Will Powerful Customers Push Suppliers to Improve Their Internal Information Quality?

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Abstract

This paper investigates how customer bargaining power impacts suppliers' internal information quality. By collecting data on all U.S. manufacturing firms with major customer data from 2004-2020, we find that suppliers with more powerful customers are associated with better internal information quality. We use the instrumental variable approach to mitigate potential endogeneity concern. The results are also robust to alternative measurements, different sample selection and additional controls. In addition, we find the effect is only exhibited in firms with higher relationship-specific investment, unique product producer, and firms whose customers have higher internal information quality themselves, indicating the effect is driven by customers' monitoring incentives.

Keywords: Customer bargaining power; Internal information quality; Supply chain

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1. introduction

As one of the most influential groups of stakeholders, big and powerful customers play important roles in firms' productions and operations. Prior studies find that customers may use their bargaining power to interfere with suppliers' behavior in order to meet their own objectives, which means customers may extract benefit from suppliers (Porter 1974; Fee and Thomas 2004; Murfin and Njoroge 2015). In this sense, the customer power could impair firms' own profits and lower future performance.[2] The most typical example is Walmart's history of squeezing out the last penny of its independent suppliers (PBS 2004). By contrast, however, powerful customers can also be beneficial to the suppliers. Suppliers can benefit from the effectiveness of collaboration with big and concentrated customers (Patatoukas 2012; Irvine, Park, and Yildizhan 2013). The discipline and monitoring from customers can also help them to improve themselves (Cai and Zhu 2020; Chen et al. 2021). Following prior studies which discuss the advantages and disadvantages of customer bargaining power, this study investigates the effect of customer bargaining power on suppliers' internal information quality.

Firms' internal information quality, which captures the speed, accuracy, and effectiveness of firms' internal information systems to compile and report the useful internal information, is not only essential for firms' decision making (Gallemore and Labro 2015; Heitzman and Huang 2019), but also influential for external stakeholders to get access to the information about firms' operational conditions (Cheng, Cho, and Yang 2018). For those major customers, the efficiency of suppliers' internal information systems also matters in these two aspects. First, the quality of suppliers' internal information is vital for their decision on internal asset allocation and investment (Shroff 2017; Cheng, Cho, and Yang 2018; Heitzman and Huang 2019), which can impact the efficiency of their productions. Because of the interdependent relationship along the supply chain, the suppliers' efficiency of production is

[2] In additional to firm's profitability, previous studies also argue that more powerful customers based is associated with higher risk and cost of capital (Chen et al. 2022), higher cost of external financing (Campello and Gao 2017), higher stock price crash risk (Ma et al. 2020), lower post M&A performance (Dong, Li, and Li 2021), and lower level of public information disclosure (Crawford et al. 2020).

also closely related to the stability of customers' material supply. Second, the quality of suppliers' internal information system can also affect the accuracy and effectiveness for customers to get access to the information about suppliers' operations (Baiman and Rajan 2002; Bauer, Henderson, and Lynch 2018). Consequently, we argue that customers should put importance to suppliers' internal information quality and are more willing to cooperate with suppliers with better internal information quality.

As customers are prone to intervene in suppliers' behavior to protect their benefits (Wang 2012; Cai and Zhu 2020), they will also exert influence on suppliers' internal information quality if they think it is important. We believe customers with higher bargaining power are more likely to affect suppliers' internal information quality, because the bargaining power determines whether customers can exert significant influence on suppliers. This influence might be rooted from two aspects. First, customers can directly use their bargaining power to align suppliers to follow their own objectives, such as corporate social responsibility (Dai, Liang, and Ng 2021), or corporate misconduct (Chen et al. 2021). In that sense, if customers are unsatisfied about supplier's internal information quality, they should have incentives to use their power to discipline suppliers to improve it. Second, the bad internal information quality may make suppliers lose important customers. According to Bauer, Henderson, and Lynch (2018), bad internal control quality will increase the probability of terminating the relationship with major customers. The fear of losing major customers may drive suppliers to actively improve internal information quality.

To understand the effect of customer bargaining power on the quality of suppliers' internal information, we adopt two proxies to measure firm's internal information quality. The first one is earnings announcement speed, which is the number of days between earnings announcement date and fiscal year end date, scaled by 365. An effective internal information environment could enable firms to shorten the period of time needed to integrate information from different divisions of organizations (Jennings, Seo, and Tanlu 2013). Therefore, a more efficient internal information system should be capable of narrowing the time gap between the

earnings announcement date and fiscal year-end (Gallemore and Labro 2015). The second measurement used is the indicator of disclosure of material weakness of internal control over financial reporting. The ineffective internal control system means manager is relying on erroneous internal management reports when making decisions or forming public reports (Feng, Li, and McVay 2009).[3] In addition, we also apply two widely used measurements to capture firms' customer bargaining power, which are the sum of sales from all of major customers and the Herfindahl Hirschman index of all firms' major customers.[4] These two variables measure the concentration level of firm's customers, which are proved to be highly related with customer bargaining power (Patatoukas 2012; Fabbri and Klapper 2016; Hribar et al. 2020).

By applying those measurements, we find firms with stronger customer bargaining power are associated with better internal information quality. Firms with more powerful customers need a shorter period of time for earnings announcement, and are associated with significantly lower probability of disclosing material weakness of internal control. These results are also economically significant. In detail, a one standard deviation increase in the sum of major customers' sales and major customer HH index will reduce 4.2% and 3% the time needed for suppliers to announce earnings, respectively. For material weakness disclosure, a one standard deviation increases in the sum of major customers' sales (major customer HH index) will decrease the probability of disclosure of material weakness by 1.87% (2.46%). Considering that the average probability of disclosing material weakness for the full sample is 8%, the magnitude of this effect is quite influential. The results support the hypothesis that firms' information quality is higher when their customers' bargaining power is stronger.

[3] Gallemore and Labro (2015) also suggest that internal control weakness will make the information acquired by firm's headquarters untimely and inaccurate.

[4] Statement of Financial Accounting Standard (No. 14 before 1997, and No. 131 after 1997) requires firms to mandatory disclose all customers that account for more than 10 percent of firm's totals sales of the year. To be consistent with precious literature, we define all customers which accounts for at least 10 percent of the focal firm's sales as major customers.

While the baseline test indicates a significant association between customer bargaining power and firms' internal information quality, it is still not enough to prove the effect is causal. The significant association may be driven by customers' incentives to select better suppliers (reverse causality), or other unobserved factors which related with both customer bargaining power and firms' internal information quality. To solve these problems, we conduct an instrumental variable approach to identify the causal effects between customer bargaining power and firms' internal information quality. The first instrumental variable we used is the aggregated merger and acquisition level in customer industries (downstream merger wave), which is developed by Campello and Gao (2017). The downstream merger wave will increase the relative size of customer firms, and decrease the market competition in customer industries, which will enhance customers' bargaining power over suppliers. In addition, merger wave in customer industry should be exogenous for suppliers' internal information quality because it is not a policy variable for suppliers (Campello and Gao 2017). Therefore, downstream merger wave can be a valid instrumental variable which can impact suppliers' internal information quality only through its influence on customer bargaining power.

The second instrumental variable used in this study is the restriction regulation index of customer industry. This index captures the restrictiveness brought by regulations of an industry, which introduce barriers for new rivals to enter. In a similar manner, the policy in customers industry should not directly impact suppliers' internal information quality except through the supply chain. Also, the higher level of regulatory restriction for an industry will decrease the market competition and minimize the choice of suppliers, thereby enhance the bargaining power of firms in the industry over their suppliers. Consistent with the baseline results, we find significant positive effects of customer bargaining power on suppliers' internal information quality in two stages least squares regressions using any of these two instrumental variables.

We then test the background mechanisms of why customer bargaining power can improve suppliers' internal information quality. We argue that the effect is driven by

customers' monitoring incentives. As discussed above, suppliers' internal information quality is important for customers because it influences the quality of products provided and the information acquired (Cen et al. 2016; Bauer, Henderson, and Lynch 2018). In this sense, customers should exert higher influence on (or monitoring) suppliers' internal information quality if the quality of suppliers' internal information is more important for customers. Or in other word, the effects of customer bargaining power on the quality of suppliers' internal information should be more pronounced if customers have higher incentives to monitor. We perform several subsample tests to test this hypothesis.

Specifically, we use relationship-specific investment, special product producer, and aggregated customers' internal information quality to capture customers' monitoring incentives. Previous literature indicates that a higher level of relationship specific investment means the supplier is producing more unique product for customers (Chu, Tian, and Wang 2019; Chen et al. 2022), which means the relationship is more important for customers (as well as suppliers). This indicates that customers are more unwilling to see the failure of suppliers, so they are more incentivized to discipline them. Similarly, customers of special product producers also put a high valuation of the stability of the supply chain (Hui, Klasa, and Yeung 2012), so they have higher incentives to monitor suppliers. Our results indicate that only for those firms with higher level of relationship-specific investment and for those firms producing more unique products, customer bargaining power will significantly impact their internal information quality.

Finally, prior studies also find that customers are stricter to suppliers in the area where they themselves perform well. For instance, Dai, Liang, and Ng (2021) indicates that customers with better corporate social responsibility performance are more willing to push suppliers to engage more in socially responsible investment. We therefore believe that customers with better internal information system will also have higher incentives to monitor suppliers' internal information quality. Consistent with the hypothesis, we find the influence of customer bargaining power only significantly impacts the internal information of firms with high level

of aggregated customer internal information quality. In sum, through all these tests, we find customer bargaining power's influence on suppliers' internal information quality is more pronounced in firms whose customers care more about suppliers' internal information quality. These results are consistent with our prediction that our main effect is driven by customers' monitoring incentives.

