Major Customers' Long-term CEO Incentives and Supplier's Performance
주요 고객사의 장기 인센티브와 공급사의 성과

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This paper examines the relationship between major customers' long-term CEO incentives and supplier firms' performance. Long-term equity incentives encourage CEOs to pursue relatively long-time horizons, potentially influencing certain relationships with slanted bargaining power. We predict and find that major customers' long-term CEO incentives, as measured by CEO incentive for unvested equity, are positively associated with supplier firms' profitability, partially through a reduced emphasis on myopic price-cuts. However, we also find that customers' equity incentives appear to decrease suppliers' operational efficiencies and cost elasticity, implying that suppliers bear burdens of implementing stable resource supplies in exchange for the price protection from the customers. Collectively, our results suggest that customers' long-term incentives may have multifaceted consequences on suppliers' performance and operations.

Key Words: long-term incentive, supply chain, spillover effect, major customer

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Ⅰ. Introduction

The existence of major customers has an extensive effect on supplier firms' operating decisions. The dependent supplier often organizes its production and investment on the basis of the orders placed by major customers (Galbraith, 1952). Any change in ordering practices can impose a significant burden on supplier operations, thus allowing major customers to exercise considerable bargaining power over contract terms (Scherer, 1970). While prior studies agree on the profound effects of major customers, they provide evidence of countervailing forces. On the one hand, a concentrated customer base may negatively affect firm profitability, because major customers squeeze out profits from dependent suppliers (e.g., Balakrishnan, Linsmeier, &

Venkatachalam, 1996; Schumacher, 1991). On the other hand, major customers may benefit suppliers, because suppliers enjoy efficiency gain from stable demand, enhanced asset utilization, and reduced general expenses (e.g., Kalwani & Narayandas, 1995; Patatoukas, 2012). Given the inconclusive debates, the effect of major customers appears to be highly contextual depending on the customers' underlying incentives to influence supply chain relationships.

In this paper, we hypothesize that major customers' long-term orientation, as shaped by their long-term equity incentives for CEOs, has a spillover effect on the customers' relationship with their suppliers. CEOs' equity incentives are significantly associated with CEOs' long-term orientation and affect firm performance and risk-taking behaviors (Coles, Daniel, & Naveen, 2006; Demsetz & Lehn, 1985; Gaver & Gaver, 1993). While a number of studies focus on the relationship between CEO compensation structure and the focal firm's performance, little is known about its inter-firm effects despite the importance of corporate governance in inter-firm relationships. By focusing on major customer-dependent supplier relationships, we try to investigate the effect of customer firms' CEO compensation structure on supplier firms' performance and extends our understanding on whether within-firm compensation practices influence the other firms in value chain.

We posit that customer firms' long-term CEO incentives can affect the performance of their supplier firms, especially when there is a slanted bargaining power in the supply-chain relationship (i.e., when the customer firms are major customers of their suppliers). For example, near-sighted CEOs in the major customer firms likely pursue short-term gains by exploiting their dependent suppliers to maximize concurrent profitability (Irvine, Park, & Yildizhan, 2016; Jia, Whang, Wu, & Zhang, 2021), whereas far-sighted CEOs in the customer firms prefer to build long-term relationships with the suppliers to ensure reliable resource supply (Patatoukas, 2012).

The recent emphasis among management is on sustainable relationships throughout the whole value chain (Villena & Giogia, 2020). These days, investors perceive the supply chain risks as one of the most critical risks, and they try to minimize the supplier-related risks. In case the managers take advantage of suppliers for short-term profits, investors would vote against such actions or even sell their stocks. Empirical evidence also supports that sustainable supply chain management is positively associated with the firm performance (Golicic & Smith, 2013). Hence, aligned managers (who are granted with sufficient long-term incentives) would pursue mutually beneficial relationship with suppliers to enhance the firm value. We extend the studies on supply chain management and firm performance by

providing the specific channel (i.e., managerial incentives) through which supply chain practices enhance the engaged parties' performance.

To answer our research question, we obtain data from the WRDS Compustat Segment file to identify the major customers of a given firm that account for more than 10% of the firm's total sales. We match the identified customers to compensation data from Execucomp. Our measure of long-term CEO incentives is the sensitivity of CEOs' unvested stock and unexercised option holdings to stock prices which captures how the top managers' compensation is aligned with the firm's long-term value (Core & Guay, 1999; Guay, Kepler, & Tsui, 2019; Jochem, Ladika, & Sautner, 2018). Lastly, we obtain control-variable data from Compustat.

We expect that, when customer firms' CEOs have more long-term equity incentives, suppliers would be less susceptible to myopic exploitation (e.g., excessive price-cuts) and instead exhibit higher profitability. This expectation is reasonable because the incentive structures in customer firms encourage their CEOs to establish a long-term reliable relationship with their resource providers to achieve sustainable growth. To provide initial evidence about whether the long-term incentives of customer firms indeed play a role in helping the firms form long-term relationships with their suppliers, we conduct a univariate test with two subsamples of suppliers based on the degree of the long-term incentives of their major customer firms and then compare the average lengths of the supplier-customer relationships in the two subgroups. As expected, we observe that the more equity incentives there are in major customer firms, the longer the relationships last.[1]

