio et al. (2022) where they find that the indirect costs of financial distress are more pronounced if firms produce durable goods. This may be due to the difference between the two settings. We examine how firms' short-term incentive to conduct EPS-driven repurchases affects supplier-customer relationships. Although this type of repurchases can worsen firms' financial capacity, the fact that firms may self-select into engaging in this type of costly repurchases might serve as a buffer to customers' concern over their financial conditions. Custódio et al. (2022) focuses on the financial distress caused by real estate price shocks, which may have a deeper and wider impact on firms' financing capacity and therefore may result in different dynamics. In our setting, the product-specificity effect is the dominating effect - firms producing durable goods are less likely to lose their major customers due to the high switching costs.

4 How Do Firms Respond to Major Customer Losses?

4.1 Major customer *v.s.* largest customer

When firms are rational, they should expect to see major customers leaving when they have the incentive to conduct EPS-driven repurchases. Expecting this, how do firms respond in order to minimize their losses? Do they prioritize the customers that they have higher sales dependence on, i.e., the largest customer? To answer these questions, we rank each firm's major customers based on the proportion of a firm's sales to these customers and identify the largest customer of each supplier. We then classify all the other major customers (customers that do not take up the largest sales proportion of a particular supplier) as the major - but not the largest - customers. We replace the major customer dummy in Equation 3 with the newly defined largest/major (excluding the largest) customer categories and re-perform the baseline analysis. If firms relinquish their major customers indiscriminately, one would expect to see no difference in the likelihood

of relationship breaks between the largest customer and other major customers.

Column 1-4 of Panel B in Table 7 reports the results. In both the OLS and Cox Hazard specifications, we find no increase in the probability of a supplier losing its largest customer. However, we find consistent evidence that firms experience a significant increase in losing these customers when they have the EPS-driven repurchase incentive. Furthermore, the magnitude of coefficients is larger than that in Table 3, which lends additional support that firms only sacrifice their major - but not largest - customers.

If firms take into account of their sales dependence when deciding which major customers to relinquish, the effect documented above should be stronger in firms whose sales rely heavily on their largest customer. According to the descriptive statistics presented in Panel A of Table 7, the average sales proportion taken up by the largest customer in our sample is 20.8%, which is significantly higher than that of the other major customers (12.5%). For instance, Amgen, a biotechnology company, its largest customer represents about 41% of its total sales in 2007, whilst the other two major customer represent 18% and 16% of its total sales respectively. One would expect that firms like Amgen have higher incentive to preserve their relationships with the largest customer, even at the expense of sacrificing other major customers.

To test this, we focus on a sample including only relationships between suppliers and their major customers where the pair-level sales volume is identifiable. We then split the sample into two subsamples based on the ratio of a supplier's sales proportion to its largest customer divided by the average sales proportion to its other major customers. If the ratio is above the sample median, we categorize the suppliers as the ones with high dependence on their largest customer, and vice versa. Column 5-8 of Panel B in Table 7 reports the regression results. Consistent with our prediction, firms only tend to prioritize the largest customer at the expense of other major customers if their sales rely heavily on their largest customer.

Overall, we find that firms actively manage their customer relationships, but only as a response to the short-termism-incurred major customer losses. In particular, firms are prone to retain their largest customer whilst relinquish other major customers due to their limited capacity. This is especially the case when a firm's sales dependence on the largest customer is substantially higher than that on other major customers.

4.2 Trade credit

How do firms preserve their largest customer? What commitment tools or financial contracts do they exploit to keep these largest customers? One policy that trade firms often use when financially contracting with customers is the provision of trade credit. We explore in this section if firms strategically employ trade credit as a means to manage their supply chain relationships.

It is *a priori* unclear how firms change their trade credit provisions when they have the incentive to conduct EPS-driven repurchases. On the one hand, firms may cut their trade credit extension when experiencing financial difficulties (Costello (2020)); on the other hand, they may offer more trade credit to customers as a way to preserve the relationship (Ersahin et al. (2021)). We examine how firms' trade credit days are affected by their short-term incentives and report the results in Table B.4. We find no effect of the EPS-driven repurchase incentive on firms' reception or extension of trade credit. This suggests that the two

effects mentioned above cancel out with each other in our setting.

Although we do not observe changes in trade credit extension at the firm level, firms may have different priorities among customers and thus manipulate trade credit provision at the relationship level. If firms cut their extension of trade credit towards other major customers to satisfy the trade credit needs of their largest customer, we should expect to see a drop in the accounts payable days of the major - but not the largest - customers. To test this, we calculate each customer's accounts payable days and examine if they are affected by suppliers' short-term incentives. As we can only observe a customer's total accounts payable, the payable days we measure are the required period of payment averaged across all its suppliers. Under the assumption that the short-termist supplier is the only supplier with the incentive to cut trade credit extension, our analysis provides an upper bound of the effect of short-termism on customers' accounts payable days.

We follow the methodology in Ersahin et al. (2021) and collapse the data to the customer-level and perform the analysis using the regression model below:

$$\begin{aligned} Change\,in\,AP\,Days_{j,(t-1,t+1)} = \alpha &+ \beta_1 Neg\_Sue\_Pct_{j,t} + \beta_2 Customer\,Importance_{j,t} \\ &+ \beta_3 Neg\_Sue\_Pct_{j,t} * Customer\,Importance_{j,t} \\ &+ \beta_4 X_{j,t} + \theta_j + \gamma_{ind_j,t} + \epsilon_{j,t}, \end{aligned} \tag{4}$$

where j denotes the customer, and t indicates the quarter. $Neg\_Sue\_Pct_{j,t}$ measures a customer's exposure to its suppliers' earnings short-termism, which is calculated as the number of short-termist suppliers normalized by the total number of suppliers the customer has in that quarter. We include *Customer Importance* and its interaction term with $Neg\_Sue\_Pct_{j,t}$ to disentangle the heterogeneities across different customers with respect to their importance to suppliers. Specifically, *Customer Importance* indicates three different variables that measure the importance based on whether a customer is seen as a major/largest/major but not largest customer by its suppliers.[15] To mitigate the confounding impact of EPS-driven repurchase incentives on the trade credit customers receive in the concurrent quarter, we measure the change in customers' *AP Days* as the ratio between the *AP Days* one quarter after and before the treatment quarter. The quarter level data also allows us to examine the instant change in customers' trade debt following the EPS-driven repurchase incentives.

Consistent with our predictions, Table 8 shows that major - but not the largest - customers are required to make faster payment when their suppliers have short-term incentives. As the relationship-level data is at the annual level, the change in customers' trade debt captured in this test happens sooner than the relationship breaks. This suggests that the worsened trade credit terms to major customers contribute to the relationship breaks. More importantly, the shortened AP Days only apply to major - but not the largest - customers. This finding reconciles with our previous results that firms do not experience an increased likelihood of losing their largest customer.

[15]To quantify the customer importance, we count in how many relationships a customer is viewed as a major/largest/major but not largest customer in that quarter and calculate the log value of one plus the number of these relationships.

Do firms extend more trade credit to their largest customer as a means of retaining the relationships? A plausible test regarding this question requires detailed relationship-level trade credit data. To collect this data, we follow Freeman (2023) and manually identify the accounts receivable extended to individual major customers disclosed by firms' 10-K filings. Due to the voluntary nature of firms' disclosure, our sample size is inevitably restricted to not only include just the major customers, but also the ones towards whom the accounts receivable extended by the supplier is available. This, together with our demanding empirical setting (e.g., we only include firms whose earnings surprises locate in a small window), yield a regression panel with 330 observations.[16]

Our main variable of interest is *Trade Credit*, which defined as the ratio of a firm's accounts receivable extended to each individual customer normalized by the firm's sales to that specific customer. A higher value of *Trade Credit* indicates a better credit term relative to the customer's sales importance. To capture how the credit terms differ across the largest customer and other major customers, we include the dummy variable *Largest Customer* and its interaction term with the *Neg_Sue* indicator. Considering that firms may have varying incentives to keep their largest customer, we define *Largest Customer* as one if a customer is the largest customer not only in the shock year, but also in at least one year of the following three years.[17]

Table 9 presents the results. The dependent variable *Trade Credit* measures the credit term each customer receives from the supplier in the year following the supplier's earnings surprise. We find that suppliers with short-term incentives offer better trade credit terms to their largest customer if they wish to preserve the corresponding relationships. On the contrary, short-termist suppliers provide worse credit terms to their other major customers. This cut in trade credit may be used as a way to finance the increased trade credit extended to the largest customer.[18]

In sum, our findings suggest that short-termist suppliers strategically re-allocate their trade credit extension towards different customers. Expecting that major customers have higher incentive to terminate the supply contracts, firms offer better trade credit terms to their largest customer at the expense of other major customers in order to minimize the adverse impact on their future profitability.

5 Additional Analyses and Robustness Checks

5.1 Additional analyses

In this section, we probe into the potential concerns over the validity of our results and perform a set of additional analyses to mitigate these concerns.

[16]The inclusion of fixed effects also requires that the supplier-customer pairs appear more than once with available trade credit data in our sample, which further reduces our sample size.

[17]This definition allows us to mitigate the bias caused by firms' reluctance to keep their largest customer due to other reasons. For instance, firms may strategically switch to a new product line and target a new group of customers, which may reduce their incentive to retain their largest customer.

[18]Due to the limited sample size, we cannot afford to include the same levels of fixed effects or interaction terms as our baseline regressions. Reassuringly, adopting the same empirical setting as our baseline analysis yields qualitatively similar results.

First, firms with large negative or positive earnings surprises may be intrinsically different and can thus bias our results. To alleviate this concern, we conduct all the previous analyses using observations located in a small window ($-0.003 \leq Sue \leq 0.003$). Restricting our sample to this small window to some extent rules out firms whose earnings surprises are driven by real positive or negative shocks. To test whether our results are sensitive to the choice of window bandwidth, we expand as well as narrow down the window width, allowing it to range from 0.001 to 0.005. Table B.6 presents the results and confirms that our findings are not sensitive to the choice of bandwidth for the small window.

Second, one concern is that limiting the sample to a small window does not guarantee that firms' negative earnings surprises are not triggered by real negative shocks. If this is the case, the observed customer losses can be driven by these real negative shocks instead of firms' short-term incentives. To address this concern, we explore whether firms whose pre-repurchase earnings surprises locate nearer to the left of the zero pre-repurchase earnings surprise threshold suffer more from customer losses compared with those that locate further away but still within a reasonable distance to the left side of the threshold. The intuition is that it is more likely for firms whose earnings surprises are only slightly negative to boost EPS via share repurchases. If the customer losses are truly caused by firms' short-term incentives instead of intrinsic adverse shocks, we should observe more relationship breaks for firms that are more likely to conduct EPS-boosting repurchases. We limit our sample to firms whose pre-repurchase earnings surprises are within the range of $(-0.005, 0)$ and define a dummy variable *Neg_Sue_Small* that equals one if $-0.0025 \leq Sue \leq 0$. Results in Table B.7 provide supporting evidence of this argument and show that among all firms that have small negative pre-repurchase earnings surprises, those that locate nearer to the left of the zero threshold experience more customer losses.