Our results are also robust to a set of robustness checks. First, to mitigate the risk that the results are driven by specific measurements used, we select several alternative bargaining power and information quality proxies. For the dependent variable, we use the disclosure of restatement results from unintentional error as an alternative internal information quality measurement. For the explanatory variable, we apply three alternative proxies to measure customers' bargaining power, which are cost price margin, supplier industry Herfindahl Hirschman index, and size weighted major customer shares. Second, to further mitigate the reverse causality problem, we lagged all independent variables and control variables by one period. Third, we conduct several alternative ways to select the sample. We check whether the results are robust by including other non-manufacturing firms. We also include government customers when estimating customer bargaining power. Lastly, we control for a set of additional control variables, such as customers characteristics, audit expertise and corporate governance, to mitigate the possibility that our results are driven by specific confounding effects. To summarize, our results are robust to all these tests mentioned, which means the results are not likely to be driven by specific measurement, unique sample, or other confounding factors.

This paper contributes to the extant literature in two ways. First, this paper provides a new perspective of customers' influence on suppliers. To the best of our knowledge, this is the first paper investigating how firms' customer bargaining power affects their internal information quality. The existing literature mainly argues that powerful and concentrated customer will hurt suppliers' interests. Large customers can squeeze suppliers' margins (Fee and Thomas 2004), which may lead to a set of consequence for suppliers, such as higher cost

of capital (Campello and Gao 2017), higher crash risk (Ma et al. 2020), or lower post M&A premium (Dong, Li, and Li 2021). However, customers' power may also have some positive aspects. Some other research suggests the customer bargaining power can also help to enhance suppliers' performance (Patatoukas 2012; Irvine, Park, and Yildizhan 2013). Consistent with these arguments, in this study, we highlight a positive aspect of customer bargaining power that it is helpful for firms to improve the efficiency of their internal information environment. These results provide a reasonable explanation of why suppliers can benefit from customer power. In our further analysis, we also find that the effect is driven by customers' monitoring incentives, which supports the view that customer have a disciplinary role in suppliers' operations (Chen et al. 2021).

In addition, as the number of research articles focusing on external determinants is comparably small,[5] our paper also contributes to the internal information quality and internal control quality literature by investigating a new external determinant of firms' internal information quality. Extant studies focusing on internal control quality and internal information environment mainly investigates the internal determinants and consequence of internal control quality (Chalmers, Hay, and Khlif 2018). In this study, we extend the literature by finding a new external factor, which is customers' bargaining power, that will impact firm's internal information environment.

The rest of the paper proceeds as follows. Section 2 presents the sample selection, variable construction and measurements used in the study. Section 3 introduces the empirical methodology used, empirical results, and robustness checks. Section 4 describes the further analysis. Section 5 provides conclusions and implications.

2. Sample and measurements

2.1 Sample selection

[5] According to Chalmers, Hay, and Khlif (2018), there are 23 papers focusing on internal determinants of internal control quality, and 61 papers focusing on the consequence of internal control quality, while there are only 12 papers investigating external determinants.

Our sample is selected from all U.S. firms covered by Compustat Segment Database and Audit Analytics database from 2004-2020. We start from 2004 because the internal control weakness data is only available since 2004, after the passage of SOX 404. The control variables data are drawn from CRSP/ Compustat merged database. For additional controls and further analysis, the hostile takeover index is from Cain, McKeon, and Solomon (2017)'s paper.[6] Audit fee data is from Audit Analytics database.

Consistent with prior studies (Campello and Gao 2017; Hui, Klasa, and Yeung 2012), we first test the effects for all manufacturing firms (SIC 2000- 3999) at supplier level. We choose manufacturing firms for several reasons: (1) manufacturing firms are more dependent on the strong relationship with their major customers (Hui, Klasa, and Yeung 2012; Campello and Gao 2017), and major customers play a more important role in these industries. For instance, Hui, Klasa, and Yeung (2012) argue that firms in more labor-intensive sectors, such as service sectors, care less about switching customers than manufacturing firms. (2) focusing on manufacturing firms can reduce the endogeneity problems brought by unobserved factors across industries (Campello and Gao 2017). (3) the majority of firms who report major customers are mainly found in manufacturing sectors.[7]

2.2 Measures for customer bargaining power

The customer information is collected from Compustat's Segment database. Statement of Financial Accounting Standard (SFAS) (SFAS No. 14 before 1997, and SFAS No. 131 after 1997) requires firms to report all customers that account for more than 10 percent of their totals revenues for the year. One concern with this data is that some firms will voluntarily disclose customers representing less than 10% of their total sales. To be consistent with previous research (Campello and Gao 2017; Chen et al. 2022), we discard those customers because the

[6] We thank Dr. Stephen Mckeon for sharing the takeover index data on his website, which is available through https://pages.uoregon.edu/smckeon/.
[7] Our results are stay robust if we also include other non-financial and non-utility industries.

background mechanisms driving firms to disclose the information of these customers are unclear. Consequently, the "major customers" in the following context only refers to those customers who account for more than 10 percent of suppliers' total sales. In addition, Compustat's Segment database include all kinds of customers, such as government and foreign countries. Following previous literature (Campello and Gao 2017; Dong, Li, and Li 2021; Chen et al. 2022), we first discard those non-corporate customers.[8] For those foreign customers, they only provide the name of country but no detailed information about the customer firms, while for those government customers, many of them are non-profit driven, which means they may not push suppliers as hard as corporate customers (Banerjee, Dasgupta, and Kim 2008; Cohen and Li 2020; Cohen et al. 2022).

The measure we used to capture customer bargaining power is firms' customer concentration base. A more concentrated customers base indicates that the supplier is more dependent on the commercial relationship with those major customers (Hui, Klasa, and Yeung 2012; Crawford et al. 2020; Chen et al. 2021), which suggests that the customers have higher bargaining power over those suppliers.[9] Following prior studies (Crawford et al. 2020; Hribar et al. 2020; Chen et al. 2022), we apply two measurements to proxy firms' customer concentration. The first one is Major_Sales, which is the rate of sales assigned to all major customers. Specifically, for a unique supplier, Major_Sales is calculated as the sum of sales to all major customers scaled by total sales of this supplier. The detailed definition is following the equation below:

$$Major\_Sales_{it} = \sum_{j=1}^{J} Sales_{ijt}/Sales_{it}$$

Where J stand for the total number of major customers for supplier i, and j is each specific major customers for supplier i. $Sales_{ijt}$ refers to the sales from supplier i to customer

[8] We only keep those customers whose customer type in Compustat segment database is "COMPANY". We also discard customers whose customer name is not reported, and customers whose sales from suppliers is not available.
[9] Customer concentration has been widely used as customer bargaining power proxies in prior literature, such as Hui, Klasa, and Yeung (2012), Fabbri and Klapper (2016), and Hribar et al. (2020).

j in year t. $Sales_{it}$ refers to total sales of supplier i, during the year t. A higher value of Major_Sales indicates that the firm's customer base is more concentrated, and the customers have stronger bargaining power.

The second customer concentration measurement is Major_HHI. Patatoukas (2012) construct this measure by calculating the Herfindahl Hirschman index (HHI) of all major customers. The specific definition is following the equation below:

$$Major\_HHI_{it} = \sum_{j=1}^{J} (Sales_{ijt}/Sales_{it})^2$$

Patatoukas (2012) suggests that the HH index captures the number of major customers the firm interacts with, and the importance of each customer to this supplier. He also argues that the higher value of Major_HHI indicates that customers have higher bargaining power.

2.3 Measures for internal information quality

We use two variables to measure a firm's internal information quality. The first one is earnings announcement speed (EAS), which is the number of days between the date of the fiscal year end and the earnings announcement date, divided by 365. EAS is widely used as a proxy for a firm's internal information quality (Gallemore and Labro 2015; Heitzman and Huang 2019; Huang, Lao, and McPhee 2020). The longer is the period a firm needs to compile the information and prepare the financial statements, the less efficient is its internal information system. Gallemore and Labro (2015) argue that an accounting system that eliminates manual intervention, reducing redundancy, and streamlining reporting improves the efficiency of financial disclosure and accelerates the earnings announcement speed. Consequently, a higher value of EAS indicates that a firm takes more time processing and integrating information, which suggest a lower level of internal information quality.

The second internal information quality measurement is the disclosure of material internal control weakness (Weakness). It is a dummy variable that equals one if firms disclose a material internal control weakness in the current year and zero otherwise. Due to the extreme bad influence of several accounting frauds surrounding the beginning of 21st century, the U.S. Congress passed the Sarbanes-Oxley Act (SOX) to enhance firm's financial reporting quality. Specifically, section 404 of SOX requires firms to evaluate their internal controls on financial reporting and auditors will disclose whether there is a material weakness of the firm. According to Feng, Li, and McVay (2009) and Gallemore and Labro (2015), when a firm displays material weakness it suffers from untimely or even inaccurate internal financial information. In principle, firms which disclose a material weakness in the current year are more likely to face lower internal information quality.

2.4 Control variables

To alleviate the concern that the effect stems from some confounding factors, we control for a set of firm characteristics. First, we control for firm size (Size), measured by the natural logarithm of sales for the year, because size is vital for bargaining power and the efficiency of the internal information system. Also, we control for firm age in our tests. Second, firm's profitability is also essential for its bargaining power and can be a reflection of its internal information quality. Consequently, we control for several performance measurements, including market-to-book ratio (MTB), return on assets (ROA), and sales growth rate (Gro). In addition, following previous studies (De Simone, Ege, and Stomberg 2015; Guo et al. 2016; Chen, Feng, and Li 2020), we also control for a set of variables which may impact firm's internal control quality. Specifically, we include the loss indicator (Loss) to control for the impact of financial constraints. We also control for the number of segments (Seg) to exclude the influence brought by business complexity, and foreign exchange indicator (For) to exclude the influence brought by complexity of multinational operations. Lastly, we include restructuring indicator (Rst) and acquisition indicator (Aqv) to control for the mismatch

between firm's internal control system and new organizational structure. For all main variables and control variables, the detailed definitions can be found in table 5.A.1.