In the first set of multivariate tests, we build on the empirical model used in the literature concerning the implications of customer-base concentration for firm performance (e.g., Cohen & Li, 2020; Patatoukas, 2012). The empirical results show that the incentives are positively associated with suppliers' return on assets. We decompose the aggregate profitability into asset turnover and profit margin by employing the Dupont analysis. We find that the incentives are positively associated with these two components, suggesting that a major customer's long-term orientations enable its suppliers to enhance overall sales-generating

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1) While we posit that customers' long-term incentives facilitate the long-term relationship, our finding may be interpreted in a way that a supplier with strong bargaining power encourage its customers to grant long-term incentives (because the customers want to maintain long-term relationships with the strong supplier). However, our sample suppliers have relatively small firm sizes compared to their major customers, which is contrary to the claim that suppliers may have significant power to influence the customer's compensation designs. Untabulated tests show that the percentage of a supplier's sales from a major customer accounts only 5% (7%) of the major customer's sales (costs of goods sold). In this regard, the reverse causality problems may not be severe in our setting.

abilities and improve profit-margins. In our detailed analysis geared toward profit margins, we observe that customers' long-term incentives are positively associated with gross margins and not significantly associated with SG&A expenses, a fact suggesting that price protection from long-term-oriented customers, rather than reduction in operating costs, is the main driver for improved profitability.

Further, we expect and find that, in the subsample of firms with customers having above-median long-term CEO incentives, customer sales and supplier sales are more closely related with each other.[2] These results suggests that customer firms with longer horizons are less likely to request price-cuts for their suppliers. Collectively, our prediction is supported that long-term CEO equity incentives of major customer firms lead to long-term oriented relationships with their resource suppliers, enabling the dependent suppliers to achieve higher profitability than is the case when the incentives do not promote long-term orientations.

However, customer‐supplier relationships warrant nuanced discussions, insofar as major customers may take other benefits in exchange for improved profitability. For instance, major customers could require suppliers to take full responsibility for stable provisions of resource materials or to stock excess inventories. We test the effects of customer firms' long-term CEO incentives on suppliers' operating efficiencies and find that the incentives reduce suppliers' inventory-turnover ratios and increase the length of suppliers' cash-conversion cycles for inventory. We also find that the incentives are positively associated with supplier inventories and accounts receivable holdings, yet are negatively associated with supplier cash holdings. The results suggest that suppliers with long-term oriented major customers have an unbalanced distribution of working capital, potentially raising operating risks associated with a reduced flexibility in adjusting the asset composition.

Strong demand for stable resource supplies would require suppliers to make excess capacity available in high-demand states, causing suppliers to adopt inelastic-cost structures (Banker, Huang, & Natarajan, 2014). Suppliers that decide to stock up on inventories and to make customer-specific investments for the purpose of customer-relations management would fail to adjust their operating costs in accordance with sales changes. Consequently, the suppliers'

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2) The idea is that the suppliers' sales would become less sensitive to the customers' sales if the customers would tightly control resource prices which are proportional to the suppliers' sales. The test results of our current study show that both the magnitude and the statistical significance of the relationship between customers' sales and suppliers' sales are greater for firms with customers having above-median long-term CEO incentives than for firms with customers having below-median long-term CEO incentives, providing evidence for the notion that customer firms' long-term CEO incentives are associated with suppliers' profitability partially through relative price protection.

commitment to their relationships with major customers would negatively affect the suppliers' cost-management efficiency. Our results support this prediction by showing that major customers' long-term CEO incentives are significantly negatively associated with suppliers' cost elasticity. While the suppliers' long-term oriented dedication to major customers may guarantee a reliable source for revenue and enhanced firm profitability, it can also adversely affect operating efficiencies and cost elasticity.

Our paper makes several contributions to the literature. First, we contribute to the literature on the economic consequences of long-term CEO incentives. Most papers on the equity compensation for executive managers concentrate on the business outcomes within a firm (Dechow & Sloan, 1991; Gaver & Gaver, 1993). We extend research on this issue by exploring the inter-firm effects of long-term CEO incentives on contract counterparts. In particular, we focus on settings where a firm has strong bargaining power as a major customer and present evidence that CEOs with significant unvested equity incentives tend to promote contract relationships in ways that, rather than impair a counterpart's short-term profitability, facilitate stable contract implementation.

Our paper also contributes to the growing body of literature concerning the effects of major customers on supplier firms' performance. While most papers focus on the aggregate effects of the existence of major customers or the composition of them (e.g., Irvine et al., 2016; Patatoukas, 2012), in the current study we try to probe deeply into the effects of cross-sectional variations among major customers. Specifically, we investigate whether the time horizon as it applies to major customers affects their dependent suppliers' accounting and operational performance. We suggest that the aspects of forced concession can vary depending on the degree of the long-term orientation of the major customers.

Lastly, we extend the literature on supply-chain spillover effects. As stakeholder-orientation becomes an important corporate agenda, firms put emphasis on building sustainable relationships with their key business partners such as resource suppliers. However, few studies have investigated the factors that affect the formation and maintenance of the key business relationships (Wittstruck & Teuteberg, 2012). In this paper, we focus on the long-term CEO incentives and show the twofold effects on dependent suppliers.

The rest of this paper proceeds as follows. In Section 2, we review the relevant literature and develop the hypotheses. In Section 3, we describe the research designs with the constructs of main variables and the sample used in the empirical analyses. In Section 4, we present empirical results and discuss findings. In Section 5, we conclude the study.