However, the presence of an incentive to conduct EPS-driven repurchases does not always ensure that the repurchases will be carried out. One may argue that firms that eventually engage in repurchases to boost their EPS to meet the analysts' forecast are to some extent different from those that do not. For instance, firms that do not resort to repurchases when they are about to miss the earnings target might be those with real negative shocks. We thus follow Almeida et al. (2016) and limit our treated sample to include only firms that would have had negative earnings surprises in the absence of share repurchases (i.e., firms whose post-repurchase EPS have met the analysts' forecast). Results presented in Table B.8 are similar to our baseline results, which indicates that our findings are unlikely to be driven by actual negative shocks.

Finally, firms may use other earnings management methods instead of share repurchases to boost their EPS, which may lead to omitted variable bias. To alleviate this concern, we exploit total accruals as well as discretionary accruals as proxies for other earnings management activities. We explicitly control for these two proxies in our analyses and report the results in Table B.9. The estimates of our negative pre-repurchase earnings surprise remain significantly positive, suggesting that our findings are not affected by other potential forms of earnings management.

5.2 Robustness checks

In this section, we conduct a battery of robustness tests and discuss the results.

We first examine whether our results are driven by other corporate activities that could take place simultaneously with short-termist repurchases, such as M&As. Boehm and Sonntag (2020) document that when suppliers vertically integrate with one of their customers' competitors, they are more likely to experience a breakdown of their existing supply chain relationships. To rule out the probability of having confounding results, we exclude all the observations where a firm engaged in an M&A deal as an acquiror with a transaction value of more than 50 million dollars in a year. Similarly, we argue that if a firm is fully acquired in an M&A deal, it may undertake some major adjustments in its supply chain components, which would also influence our results. We therefore omit all the firm-year observations if it is the last year a firm appears in Compustat. If our baseline findings are not contaminated by the M&A deals, the coefficient of our negative pre-repurchase earnings surprise indicator should remain significantly positive. Column 1 and 2 of Table 10 report the results and confirm our baseline findings.

The stability of supply chain relationships can be influenced by abnormal changes in firms' economic conditions, which may also affect firms' share repurchases decisions. For instance, when firms are in a period where economic growth is stagnated and are going to miss the EPS forecasts, managers are likely to conduct share repurchases to manipulate the EPS in order to boost market's confidence; in the meantime, firms' customer may break their existing supply chain relationships, not because of the share repurchases, but because of the gloomy economic prospects. To mitigate this concern, we first exclude the years where the 2008 financial crisis took place to account for sudden changes in the overall economic environment.[19] To capture firms' idiosyncratic changes, we next exclude all the firm-year observations where a firm experiences a more than 50% increase/decrease in their PPE. Column 3 and 4 of Table 10 report the results. We continue to find a significantly positive effect of earnings short-termism on major customer losses.

We next proceed to test to what extent the inclusion of polynomials affects our results. In column 5 and 6 of Table 10, we include the second- and third-order polynomials of pre-repurchase earnings surprise as well as their interaction terms with *Neg_Sue* in our baseline model. As is shown in the table, our results are not sensitive to the order of polynomials.

Critics may argue that in our small window sample, firms with slightly negative pre-repurchase earnings surprises may be different to those with positive surprises. These differences, instead of the earnings short-termism, could be driving our results. To alleviate this concern, we perform a Mahalanobis matching based on firms' size, ROA, dividends, and quarterly stock returns. We assign one control firm (firms with positive *Sue*) to each treated firm (firms with negative *Sue*) and repeat our analysis on this matched sample. As is shown in column 7, our results remain significantly positive using this refined sample, suggesting that our findings are not driven by the intrinsic differences between the treated firms and their controls.

Last but not least, we explore a new measure of supply chain relationship breakdowns and re-examine the effect of earnings short-termism exploiting this measure. To be specific, we count the number of customers each firm has as well as the number of customers and major customers each firm loses in that year, and then

[19]Following the literature, we exclude all the observations between 2007 and 2009 as the financial crisis started to show its signs in 2007 and ended in 2009.

calculate the break ratio. We replace our relationship break dummy with the variable *Break Ratio* and *Break Ratio (Major)* and re-run the regression at the supplier level. The results are shown in column 8 and 9 of Table 10 - firms are more likely to lose their major customers when they are have the incentive to conduct EPS-boosting repurchases, which is in line with our baseline findings.

6 Conclusion

This paper adds to the conventional corporate governance literature by highlighting the largely neglected governance role exerted by corporate customers. We focus on a specific form of governance inefficiencies, earnings short-termism, which is not easily identifiable by the general public and requires customers to make actual monitoring efforts. Our findings document an increase in major customers' tendency to sever their relationships with the suppliers that have short-term earnings incentives. This provides novel evidence that downstream firms actively monitor their dependent upstream firms and can exert governance discipline via *exiting* the trading relationships.

This paper also sheds light on how firms respond to major customers' monitoring. We find that firms with earnings short-termism prioritize their largest customer at the expense of other major customers, especially when their sales dependence on the largest customer is high. A closer inspection shows that firms exploit trade credit extension as means of customer entrenchment. This suggests that the effectiveness of downstream firms' governance discipline can be influenced by the financial contracts between the trading partners.

By studying the indirect costs of earnings short-termism, our study makes an additional contribution in examining the consequences of corporate short-termism beyond firm boundaries. By providing the first direct evidence unveiling the adverse impact of earnings short-termism on supply chain stability, our results suggest that short-termism imposes costs similar to the indirect costs of financial distress, and that firm boundary should not serve as the confinement when measuring its economic consequences. Instead, firms' supply chain components should also be considered.

References

Almeida, Heitor, Nuri Ersahin, Vyacheslav Fos, Rustom M. Irani, and Mathias Kronlund, 2019, Do short-term incentives affect long-term productivity?, *SSRN Electronic Journal* .

Almeida, Heitor, Vyacheslav Fos, Po-Hsuan Hsu, Mathias Kronlund, and Kevin Tseng, 2020, Do short-term incentives hurt innovation?, *SSRN Electronic Journal* .

Almeida, Heitor, Vyacheslav Fos, and Mathias Kronlund, 2016, The real effects of share repurchases, *Journal of Financial Economics* 119.

Altman, Edward I, 1984, A further empirical investigation of the bankruptcy cost question, *the Journal of Finance* 39, 1067–1089.

Banerjee, Shantanu, Sudipto Dasgupta, and Yungsan Kim, 2008, Buyer–supplier relationships and the stakeholder theory of capital structure, *the Journal of finance* 63, 2507–2552.

Barrot, Jean Noel, and Julien Sauvagnat, 2016, Input specificity and the propagation of idiosyncratic shocks in production networks, *Quarterly Journal of Economics* 131.

Beaumont, Paul, and Clémence Lenoir, 2019, Building a customer base under liquidity constraints, *Available at SSRN 3232638* .

Bertrand, Marianne, and Sendhil Mullainathan, 2003, Enjoying the quiet life? corporate governance and managerial preferences, *Journal of political Economy* 111, 1043–1075.

Bhojraj, Sanjeev, Paul Hribar, Marc Picconi, and John McInnis, 2009, Making sense of cents: An examination of firms that marginally miss or beat analyst forecasts, *The Journal of Finance* 64, 2361–2388.

Boehm, Johannes, and Jan Sonntag, 2020, Vertical integration and foreclosure: Evidence from production network data, *SSRN* .

Brav, Alon, Wei Jiang, Frank Partnoy, and Randall Thomas, 2008, Hedge fund activism, corporate governance, and firm performance, *The Journal of Finance* 63, 1729–1775.

Breza, Emily, and Andres Liberman, 2017, Financial contracting and organizational form: Evidence from the regulation of trade credit, *Journal of Finance* 72.

Cai, Kelly, and Hui Zhu, 2020, Customer-supplier relationships and the cost of debt, *Journal of Banking & Finance* 110, 105686.

Campello, Murillo, and Janet Gao, 2017, Customer concentration and loan contract terms, *Journal of financial economics* 123, 108–136.

Cen, Ling, Sudipto Dasgupta, Redouane Elkamhi, and Raunaq S Pungaliya, 2016, Reputation and loan contract terms: The role of principal customers, *Review of Finance* 20, 501–533.

Costello, Anna M, 2020, Credit market disruptions and liquidity spillover effects in the supply chain, *Journal of Political Economy* 128, 3434–3468.

Custódio, Cláudia, Miguel Ferreira, and Emilia Garcia-Appendini, 2022, Indirect costs of financial distress .

Dai, Rui, 2012, International accounting databases on wrds: Comparative analysis, *Research Methods & Methodology in Accounting eJournal* .

Dechow, Patricia M, Richard G Sloan, and Amy P Sweeney, 1995, Detecting earnings management, *Accounting review* 193–225.

Ding, Wenzhi, Ross Levine, Chen Lin, and Wensi Xie, 2021, Corporate immunity to the covid-19 pandemic, *Journal of Financial Economics* 141, 802–830.

Ersahin, Nuri, Mariassunta Giannetti, and Ruidi Huang, 2021, Trade credit and the stability of supply chains, *SSRN Electronic Journal* .

Freeman, Kayla, 2023, The lender's lender: Trade credit and the monitoring role of banks, *SSRN Electronic Journal* .

Gillan, Stuart L, and Laura T Starks, 2000, Corporate governance proposals and shareholder activism: The role of institutional investors, *Journal of financial Economics* 57, 275–305.

Giroud, Xavier, and Holger M Mueller, 2010, Does corporate governance matter in competitive industries?, *Journal of financial economics* 95, 312–331.

Giroud, Xavier, and Holger M Mueller, 2011, Corporate governance, product market competition, and equity prices, *the Journal of Finance* 66, 563–600.

Hadlock, Charles J, and Joshua R Pierce, 2010, New evidence on measuring financial constraints: Moving beyond the kz index, *The Review of Financial Studies* 23, 1909–1940.

Hoberg, Gerard, and Gordon Phillips, 2016, Text-based network industries and endogenous product differentiation, *Journal of Political Economy* 124, 1423–1465.