[Insert Table 1 Here]

2.5 Summary statistics

Table 5.1 reports the descriptive statistics for all variables used in this study. In detail, table 5.1 displays the mean, standard deviation and distribution of each variable. Because of the data availability, the sample size of EAS and Weakness is smaller than other variables. According to the summary statistics, nearly 8% of firm-year observations in our sample indicate the firm is suffering from material weakness. On average, major customers accounts for around 45% of sales of suppliers' total sales, these numbers are comparable with previous studies (Guo et al. 2016; Chen, Feng, and Li 2020; Chen et al. 2021; Chen et al. 2022).

3. Model and empirical results

3.1 Model specification

To examine whether customer bargaining power will impact firms' internal information quality at supplier level, we apply the following regression model:

$$IIQ_{i,t} = \beta_0 + \beta_1 Cus\_Concentration_{i,t} + \beta_2 Controls_{i,t} + Industry\ FE + Year\ FE + \varepsilon_{i,t} \quad (5.1)$$

Where $IIQ_{i,t}$ is the internal information quality of supplier *i* in year *t*. $Cus\_Concentration_{i,t}$ is supplier *i*'s customer concentration base in year *t*. $Controls_{i,t}$ includes all control variables introduced in section 2.4. Industry and year fixed effects are also included in the regression. Consistent with prior studies (Campello and Gao 2017; Chen et al.

2022), we do not include firm fixed effects due to little within firm variation of customer concentrations.[10]

3.2 Baseline regression results

We first investigate whether customer bargaining power will impact suppliers' internal information quality by running the regression of equation (1). Table 2 reports the baseline regression results. Specifically, columns (1)- (2) and (3)- (4) show how customer bargaining power (measured by Major_Sales and Major_HHI) affects firms' earnings announcement speed and disclosure of material weakness, respectively. To better interpret the influence brought by customer bargaining power on the probability of material weakness disclosure, we use a logistic regression model in columns (3) and (4). The coefficients of all bargaining power measurements are negative and statistically significant. Considering that the lower value of EAS and Weakness indicates higher level of internal information quality, these results are consistent with the hypothesis that higher levels of customers bargaining power will improve suppliers' internal information quality.

[Insert Table 2 Here]

The coefficients of regression results also indicate significant economic meaning: a one standard deviation increase in sum of major customers' sales (Major_Sales) will the time needed for suppliers to announce earnings (EAS) by 4.2% . Also, a one standard deviation increase in major customer HH index (Major_HHI) will reduce the time needed for suppliers to announce earnings by 3%. To calculate the economic significance of customer bargaining power on suppliers' probability of disclosing material weakness, we first calculate the average

[10] According to Chen et al. (2022), the within firm variation for customer concentration is only half of cross firm variation, which may not support to include firm fixed effects. Also, Dhaliwal et al. (2016) and Chen et al. (2022) suggest to use industry × year fixed effects to control for variables correlated with customer bargaining power and vary within the industry and year. We also perform a robustness checks using industry × year fixed effects model and the robustness stay robust. The detailed regression results are reported in table 5.A.2.

marginal effects of the coefficients in logistic model. The marginal effects of Major_Sales and Major_HHI are -0.071 and -0.110, respectively. Given the standard deviation of Major_Sales and Major_HHI are 0.264 and 0.224, a one standard deviation increases in Major_Sales (Major_HHI) will decrease the probability of disclosure of material weakness by 1.87% (2.46%). Considering that the mean probability of material weakness disclosure for the full sample is 8%, one standard deviation increase in Major_Sales (Major_HHI) will decrease the unconditional probability of material weakness disclosure by 23.4% (30.8%).

As for control variables, firm size and age show significantly negative influence on both EAS and Weakness, which is consistent with Guo et al. (2016) and Chen, Feng, and Li (2020)'s prediction that larger firms have better financial resource in implementing internal control functions. The market-to-book ratio and ROA are negatively related to EAS and Weakness, while Loss is positively related to these two internal information quality measurements. This indicates that more profitable firms are less likely to suffer from inefficient internal information systems. In addition, the transactions related to foreign currency will also decrease the speed of firms to announce earnings.

3.3 Endogeneity

In section 3, we have found that suppliers with higher level of customers bargaining power are less likely to suffer from low quality internal information. However, the results cannot fully indicate the causal relationship between the two variables. First, because customers night also actively choose suppliers with better internal information quality, this positive association may suffer from reverse causality concern. In addition, the results may also be affected by some unobserved confounding factors which may impact both customer bargaining power and suppliers' internal information quality simultaneously. To mitigate the endogeneity problem, we perform an instrumental variable approach by extracting and exogenous part of

customer bargaining power and to test how it will impact suppliers' internal information quality.

3.3.1 Instrumental variables

We apply two instrumental variables in this study. The first instrumental variable used is the aggregated customer industry-level merger wave (downstream M&A wave), which was initially developed by Campello and Gao (2017). The downstream M&A wave can be a good instrumental variable because it meets both inclusion and exclusion restrictions. For the inclusion restriction, the mergers and acquisitions activities in customer industries can increase the relative size of customers and lower the market competition in customer industries (Campello and Gao 2017). These activities, therefore, will increase the customer concentration and customer bargaining power (Fee and Thomas 2004; Bhattacharyya and Nain 2011). For the exclusion restrictions, the mergers and acquisitions activities in customer industries should not directly impact suppliers' internal information quality. It may only affect suppliers' internal information quality through its influence on supply chain, by improving customers' bargaining power.

To construct the downstream merger wave variable, we follow the procedure applied by Campello and Gao (2017) and Chen et al. (2022). First, we collect the M&A expenditure of all customers from Compustat database. We then calculate the customer industry level M&A activities by taking the five-year mean value of M&A expenditure scaled by total sales of the acquirer. To construct the aggregated customer industry M&A activities at supplier level, we calculate the weighted sum of all customers' industry level M&A activities, weighted by the percentage of sales accounted for by each customer. The detailed model is formed below:

$$Cus\_MA\_Wave_{i,t} = \sum_{j=1}^{n} \%Sales_{i,j,t} \times 5\ year\ industry\ mean\left(\frac{M\&A\ expenditure_j}{Sales_j}\right)$$

Where $Cus\_MA\_Wave_{i,t}$ is the supplier level customer M&A activities. $\%Sales_{i,j,t}$ refers to the percentage of sales each customer j contributes to supplier i's total sales in year t. $M\&A\ expenditure_j$ is the merger and acquisition expenditure for customer j. To calculate the customer M&A activities, we need to select supplier- customer links with identifiable customers and suppliers. Following the procedure of Cohen and Frazzini (2008) and Cen et al. (2017), we match each customers with suppliers through a fuzzy name-matching algorithm and verified manually, we lose some supplier-year observations that cannot be accurately matched with an identifiable customer.

The second instrumental variable used in our study is aggregated customers' industry level regulatory restrictions, which is also applied by Gutiérrez and Philippon (2017), Duan, Larkin, and Ng (2019), and Chen et al. (2022). Duan, Larkin, and Ng (2019) suggest that the higher level of regulatory stringency for an industry will increase fixed cost for new firms, and prohibit them from entering this industry. Consequently, the regulation in a customer's industry will decrease market competition and increase the relative size of these customer firms in the industry, thereby enhance the bargaining power of customers. So, the instrumental variable meets the inclusion restriction. Also, the regulatory index in customer industry should not directly impact suppliers' internal information quality except through its influence on customer industry competition. Hence, the exclusion restriction is also met.

Following Duan, Larkin, and Ng (2019) and Chen et al. (2022), we collect industry level regulation data from McLaughlin and Sherouse (2018) and McLaughlin and RegData (2020).[11] McLaughlin and Sherouse apply a custom-made text analysis and machine-learning algorithms to quantitively measure characteristics of industry level regulation, including volume, restrictiveness, and complexity. In this study, we only apply the index of restrictiveness brought by regulations provided by (McLaughlin and RegData 2020) for each 6-digit NAICS industry. To construct the customer regulation index for each supplier, we

[11] The data is available through: https://www.quantgov.org/bulk-download.

calculate the weighted sum of customer regulation index for each supplier, weighted by the percentage of supplier's sales each customer accounts for. The variable is defined as follows:

$$Cus\_Reg\_Index_{i,t} = \sum_{j=1}^{n} \%Sales_{i,j,t} \times Customer\ industry\ regulation\ index_{jt}$$

3.3.2 2SLS regression

We apply two-stage-least-squares (2SLS) regression to extract the exogenous part of customer bargaining power and interpret the causal effect of customer bargaining power on suppliers' internal information quality. In the first stage, we estimate the predicted value of customer bargaining power by regressing the Major_Sales and Major_HHI on instrumental variables as well as all control variables used in model (1). Then, in the second stage, we test the effect of customer bargaining power on suppliers' internal information quality using predicted customer bargaining power estimated from the first stage.

[Insert Table 3 Here]

Panel A and panel C of table 3 report the first stage of 2SLS regression by adopting customer merger wave (Cus_MA_Wave) and customer regulation index (Cus_Reg_Index) as instrumental variable, respectively. As reported in Panel A, the coefficients of Cus_MA_Wave are highly statistically positive, which indicates that the aggregated merger activities in customers' industries have significant impact on customer concentration and bargaining power. In addition, the F-statistics are higher than the threshold of 10, which indicates that our instrument is not weak. The Kleibergen-Paap rk LM statistics is significant, which reject the null hypothesis that our instrument is under identified. Similarly, the Panel C of table 3 indicates that Cus_Reg_Index also pronounce significant positive effect on customer concentration, which suggests that regulatory restrictions will enhance customer bargaining power. The F statistics and Kleibergen-Paap rk LM statistics also reject the null hypothesis that our instrumental variables are weak.