II. Literature Review and Hypothesis Development

2.1 The Effects of Major Customers on Suppliers

Early studies provide mixed findings regarding the effects that the existence of dominant customers can have on the performance of their dependent suppliers. Some studies argue that major customers' strong bargaining power enables them to adjust a given contract term optimally for themselves and to prevent suppliers from generating profit (e.g., Scherer, 1970; Schumacher, 1991). Other studies contend that condensed revenue sources generate operating efficiencies by reducing operating costs and enhancing asset utilization and the benefits accrue to the suppliers (e.g., Gosman, Kelly, Olsson, & Warfield, 2004; Kalwani & Narayandas, 1995).

While the findings of the aforementioned studies are based on small-size samples, more recent studies overcome this limitation by compiling a comprehensive sample of supply-chain relationships based on mandated disclosures about major customers of US firms. Patatoukas (2012) uses a sample with profitable firm-year observations and finds a positive association between the degree of customer concentration and accounting earnings, suggesting the existence of efficiency gains from operating with a limited number of customers. Irvine et al. (2016) expand the sample by incorporating the loss-making firms and present that the effect of customer-base concentration on suppliers' profitability changes from negative to positive as the relationship develops and matures.

Also, some studies go beyond the effects of the concentration of major customers and examine the spillover effects that specific characteristics of major customers can have on dependent suppliers. Jia et al. (2021) show that major customers' myopia reduces suppliers' R&D expenditure. Pandit, Wasley, and Zach (2011) and Cho, Kim, and Zhang (2020) find an association between the information disclosed by customers and market reactions of dependent suppliers, suggesting that customers' performance is indicative of suppliers' future performance.

Overall, studies share the common view that certain characteristics of major customers have profound effects on suppliers via slanted bargaining power between the two parties. We extend the literature concerning the effects of major customers on firm performance by investigating how customers' long-term CEO incentives can affect the relationships with their dependent suppliers.

2.2 Long-term Equity Incentives

Compensation design profoundly affects man-

agerial behaviors including their long-term orientation and strategic focus. Given the different risk preferences of managers and shareholders, managers are expected to favor short-term profits and low-risk strategies, a fact that often translates into agency costs for risk-neutral shareholders (Jensen & Murphy, 1990). To address the horizon problem, boards often use appropriate incentives that help establish interest alignment between managers and shareholders (Dechow & Sloan, 1991). Literature on corporate governance suggests that firms grant equity ownership to top-level managers as a way to incentivize their cultivation of long-term orientations (Core & Guay, 1999; Dechow & Sloan, 1991).

Equity grants can align the preferences of managers with those of shareholders, reducing the risks of insiders pursuing myopic corporate strategies. Empirical studies on executive incentives show that equity-incentive grants are significantly associated with firm characteristics, such as corporate risk (Demsetz & Lehn, 1985) and growth opportunities (Gaver & Gaver, 1993; Smith & Watts, 1992). Core and Guay (1999) define equity incentives as the change in the dollar value of the CEO's stocks and options for a 1% change in the stock price, which is often used as a proxy for managerial long-term incentives. Coles et al. (2006) find that equity delta is closely related to firms' investment and Banker et al. (2011) show that equity incentives positively

affect the long-term value created by SG&A expenditure.

Several studies in management literature provide further evidence on the relationships between insider equity ownership and corporate strategic choices (Agrawal & Mandelker, 1987; Sanders & Carpenter, 1998). For instance, managers who have more equity ownership are likely to exhibit risk preferences that more closely match those of shareholders (Beatty & Zajac, 1994) and are likely to favor investments that maximize long-term firm value (Datta, Musteen, & Herrman, 2009; Jacobs, 1991). As equity incentives grow, top-level managers' personal wealth increasingly depends on firm value. To the extent that the managerial compensation is aligned with long-term firm value, the managers may be encouraged to pursue long-term corporate-strategy orientations.

Recent studies focus on unvested equity holdings as an effective instrument with which firms promote their top-level managers' long-term orientations (Edmans, Fand, & Lewellen, 2017; Jochem et al., 2018). Equity that CEOs plan to hold for the long term can deter managerial myopia (Edmans, Gabaix, Sadzik, & Sannikov, 2012). Deferred equity vesting effectively retains CEOs and other top-level managers within firms (Jochem et al., 2018) and motivates these individuals to invest in long-term projects (Edmans et al., 2017). Building upon these papers, we focus on CEOs'

equity delta of unvested stockholdings and unexercised stock options and expect that managers with more long-term equity incentives sustain a more stable supplier relationship to reduce long-term risks arising from supply chains.

2.3 Hypothesis Development

In this paper, we investigate the inter-firm effect of major customer firms' long-term CEO equity incentives, on supplier firms' performance. When a large portion of revenue is generated from a small number of concentrated customers, the ordering practices of the customers can heavily affect the suppliers' operating procedures and performance outcomes. The economic influence of the major customers manifests in the form of slanted bargaining power, which enables the customers to exercise control over the contract terms. Therefore, the major customers' business strategies can significantly affect the customers' dependent suppliers through supply-chain transaction agreements.

The time horizon of corporate strategy is largely determined by managerial incentive schemes. To curb short-term profit maximization, which can sacrifice a firm's fundamental value, shareholders attempt to align CEOs' incentives with the long-term performance of the firms by granting the CEOs stock-based compensation with vesting restrictions (Holmstrom, 1979; Dechow & Sloan, 1991; Edmans et al.,

2012). With equity-incentive plans, CEOs are encouraged to promote sustainable firm growth rather than sacrifice future profits for current profitability (Gaver & Gaver, 1993; Chung, 2004). The resulting operational decisions of the CEOs will, in turn, be reflected in the transaction terms between the firms and their business partners, especially when the firms have superior bargaining power. Therefore, we predict that the types of concessions that major customer firms request of their dependent supplier firms are affected by incentive structures that the customer firms offer to their CEOs.