Hribar, Paul, Nicole Thorne Jenkins, and W. Bruce Johnson, 2006, Stock repurchases as an earnings management device, *Journal of Accounting and Economics* 41.

La Porta, Rafael, Florencio Lopez-de Silanes, Andrei Shleifer, and Robert W Vishny, 1997, Legal determinants of external finance, *The journal of finance* 52, 1131–1150.

Larcker, David F, Gaizka Ormazabal, and Daniel J Taylor, 2011, The market reaction to corporate governance regulation, *Journal of financial economics* 101, 431–448.

Maksimovic, Vojislav, and Sheridan Titman, 1991, Financial policy and reputation for product quality, *The Review of Financial Studies* 4, 175–200.

Opler, Tim C, and Sheridan Titman, 1994, Financial distress and corporate performance, *The Journal of finance* 49, 1015–1040.

Patatoukas, Panos N, 2012, Customer-base concentration: Implications for firm performance and capital markets: 2011 american accounting association competitive manuscript award winner, *The accounting review* 87, 363–392.

Son, Byung-Gak, Sangho Chae, and Canan Kocabasoglu-Hillmer, 2021, Catastrophic supply chain disruptions and supply network changes: a study of the 2011 japanese earthquake, *International Journal of Operations & Production Management* .

Titman, Sheridan, and Roberto Wessels, 1988, The determinants of capital structure choice, *The Journal of finance* 43, 1–19.

Whited, Toni M, and Guojun Wu, 2006, Financial constraints risk, *The Review of Financial Studies* 19, 531–559.

Table 1. Descriptive statistics

This table reports the descriptive statistics of our small window sample where $-0.003 \leq Sue_{adj} \leq 0.003$. The sample period spans from 2003 to 2019. *Treated Firms* are defined as the ones with a slightly negative pre-repurchase earnings surprise ($-0.003 \leq Sue_{adj} \leq 0$); *Control Firms* are the ones with a slightly positive pre-repurchase earnings surprise ($0 \leq Sue_{adj} \leq 0.003$). The detailed variable definitions are described in Table A.1.

	Full Sample				Treated Firms				Control Firms			
	Mean	Median	SD	N	Mean	Median	SD	N	Mean	Median	SD	N
Relationship-Level Variables:												
Relationship Break	0.127	0.000	0.333	47063	0.127	0.000	0.333	15765	0.126	0.000	0.332	31298
When the customer is a major customer												
Relationship Break	0.027	0.000	0.162	4704	0.033	0.000	0.179	1562	0.024	0.000	0.153	3142
Firm-Level Variables												
Repurchases	187.242	0.000	1095.094	6263	289.823	0.001	1520.937	2123	134.638	0.000	787.538	4140
Repurchases/Assets	0.016	0.000	0.037	6263	0.020	0.000	0.043	2123	0.014	0.000	0.033	4140
Accretive Repurchases	0.138	0.000	0.345	6263	0.180	0.000	0.384	2123	0.116	0.000	0.320	4140
Size	7.640	7.565	1.802	6263	7.616	7.525	1.914	2123	7.653	7.588	1.743	4140
ROA	0.046	0.056	0.101	6263	0.041	0.054	0.110	2123	0.048	0.058	0.096	4140
Cash	0.144	0.106	0.132	6191	0.137	0.096	0.131	2106	0.149	0.111	0.132	4085
Leverage	0.209	0.190	0.183	6263	0.218	0.202	0.186	2123	0.204	0.183	0.182	4140
Dividend	0.490	0.000	0.500	6263	0.524	1.000	0.500	2123	0.472	0.000	0.499	4140
Number of Customers	13.399	7.000	23.743	6263	12.975	6.000	22.163	2123	13.617	7.000	24.513	4140
Number of Major Customers	0.874	0.000	1.725	6263	0.868	0.000	1.698	2123	0.877	0.000	1.739	4140
When there is at least one major customer												
Number of Major Customers	2.090	1.000	2.140	2618	2.079	1.000	2.096	886	2.095	1.000	2.163	1732

Table 2. Impact of short-term incentives on firm outcomes

This table reports the firm-level estimates of the impact of incentives to conduct EPS-motivated share repurchases on firm outcomes. *Cash* is calculated as $(Cash_{(t+1,t+4)} - Cash_{(t-4,t-1)})/Assets_{(t-4,t-1)}$, where t is the earnings surprise quarter. *Interest Coverage* is at the annual level and is calculated as EBIT/interest expenses in year $t+1$. We measure *Investment* as $(CAPEX_{(t+1,t+4)} - CAPEX_{(t-4,t-1)})/Assets_{(t-4,t-1)}$, and measure *Sales Growth* as $(Sales_{(t+1,t+4)} - Sales_{(t-4,t-1)})/Sales_{(t-4,t-1)}$. Our main independent variable *Neg_Sue* is a dummy variable indicating whether a firm has a negative pre-repurchase EPS surprise. We also include the size of the pre-repurchase EPS surprise, as well as its interaction term with the sign of the surprise. The detailed variable definitions are described in Table A.1. To mitigate the concern of systematic differences between firms that fall on either side of a zero pre-repurchase EPS surprise, we limit our analysis to a small window where $-0.003 \leq Sue_{adj} \leq 0.003$. We control for firm fixed effects, time × industry fixed effects and firm-level characteristics (size, ROA, dividend, and quarterly stock return). All standard errors are clustered at the firm level and are reported in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% level, respectively.

	Cash	Interest Coverage	Investment	Sales Growth
	(1)	(2)	(3)	(4)
Neg_Sue	-0.0063***	-0.0797**	-0.0003***	-0.0215***
	(0.002)	(0.032)	(0.000)	(0.005)
Observations	51493	9676	50927	51121
R^2	0.401	0.760	0.385	0.445
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Time*Industry FE	Yes	Yes	Yes	Yes

Table 3. Impact of short-term incentives on supplier-customer relationships

This table reports estimates of the impact of incentives to conduct EPS-motivated share repurchases on the stability of supplier-customer relationships. Column (1)-(3) report the OLS regression results, whilst column (4)-(7) report results estimated by the Cox Hazard model. The outcome variable *Relationship Break* measures whether a supplier-customer relationship is active in year t but is no longer active in year $t+1$. Our main independent variable *Neg_Sue* is a dummy variable indicating whether a firm has a negative pre-repurchase EPS surprise, where the pre-repurchase EPS surprise is calculated as the difference between the repurchase-adjusted EPS and the median end-of-quarter EPS forecast, scaled by the end-of-quarter stock price. *Major Customer* is a dummy variable that equals one if a supplier-customer relationship is covered by the Compustat Segment data (i.e., if the customer represents more than 10% of the supplier's sales). We also include the size of the pre-repurchase EPS surprise, as well as its interaction term with the sign of the surprise. To mitigate the concern of systematic differences between firms that fall on either side of a zero pre-repurchase EPS surprise, we limit our analysis to a small window where $-0.003 \leq Sue_{adj} \leq 0.003$. All variables are defined in Table A.1. We control for the supplier-level characteristics (size, ROA, dividend, and quarterly stock return) in certain specifications. In OLS regressions, we include the supplier× customer fixed effects, customer × year fixed effects, supplier industry × customer industry × year fixed effects. In the Cox Hazard model, we control for year strata, supplier industry strata, customer industry strata, and supplier industry × customer industry strata across different specifications. All standard errors are clustered at the supplier-customer pair-level and are reported in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% level, respectively.

	Relationship Break						
	OLS			Cox Hazard Model			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Neg_Sue	0.006	0.001	0.001	0.009	0.016	0.009	0.016
	(0.007)	(0.008)	(0.008)	(0.030)	(0.030)	(0.030)	(0.030)
Neg_Sue × Major Customer		0.043***	0.045***	0.597***	0.596***	0.597***	0.596***
		(0.015)	(0.015)	(0.203)	(0.202)	(0.203)	(0.202)
Observations	47108	47108	47063	85305	85209	85305	85209
R^2	0.651	0.652	0.653				
Controls	No	No	Yes	No	Yes	No	Yes
Supplier*Customer FE	Yes	Yes	Yes				
Customer*Year FE	Yes	Yes	Yes				
S.Industry*C.Industry*Year FE	Yes	Yes	Yes				
Year Strata				Yes	Yes	Yes	Yes
S.Industry Strata				Yes	Yes	No	No
C.Industry Strata				Yes	Yes	No	No
S.Industry*C.Industry Strata				No	No	Yes	Yes

Table 4. Evidence on major customer monitoring - previous earnings short-termism

This table examines how the destabilizing effect of short-termism on supply chains varies with respect to whether the negative pre-repurchase earnings surprise is the first time or not. Column (1) reports the results using the sample where only firms with the first-time negative earnings surprises are included. On the contrary, the negative earnings surprises included in Column (2) are not the first earnings surprise firms have had in our sample. The outcome variable *Relationship Break* measures whether a supplier-customer relationship is active in year t but is no longer active in year $t+1$. *Neg_Sue (1st time)* is a dummy variable indicating whether the negative pre-repurchase EPS surprise of a firm is the first time. Similarly, *Neg_Sue (>1st)* is a dummy variable indicating whether the negative pre-repurchase EPS surprise of a firm is not the first time. *Major Customer* is a dummy variable that equals one if a supplier-customer relationship is covered by the Compustat Segment data (i.e., if the customer represents more than 10% of the supplier's sales). We also include the size of the pre-repurchase EPS surprise, as well as its interaction term with the sign of the surprise. To mitigate the concern of systematic differences between firms that fall on either side of a zero pre-repurchase EPS surprise, we limit our analysis to a small window where $-0.003 \leq Sue_{adj} \leq 0.003$. All variables are defined in Table A.1. We control for the supplier-level characteristics (size, ROA, dividend, and quarterly stock return) in both specifications. We include the supplier× customer fixed effects, customer × year fixed effects, and supplier industry × customer industry × year fixed effects. All standard errors are clustered at the supplier-customer pair-level and are reported in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% level, respectively.