Panel B and D of table 3 reports the second stage regression results of 2SLS regression by adopting Cus_MA_Wave and Cus_Reg_Index as instrumental variables, respectively. In panel B, the estimated customer bargaining power measurements, which are predicted by Cus_MA_Wave, have significantly negative effects on both EAS and Weakness, which are consistent with our baseline results. Similarly, panel D also indicates similar results by estimating customer bargaining power using Cus_Reg_Index. In sum, the results of instrumental variable approach are consistent with our baseline regression results, which mitigates the concern that our findings are resulting from endogeneity problems.

3.4 Robustness checks

The results of 2SLS regression mitigate the concern that the baseline finding is influenced by endogeneity. In this section, we conduct a set of robustness checks to further strengthen our findings.

3.4.1 Alternative measurements and sample selection

In the baseline tests, we choose two widely used proxies to measure firms' internal information quality and customer bargaining power. This reduces the risk that the previous findings are driven by the specific measurements used or the inaccuracy of the measurements. In this sub-section, several additional alternative measurements have been applied to further strengthen our finding. First, for firms' internal information quality, we choose disclosure of restatement because of unintentional error (Restat) as the alternative measurement. Specifically, the Restat is an indicator variable that equals one if firms restate the a financial statement because of unintentional errors and zero otherwise. Considering restating financial statement is mainly driven by basic accounting errors, this behavior indicates the information reported is unreliable or inaccurate, which also suggests the inefficiency of firms' internal information system (Gallemore and Labro 2015; Heitzman and Huang 2019). Panel A of table

4 reports the baseline regression results by using Restat as internal information quality proxy. The results are consistent with our baseline finding- the coefficients are all significantly negative, which indicates that higher level of customer bargaining power will reduce the probability that the supplier restating the financial statement.

[Insert Table 4 Here]

For customer bargaining power, we apply three alternative proxies, which are supplier price- cost margin (PCM), supplier industry level Herfindahl Hirschman Index (Industry_HHI), and relative size of major customers (Major_Size). In detail, the price-cost margin is sales minus cost of goods sold and general and administrative expense, scaled by sales. Ahern (2012) argues that the price- cost margin captures supplier's ability to price above marginal cost. He uses this variable to measure the substitutability of firm's product, and the dependence of firms on its customers. The more a firm depends on its customers, the higher is the bargaining power its customers have. Consequently, we believe that a higher value of supplier PCM indicates a lower level of customer bargaining power.

Following Ahern (2012), we then calculate the supplier industry level Herfindahl Hirschman index to proxy for supplier industry level competition. A more competitive supplier industry means the customers can easily switch suppliers within the industry, which will enhance the bargaining position of customers. Because the higher level of HH index indicates a lower level of market competition, we believe the higher level of supplier HH index suggests a lower level of customer bargaining power.

Thirdly, following Campello and Gao (2017), we calculate the size weighted sales of major customers (Major_Size) as the alternative proxy for customer concentration. Major_Size is calculated as percentage of sales each major customer accounts for, weighted by the size of those major customers:

$$Major\_HHI_{it} = \sum_{j=1}^{J} (Sales_{ijt}/Sales_{it}) \times Size_{jt}$$

Panel B of table 4 reports the regression results using alternative customer bargaining power proxies. As shown in columns (1)- (2), the coefficients of PCM are significantly positive. As noted previously, PCM captures suppliers' power to bargain for a higher price, so a higher value of PCM suggests a lower level of customer bargaining power. Thus, this effect is consistent with our main story that when customers are in a better bargaining position, suppliers should have better internal information quality. Similarly, a higher level of Industry_HHI indicates that the supplier industry is more concentrated, so that the customer has lower bargaining power. The positive coefficients in column (3)- (4) also support our baseline results. Lastly, as an alternative proxy for customer concentration, the coefficients of Major_Size is negatively significant, which is still consistent with our main story.

We then perform a robustness check by lagging all independent variables and control variables by one period. Although the customer concentration is a long-term effect with little time series variance, one may argue that using contemporaneous explanatory variables will increase the concern of reverse causality. Panel C of table 4 reports the results by lagging all independent variables and control variables by one period. Our results are robust after performing this test.

Lastly, we test the robustness of our results by applying different samples. First, our baseline results test the effect only on manufacturing firms. In this section, we also check whether the effect exists when including non-manufacturing firms. To be consistent with prior literature, we do not include financial and utility firms, because the fundamental characteristics of these firms are different from other firms. Panel D of table 4 reports the results including both manufacturing industries and non-manufacturing industries. Consistent with our baseline results, customer concentration shows significantly positive effects on suppliers' internal information quality. Second, for our baseline regression, we only include company customers

in our sample. In this section, we also check the robustness of our results by including government customers. Our results are still highly significant after using these alternative samples.

3.4.2 Control for corporate governance

Corporate governance is an important firm characteristic that will affect firms' monitoring and information environment. One may be concerned that it is a confounding factor which may be related to both customer bargaining power and suppliers' internal information quality. On the one hand, a firm's corporate governance characteristics, such as the expertise of the audit committee (Hoitash, Hoitash, and Bedard 2009), has a significant impact on the firm's probability of disclosure of internal control weakness over financial reporting. On the other hand, customers may be more willing to choose suppliers with stronger corporate governance. Consequently, in our study, it is also necessary to ensure that our results are not driven by suppliers' corporate governance level. To control for corporate governance, we include the takeover index constructed by Cain, McKeon, and Solomon (2017) in our test.

[Insert Table 5 Here]

Panel A of table 5 reports the results after controlling for corporate governance level. Our findings stay robust after including the takeover index in our regression. In addition, we do not find the takeover index has a significant impact on firms' internal information quality. To further strengthen this finding, we run another test without customer concentration variables.[12] According to the regression results in panel B of table 5, the takeover index shows no significant influence on firm's internal information quality if we control for several basic firm characteristics, such as size, age, ROA, and market to book ratio. These tests prove that our results are not driven by firms' corporate governance level.

[12] We do not include customer bargaining power measurements because it will make us lose many observations.

3.4.3 Control for customer characteristics and auditor characteristics

Finally, we also control for several customer characteristics as well as auditor characteristics to avoid the possibility that our results are driven by traits of customers or the expertise of auditors. Specifically, we control for aggregated customer size, age, market to book ratio, and return on assets. The aggregated value is calculated as the weighted average of all identifiable major customers, weighted by the percentage sales each customer accounts for suppliers' total sales. In addition, we also control for Big4 variable, which is an indicator that equals one if the firm is audited by the four biggest auditors, to exclude the possibility that the effect is driven by the expertise of auditors[13]. Lastly, we also control for the audit fee spent by the firm during the year. As De Simone, Ege, and Stomberg (2015) suggested, the size of audit fee can also impact firm's internal control quality. We include this variable to further mitigate the concern that the effect is driven by auditors' efforts.

[Insert Table 6 Here]

Table 6 presents the results of controlling for customer characteristics (columns 1- 4), auditor characteristics (columns 5- 8), and both characteristics (columns 9- 12). Our results remain robust after controlling for these variables, which reject the null hypothesis that our results are driven by unique customer traits or auditor's expertise.

4. Further analysis

In section 3, we find that customers with higher bargaining power can enhance suppliers' internal information quality. This effect is unlikely to be driven by unobserved

[13] De Simone, Ege, and Stomberg (2015) and (Chen, Feng, and Li 2020) include the *BIG4* dummy to control for auditor quality.

factors or reverse causality. In this section, we are going to investigate the background reason drives this effect.

We argue that the positive effect of customer bargaining power on suppliers' internal information quality is driven by customers' monitoring incentives. On the one hand, suppliers are influential for customers' performance. The direct economic tie alone the supply chain makes the customer attach great importance to suppliers' production and operations. On the other hand, the efficiency of suppliers' internal information environment is influential for customers to acquire information about the stability of supply chain and the quality of product bought (Cen et al. 2016; Bauer, Henderson, and Lynch 2018)[14], which should also draw substantial attention from customers. Consequently, we believe that the causal effect between customer bargaining power and suppliers' internal information quality should be more significant when customers have higher monitoring incentives to improve supplier's information quality. We test this hypothesis through checking the two types of moderators which can reflect customers' monitoring incentives.

4.1 Strength of the relationship

We first test whether the strength of the customer-supplier relationship can moderate our effects. If the customers are more dependent on the commercial relationship, they should put more attention to the stability of this supply chain, which will also increase customers' monitoring incentives (Kang et al. 2015). In this subsection, we apply two proxies to measure the strength of customer-supplier relationship.

4.1.1 Relationship specific investment

[14] According to Baiman and Rajan (2002), reliable information sharing will impact the relationship between sellers and buyers. Bauer, Henderson, and Lynch (2018) also argue that the powerful customers need accurate and reliable information about suppliers' ability to provide products and services with satisfactory quantity and quality.

The first measurement used to proxy the strength of customer-supplier relationship is suppliers' relationship specific investment. The relationship specific investment captures the uniqueness of production produced by suppliers to meet specific customers' requirements. These products maybe customized by major customers such that they have little value to other potential buyers (Titman and Wessels 1988; Allen and Phillips 2000; Chen et al. 2022). Thus, the higher value of relationship specific investment will strengthen the relationship, and it will increase the switching cost for both of them to choose a new partner (Dai, Liang, and Ng 2021; Chen et al. 2022). Consequently, we believe that the uniqueness of product in a relationship will not significantly change the bargaining position of customer but will increase customer's incentives to monitor supplier's operations.

Following prior studies (Raman and Shahrur 2008; Chen et al. 2022), we measure relationship specific investment using suppliers' R&D intensity which is the research and development investment scaled by total assets. Existing evidence suggests that customers of research-intensive firms are more likely to push suppliers to invest in relationship specific projects (Allen and Phillips 2000; Chu, Tian, and Wang 2019). To test the hypothesis that customer bargaining power's impact on firm's internal information quality is driven by customers' monitoring incentives, we split our sample into high and low subsamples based on the median value of firms' R&D intensity each year. We then run our baseline regression based on these subsamples.