When customer firms with strong bargaining power pursue short-term gains at the expense of long-term performance, they exercise the power to extract rents from suppliers by demanding lower delivery price. They would squeeze out every last penny from the dependent suppliers without taking into account the formation of a long-term relationship for stable resource supply. By contrast, when major customers have long-term orientations and pursue steady growth in firm value, they seek a reliable relationship with their business partners. Rather than require an excessively low price, they demand a reasonably priced, sustainable resource supply. The relative price protection from long-term oriented customers can enhance suppliers' profitability. Especially due to the rise of ESG management, businesses have begun to emphasize sustainable relation-

ships throughout the whole value chain (Villena & Giogia, 2020). As supply chain risks are perceived as one of the most critical ESG-related risks, managers whose incentives are aligned with long-term firm value would pursue long-term supply chain and maintain mutually beneficial relationship with suppliers to improve long-term financial performance (Golicic & Smith, 2013). Drawing on the above arguments, we posit our first hypothesis as follows:

H1: Major customers' long-term CEO incentives are positively associated with dependent suppliers' concurrent profitability.

The reason that major customers with long-term incentives would protect suppliers' profitability is to build sustainable relationships with suppliers to achieve stable resource supply. Thus, the major customers' incentives to maximize long-term firm value may not only provide benefits to the suppliers by ensuring price protection, but also put operational burdens on the suppliers by requiring sufficient supplies. When major customers with long-term incentives prefer to maintain a long-term engagement with a vertical partner, they are essentially asking the partner to dedicate itself to relation-oriented asset management. Given their economic dependence on major customers, supplier firms would respond to the request by shouldering great responsibility for contract implementation, and

even more so if the major customers allow them to enjoy higher profitability. The supplier firms would prioritize the needs of the major customers and prevent inventory shortage to secure the relationship with the important revenue sources. To fulfill the duties to the customers, the suppliers would hold much of their assets in the form of inventory in excess of the expected sales volume. This strategy could lead to a lengthened cash-conversion cycle for inventory, reducing the overall efficiency of working-capital management.

Supplier firms' emphasis on maintaining relationships with major customers can also negatively affect the supplier firms' cost-management efficiency. To secure sufficient capacity to prepare for the possibility of high demand from the important major customers, they have to make customer-specific investments and experience a suboptimal adjustment of business costs. Customers generally have an incentives to inflate demand estimates to hold up suppliers' assets to ensure seamless supplies (Williamson, 1979). If demand turns out to be lower than expected, supplier firms' reluctance to scale down operations can result in lower elasticities of operating expenses (Irvine et al., 2016; Cohen & Li, 2020). Consequently, if dependent suppliers put considerable effort into securing long-term-oriented relationships with major customers, the suppliers might fail to effectively manage their working capital and operating expenses.

Following this line of reasoning, we formulate our last hypotheses as follows:

> H2a: *Major customers' long-term CEO incentives are negatively associated with dependent suppliers' working capital management efficiency.*
>
> H2b: *Major customers' long-term CEO incentives are negatively associated with dependent suppliers' operating cost elasticity.*

III. Research Design and Sample

3.1 Measurement of Long-term Equity Incentives

Equity delta is the frequently used and well-established measure of stock-based incentives in prior studies (Hall & Liebman, 1998; Core & Guay, 1999; Coles et al., 2006; Guay et al., 2019). Defined as the change in the dollar value of the top-level manager's (e.g., CEO's) stocks and options for a 1% change in stock price, equity delta as a measure of incentives rests on two central assumptions: (1) managers' utility increases with the "dollar" value of their wealth and (2) managerial actions affect primarily the firm's "percentage" return rather than the fixed dollar amount of firm performance (Baker & Hall, 1998; Core & Guay, 1999).

Delta from stockholdings (i.e., Stock Delta) is straightforward since stock value changes by 1% for each 1% change in stock price. Computation of delta provided by stock options (i.e., Stock Option Delta) is relatively complicated since the change in option values is not exactly proportional to the change in stock price.[3] The sum of Stock Delta and Stock Option Delta leads to stock-based in-

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3) Following Core and Guay (1999), we first estimate an option's value on the basis of the Black-Scholes (1973) model to account for dividend payouts (the Black-Scholes value, or BSV). Second, we estimate the sensitivity of an option's value to stock-price change by taking the partial derivative of option value with respect to stock price ($\partial(BSV)/\partial(S)$). Third, we multiply the sensitivity ($\partial(BSV)/\partial(S)$) by 1% of stock price (per-option Delta). Finally, we calculate the delta for all the executive options (Stock Option Delta) by multiplying the per-option Delta by the total number of stock options.

$$BSV = Se^{-\delta T}N(d_1) - Xe^{-rT}N(d_2)$$

S : price of the underlying stock
X : exercise price of the option, as disclosed on the firm's annual report
δ : expected dividend rate over the life of the option
T : time-to-maturity of the option in years
r : risk-free interest rate
N : cumulative probability function for the normal distribution
σ : the expected stock-return volatility over the life of the option
d1 : $[\log(S/X) + (r - \delta + \sigma^{2/2})T]/[\sigma\sqrt{T}]$
d2 : $d1 - \sigma\sqrt{T}$
$\partial(BSV)/\partial(S) = e^{(-\delta T)}N(d_1)$
per-option Delta $= e^{(-\delta T)}N(d_1) \times (S/100)$

centives held by a manager and is widely used as the primary measure of equity incentives (i.e., Portfolio Delta). In this paper, we focus on unvested stockholdings and unexercised stock options in calculating the CEO Portfolio Delta of major-customer firms. As some suppliers have more than one major customer, we use the weighted average of the unvested equity delta based on the sales amount generated by each major customer.