	Relationship Break	
	(1)	(2)
Neg_Sue (1st time)	0.021**	
	(0.009)	
Neg_Sue (1st time) × Major Customer	0.015	
	(0.018)	
Neg_Sue (>1st)		-0.041***
		(0.014)
Neg_Sue (>1st) × Major Customer		0.108***
		(0.025)
Observations	37989	30562
R^2	0.659	0.678
Controls	Yes	Yes
Supplier*Customer FE	Yes	Yes
Customer*Year FE	Yes	Yes
S.Industry*C.Industry*Year FE	Yes	Yes

Table 5. Evidence on major customer monitoring - dependent customers

This table examines how the destabilizing effect of short-termism on supply chains varies when the supplier is of different degree of importance to its customers. Column (1)-(2) use the sample where only the supplier-customer relationships in which the customer represents more than 10% of the supplier's sales are included, whilst column (3)-(4) use the full sample. The outcome variable *Relationship Break* measures whether a supplier-customer relationship is active in year t but is no longer active in year $t+1$. *Dependent Customer* is a dummy variable that equals one if the ratio of the sales volume between the supplier-customer pair divided by the customer's COGS is above the sample median, and zero otherwise. *Dependent Customer1* builds on the definition of *Dependent Customer* and further adds an additional condition where the supplier needs to be one of the top 3 suppliers to a customer regarding the sales volume in the sample. We also include the size of the pre-repurchase EPS surprise, as well as its interaction term with the sign of the surprise. To mitigate the concern of systematic differences between firms that fall on either side of a zero pre-repurchase EPS surprise, we limit our analysis to a small window where $-0.003 \leq Sue_{adj} \leq 0.003$. All variables are defined in Table A.1. We control for the supplier-level characteristics (size, ROA, dividend, and quarterly stock return) in all specifications. We include the supplier× customer fixed effects, customer × year fixed effects, and supplier industry × customer industry × year fixed effects. All standard errors are clustered at the supplier-customer pair-level and are reported in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% level, respectively.

	Relationship Break			
	(1)	(2)	(3)	(4)
Neg_Sue	-0.001	0.014	0.005	0.005
	(0.016)	(0.015)	(0.007)	(0.007)
Neg_Sue × Dependent Customer	0.057**		0.036*	
	(0.028)		(0.021)	
Neg_Sue × Dependent Customer1		0.059*		0.052**
		(0.034)		(0.026)
Sample	Major Customers	Major Customers	Full Sample	Full Sample
Observations	2840	2840	47063	47063
R^2	0.658	0.659	0.652	0.652
Controls	Yes	Yes	Yes	Yes
Supplier*Customer FE	Yes	Yes	Yes	Yes
Customer*Year FE	Yes	Yes	Yes	Yes
S.Industry*C.Industry*Year FE	Yes	Yes	Yes	Yes

Table 6. Impact of short-term incentives on supplier-customer relationships - subsample analysis

This table reports how the impact of incentives to conduct EPS-motivated share repurchases on the stability of supplier-customer relationships differs in different sub-samples. We conduct three sets of tests from the perspective of financial constraints, product market competition, and product specificity. We use the Hadlock-Pierce Index and Whited-Wu Index to proxy for financial constraints. To measure competition, we use the number of competitors each firm has in each year documented by FactSet Revere and the supplier industry HHI developed by Hoberg and Phillips (2016). We follow the literature and use R&D expenses and whether a firm operates in the durable sector to proxy for product specificity (e.g. Barrot and Sauvagnat (2016); Banerjee et al. (2008)). We categorize firms whose SIC codes are between 3400 and 4000 as durable goods producers, and those whose SIC codes are between 2000 and 3400 as non-durable goods producers (e.g., Titman and Wessels (1988)). The outcome variable *Relationship Break* measures whether a supplier-customer relationship breaks in year $t+1$. Our main independent variable *Neg_Sue* is a dummy variable indicating whether a firm has a negative pre-repurchase EPS surprise. *Major Customer* is a dummy variable that equals one if a supplier-customer relationship is covered by the Compustat Segment data (i.e., if the customer represents more than 10% of the supplier's sales). We also include the size of the pre-repurchase EPS surprise, as well as its interaction term with the sign of the surprise. To mitigate the concern of systematic differences between firms that fall on either side of a zero pre-repurchase EPS surprise, we limit our analysis to a small window where $-0.003 \leq Sue_{adj} \leq 0.003$. All variables are defined in Table A.1. We include the supplier× customer fixed effects, customer × year fixed effects, supplier industry × customer industry × year fixed effects and supplier-level characteristics (size, ROA, dividend, and quarterly stock return). All standard errors are clustered at the supplier-customer pair-level and are reported in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% level, respectively.

	Relationship Break			
	(1)	(2)	(3)	(4)
Panel A: Financial Constraint				
	Hadlock-Pierce Index		Whited-Wu Index	
Neg_Sue	0.000	-0.006	-0.010	-0.004
	(0.015)	(0.011)	(0.013)	(0.013)
Neg_Sue × Major Customer	0.088***	0.024	0.092***	0.024
	(0.028)	(0.024)	(0.024)	(0.030)
Observations	18687	17845	20391	14952
R^2	0.681	0.748	0.677	0.768
Sample	Fin Constrained	Fin Un-Constrained	Fin Constrained	Fin Un-Constrained
Panel B: Competition				
	Number of Competitors		HHI	
Neg_Sue	-0.026**	0.021	0.019	-0.008
	(0.012)	(0.015)	(0.016)	(0.012)
Neg_Sue × Major Customer	0.060**	0.031	0.086**	0.030
	(0.026)	(0.026)	(0.035)	(0.020)
Observations	20989	16510	12434	22860
R^2	0.734	0.692	0.718	0.716
Sample	Competitive	Uncompetitive	Competitive	Uncompetitive
Panel C: Product Specificity				
	R&D		Durable Sector	
Neg_Sue	-0.013	0.001	0.009	-0.000
	(0.021)	(0.010)	(0.011)	(0.017)
Neg_Sue × Major Customer	0.013	0.059***	0.026	0.084***
	(0.035)	(0.023)	(0.024)	(0.026)
Observations	8976	28793	18936	6894
R^2	0.695	0.714	0.617	0.705
Sample	High R&D	Low R&D	Durable	Non Durable
Controls	Yes	Yes	Yes	Yes
Supplier*Customer FE	Yes	Yes	Yes	Yes
Customer*Year FE	Yes	Yes	Yes	Yes
S.Industry*C.Industry*Year FE	Yes	Yes	Yes	Yes

Table 7. Impact of short-term incentives on supplier-customer relationships - largest customer v.s. other major customers

This table reports the heterogeneous impact of earnings short-termism on the stability of supplier-customer relationships across the largest and other major customers. Panel A splits the major customers into the largest one and other major ones and reports the descriptive statistics. Panel B reports the regression results. The outcome variable *Relationship Break* measures whether a supplier-customer relationship breaks in year $t+1$. Our main independent variable *Neg_Sue* is a dummy variable indicating whether a firm has a negative pre-repurchase EPS surprise. *Largest Customer* is a dummy variable indicating whether a customer is the firm's largest customer. *Major Customer (excl Largest)* is a dummy variable indicating whether a customer is a major but not the largest customer. Column(1)-(4) in Panel B perform the baseline regression where both the largest and other major customer dummies are included. Column (5)-(8) split the sample into firms that rely heavily on their largest customer as opposed to other major customers and firms that do not, where the dependence is measured by sales volume. We also include the size of the pre-repurchase EPS surprise, as well as its interaction term with the sign of the surprise. To mitigate the concern of systematic differences between firms that fall on either side of a zero pre-repurchase EPS surprise, we limit our analysis to a small window where $-0.003 \leq Sue_{adj} \leq 0.003$. All variables are defined in Table A.1. We include firm-level controls (size, ROA, dividend, and quarterly stock return) and different levels of fixed effects or strata across specifications. All standard errors are clustered at the supplier-customer pair-level and are reported in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% level, respectively.

Panel A	*Descriptive Statistics*							
	Largest Customers			Major Customers (excl Largest)			Difference	
	Mean	Median	N	Mean	Median	N	Difference	P-Value
Sales Proportion	0.208	0.166	2527	0.125	0.113	1467	0.083***	0.000
Size	10.575	10.762	2406	10.372	10.457	3592	0.203***	0.000
ROA	0.062	0.062	2406	0.050	0.049	3581	0.012***	0.000
Dividend	0.768	1.000	2406	0.764	1.000	3592	0.004	0.718
Stock Return	0.034	0.042	2400	0.031	0.036	3575	0.003	0.401

Panel B	*Relationship Break*							
	OLS		Cox Hazard Model		OLS		Cox Hazard Model	
Neg_Sue	0.001	0.001	0.016	0.016	-0.004	0.058**	-0.077	0.503***
	(0.008)	(0.008)	(0.030)	(0.030)	(0.040)	(0.029)	(0.133)	(0.114)
Neg_Sue × Largest Customer	0.029	0.032	-0.064	-0.064	0.063	0.010	-0.044	-0.155
	(0.021)	(0.021)	(0.294)	(0.294)	(0.045)	(0.044)	(0.447)	(0.548)
Neg_Sue × Major Customer (excl Largest)	0.056***	0.058***	1.241***	1.241***	0.199**	-0.025	1.806***	0.482
	(0.020)	(0.020)	(0.275)	(0.275)	(0.082)	(0.045)	(0.653)	(0.527)
Observations	47108	47063	85209	85209	2507	2773	9814	11499
R^2	0.652	0.653			0.770	0.765		
Dep. on Largest Customer					High	Low	High	Low
Controls	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supplier*Customer FE	Yes	Yes			Yes	Yes		
Customer*Year FE	Yes	Yes			Yes	Yes		
S.Industry*C.Industry*Year FE	Yes	Yes			Yes	Yes		
Year Strata			Yes	Yes			Yes	Yes
S.Industry Strata			Yes	No				
C.Industry Strata			Yes	No				
S.Industry*C.Industry Strata			No	Yes			Yes	Yes

Table 8. Impact of short-term incentives on trade credit - customer-level evidence

This table reports how customers' accounts payable is affected by suppliers' short-term incentives. We collapse the relationship-level data to customer-level and define the main independent variable *Neg_Sue_Pct* as the ratio of the number of suppliers with short-term incentives divided by the total number of suppliers a customer has in that quarter. *#.Major Customer* is measured as the log number of supplier-customer relationships a customer has in which it is a major customer in that quarter. *#.Largest Customer* and *#.Major Customer (excl Largest)* are defined in a smilar way. To capture the immediate effect of supplier's short-term incentives on customers' accounts payable, *Change in AP Days* is calculated as $Accounts\ Payable\ Days_{t+1}/Accounts\ Payable\ Days_{t-1}$, where t is the supplier's earnings surprise quarter and accounts payable is normalized by customer's COGS in the corresponding quarter. To mitigate the concern of systematic differences between firms that fall on either side of a zero pre-repurchase EPS surprise, we limit our analysis to a small window where $-0.003 \leq Sue_{adj} \leq 0.003$. We control for firm fixed effects, year-quarter × industry fixed effects and customer-level characteristics (size, ROA, dividend, leverage, and cash). All standard errors are clustered at the firm level and are reported in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% level, respectively.