[Insert Table 7 Here]

Table 7 displays the results of subsample tests. The coefficients on EAS and weakness measures for high R&D intensity subsamples are statistically significant and consistent with our baseline results. However, the coefficients of low R&D intensity subsamples are statistically insignificant and generally smaller in magnitude. The results suggest that our main effect is more pronounced in suppliers whose customers put more importance on the

relationship. The effect is consistent with our prediction that customers' impact on suppliers' internal information quality is driven by customers' monitoring incentives.

4.1.2 Special product producers

The second measurement used for strength of relationship is the uniqueness of product produced for customers. Similar to the suppliers with higher level of relationship specific investment, the special product producers can fulfil some additional requirements, and will increasing the switching cost for customers to choose a new supplier (Hui, Klasa, and Yeung 2012; Kang et al. 2015). According to Banerjee, Dasgupta, and Kim (2008) and Hui, Klasa, and Yeung (2012), firms with higher selling, general, and administrative (SG&A) expenditure are more likely to produce special products that require specialized servicing or spare parts. Thus, following Hui, Klasa, and Yeung (2012), we use firms' selling, general, and administrative cost, scaled by their total revenue, to proxy the uniqueness of the product supplied to our sample firms. Consistent with last section, our sample is divided into sub-samples based on the median value of SG&A/Sales. We then test our baseline regression based on these sub-samples.

[Insert Table 8 Here]

Table 8 displays the results of subsample tests for firms with high (low) level of SG&A/Sales. The coefficients are statistically significant for subsamples with high SG&A/Sales, while for low SG&A/Sales sample, we do not find significant effects. Also, the magnitude of coefficients for high SG&A/Sales sample is larger than that of low SG&A/Sales sample. These results are consistent using both EAS and Weakness measurements. The results indicates that uniqueness of products provided by suppliers can increase the effect of customer bargaining power on suppliers' internal information quality. Combining with the argument that more unique products increase customers' monitoring incentives, the results is consistent with

our prediction that customer bargaining power can affect suppliers' information quality because of customers' monitoring incentives.

4.2 Customer internal information quality

In addition to, suppliers' characteristics and the uniqueness of their products, we believe customers' own internal information quality will also affect their incentives to monitor suppliers. Prior studies indicate that customers are more likely to push suppliers in the area where they themselves perform well. For instance, Dai, Liang, and Ng (2021) find customers are more prone to affect suppliers' corporate social responsibility if they have a high level of social responsible investment themselves. Chu, Tian, and Wang (2019) also find that more innovative firms have positive effects on suppliers' innovation. Consequently, customers with more efficient internal information environment are expected to be less tolerant with worse information quality of suppliers.

[Insert Table 9 Here]

To test this conjecture, we split our sample into subsamples with high (low) aggregated customer internal information quality. The aggregated customer internal information quality is calculated as the weighted sum of customer earnings announcement speed, weighted by the percentage of sales to each customer.[15] Table 9 displays the results of subsample tests for firms with good (low Cus_EAS) and bad (high Cus_EAS) aggregated customer internal information quality. For both EAS and Weakness measurements, the coefficients are only significant for subsamples with a high level of customer internal information quality. The results indicate that customers' own information quality can moderate the effects between bargaining power and suppliers' internal information quality. It is consistent with the prediction that customers with

[15] We do not use weakness as customer internal information quality measurements because few firms have a record of disclosing material weakness, which will make a large difference in size of two subsamples. Our results are stay robust if we choose weakness as customer internal information quality measurements.

better internal information quality are less tolerant of bad information quality of suppliers, and also supports the hypothesis that the relationship between customer bargaining power and supplier internal information quality is driven by customers' monitor incentives.

5. Conclusion

In this study, we investigate whether customers' bargaining power will help them to improve suppliers' internal information quality. By using data on all manufacturing firms with major company customers in U.S. markets, we find that customer bargaining power has a significantly positive effect on suppliers' internal information quality. In detail, a one standard deviation increases in sum of major customers' sales (Major_Sales) and major customer HHI (Major_HHI) index will reduce 4.2% and 3% of time needed for suppliers to announce earnings (EAS), respectively. For firm's internal control quality over financial reporting, a one standard deviation increase in Major_Sales (Major_HHI) will decrease the probability of disclosure of material weakness by 1.87% (2.46%). These results are robust to various alternative measurements, alternative sample selection, additional control variables, and two stage least squares regression. In our further analysis, we find these effects are more pronounced if the relationship is more important for customers and are more pronounced if customers put more importance on suppliers' information quality. Specifically, we find the effects are seen in supplier firms with higher levels of relationship specific investment, higher levels of selling, general, and administrative expenditure and higher levels of customer information quality. These results also support the hypothesis that the influence of customer bargaining power on suppliers' internal information quality is driven by customers' monitoring incentives.

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Table 1 Summary statistics

This table displays the summary statistics of variables used in this study. Panel A displays the mean, median, 25th and 75th value of variables. The sample covers all manufacturing firms (SIC code 2000-3999) from 2004-2020 with non-missing data for all independent variables and control variables. Detailed variable definitions are displayed in table A1 and section 2.1.

	Nobs	Mean	SD	P25	P50	P75
Dependent variables						
EAS	8705	0.149	0.060	0.101	0.142	0.186
Weakness	8383	0.080	0.271	0	0	0
Independent variables						
Major_Sales	9504	0.450	0.264	0.230	0.397	0.622
Major_HHI	9504	0.176	0.224	0.040	0.091	0.202
Control variables						
Size	9504	5.647	2.270	4.105	5.733	7.301
Age	9504	2.496	1.012	1.946	2.708	3.258
MTB	9504	1.848	1.626	0.882	1.346	2.188
ROA	9504	-0.079	0.313	-0.113	0.023	0.074
Gro	9504	0.178	0.730	-0.058	0.059	0.206
Loss	9504	0.412	0.492	0	0	1
Seg	9504	2.462	0.766	1.946	2.565	3.045
For	9504	0.430	0.495	0	0	1
Rst	9504	0.399	0.490	0	0	1
Aqv	9504	0.418	0.493	0	0	1
Other variables						
Restat	8460	0.084	0.277	0	0	0
PCM	18060	-0.210	1.819	0.033	0.109	0.180
HHI	19975	0.303	0.227	0.145	0.224	0.405
Major_Size	6288	3.273	2.879	1.233	2.418	4.707
Hostile_Index	5551	0.145	0.084	0.086	0.126	0.180
Cus_Size	6288	7.409	3.755	4.071	7.890	10.697
Cus_Age	6288	2.028	1.101	1.079	2.003	2.944
Cus_ROA	6288	0.034	0.148	0.011	0.035	0.074
Cus_Mtb	6288	1.374	1.107	0.601	1.197	1.807
Big4	9552	0.574	0.494	0	1	1
Audit_Fee	9054	13.692	1.265	12.848	13.728	14.523

Table 2 Customer bargaining power and supplier internal information quality

This table displays the regression results of how customers' bargaining power impact suppliers' internal information quality (IIQ). The regression covers manufacturing firms (SIC code 2000-3999) with non-missing data for all variables. The dependent variable (suppliers IIQ) is measured by suppliers' earnings announcement speed (EAS) and the indicator of disclosure of material weakness (Weakness). Customers bargaining power is measured by sum of major customers' sales (Major_Sales) and the Herfindahl–Hirschman index of major customers (Major_HHI). Firm level variables, including Size, Age, MTB, ROA, Loss, Gro, Seg, For, Rst, and Aqv, as well as industry and year fixed effects are included in each regression. All variables are defined in Appendix A1. Columns (1)- (2) reports the results of OLS regression, while columns (3)- (4) indicates the results of logit regression. Standard errors are robust to heteroskedasticity. ***, **, or * indicates statistical significance level at the 1%, 5%, or 10% levels, respectively

	OLS		Logistic	
	(1)	(2)	(3)	(4)
VARIABLES	EAS	EAS	Weakness	Weakness
Major_Sales	-0.024***		-1.019***	
	(-5.450)		(-3.826)	
Major_HHI		-0.026***		-1.588***
		(-5.330)		(-4.454)
Size	-0.013***	-0.013***	-0.212***	-0.230***
	(-18.826)	(-18.871)	(-5.180)	(-5.504)
Age	-0.003***	-0.003***	-0.237***	-0.241***
	(-3.117)	(-3.022)	(-4.177)	(-4.296)
MTB	-0.007***	-0.007***	-0.243***	-0.249***
	(-11.420)	(-11.477)	(-3.780)	(-3.824)
ROA	-0.008**	-0.008**	-0.122	-0.176
	(-2.137)	(-2.276)	(-0.546)	(-0.801)
Loss	0.007***	0.007***	0.447***	0.420***
	(3.779)	(3.643)	(3.531)	(3.329)
Gro	0.001	0.001	-0.073	-0.055
	(0.639)	(1.166)	(-1.092)	(-0.783)
Seg	-0.001	-0.001	0.024	0.022
	(-0.671)	(-0.555)	(0.248)	(0.233)
For	0.005**	0.005**	0.157	0.160
	(2.218)	(2.355)	(1.292)	(1.323)
Rst	-0.014***	-0.014***	-0.185	-0.173
	(-7.438)	(-7.529)	(-1.641)	(-1.535)
Aqv	-0.006***	-0.006***	-0.091	-0.077
	(-4.031)	(-3.791)	(-0.822)	(-0.691)
Constant	0.258***	0.251***	1.167**	1.088**
	(43.375)	(44.393)	(2.255)	(2.175)
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	8,705	8,705	8,383	8,383
Adjusted/ Pseudo R^2	0.342	0.340	0.0926	0.0948