3.2 Model Specification

To test the effects that the long-term equity incentives of major customers' CEOs can have on the performance of dependent suppliers, we refer to the prior literature (e.g., Cohen & Li, 2020; Patatoukas, 2012) and develop the following regression model (1):

$$
\begin{aligned}
Performance_{i,t} = \ & \beta_0 + \beta_1 WC\_UnEqDelta_{i,t} \\
& + \beta_2 LnMV_{i,t} + \beta_3 LnFirmAge_{i,t} + \beta_4 Flev_{i,t} \\
& + \beta_5 Conglo_{i,t} + \beta_6 SG_{i,t} + \beta_7 CC_{i,t} \\
& + Year\ FE + Industry\ FE + \varepsilon_{i,t} \qquad (1)
\end{aligned}
$$

In our tests for H1, the dependent variable in Eq. (1) includes supplier firms' return on assets (ROA) and its components of asset turnover (ATO) and profit margin (PM). Profit margin is composed of gross margin (GM) and selling, general, and administrative expenses (SGA), thus making it possible to track down, in great detail, the effect of customers' long-

term orientation on suppliers' profitability. In our tests for H2a, we use five measures for the efficiency of working-capital management as the dependent variable: inventory turnover (ITO), inventory cash-conversion period (ICP), inventory held as a fraction of total assets ($IHLD$), receivables held as a fraction of total assets ($RHLD$), and cash held as a fraction of total assets ($CHLD$).

As a main explanatory variable, we use the weighted average of the CEO unvested equity delta for each major customer ($WC\_UnEqDelta$) of a supplier firm. To account for the fact that the effects of a major customer are proportional to sales generated by the customer relative to the supplier's total sales, we compute the weight as the sales amount generated by each major customer divided by the supplier's total sales. In the model, we control for variables that have been documented to have associations with accounting rates of return (Patatoukas, 2012): the natural logarithm of the market value of equity ($LnMV$), the natural logarithm of firm age ($LnAge$), financial leverage ($Flev$), degree of business diversification ($Conglo$), and annual percentage sales growth (SG). To control for the distinctive effects of customer-base concentration, we also include the measure of customer concentration (CC). The regression model covers both (two-digit SIC) industry and year fixed effects. Also, standard errors are clustered at the firm and year levels.

In our test for H2b, we examine the effects that major customers' long-term CEO incentives can have on the change in operating cost of dependent suppliers in response to changes in sales. To this end, we employ the following regression model (2):

$$
\begin{aligned}
CostChange_{i,t} = {} & \beta_0 + \beta_1 WC\_UnEqDelta_{i,t} \\
& + \beta_2 SalesChange_{i,t} \\
& + \beta_3 WC\_UnEqDelta_{i,t} * SalesChange_{i,t} \\
& + \beta_4 LnMV_{i,t} + \beta_5 FirmAge_{i,t} + \beta_6 Flev_{i,t} \\
& + \beta_7 Conglo_{i,t} + \beta_8 SG_{i,t} + \beta_9 CC_{i,t} \\
& + Year\ FE + Industry\ FE + \varepsilon_{i,t} \quad\quad (2)
\end{aligned}
$$

⟨Table 1⟩ Variable Definition

Variable	Definition
ROA	Income before extraordinary items/ beginning of year book value of assets;
ATO	Total sales/ beginning of year book value of assets;
PM	Income before extraordinary items/ total sales;
GM	Gross margin (total sales – cost of goods sold)/ total sales;
SGA	SG&A expenses/ total sales;
WC_LnSale	Weighted average of major customers' natural logarithm of total sales where the weight is sales from the major customer scaled by sales from all major customers;
LnSale	Natural logarithm of total sales;
ITO	Total sales/ beginning of year inventory;
ICP	365 * inventory/ cost of goods sold;
IHLD	Inventory/ book value of assets;
RHLD	Accounts receivable/ book value of assets;
CHLD	Cash and cash equivalents/ book value of assets;
SalesChange	Change in natural logarithm of total sales;
CogsChange	Change in natural logarithm of costs of goods sold;
SgaChange	Change in natural logarithm of SGA costs;
WC_Linkage	Weighted average of the years that a firm has maintained sales to its major customers where the weight is sales from the major customer scaled by sales from all major customers (Irvine et al., 2016);
WC_UnEqDelta	C_UnEqDelta * the proportion of sales from all major customers to total sales;
LnMV	Natural logarithm of market value of equity;
Flev	Beginning of year book value of total assets/ beginning of year book value of equity;
LnAge	Natural logarithm of firm age measured relative to the year the firm was first listed on Compustat;
Conglo	An indicator variable equal to 1 if the firm reports at least two business segments, and 0 otherwise;
SG	Annual growth rate of total sales from t-1 to t;
CC	The sum of squared sales generated from each major customer scaled by squared total sales;

The dependent variable in Eq. (2) covers the COGS change (*CogsChange*) and the SG&A expense change (*SgaChange*). The primary explanatory variable is the interaction term between major customers' long-term CEO incentives (*WC_UnEqDelta*) and the change in supplier firms' sales (*SalesChange*). The control variables and fixed effects are the same as those in Eq. (1). Standard errors are also clustered at the firm and year levels. The detailed definitions of the variables used in the model are presented in ⟨Table 1⟩.