	Change in AP Days			
	(1)	(2)	(3)	(4)
Neg_Sue_Pct	-0.010	-0.007	-0.010	-0.007
	(0.008)	(0.008)	(0.008)	(0.008)
Neg_Sue_Pct × #.Major Customer		-0.055*		
		(0.029)		
Neg_Sue_Pct × #.Largest Customer			-0.033	
			(0.048)	
Neg_Sue_Pct × #.Major Customer (excl Largest)				-0.078**
				(0.034)
Observations	35943	35943	35943	35943
R^2	0.208	0.208	0.208	0.208
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year-Quarter*Industry FE	Yes	Yes	Yes	Yes

Table 9. Impact of short-term incentives on trade credit - supplier-customer pair-level evidence

This table reports the estimates of how suppliers' short-term incentives affect supplier-customer pair-level trade credit. The dependent variable *Trade Credit* is defined as the ratio of a firm's trade receivable balance with a customer to its annual sales to that customer. Our main independent variable *Neg_Sue* is a dummy variable indicating whether a firm has a negative pre-repurchase EPS surprise. *Largest Customer* is a dummy variable that equals one if a customer is the firm's largest customer in both the earnings surprise year and the following year. To mitigate the concern of systematic differences between firms that fall on either side of a zero pre-repurchase EPS surprise, we limit our analysis to a small window where $-0.003 \leq Sue_{adj} \leq 0.003$. All variables are defined in Table A.1. We control for supplier× customer fixed effects, customer × year fixed effects, and supplier-level characteristics (size, ROA, dividend, and quarterly stock return). All standard errors are clustered at the supplier-customer pair-level and are reported in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% level, respectively.

	Trade Credit	
	(1)	(2)
Neg_Sue	-0.025	-0.031*
	(0.017)	(0.017)
Neg_Sue × Largest Customer	0.042*	0.044**
	(0.022)	(0.022)
Observations	331	330
R^2	0.891	0.893
Controls	No	Yes
Supplier*Customer FE	Yes	Yes
Customer*Year FE	Yes	Yes

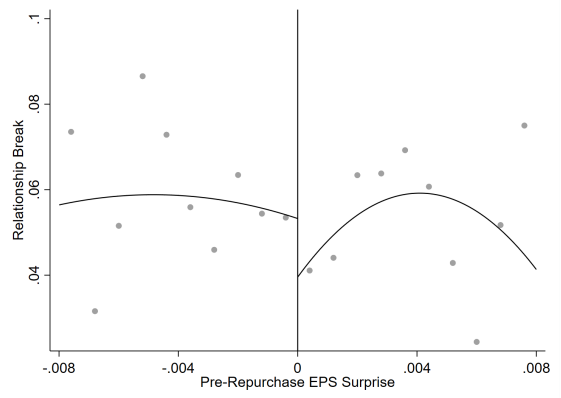
Table 10. Robustness check

This table reports the estimates of robustness tests of our baseline analysis. In the first two columns, we exclude suppliers that have engaged in M&A deals in that year. Specifically, in column (1), We exclude all the suppliers that have acquired another firm in that year; and in column (2), we exclude the ones that were acquired and removed from Compustat. In column (3), we exclude the observations during the financial crisis (2007-2009). In column (4), we exclude firms that experience a more than 50% increase/decrease in PPE to rule out the possibility of abnormal expansions. In column (5) and (6), we further control for the second- and third-order polynomial and its interaction terms with the sign of the pre-repurchase surprise. In column (7), we use a matched sample where each treated firm with a negative *Sue* is matched with one control firm that has a positive *Sue* based on firms' size, ROA, dividends, and quarterly stock returns. In column (8) and (9), we define two new outcome variables as a way to measure the intensity of relationship breaks and perform the analysis at the supplier firm-year level. The outcome variable *Break Ratio* is measured as the number of customer relationship breaks divided by the total number of customers a supplier has. Similarly, *Break Ratio (Major)* is measured as the number of major customer losses divided by the total number of customers a supplier has. Our main independent variable *Neg_Sue* is a dummy variable indicating whether a firm has a negative pre-repurchase EPS surprise. We also include the size of the pre-repurchase EPS surprise, as well as its interaction term with the sign of the surprise. To mitigate the concern of systematic differences between firms that fall on either side of a zero pre-repurchase EPS surprise, we limit our analysis to a small window where $-0.003 \leq Sue_{adj} \leq 0.003$. All variables are defined in Table A.1. We control for different levels of fixed effects and supplier-level characteristics (size, ROA, dividend, and quarterly stock return). All standard errors are clustered at the supplier-customer pair-level in column (1)-(7) and are clustered at the supplier level in column (8)-(9) and are reported in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% level, respectively.

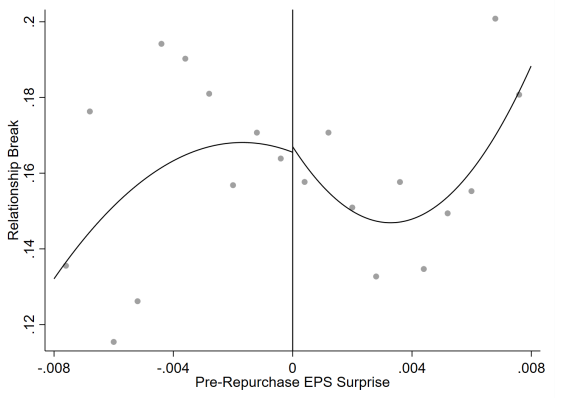
	Relationship Break								
	Excl M&A		Excl Fin. Crisis	Excl $\lvert\Delta PPE\rvert \geq 50\%$	Poly2	Poly3	Matched Sample	Break Ratio	Break Ratio(Major)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Neg_Sue	-0.007	-0.016*	-0.004	-0.012	-0.010	-0.006	0.011	0.013	0.006*
	(0.011)	(0.009)	(0.008)	(0.008)	(0.009)	(0.011)	(0.010)	(0.009)	(0.003)
Neg_Sue × Major Customer	0.045**	0.037**	0.042**	0.070***	0.044***	0.044***	0.045**		
	(0.021)	(0.015)	(0.017)	(0.016)	(0.015)	(0.015)	(0.018)		
Observations	27713	36255	41701	39165	47063	47063	31458	10227	10227
R^2	0.684	0.656	0.667	0.669	0.653	0.653	0.675	0.259	0.400
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supplier*Customer FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Customer*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
S.Industry*C.Industry*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Year FE								Yes	Yes
Supplier FE								Yes	Yes

Figure 1: Impact of pre-repurchase EPS surprises on the relationships with customers

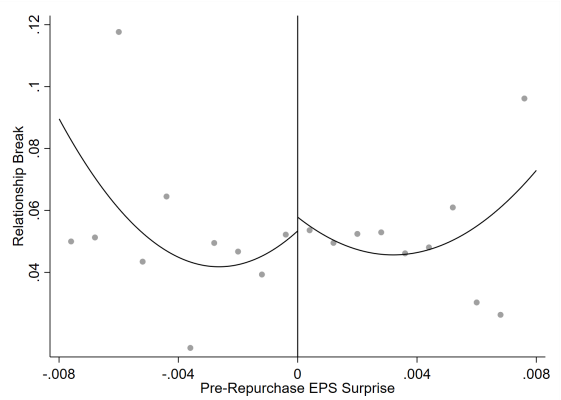
This figure depicts the probability of relationship breaks between firms and their customers. For every earnings surprise bin, the dots represent the probability of a customer relationship break. The lines are second-order polynomials fitted through the estimated relationship break probabilities on each side of the zero pre-repurchase earnings surprise. Figure (a) uses the sample with all the major customers; Figure (b) uses the sample with small customers; Figure (c) includes only the largest customer of each supplier; and Figure (d) uses the sample with all the major customers excluding the largest ones.



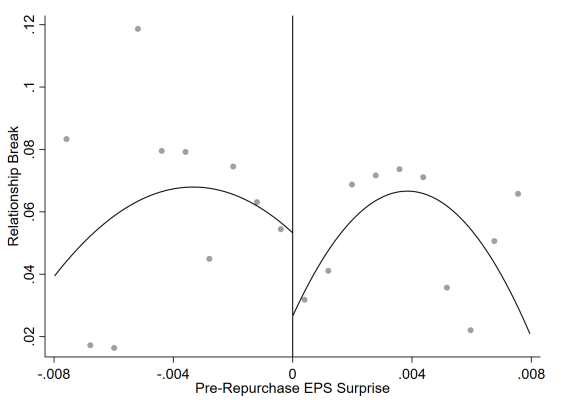
(a) Major Customer



(b) Small Customer



(c) Largest Customer



(d) Major Customer (excl. Largest Customer)

Appendix A: Variable Definitions

Table A.1. Variable Definitions

This table shows the definitions of all the variables used in this paper.

Variable	Definition	Source
Relationship-Level Variables		
Relationship Break	A dummy variable that equals one if and only if the supplier-customer relationship is active in year t but not active in year $t+1$.	FactSet Revere
Major Customer	An indicator variable that equals one if a customer is a major customer of the supplier (if the supplier-customer relationship appears in the Compustat Segment data), zero otherwise.	Compustat Segment
Largest Customer	An indicator variable that equals one if a customer is the largest customer of the supplier (the customer that takes up the supplier's highest sales proportion), zero otherwise.	Compustat Segment
Major Customer (excl Largest)	An indicator variable that equals one if a customer is a major but not the largest customer of the supplier, zero otherwise.	Compustat Segment
Break Ratio	The number of customer relationship breaks divided by the total number of customers in that year.	FactSet Revere
Trade Credit	This variable measures trade credits at the supplier-customer level. We calculate it as the supplier's receivables to a specific customer normalized by its sales to that customer.	Compustat Segment 10-K
Firm-Level Variables		
Sue_adj	Pre-repurchase EPS surprise calculated as the difference between the repurchase-adjusted EPS and the median end-of-quarter EPS forecast, normalized by the end-of-quarter stock price. The repurchase-adjusted EPS is calculated as $EPS\_adj = \frac{E\_adj}{S\_adj} = \frac{(E+I)}{(S+\Delta S)}$, where E is the reported earnings, I is the estimated forgone interest incurred by the repurchase (calculated as the after-tax return a firm would have obtained if it invested the repurchase stock in a 3-month T-bill), S is the end-of-quarter number of shares, and ΔS is the estimated number of shares repurchased (the amount of repurchase divided by the average daily share price in that quarter).	CRSP Compustat I/B/E/S

continue...