Table 3 Two stage least squares regression

This table displays the two stages least squares (2SLS) regression results of how customers' bargaining power impact suppliers' internal information quality (IIQ). The instrumental variable (IV) used for panels A and B is the value of merger wave in customer industries (*Cus_MA_Wave*), and the IV used in panel C and D is the aggregate regulatory restrictions index for customers' industries (*Cus_Reg_Index*). Specifically, Panels A and C report the first stage regressions using *Cus_MA_Wave* and *Cus_Reg_Index* as instrumental variable, respectively. Panels B and D report the second stage regressions using *Cus_MA_Wave* and *Cus_Reg_Index* as instrumental variable, respectively. The regression covers manufacturing firms (SIC code 2000-3999) with non-missing data for all variables. Suppliers' internal information quality is measured by suppliers' earnings announcement speed (EAS) and the indicator of disclosure of material weakness (Weakness). Customers bargaining power is measured by sum of major customers' sales (Major_Sales) and the Herfindahl–Hirschman index of major customers (Major_HHI). Firm level variables, including Size, Age, MTB, ROA, Loss, Gro, Seg, For, Rst, and Aqv, as well as industry and year fixed effects are included in each regression. All variables are defined in Appendix A1. Standard errors are robust to heteroskedasticity. ***, **, or * indicates statistical significance level at the 1%, 5%, or 10% levels, respectively

Panel A. Instrumental variable: Customer merger wave (First stage)

	EAS Sample		Weakness Sample	
	(1)	(2)	(3)	(4)
VARIABLES	Major_Sales	Major_HHI	Major_Sales	Major_HHI
Cus_MA_Wave	1.472***	1.705***	1.354***	1.649***
	(16.115)	(18.253)	(15.358)	(18.553)
Constant	0.625***	0.265***	0.652***	0.282***
	(15.650)	(11.878)	(15.007)	(11.001)
Control Variables	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	4,783	4,783	4,583	4,583
Under identification test				
Kleibergen-Paap rk LM statistic:	160.778	137.608	144.844	130.112
Weak identification test				
Cragg-Donald Wald F statistic:	669.1	2057.52	628.572	2135.46
Kleibergen-Paap Wald F statistic:	259.705	333.164	235.871	344.225

Panel B. Instrumental variable: Customer merger wave (Second stage)

	(1)	(2)	(3)	(4)
VARIABLES	EAS	EAS	Weakness	Weakness
Eestimated Major_Sales	-0.050***		-0.145***	
	(-3.886)		(-2.790)	
Eestimated Major_HHI		-0.043***		-0.119***
		(-3.823)		(-2.799)
Constant	0.279***	0.259***	0.320***	0.259***
	(22.515)	(29.729)	(5.459)	(5.823)
Control Variables	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	4,783	4,783	4,583	4,583
Adjusted R^2	0.327	0.335	0.0185	0.0276

Panel C. Instrumental variable: Customer regulatory restrictions index (First stage)

	EAS Sample		Weakness Sample	
	(1)	(2)	(3)	(4)
VARIABLES	Major_Sales	Major_HHI	Major_Sales	Major_HHI
Reg_index	0.050***	0.048***	0.050***	0.049***
	(17.530)	(17.582)	(16.763)	(17.212)
Constant	0.539***	0.220***	0.542***	0.215***
	(8.338)	(6.717)	(8.021)	(5.776)
Control variables	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	2,823	2,823	2,761	2,761
Under identification test				
Kleibergen-Paap LM statistic:	144.25	144.392	131.907	133.737
Weak identification test				
Cragg-Donald Wald F statistic:	1059.216	1672.113	1053.321	1682.9
Kleibergen-Paap Wald F statistic:	307.29	309.139	280.994	296.242

Panel D. Instrumental variable: Customer regulatory restrictions index (Second stage)

	(1)	(2)	(3)	(4)
VARIABLES	EAS	EAS	Weakness	Weakness
Eestimated Major_Sales	-0.030***		-0.102**	
	(-2.835)		(-2.491)	
Eestimated Major_HHI		-0.031***		-0.105**
		(-2.788)		(-2.541)
Constant	0.276***	0.266***	0.343***	0.310***
	(18.139)	(19.225)	(3.802)	(3.630)
Control variables	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	2,823	2,823	2,761	2,761
Adjusted R^2	0.364	0.363	0.0181	0.0222

Table 4 Robustness Checks

This table contains several robustness tests of how customer bargaining power impact suppliers' internal information quality (IIQ). Panel A re-examines the baseline results by using unintentional error restatement (*Restat*) as IIQ measurement. Panel B re-estimates the baseline regression by adopting price-cost margin (*PCM*), industry level HHI index of supplier (*Industry_HHI*), and weighted sum of major customer size (*Major_Size*) as alternative measurements for customer bargaining power. Panel C displays the results of tests by lagging all independent variables and control variables by one period. Panel D displays the results of baseline model by including all other non-financial and non-utility industries. Panel E re-estimates customer bargaining power by including government customers. Firm level variables, including Size, Age, MTB, ROA, Loss, Gro, Seg, For, Rst, and Aqv, as well as industry and year fixed effects are included in each regression. All variables are defined in Appendix A1. Standard errors are robust to heteroskedasticity. ***, **, or * indicates statistical significance level at the 1%, 5%, or 10% levels, respectively

Panel A. Alternative IIQ measurement

	(1)	(2)	(3)	(4)
VARIABLES	Restat (OLS)	Restat (OLS)	Restat (Logit)	Restat (Logit)
Major_Sales	-0.033**		-0.443**	
	(-2.382)		(-2.301)	
Major_HHI		-0.028*		-0.444*
		(-1.701)		(-1.656)
Constant	0.120***	0.108***	-0.889**	-1.022***
	(5.694)	(5.484)	(-2.380)	(-2.831)
Control variables	Yes	Yes	Yes	Yes
Industry/Year fixed effects	Yes	Yes	Yes	Yes
Observations	8,460	8,460	8,433	8,433
Adjusted/ Pseudo R^2	0.0189	0.0185	0.0403	0.0398

Panel B. Alternative customer bargaining power measurements

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	EAS	Weakness	EAS	Weakness	EAS	Weakness
PCM	0.005***	0.114***				
	(12.129)	(4.969)				
Industry_HHI			0.024***	0.304**		
			(4.719)	(2.399)		
Major_Size					-0.001*	-0.059**
					(-1.835)	(-2.297)
Constant	0.257***	0.774**	0.231***	-0.270	0.225***	0.064
	(62.675)	(2.294)	(62.159)	(-0.562)	(36.907)	(0.133)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Industry/Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	16,503	15,845	18,190	17,442	6,493	6,269
Adjusted/ Pseudo R^2	0.380	0.0941	0.357	0.0736	0.317	0.0828

Panel C. Lagged independent variables

	(1)	(2)	(3)	(4)
VARIABLES	EAS_t	EAS_t	$Weakness_t$	$Weakness_t$
$Major\_Sales_{t-1}$	-0.017***		-0.633**	
	(-3.611)		(-2.126)	
$Major\_HHI_{t-1}$		-0.018***		-1.067***
		(-3.424)		(-2.759)
Constant	0.257***	0.225***	0.813	0.787
	(62.675)	(11.684)	(1.367)	(1.386)
Control variables	Yes	Yes	Yes	Yes
Industry/Year fixed effects	Yes	Yes	Yes	Yes
Observations	7,939	7,939	7,843	7,843
Adjusted/ Pseudo R^2	0.323	0.321	0.0811	0.0827

Panel D. Including non-manufacturing industries

	(1)	(2)	(3)	(4)
VARIABLES	EAS	EAS	Weakness	Weakness
Major_Sales	-0.015***		-0.692***	
	(-4.676)		(-3.542)	
Major_HHI		-0.014***		-0.952***
		(-3.574)		(-3.593)
Constant	0.255***	0.250***	-0.261	-0.371
	(56.600)	(56.757)	(-0.383)	(-0.557)
Control variables	Yes	Yes	Yes	Yes
Industry/Year fixed effects	Yes	Yes	Yes	Yes
Observations	14,255	14,255	13,525	13,525
Adjusted/ Pseudo R^2	0.330	0.328	0.0977	0.0980

Panel E. Including government customers

	(1)	(2)	(3)	(4)
VARIABLES	EAS	EAS	Weakness	Weakness
Major_Sales	-0.018***		-0.764***	
	(-4.452)		(-3.074)	
Major_HHI		-0.017***		-1.265***
		(-3.829)		(-3.868)
Constant	0.257***	0.250***	0.946*	0.919*
	(44.847)	(46.294)	(1.928)	(1.937)
Control variables	Yes	Yes	Yes	Yes
Industry/Year fixed effects	Yes	Yes	Yes	Yes
Observations	9,354	9,354	8,935	8,935
Adjusted/ Pseudo R^2	0.349	0.347	0.0848	0.0870

Table 5 Control for corporate governance

This table re-examines the baseline tests by controlling for corporate governance. Panel A displays the results including corporate governance level (*Hostile_Index)* as control variable. Panel B examines whether corporate governance level will impact firms' internal information quality (IIQ). The regressions cover manufacturing firms (SIC code 2000-3999) with non-missing data for all variables. Firm level variables, including Size, Age, MTB, ROA, Loss, Gro, Seg, For, Rst, and Aqv, as well as industry and year fixed effects are included in each regression. All variables are defined in Appendix A1. Standard errors are robust to heteroskedasticity. ***, **, or * indicates statistical significance level at the 1%, 5%, or 10% levels, respectively