3.3 Sample

We start with the publicly traded companies in the Compustat Segment Customer file which discloses the names of major customers and the amounts of sales generated by them following the requirement by the Financial Accounting Standards Board (FASB) and the Securities and Exchange Commission (SEC). Here, major customers are the customers that represent at least 10 percent of each supplier's annual total revenue. To be part of the sample, each observation is required to have all information about the identification and the sales amounts from the customer. We exclude observations if the sales amounts of the listed customer are less than 10% of the total sales or if the sum of sales from all listed customers is greater than the total sales.

To construct the CEO equity incentives for major customers, we merge data from Compustat and Execucomp for each listed customer firm. Because we construct our "long-term CEO incentive" variable by using the Execucomp database, which begins in 1992, our sample period begins accordingly. We exclude the observations lacking the customer firm's CEO equity incentive data. For each supplier-year observation, we then compute the weighted

⟨Table 2⟩ Sample Selection

Sample Selection Procedure	Obs
Firm-years in the Compustat Segment Files (1992−2017)	39,179
(less)	
Firm-years with no information about major customers' identification or sales amounts	(5,167)
Firm-years with no major customer whose sales amount accounts for more than 10% of total sales	(6,115)
Firm-years with sales from all major customers greater than total sales	(186)
Firm-years with no major customer's CEO unvested equity delta	(7,804)
Firm-years in financial and public-utility industries	(2,064)
Firm-years with negative book value of equity	(1,410)
Firm-years without firm-specific variables in the main model	(5,789)
Final sample =	10,644

average of CEO unvested equity delta of all listed customer firms.

Next, we obtain other financial and accounting variables for supplier firms from Compustat and CRSP. From the initial sample, we exclude financial and public-utility firms and firm-year observations with a negative book value of equity. Lastly, we exclude observations with missing values of key variables. The final sample consists of 10,642 firm-year observations from 1992 to 2017. The sample selection procedure is presented in ⟨Table 2⟩. To mitigate the effects of outliers, we winsorized all continuous variables at 1% and 99% levels.

Ⅳ. Empirical Results

4.1 Descriptive Statistics

In ⟨Table 3⟩, Panel A presents descriptive statistics for key variables. Average ROA (*ROA*) is -0.016, with a standard deviation of 0.234, which suggests a significant variation in the accounting profitability across all supplier-year observations. Average asset turnover (*ATO*) is 1.301, indicating that sample firms are on average generating sales about 130% of their assets. The mean value of the natural logarithm of the weighted average customer firms' sales (*WC_LnSale*) is 9.467, whereas the mean value of the natural loga-

rithm of the supplier-firm's sales (*LnSale*) is 5.298, indicating a significant difference between the major-customer groups and the dependent-supplier groups regarding size of business.

Panel B of ⟨Table 3⟩ presents the average length of relationships depending on the level of these incentives. We first divide supplier firms, on the basis of the sample median values of the weighted-average equity delta of their major customers (*WC_UnEqDelta*) for each year, into With High Long-term Incentives Customers and With Low Long-term Incentives Customers groups. Then, we use the weighted average length of customer‐supplier relationships (*WC_Linkage*), following Irvine et al. (2016). We find that the relationship length is significantly higher in With High Long-term Incentives Customers group than in With Low Long-term Incentives Customers group. This finding is in line with our prediction that long-term CEO incentives encourage the firm to build a stable relationship with its business partners, providing initial evidence regarding the effects that major customers' long-term CEO incentives can have on the length of supply-chain relationships.

⟨Table 4⟩ presents the Pearson correlation coefficients among variables used in the analyses. Major-customer CEOs' average unvested equity delta (*WC_UnEqDelta*) is positively associated with suppliers' ROA (*ROA*). By contrast, it is negatively associated with suppliers' inventory

<Table 3> Univariate Analysis

Panel A. Descriptive Statistics

Variable	N	Mean	SD	P5	P25	P50	P75	P95
ROA	10,644	−.016	.234	−.448	−.059	.036	.092	.508
ATO	10,644	1.301	.943	.217	.647	1.113	1.671	5.262
PM	10,644	−.216	1.042	−1.252	−.062	.027	.076	.41
GM	10,644	.242	.83	−.165	.207	.341	.518	.923
SGA	9,944	.327	.327	.048	.129	.243	.405	2.223
WC_LnSale	10,642	9.467	2.446	4.215	8.32	10.006	11.271	13.07
LnSale	10,642	5.298	2.116	1.856	3.879	5.232	6.701	10.476
ITO	8,974	19.264	39.37	3.01	5.679	8.952	15.283	291
ICP	10,584	77.732	74.459	0	23.795	63.792	109.259	405.739
IHLD	10,588	.134	.125	0	.028	.105	.206	.509
RHLD	10,620	.174	.119	.023	.086	.152	.235	.591
CHLD	10,644	.227	.235	.003	.032	.142	.358	.908
SalesChange	10,643	.097	.313	−.379	−.042	.076	.219	1.297
CogsChange	10,638	.1	.324	−.371	−.038	.078	.22	1.409
SgaChange	9,899	.097	.242	−.254	−.027	.073	.196	.993
WC_UnEqDelta	10,644	1.966	1.343	.593	.945	1.533	2.597	6.431
LnMV	10,644	5.48	2.19	1.999	3.927	5.4	6.972	10.897
Flev	10,644	2.305	2.455	1.087	1.309	1.728	2.508	17.365
LnAge	10,644	2.587	.795	1.386	1.946	2.565	3.178	4.127
Conglo	10,644	.742	.438	0	0	1	1	1
SG	10,644	.161	.438	−.315	−.041	.078	.245	2.659
CC	10,644	.124	.168	.013	.029	.06	.139	.941