...continued		
Firm-Level Variables		
Neg_Sue	An indicator that equals one if *Sue_adj* is negative, zero otherwise.	Same as above
Accretive_Rep	An indicator that equals one if the repurchase is accretive (if the repurchase increases EPS by at least one cent).	Same as above
Repurchase	Measured as the net repurchase scaled by assets. Net repurchase is calculated as the increase in common Treasury stock if Treasury stock if not zero or missing. If Treasury stock is zero in the current and prior quarter, net repurchase is measured as the difference between stock repurchases and stock issuances. If either of these two amounts is negative, net repurchase is set to zero.	Compustat
AP Days	A firms' accounts payable normalized by its cost of goods sold.	Compustat
AR Days	A firms' accounts receivables scaled by its sales.	Compustat
Whited-Wu Index	Whited-Wu index $= -0.091 \times Cash\,flow + 0.062 \times Dividend\,dummy + 0.021 \times Long-term\,debt - 0.044 \times Size + 0.102 \times Industry\,sales\,growth - 0.035 \times Sales\,growth.$	Compustat
Hadlock-Pierce Index	Hadlock-Pierce index $= -0.737 \times Size + 0.043 \times Size^2 - 0.04 \times Age.$	Compustat
Interest Coverage	Interest coverage ratio is defined as EBIT/interest expenses.	Compustat
Size	Log value of firms' total assets.	Compustat
ROA	Firms' return on asset.	Compustat
Dividend	A dummy variable that equals one if a firm pays positive dividend in a year, zero otherwise.	Compustat
q_ret	Firms' quarterly stock returns.	CRSP

Table A.2. Industry and Country Distribution

This table shows the distributions of firms and their customers in the Fama-French 17 industries as well as in countries/regions. Note: Compustat Global may assign the same unique exchange code for more than one country, so there are 1519 customer firms in the country/region table but only 1513 customer firms in the Fama-French 17 industry table.

Industry	Supplier Firm No. (%)	Customer Firm No. (%)
Food	68(4.82%)	92(4.58%)
Mining and Minerals	7(0.50%)	18(0.90%)
Oil and Petroleum Products	45(3.19%)	58(2.89%)
Textiles, Apparel, Footware	38(2.69%)	41(2.04%)
Consumer Durables	31(2.20%)	40(1.99%)
Chemicals	37(2.62%)	53(2.64%)
Drugs, Soap, Prfums, Tobacco	77(5.45%)	111(5.53%)
Construction and Construction Materials	38(2.69%)	34(1.69%)
Steel Works Etc	19(1.35%)	19(0.95%)
Fabricated Products	14(0.99%)	2(0.10%)
Machinery and Business Equipment	331(23.44%)	320(15.93%)
Automobiles	30(2.12%)	65(3.24%)
Transportation	66(4.67%)	118(5.87%)
Utilities	0(0%)	0(0%)
Retail Stores	35(2.48%)	197(9.81%)
Banks, Insurance Companies, and Other F	0(0%)	0(0%)
Other	576(40.79%)	841(41.86%)
Total	1412(100%)	2009(100%)
Country/Region	Customer Firm No.	Customer Firm%
Australia	35	1.71
Austria	1	0.05
Belgium	7	0.34
Brazil	10	0.49
Bulgaria	1	0.05
Chile	13	0.63
China	27	1.32
Colombia	2	0.10
Croatia	3	0.15
Czech Republic	3	0.15
Denmark	9	0.44
Estonia	1	0.05
Finland	59	2.88
France	54	2.64
Germany	57	2.78
Greece	6	0.29
Hong Kong	50	2.44
Hungary	2	0.10
Iceland	2	0.10
India	38	1.85
Indonesia	18	0.88
Ireland	2	0.10
Israel	98	4.78

continue...

Country/Region	Customer Firm No.	Customer Firm%
continued...		
Italy	65	3.17
Japan	148	7.22
Jordan	2	0.10
Kuwait	3	0.15
Malaysia	8	0.39
Mauritius	1	0.05
Mexico	25	1.22
Morocco	3	0.15
Netherlands	66	3.22
New Zealand	3	0.15
Norway	57	2.78
Pakistan	2	0.10
Peru	1	0.05
Philippines	10	0.49
Poland	9	0.44
Portugal	2	0.10
Qatar	2	0.10
Russia	5	0.24
Saudi Arabia	4	0.20
Singapore	12	0.59
South Africa	19	0.93
South Korea	56	2.73
Spain	62	3.03
Sri Lanka	6	0.29
Sweden	18	0.88
Switzerland	17	0.83
Taiwan	68	3.32
Thailand	17	0.83
Trinidad and Tobago	2	0.10
Turkey	8	0.39
United Arab Emirates	4	0.20
United Kingdom	81	3.95
United States	764	37.29
Vietnam	1	0.05
Total	2049	100.00

Table A.3. Time Series Summary Statistics

This table shows the annual distribution of our final sample.

Year	Supplier Firm	Customer Firm	Customer Relationship	Customer Break
2003	651	848	2819	445
2004	793	977	1677	577
2005	276	621	642	314
2006	185	491	274	252
2007	650	976	1613	304
2008	487	959	708	327
2009	617	1065	750	281
2010	751	1260	1038	457
2011	232	813	608	335
2012	767	1958	3621	820
2013	962	2375	3156	1035
2014	938	2739	3160	1396
2015	927	3024	3488	1587
2016	295	1861	1728	689
2017	212	1586	1156	466
2018	858	3923	7065	2146
2019	1011	5525	10207	2674

Appendix B: Ancillary Results

Table B.1. Impact of short-term incentives on share repurchases

This table reports the relationship between having a negative pre-repurchase EPS surprise and the probability of doing share repurchases. The outcome variable *Accretive_Rep* is an indicator that equals one if the repurchases increase EPS by at least one cent. *Repurchase* is measured as the net repurchase amount scaled by total assets. Our main independent variable *Neg_Sue* is a dummy variable indicating whether a firm has a negative pre-repurchase EPS surprise. We also include the size of the pre-repurchase EPS surprise, as well as its interaction term with the sign of the surprise. We use the full sample as well as a small window where $-0.003 \leq Sue_{adj} \leq 0.003$. We control for firm fixed effects and year-quarter $\times$ industry fixed effects. All standard errors are clustered at the firm level and are reported in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% level, respectively.

	Accretive_Rep		*Repurchase*	
	(1)	(2)	(3)	(4)
Neg_Sue	0.024***	0.048***	0.004***	0.004***
	(0.002)	(0.004)	(0.000)	(0.001)
Observations	93799	55587	93799	55587
R^2	0.318	0.361	0.292	0.332
Small Window	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes
Year-Quarter*Industry FE	Yes	Yes	Yes	Yes

Table B.2. Impact of short-term incentives on supplier-customer relationships: pre-trends

This table reports the pre-trend analysis of the impact of incentives to conduct EPS-motivated share repurchases on the stability of supplier-customer relationships. The column name *Break_i* indicates that we are looking at the relationship breakdowns i year ($i = 1, 2, 3$) before firms' negative earnings surprises. Our main independent variable *Neg_Sue* is a dummy variable indicating whether a firm has a negative pre-repurchase EPS surprise, where the pre-repurchase EPS surprise is calculated as the difference between the repurchase-adjusted EPS and the median end-of-quarter EPS forecast, scaled by the end-of-quarter stock price. *Major Customer* is a dummy variable that equals one if a supplier-customer relationship is covered by the Compustat Segment data (i.e., if the customer represents more than 10% of the supplier's sales). We also include the size of the pre-repurchase EPS surprise, as well as its interaction term with the sign of the surprise. To mitigate the concern of systematic differences between firms that fall on either side of a zero pre-repurchase EPS surprise, we limit our analysis to a small window where $-0.003 \leq Sue_{adj} \leq 0.003$. All variables are defined in Table A.1. We control for supplier× customer fixed effects, customer × year fixed effects, supplier industry × customer industry × year fixed effects and supplier-level characteristics (size, ROA, dividend, and quarterly stock return). All standard errors are clustered at the supplier-customer pair-level and are reported in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% level, respectively.

	Break_1	*Break_2*	*Break_3*
	(1)	(2)	(3)
Neg_Sue	-0.016	0.021	-0.010
	(0.010)	(0.015)	(0.016)
Neg_Sue × Major Customer	-0.006	-0.028	-0.002
	(0.018)	(0.024)	(0.025)
Observations	29333	12537	9645
R^2	0.703	0.735	0.714
Supplier*Customer FE	Yes	Yes	Yes
Customer*Year FE	Yes	Yes	Yes
S.Industry*C.Industry*Year FE	Yes	Yes	Yes

Table B.3. Impact of short-term incentives on supplier-customer relationships: supplier power

This table reports the cross-sectional analysis regarding how supplier power affects customers' monitoring power over earnings short-termism. The outcome variable *Relationship Break* measures whether a supplier-customer relationship is active in year t but is no longer active in year $t+1$. Our main independent variable *Neg_Sue* is a dummy variable indicating whether a firm has a negative pre-repurchase EPS surprise. *Major Customer* is a dummy variable that equals one if a supplier-customer relationship is covered by the Compustat Segment data (i.e., if the customer represents more than 10% of the supplier's sales). *Relative Size (S/C)* captures the supplier power and is calculated as the supplier size divided by the customer size. In the first two columns, we explore whether supplier power exerts a downward pressure on customers' monitoring and their incentive to sever the relationship. In Column 3-4, we split the sample based on the median value of the relative size of supplier and customer and examine the variations in major customers' monitoring power. We also include the size of the pre-repurchase EPS surprise, as well as its interaction term with the sign of the surprise. To mitigate the concern of systematic differences between firms that fall on either side of a zero pre-repurchase EPS surprise, we limit our analysis to a small window where $-0.003 \leq Sue_{adj} \leq 0.003$. All variables are defined in Table A.1. We control for the supplier-level characteristics (ROA, dividend, and quarterly stock return), and include the supplier× customer fixed effects, customer × year fixed effects, as well as supplier industry × customer industry × year fixed effects. All standard errors are clustered at the supplier-customer pair-level and are reported in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% level, respectively.