Panel A. Control for hostile takeover index

	(1)	(2)	(3)	(4)
VARIABLES	EAS	EAS	Weakness	Weakness
Major_Sales	-0.022***		-0.264*	
	(-4.623)		(-1.657)	
Major_HHI		-0.017***		-0.474**
		(-2.859)		(-2.154)
Hostile_Index	0.011	0.014	0.222	0.236
	(0.483)	(0.620)	(0.326)	(0.350)
Size	-0.014***	-0.014***	-0.146***	-0.151***
	(-17.877)	(-17.567)	(-5.076)	(-5.176)
Age	0.001	0.001	0.020	0.019
	(0.627)	(0.677)	(0.295)	(0.284)
MTB	-0.006***	-0.006***	-0.058*	-0.057*
	(-7.886)	(-7.790)	(-1.822)	(-1.794)
ROA	-0.012***	-0.012***	-0.069	-0.080
	(-2.623)	(-2.601)	(-0.454)	(-0.527)
Loss	0.001	0.001	-0.003	0.003
	(0.572)	(0.661)	(-0.074)	(0.077)
Gro	0.006***	0.006***	0.235***	0.231***
	(2.788)	(2.756)	(2.651)	(2.609)
Seg	-0.004*	-0.003*	0.013	0.013
	(-1.896)	(-1.691)	(0.203)	(0.203)
For	0.004*	0.005**	0.111	0.111
	(1.907)	(2.035)	(1.413)	(1.418)
Rst	-0.009***	-0.009***	0.000	0.004
	(-4.607)	(-4.693)	(0.005)	(0.049)
Aqv	-0.004**	-0.004**	-0.069	-0.067
	(-2.463)	(-2.139)	(-0.927)	(-0.903)
Constant	0.245***	0.236***	0.096	0.085
	(37.479)	(37.839)	(0.276)	(0.252)
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	5,519	5,519	4,593	4,593
Adjusted/ Pseudo R^2	0.341	0.336	0.0902	0.0912

Panel B. The impact of corporate governance on IIQ				
	(1)	(2)	(3)	(4)
VARIABLES	EAS	Weakness	EAS	Weakness
Hostile_Index	-0.002	-0.117	-0.001	-0.007
	(-0.150)	(-0.249)	(-0.034)	(-0.120)
Size	-0.015***	-0.101***	-0.014***	-0.013***
	(-33.523)	(-6.946)	(-26.397)	(-5.524)
Age	0.002*	0.008	0.002*	0.004
	(1.825)	(0.197)	(1.646)	(0.626)
MTB	-0.005***	-0.080***	-0.006***	-0.009***
	(-11.506)	(-4.215)	(-12.334)	(-3.930)
ROA	-0.010***	-0.209**	-0.005*	0.001
			(-1.739)	(0.074)
Loss			0.002**	0.006
			(2.159)	(1.337)
Gro			0.010***	0.044***
			(5.653)	(4.564)
Seg			0.000	0.013**
			(0.140)	(2.243)
For			0.003*	0.011*
			(1.854)	(1.676)
Rst			-0.009***	-0.007
			(-6.425)	(-1.146)
Aqv			-0.003**	-0.001
			(-2.282)	(-0.232)
Constant	0.230***	-0.038	0.227***	0.098***
	(70.782)	(-0.202)	(55.491)	(5.223)
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	17,779	13,482	11,294	9,546
Adjusted R^2	0.357	0.0677	0.382	0.0353

Table 6 Control for customer characteristics and auditor characteristics

This table re-examines the baseline tests by controlling for customer characteristics and auditor characteristics. Columns (1)- (2) display the results including aggregate customer size, age, market to book ratio and ROA as additional control variables. Columns (3)- (4) include indicator of four biggest auditor offices (*BIG4*) and natural logarithm of audit fees (*Audit_Fee*) as additional control variables. Columns (5)- (6) add all additional controls in the regression model. All the regressions cover manufacturing firms (SIC code 2000-3999) from 2004 to 2020 with non-missing data for all variables. Firm level variables, including Size, Age, MTB, ROA, Loss, Gro, Seg, For, Rst, and Aqv, as well as industry and year fixed effects are included in each regression. All variables are defined in Appendix A1. Standard errors are robust to heteroskedasticity. ***, **, or * indicates statistical significance level at the 1%, 5%, or 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
VARIABLES	EAS	EAS	Weakness	Weakness	EAS	EAS	Weakness	Weakness	EAS	EAS	Weakness	Weakness
Major_Sales	-0.017***		-0.259*		-0.020***		-0.925***		-0.015***		-0.270*	
	(-3.327)		(-1.712)		(-4.685)		(-3.475)		(-2.823)		(-1.713)	
Major_HHI		-0.019***		-0.441**		-0.020***		-1.455***		-0.013**		-0.486**
		(-3.147)		(-2.376)		(-4.097)		(-4.038)		(-2.112)		(-2.406)
Cus_Size	0.000	0.000	0.007	0.006					0.000	0.000	0.003	0.002
	(0.395)	(0.392)	(0.458)	(0.422)					(0.246)	(0.274)	(0.177)	(0.121)
Cus_Age	-0.000	0.000	0.043	0.051					0.001	0.001	0.048	0.057
	(-0.130)	(0.242)	(0.952)	(1.110)					(0.357)	(0.669)	(1.054)	(1.234)
Cus_MTB	-0.001	-0.001	-0.093**	-0.088*					-0.002	-0.002	-0.078*	-0.072
	(-1.492)	(-1.344)	(-1.980)	(-1.871)					(-1.629)	(-1.569)	(-1.696)	(-1.578)
Cus_ROA	0.000	0.000	-0.000	-0.000					0.000	0.000	-0.000	-0.000
	(0.447)	(0.560)	(-0.835)	(-0.837)					(0.347)	(0.456)	(-0.739)	(-0.739)
Audit_Fee					-0.005***	-0.005***	0.161	0.189*	-0.003*	-0.003	0.210***	0.221***
					(-2.963)	(-2.843)	(1.548)	(1.730)	(-1.675)	(-1.560)	(3.336)	(3.407)
BIG4					-0.017***	-0.017***	-0.590***	-0.578***	-0.014***	-0.014***	-0.257***	-0.253***
					(-7.423)	(-7.394)	(-5.399)	(-5.295)	(-5.451)	(-5.433)	(-3.867)	(-3.812)
Constant	0.237***	0.231***	-0.086	-0.110	0.303***	0.294***	-0.719	-1.066	0.271***	0.262***	-2.222***	-2.348***
	(32.073)	(34.835)	(-0.299)	(-0.399)	(17.522)	(16.871)	(-0.577)	(-0.838)	(12.683)	(12.251)	(-2.952)	(-3.070)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry/Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,799	5,799	5,516	5,516	8,305	8,305	8,214	8,214	5,484	5,484	5,420	5,420
Adjusted/ Pseudo R^2	0.329	0.327	0.0841	0.0852	0.357	0.354	0.0976	0.0995	0.345	0.343	0.0961	0.0975

Table 7 Monitor incentives: Relationship specific investment

This table displays the results of how relationship specific investment (RSI) between suppliers and customer impact major customers' disciplinary behavior. The RSI is measured by suppliers' research and development expenditure scaled by total asset (R&D). The table reexamine the tests of baseline model by splitting the sample into subsamples with high and low R&D investment based on the median value of the year. The regression covers manufacturing firms (SIC code 2000-3999) from 2004 to 2020 with non-missing data for all variables. Suppliers' internal information quality is measured by suppliers' earnings announcement speed (EAS) and the indicator of disclosure of material weakness (Weakness). Customers bargaining power is measured by sum of major customers' sales (Major_Sales) and the Herfindahl–Hirschman index of major customers (Major_HHI). Firm level variables, including Size, Age, MTB, ROA, Loss, Gro, Seg, For, Rst, and Aqv, as well as industry and year fixed effects are included in each regression. All variables are defined in Appendix A1. Standard errors are robust to heteroskedasticity. ***, **, or * indicates statistical significance level at the 1%, 5%, or 10% levels, respectively

	High R&D		Low R&D		High R&D		Low R&D	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	EAS	EAS	EAS	EAS	Weakness	Weakness	Weakness	Weakness
Major_Sales	-0.021***		-0.007		-1.219***		0.024	
	(-4.289)		(-0.955)		(-3.507)		(0.057)	
Major_HHI		-0.011**		-0.014		-1.187***		-0.447
		(-2.059)		(-1.310)		(-2.835)		(-0.664)
Constant	0.213***	0.202***	0.284***	0.283***	1.960	1.525	1.129	1.268*
	(28.493)	(28.733)	(31.776)	(32.444)	(1.332)	(0.995)	(1.446)	(1.687)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,745	3,745	3,453	3,453	3,616	3,616	3,296	3,296
Adjusted/ Pseudo R^2	0.389	0.383	0.451	0.452	0.0849	0.0816	0.137	0.138

Table 8 Monitor incentives: Durable/ special product producer

This table displays the results of how unique product producers impact customers' disciplinary behaviour. The unique product producer is measured by suppliers' selling, general and administrative expenses scaled by sales (SG&A). The table re-examines the tests of baseline model by splitting the sample into subsamples with high and low SG&A based on the median value of the year. The regressions cover manufacturing firms (SIC code 2000-3999) from 2004 to 2020 with non-missing data for all variables. Suppliers' internal information quality is measured by suppliers' earnings announcement speed (EAS) and the indicator of disclosure of material weakness (Weakness). Customers bargaining power is measured by sum of major customers' sales (Major_Sales) and the Herfindahl–Hirschman index of major customers (Major_HHI). Firm level variables, including Size, Age, MTB, ROA, Loss, Gro, Seg, For, Rst, and Aqv, as well as industry and year fixed effects are included in each regression. All variables are defined in Appendix A1. Standard errors are robust to heteroskedasticity. ***, **, or * indicates statistical significance level at the 1%, 5%, or 10% levels, respectively

	High SG&A		Low SG&A		High SG&A		Low SG&A	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	EAS	EAS	EAS	EAS	Weakness	Weakness	Weakness	Weakness
Major_Sales	-0.031***		-0.010		-1.579***		-0.156	
	(-6.202)		(-1.639)		(-4.678)		(-0.428)	
Major_HHI		-0.024***		-0.015		-1.863***		-0.388
		(-4.458)		(-1.606)		(-4.190)		(-0.743)
Constant	0.251***	0.239***	0.281***	0.278***	0.457	0.207	2.581***	2.579***
	(33.865)	(34.191)	(34.623)	(35.754)	(0.695)	(0.324)	(3.635)	(3.755)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,692	4,692	4,013	4,013	4,433	4,433	3,903	3,903
Adjusted/ Pseudo R^2	0.357	0.349	0.380	0.379	0.0895	0.0884	0.127	0.127