Panel B. The Length-of-Contract Relationship Conditional on the Degree of the Long-Term Incentives of Customers' CEOs

Variable = WC_Linkage	N	Mean	SD	Std. Err.
With Low Long-term Incentives Customers	5,319	4.1306	3.3509	0.0459
With High Long-term Incentives Customers	5,325	5.0859	3.8665	0.0530
Diff (1-2): Pooled		−0.9554	3.6180	0.0701
	t-value = −13.62		Pr < 0.0001	

1) Variable definitions are presented in <Table 1>.
2) Panel A reports the descriptive statistics of variables used in the paper and Panel B reports the mean value of supplier firms' weighted-average length of supplier‐customer relationships conditional on the degree of the long-term incentives of customers' CEO. A With High (Low) Long-term Incentives Customers group includes supplier firms whose customers have unvested equity delta higher (lower) than the annual median value.

turnover (*ITO*) and positively associated with suppliers' cash-conversion period of inventory (*ICP*). Consistent with prior studies, our firm-performance measures are significantly associated with the control variables used in our regression models.

〈Table 4〉 Correlation Matrix

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1)	*ROA*	1.000								
(2)	*ATO*	**0.271**	1.000							
(3)	*PM*	**0.618**	**0.260**	1.000						
(4)	*GM*	**0.398**	**0.123**	**0.817**	1.000					
(5)	*SGA*	**-0.554**	**-0.304**	**-0.673**	**0.163**	1.000				
(6)	*ITO*	0.001	**0.060**	0.000	0.012	0.011	1.000			
(7)	*ICP*	**0.053**	**-0.144**	**0.109**	**0.237**	**0.220**	**-0.308**	1.000		
(8)	*IHLD*	**0.096**	**0.348**	**0.174**	**0.089**	**-0.200**	**-0.352**	**0.484**	1.000	
(9)	*RHLD*	**0.164**	**0.585**	**0.236**	**0.142**	**-0.215**	0.000	**-0.112**	**0.302**	1.000
(10)	*CHLD*	**-0.238**	**-0.246**	**-0.352**	**-0.261**	**0.490**	**0.072**	**-0.066**	**-0.400**	**-0.353**
(11)	*WC_UnEqDelta*	**0.025**	0.017	0.010	0.016	0.017	**-0.033**	**0.074**	0.010	0.019
(12)	*LnMV*	**0.249**	**-0.136**	**0.117**	**0.105**	**-0.126**	0.042	0.016	**-0.279**	**-0.283**
(13)	*Flev*	**0.027**	**0.088**	**0.064**	0.019	**-0.114**	-0.006	**-0.071**	**0.058**	**0.072**
(14)	*LnAge*	**0.169**	**-0.060**	**0.170**	**0.115**	**-0.167**	**-0.092**	**0.086**	**0.131**	0.02
(15)	*Conglo*	0.000	**-0.162**	0.017	**0.043**	0.019	0.021	0.001	**-0.133**	**-0.190**
(16)	*SG*	**0.044**	**0.213**	0.008	0.029	0.034	**0.140**	-0.024	**-0.105**	-0.026
(17)	*CC*	**-0.184**	**-0.084**	**-0.314**	**-0.337**	**0.122**	**0.061**	**-0.113**	**-0.138**	**-0.135**

		(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
(10)	*CHLD*	1.000							
(11)	*WC_UnEqDelta*	0.003	1.000						
(12)	*LnMV*	**0.031**	**0.106**	1.000					
(13)	*Flev*	**-0.193**	0.003	0.013	1.000				
(14)	*LnAge*	**-0.227**	**0.085**	**0.197**	0.035	1.000			
(15)	*Conglo*	**0.021**	**0.113**	**0.254**	0.006	**0.306**	1.000		
(16)	*SG*	**0.123**	0.003	**0.089**	-0.015	**-0.248**	**-0.104**	1.000	
(17)	*CC*	**0.282**	0.002	**-0.146**	-0.022	**-0.187**	**-0.053**	**0.103**	1.000

1) Variable definitions are presented in 〈Table 1〉.
2) This table presents the Pearson correlation matrix between variables used in the regression models. Coefficients in bold indicate statistical significance at the 5 % level.

4.2 Empirical Results

4.2.1 Customers' Long-term Incentives and Suppliers' Profitability

⟨Table 5⟩ Panel A presents the estimation results of Hypothesis 1, which examines the effects that major customers' long-term CEO equity incentives can have on suppliers' profitability. In Column (1), we find that *WC_UnEqDelta* is significantly and positively associated with supplier firms' *ROA*, suggesting that customer firms with a high level of long-term incentives for CEOs likely have a positive spillover effect on supplier firms' concurrent profitability.