	Relationship Break			
	(1)	(2)	(3)	(4)
Neg_Sue	0.026*	0.030**	-0.005	0.007
	(0.015)	(0.015)	(0.012)	(0.010)
Neg_Sue × Relative Size (S/C)	-0.024**	-0.027**		
	(0.011)	(0.011)		
Neg_Sue × Major Customer			0.048	0.048***
			(0.115)	(0.017)
Sample	All	All	Large Supplier	Small Supplier
Observations	47082	47037	11492	30372
R^2	0.651	0.652	0.811	0.609
Controls	No	Yes	Yes	Yes
Supplier*Customer FE	Yes	Yes	Yes	Yes
Customer*Year FE	Yes	Yes	Yes	Yes
S.Industry*C.Industry*Year FE	Yes	Yes	Yes	Yes

Table B.4. Impact of short-term incentives on trade credit

This table reports the firm-level estimates of the impact of incentives to conduct EPS-motivated share repurchases on trade credit. We measure *AP Days* as $Accounts\ Payable\ Days_{(t+1,t+4)}$, and measure *AR Days* as $Accounts\ Receivable\ Days_{(t+1,t+4)}$, where t is the earnings surprise quarter. Our main independent variable *Neg_Sue* is a dummy variable indicating whether a firm has a negative pre-repurchase EPS surprise. We also include the size of the pre-repurchase EPS surprise, as well as its interaction term with the sign of the surprise. The detailed variable definitions are described in Table A.1. To mitigate the concern of systematic differences between firms that fall on either side of a zero pre-repurchase EPS surprise, we limit our analysis to a small window where $-0.003 \leq Sue_{adj} \leq 0.003$. We control for firm fixed effects, year-quarter × industry fixed effects and supplier-level characteristics (size, ROA, dividend, and quarterly stock return). All standard errors are clustered at the firm level and are reported in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% level, respectively.

	AP Days		AR Days	
	(1)	(2)	(3)	(4)
Neg_Sue	-0.001	-0.001	0.004	0.002
	(0.005)	(0.005)	(0.003)	(0.003)
Observations	52880	51584	52846	51491
R^2	0.824	0.825	0.856	0.859
Controls	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes
Year-Quarter*Industry FE	Yes	Yes	Yes	Yes

Table B.5. Impact of short-term incentives on firm outcomes: pre-trend analysis

This table reports the pre-trend analysis of how corporate short-term incentives affect firm outcomes. Our main independent variable *Neg_Sue* is a dummy variable indicating whether a firm has a negative pre-repurchase EPS surprise. Same as in the previous tables, we also include the size of the pre-repurchase EPS surprise, as well as its interaction term with the sign of the surprise. To mitigate the concern of systematic differences between firms that fall on either side of a zero pre-repurchase EPS surprise, we limit our analysis to a small window where $-0.003 \leq Sue_{adj} \leq 0.003$. We control for firm fixed effects, year-quarter × industry fixed effects and supplier-level characteristics (size, ROA, dividend, and quarterly stock return). All standard errors are clustered at the firm level and are reported in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% level, respectively.

	t-1	t-2	t-3
	(1)	(2)	(3)
Panel A: Cash			
Neg_Sue	-0.003	-0.005*	-0.003
	(0.002)	(0.002)	(0.003)
Observations	31757	30836	28033
R^2	0.457	0.437	0.438
Panel B: Interest Coverage			
Neg_Sue	0.021	0.030	-0.003
	(0.043)	(0.052)	(0.055)
Observations	6131	3849	3995
R^2	0.763	0.805	0.778
Panel C: Investment			
Neg_Sue	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
Observations	31335	30451	27715
R^2	0.406	0.396	0.408
Panel D: Sales Growth			
Neg_Sue	-0.007	-0.002	0.001
	(0.006)	(0.006)	(0.006)
Observations	31582	30676	27891
R^2	0.522	0.502	0.507
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Time*Industry FE	Yes	Yes	Yes

Table B.6. Impact of short-term incentives on supplier-customer relationships: sensitivity test

This table reports the sensitivity test of the impact of incentives to conduct EPS-motivated share repurchases on the stability of supplier-customer relationships. We adjust the pre-repurchase EPS surprise window and allow it to range from 0.001 to 0.005. Our main independent variable *Neg_Sue* is a dummy variable indicating whether a firm has a negative pre-repurchase EPS surprise, where the pre-repurchase EPS surprise is calculated as the difference between the repurchase-adjusted EPS and the median end-of-quarter EPS forecast, scaled by the end-of-quarter stock price. We also include the size of the pre-repurchase EPS surprise, as well as its interaction term with the sign of the surprise. All variables are defined in Table A.1. We control for supplier × customer fixed effects, customer × year fixed effects, supplier industry × customer industry × year fixed effects and supplier-level characteristics (size, ROA, dividend, and quarterly stock return). All standard errors are clustered at the supplier-customer pair-level and are reported in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% level, respectively.

	Relationship Break				
	(1)	(2)	(3)	(4)	(5)
Neg_Sue	-0.004	-0.010	0.001	0.002	0.004
	(0.013)	(0.009)	(0.008)	(0.007)	(0.007)
Neg_Sue × Major Customer	0.056**	0.051***	0.045***	0.038***	0.027**
	(0.025)	(0.018)	(0.015)	(0.014)	(0.013)
Observations	22511	37928	47063	52513	56635
R^2	0.716	0.669	0.653	0.641	0.635
Bandwidth	0.001	0.002	0.003	0.004	0.005
Supplier*Customer FE	Yes	Yes	Yes	Yes	Yes
Customer*Year FE	Yes	Yes	Yes	Yes	Yes
S.Industry*C.Industry*Year FE	Yes	Yes	Yes	Yes	Yes

Table B.7. Impact of short-term incentives on supplier-customer relationships: degree of EPS surprises

This table estimates whether firms with less negative pre-repurchase EPS surprises are more likely to lose customers compared with those with more negative pre-repurchase EPS surprises. Firms included in this sample all have negative pre-repurchase EPS surprises where $-0.005 \leq Sue \leq 0$. *Neg_Sue_Small* is defined as an indicator variable that equals one if a firm's *Sue* is within the range of $(-0.0025, 0)$, zero if $-0.005 \leq Sue \leq 0.0025$. Same as in the previous tables, we also include the size of the pre-repurchase EPS surprise, as well as its interaction term with *Neg_Sue_Small*. We control for supplier × customer fixed effects, customer × year fixed effects, supplier industry × customer industry × year fixed effects and supplier-level characteristics (size, ROA, dividend, and quarterly stock return). All standard errors are clustered at the supplier-customer pair-level and are reported in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% level, respectively.

	Relationship Break	
	(1)	(2)
Neg_Sue_Small	-0.188	-0.185
	(0.115)	(0.116)
Neg_Sue_Small × Major Customer	0.685***	0.663***
	(0.195)	(0.204)
Observations	7017	7013
R^2	0.808	0.809
Controls	No	Yes
Supplier*Customer FE	Yes	Yes
Customer*Year FE	Yes	Yes
S.Industry*C.Industry*Year FE	Yes	Yes

Table B.8. Impact of short-term incentives on supplier-customer relationships: positive actual EPS surprises

This table reports estimates of the impact of incentives to conduct EPS-motivated share repurchases on the stability of supplier-customer relationships. For the observations that are to the left of the zero pre-repurchase earnings surprise, we only include firm-years that would have missed the EPS forecast if share repurchases had not taken place. Our main independent variable *Neg_Sue* is a dummy variable indicating whether a firm has a negative pre-repurchase EPS surprise. Same as in the previous tables, we also include the size of the pre-repurchase EPS surprise, as well as its interaction term with *Neg_Sue*. We control for supplier × customer fixed effects, customer × year fixed effects, supplier industry × customer industry × year fixed effects and supplier-level characteristics (size, ROA, dividend, and quarterly stock return). All standard errors are clustered at the supplier-customer pair-level and are reported in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% level, respectively.

	Relationship Break	
	(1)	(2)
Neg_Sue	-0.018*	-0.017*
	(0.010)	(0.010)
Neg_Sue × Major Customer	0.038*	0.039*
	(0.022)	(0.022)
Observations	33072	33035
R^2	0.675	0.675
Controls	No	Yes
Supplier*Customer FE	Yes	Yes
Customer*Year FE	Yes	Yes
S.Industry*C.Industry*Year FE	Yes	Yes

Table B.9. Impact of short-term incentives on supplier-customer relationships: controlling for earnings management

This table reports estimates of the impact of incentives to conduct EPS-motivated share repurchases on the stability of supplier-customer relationships, controlling additionally for earnings management. In column (1) and (2), we include firms' total accruals in our baseline regression; whilst in column (3) and (4), we control for the discretionary accruals. Our main independent variable *Neg_Sue* is a dummy variable indicating whether a firm has a negative pre-repurchase EPS surprise. To measure total accruals, we follow the method in Dechow, Sloan, and Sweeney (1995) and normalize total accruals by lagged assets. As for discretionary accruals, we adopt the modified Jones model in Dechow et al. (1995) to obtain the estimates. Same as in the previous tables, we also include the size of the pre-repurchase EPS surprise, as well as its interaction term with the sign of the surprise. To mitigate the concern of systematic differences between firms that fall on either side of a zero pre-repurchase EPS surprise, we limit our analysis to a small window where $-0.003 \leq Sue_{adj} \leq 0.003$. We control for supplier × customer fixed effects, customer × year fixed effects, supplier industry × customer industry × year fixed effects and supplier-level characteristics (size, ROA, dividend, and quarterly stock return). All standard errors are clustered at the supplier-customer pair-level and are reported in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% level, respectively.

	Relationship Break			
	(1)	(2)	(3)	(4)
Neg_Sue	0.001	0.001	0.001	0.001
	(0.008)	(0.008)	(0.008)	(0.008)
Neg_Sue × Major Customer	0.042***	0.045***	0.042***	0.045***
	(0.015)	(0.015)	(0.015)	(0.015)
Total Accruals	0.168***	0.190***		
	(0.057)	(0.057)		
Discretionary Accruals			0.134***	0.151***
			(0.051)	(0.051)
Observations	46280	46235	46259	46214
R^2	0.651	0.652	0.651	0.652
Controls	No	Yes	No	Yes
Supplier*Customer FE	Yes	Yes	Yes	Yes
Customer*Year FE	Yes	Yes	Yes	Yes
S.Industry*C.Industry*Year FE	Yes	Yes	Yes	Yes