Table 9 Disciplinary incentives: Customers' internal information quality

This table displays the results of how customer IIQ level impact customers' disciplinary behaviour. The customer IIQ level is measured by aggregated customer earning announcement speed (Cus_EAS). The table re-examines the tests of baseline model by splitting the sample into subsamples with high and low Cus_EAS based on the median value of the year. The regression covers manufacturing firms (SIC code 2000-3999) from 2004 to 2020 with non-missing data for all variables. Suppliers' internal information quality is measured by suppliers' earnings announcement speed (EAS) and the indicator of disclosure of material weakness (Weakness). Customers bargaining power is measured by sum of major customers' sales (Major_Sales) and the Herfindahl–Hirschman index of major customers (Major_HHI). Firm level variables, including Size, Age, MTB, ROA, Loss, Gro, Seg, For, Rst, and Aqv, as well as industry and year fixed effects are included in each regression. All variables are defined in Appendix A1. Standard errors are robust to heteroskedasticity. ***, **, or * indicates statistical significance level at the 1%, 5%, or 10% levels, respectively

	Low Cus_EAS		High Cus_EAS		Low Cus_EAS		High Cus_EAS	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	EAS	EAS	EAS	EAS	Weakness	Weakness	Weakness	Weakness
Major_Sales	-0.026***		-0.005		-0.856**		0.120	
	(-4.077)		(-0.617)		(-2.102)		(0.233)	
Major_HHI		-0.023***		-0.012		-0.989**		-0.720
		(-2.651)		(-1.426)		(-2.221)		(-0.808)
Constant	0.254***	0.243***	0.220***	0.222***	0.085	-0.152	1.444**	1.890***
	(27.685)	(28.237)	(20.651)	(23.216)	(0.096)	(-0.200)	(2.422)	(3.664)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,476	2,476	2,521	2,521	2,153	2,153	2,121	2,121
Adjusted/ Pseudo R^2	0.382	0.375	0.310	0.311	0.118	0.117	0.120	0.121

Appendix A: Variable definitions

Table A1 Variable definition

Variable	Description	Source
Main Variables		
EAS	Number of days between the fiscal year end and earnings announcement date, scaled by 365.	Compustat and I/B/E/S
Weakness	Dummy variable: equals one if the firm reported a SOX Section 404 material weakness in the fiscal year, and zero otherwise	Audit Analytics
Major_Sales	Sum of sales to all major customers scales by the total sales for each supplier. The major customer is defined as any customer which account for more than 10% of total sales of the year.	Compustat Segment
Major_HHI	Herfindahl–Hirschman Index (HHI) of all major customers for each supplier, which is the sum of square of sales to each major customers scaled by its total sales in the fiscal year. The major customer is defined as any customer which account for more than 10% of total sales of the year.	Compustat Segment
Control Variables		
Size	The natural logarithm of the firm's sales (**sale**).	Compustat
Age	The natural logarithm of the firms' age. The firms' age is calculated as the difference between first year it is recorded by Compustat database and the current year, plus one.	Compustat
MTB	Market-to-book ratio, which is the market value of asset to the book value of asset (Leary and Roberts, 2014). Market value of asset is calculated as: stock price (**prcc_f**) × common share (**csho**) + total asset (**at**) – book value of equity (**ceq**).	Compustat
ROA	The ratio of the firm's net income (**ni**) to its total assets (**at**).	Compustat
Gro	Sales growth. Current year's sales (**sale**) minus previous year's sales ($\mathbf{sale}_{t-1}$), scaled by previous year's sales ($\mathbf{sale}_{t-1}$).	Compustat
Loss	Loss indicator. Dummy variable that is assigned a value of one if the income before extraordinary items (**ib**) for the current fiscal year is negative, and zero otherwise	Compustat

Seg	Number of segments. Natural logarithm of the number of business and geographic segments for the fiscal year (log (number of "BUSSEG" and number of "GEOSEG"))	Compustat Segment
For	Foreign currency transaction indicator. Dummy variable that is assigned a value of one if firm have non-zero foreign currency adjustment (**fca**) during the fiscal year, and zero otherwise.	Compustat
Rst	Restructuring indicator. Dummy variable equals one if the firm reports a non-zero value in any of the four restructuring items during the fiscal year, and zero otherwise (**rca**, **rcd**, **rceps**, or **rcp**)	Compustat
Aqv	Merger and acquisition indicator. Dummy variable equals one if the firm engages in acquisitions in the given fiscal year, and zero otherwise (**aqa**, **aqc**, **aqi**, **aqp**, or **aqs**)	Compustat
Additional Control Variables		
Hostile_Index	Takeover index from Cain, McKeon, and Solomon (2017). A higher index indicates a higher level of corporate governance for the firm.	Cain, McKeon, and Solomon (2017)
Cus_Size	Aggregated customer size. For a specific supplier, Cus_Size is calculated as sum of all major customers' *Size* weighted by the percentage of sales to each major customer. This number is scaled by the rate of total major customer sales to total sales.	Compustat
Cus_Age	Aggregated customer age. For a specific supplier, Cus_Age is calculated as sum of all major customers' *Age* weighted by the percentage of sales to each major customer. This number is scaled by the rate of this supplier's total major customer sales to its total sales.	Compustat
Cus_MTB	Aggregated customer market-to-book ratio. For a specific supplier, Cus_MTB is calculated as sum of all major customers' *MTB* weighted by the percentage of sales to each major customer. This number is scaled by the rate of this supplier's total major customer sales to its total sales.	Compustat
Cus_ROA	Aggregated customer ROA. For a specific supplier, Cus_ ROA is calculated as sum of all major customers' *ROA* weighted by the percentage of sales to each major customer.	Compustat

	This number is scaled by the rate of this supplier's total major customer sales to its total sales.	
BIG4	Auditor indicator. Dummy variable equals one if the firm is audited by one of the four biggest audit firms, and zero otherwise (**au**=2, 4, 5, or 7)	Compustat
Audit_Fee	Natural logarithm of audit fee of the fiscal year.	Audit Analytics
Other Variables		
PCM	Price cost margin. Supplier sales (**sale**) deduct cost of goods sold (**cogs**) and general and administrative expense (**xsga**), scaled by sales (**sale**).	Compustat
Industry_HHI	Industry level Herfindahl–Hirschman index for each supplier.	Compustat
Major_Size	Size weighted sales of major customers. The Major_Size is calculated as sum of all size-weighted percentage of sales each major customer accounts for, weighted by the size of those major customers. The major customer is defined as any customer which account for more than 10% of total sales of the year.	Compustat
Relationship specific investment	The research and development (**xrd**) expenditure of suppliers scaled by total sales (**sale**).	Compustat
Unique product producer	Selling, general and administrative expenditure (**xsga**), of each supplier, scaled by its total assets (**at**).	Compustat

Table A2 Baseline results: Industry-year fixed effects

This table displays the regression results of how customers' bargaining power impact suppliers' internal information quality (IIQ) by including industry × year fixed effects. The regression covers manufacturing firms (SIC code 2000-3999) with non-missing data for all variables. The dependent variable (suppliers IIQ) is measured by suppliers' earnings announcement speed (EAS) and the indicator of disclosure of material weakness (Weakness). Customers bargaining power is measured by sum of major customers' sales (Major_Sales) and the Herfindahl–Hirschman index of major customers (Major_HHI). Firm level variables, including Size, Age, MTB, ROA, Loss, Gro, Seg, For, Rst, and Aqv are included in each regression. All variables are defined in Appendix A1. Columns (1)- (2) reports the results of OLS regression, while columns (3)- (4) indicates the results of logit regression. Standard errors are robust to heteroskedasticity. ***, **, or * indicates statistical significance level at the 1%, 5%, or 10% levels, respectively

	OLS		Logistic	
	(1)	(2)	(3)	(4)
VARIABLES	EAS	EAS	Weakness	Weakness
Major_Sales	-0.024***		-0.980***	
	(-5.350)		(-3.581)	
Major_HHI		-0.025***		-1.518***
		(-5.184)		(-4.203)
Size	-0.012***	-0.013***	-0.194***	-0.211***
	(-18.067)	(-18.097)	(-4.610)	(-4.964)
Age	-0.003***	-0.003***	-0.237***	-0.239***
	(-2.798)	(-2.690)	(-4.128)	(-4.222)
MTB	-0.007***	-0.007***	-0.203***	-0.207***
	(-10.444)	(-10.494)	(-3.373)	(-3.403)
ROA	-0.010***	-0.011***	-0.226	-0.267
	(-2.693)	(-2.827)	(-1.005)	(-1.200)
Loss	0.007***	0.007***	0.473***	0.450***
	(3.704)	(3.567)	(3.567)	(3.426)
Gro	0.000	0.001	-0.056	-0.036
	(0.515)	(1.002)	(-0.823)	(-0.513)
Seg	-0.001	-0.001	0.032	0.031
	(-0.624)	(-0.506)	(0.326)	(0.316)
For	0.005**	0.005**	0.162	0.167
	(2.359)	(2.486)	(1.299)	(1.339)
Rst	-0.013***	-0.013***	-0.185	-0.171
	(-7.044)	(-7.119)	(-1.592)	(-1.471)
Aqv	-0.007***	-0.006***	-0.151	-0.137
	(-4.147)	(-3.889)	(-1.309)	(-1.194)
Constant	0.256***	0.249***	1.192	1.135
	(42.003)	(42.968)	(1.030)	(1.002)
Industry × Year fixed effects	Yes	Yes	Yes	Yes
Observations	8,705	8,705	7,629	7,629
Adjusted/ Pseudo R^2	0.329	0.327	0.112	0.114