Table B.10. Impact of short-term incentives on customer concentration

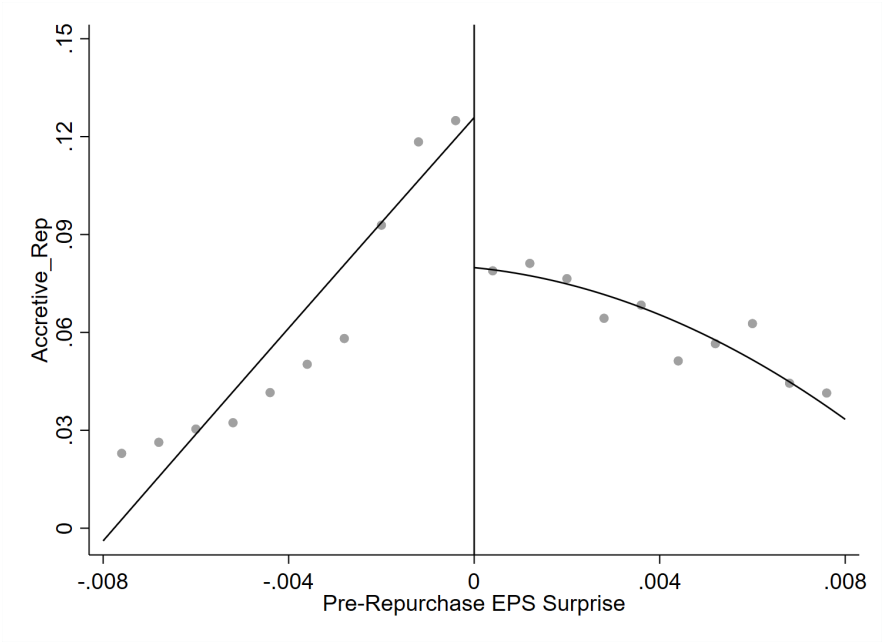
This table reports the firm-level estimates of the impact of incentives to conduct EPS-motivated share repurchases on customer concentration. We measure *Major Customer HHI* as the HHI index of major customer sales in the next year, and measure *Major Customer Proportion* as the proportion of sales to major customers in the next year. Our main independent variable *Neg_Sue* is a dummy variable indicating whether a firm has a negative pre-repurchase EPS surprise. We also include the size of the pre-repurchase EPS surprise, as well as its interaction term with the sign of the surprise. The detailed variable definitions are described in Table A.1. To mitigate the concern of systematic differences between firms that fall on either side of a zero pre-repurchase EPS surprise, we limit our analysis to a small window where $-0.003 \leq Sue_{adj} \leq 0.003$. We control for firm fixed effects, year-quarter × industry fixed effects and supplier-level characteristics (size, ROA, dividend, and quarterly stock return). All standard errors are clustered at the firm level and are reported in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% level, respectively.

	Customer Concentration			
	Major Customer HHI		Major Customer Proportion	
	(1)	(2)	(3)	(4)
Neg_Sue	-0.001**	-0.001**	-0.003**	-0.003**
	(0.001)	(0.001)	(0.001)	(0.001)
Observations	55587	54133	55587	54133
R^2	0.719	0.723	0.768	0.772
Controls	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes
Year-Quarter*Industry FE	Yes	Yes	Yes	Yes

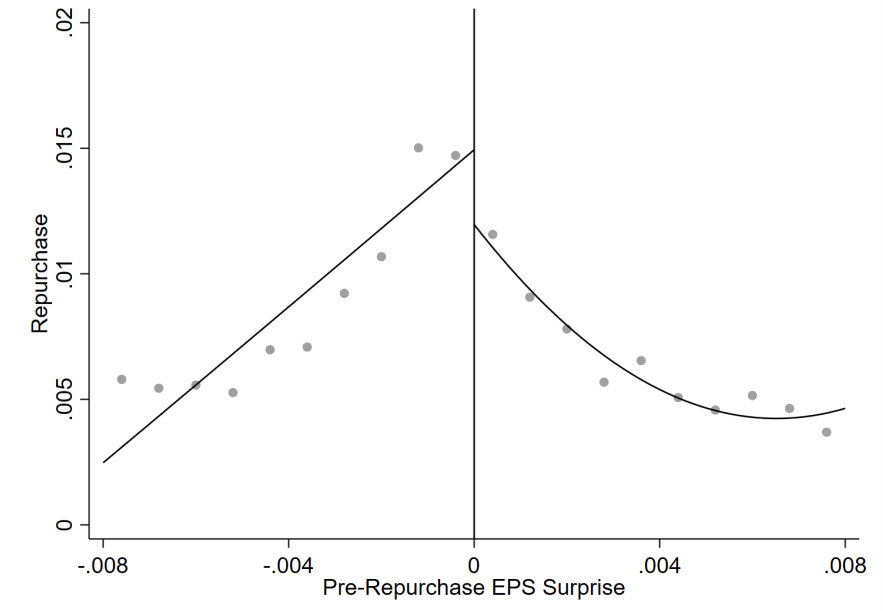
Appendix C: Ancillary Figures

Figure C.1: Impact of short-term incentives on repurchases

This figure depicts the probability and amount of share repurchases as a function of pre-repurchase EPS surprise. In Figure (a), for every earnings surprise bin, the dots represent the probability of accretive share repurchases. In Figure (b), the dots represent the repurchase amount for that corresponding earnings surprise bin. The lines are second-order polynomials fitted through the estimated probability and amount of repurchase on each side of the zero pre-repurchase earnings surprise.



(a)



(b)

Figure C.2: Impact of short-term incentives on repurchases: decretive repurchases

This figure depicts the probability of decretive share repurchases as a function of pre-repurchase EPS surprise. For every earnings surprise bin, the dots represent the probability of decretive share repurchases. The lines are second-order polynomials fitted through the estimated probability of decretive repurchase on each side of the zero pre-repurchase earnings surprise.

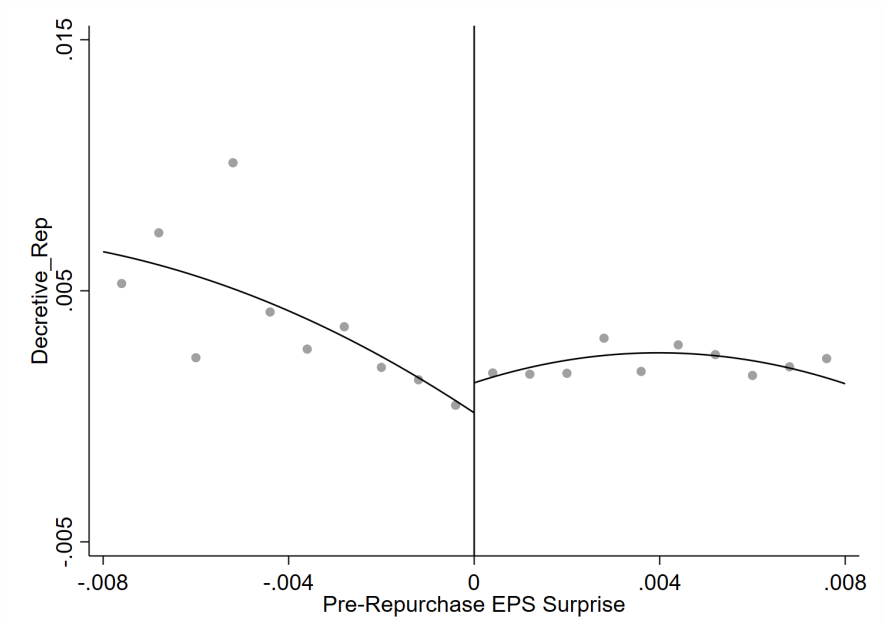
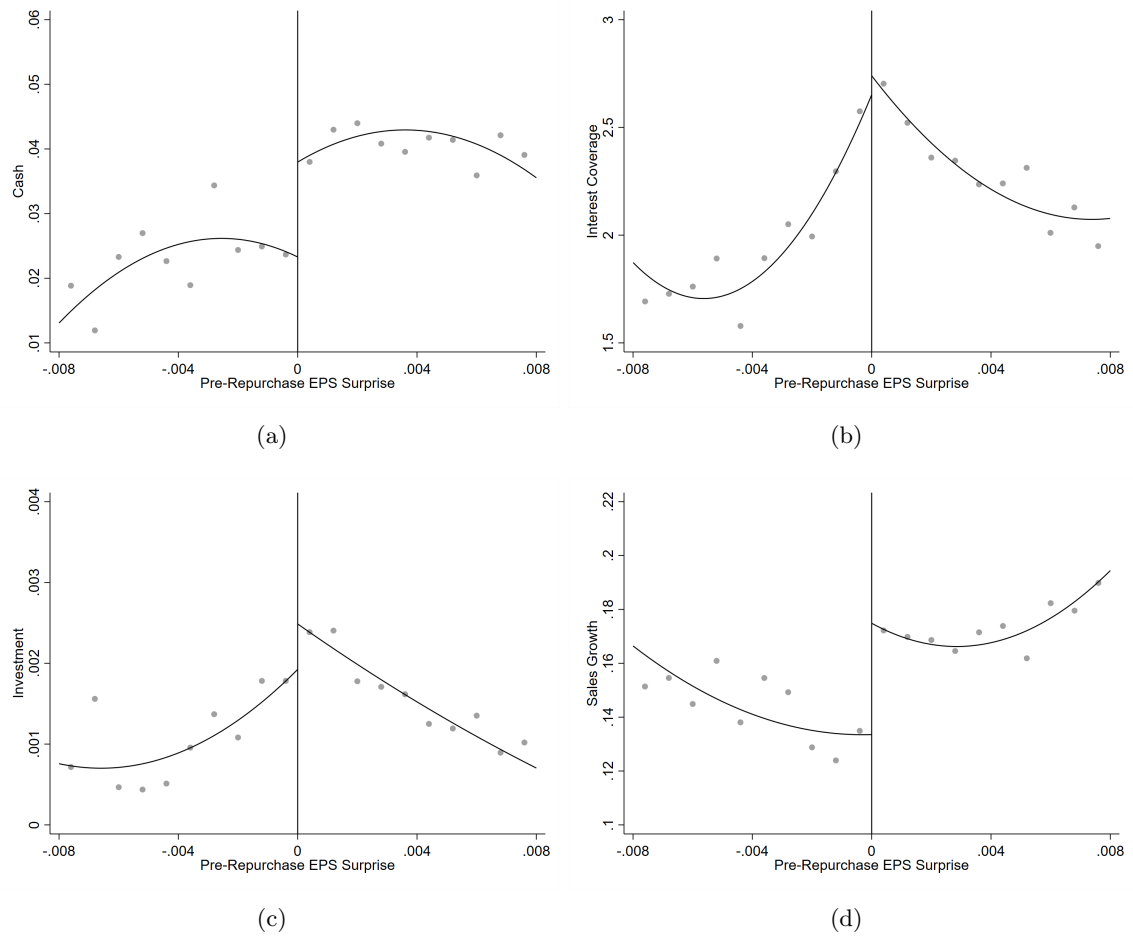


Figure C.3: Impact of short-term incentives on firm outcomes

This figure plots firms' cash, interest coverage, investment, and sales growth as a function of pre-repurchase EPS surprise. The lines are second-order polynomials fitted through the estimated value of outcome variables on each side of the zero pre-repurchase earnings surprise.



(a) (b)

(c) (d)