The results in Columns (2) and (3) suggest that supplier firms' enhanced profitability stems from both asset turnover and profit margin. The positive association between *WC_UnEqDelta* and *ATO* suggests that major customers' long-term-oriented relationships with suppliers improves the overall sales-generating ability of supplier firms; likewise, the positive association between *WC_UnEqDelta* and *PM* suggests that supplier firms achieve greater profit margin improvement, as their customers have more long-term incentives.

In Columns (4) and (5), we find that *WC_UnEqDelta* is significantly positively associated with *GM* and not significantly associated with *SGA*. These results suggest that the effects of major customers' long-term CEO incentives

stem not from reductions in customer-related expenses, but from the relative price protections from customers. In other words, the CEOs with more long-term incentives are less likely to lowball a price, allowing their suppliers to make a margin.

To corroborate our findings, we replace the weighted average of CEO unvested equity delta of major customers (*WC_UnEqDelta*) in Equation (1) with the weighted average of CEO total equity delta of major customers (*WC_EqDelta*). If the main driver of the suppliers' profitatility is the major customers' long-term orientation fostered by the alignment of CEOs' wealth with firm value, the coefficient on *WC_EqDelta* would be as statistically significant and positive as the coefficient on *WC_UnEqDelta*. ⟨Table 5⟩ Panel B reports the results. As predicted, we find that the coefficients on *WC_EqDelta* are significant and positive throughout Columns (1) to (4). The overall results presented in ⟨Table 5⟩ suggest that customers' long-term orientation can have a positive spillover effect on supplier firms' overall profitability, lending support to Hypothesis 1.

4.2.2 Customer-Supplier Dynamics Depending on the Level of Customers' Long-Term Incentives

In ⟨Table 6⟩, we try to corroborate the implication from previous tests by investigating

〈Table 5〉 The Effects of Major Customers' Long-term CEO Incentives on Suppliers' Profitability

Panel A. Using Unvested Equity Delta

Dep. Var	(1) ROA	(2) ATO	(3) PM	(4) GM	(5) SGA
WC_UnEqDelta	0.014***	0.059***	0.122***	0.125***	-0.012
	(2.96)	(3.64)	(4.84)	(4.85)	(-1.64)
LnMV	0.028***	-0.049***	0.049***	0.034***	-0.019***
	(14.57)	(-4.93)	(6.51)	(5.12)	(-6.47)
Flev	0.000	0.023***	0.017***	0.005*	-0.008***
	(0.34)	(4.31)	(4.96)	(1.73)	(-4.57)
LnAge	0.037***	0.035	0.168***	0.082***	-0.051***
	(7.40)	(1.04)	(7.13)	(5.09)	(-5.40)
Conglo	-0.011	-0.002	-0.015	-0.011	-0.015
	(-0.75)	(-0.04)	(-0.36)	(-0.32)	(-0.87)
SG	0.036*	0.547***	0.159***	0.145***	0.002
	(1.82)	(13.28)	(3.16)	(4.17)	(0.10)
CC	-0.225***	-0.726***	-2.167***	-2.098***	0.290***
	(-5.13)	(-4.48)	(-7.04)	(-6.92)	(3.80)
Intercept	-0.263***	1.314***	-0.942***	-0.168**	0.585***
	(-15.86)	(14.64)	(-11.26)	(-2.43)	(17.71)
Fixed effects	Industry/Year	Industry/Year	Industry/Year	Industry/Year	Industry/Year
Cluster	Firm/Year	Firm/Year	Firm/Year	Firm/Year	Firm/Year
Observations	10,642	10,642	10,642	10,642	9,942
Adjusted R^2	0.266	0.370	0.276	0.213	0.338

Panel B. Using Equity Delta

Dep. Var	(1) ROA	(2) ATO	(3) PM	(4) GM	(5) SGA
WC_EqDelta	0.003***	0.013***	0.022***	0.021***	-0.003**
	(3.79)	(4.21)	(5.74)	(5.57)	(-2.24)
LnMV	0.028***	-0.051***	0.048***	0.033***	-0.019***
	(14.35)	(-4.97)	(6.42)	(5.04)	(-6.33)
Flev	0.000	0.023***	0.016***	0.004	-0.008***
	(0.16)	(4.31)	(4.57)	(1.29)	(-4.52)
LnAge	0.037***	0.037	0.166***	0.081***	-0.050***
	(7.18)	(1.09)	(6.93)	(5.02)	(-5.26)
Conglo	-0.010	-0.005	-0.010	-0.002	-0.016
	(-0.61)	(-0.09)	(-0.22)	(-0.07)	(-0.89)
SG	0.036*	0.544***	0.150***	0.138***	0.002
	(1.79)	(12.71)	(2.93)	(3.90)	(0.11)
CC	-0.136***	-0.355***	-1.389***	-1.303***	0.214***
	(-4.67)	(-3.24)	(-7.07)	(-6.99)	(3.94)
Intercept	-0.268***	1.276***	-0.984***	-0.203**	0.592***
	(-15.28)	(14.25)	(-11.35)	(-2.63)	(17.86)
Fixed effects	Industry/Year	Industry/Year	Industry/Year	Industry/Year	Industry/Year
Cluster	Firm/Year	Firm/Year	Firm/Year	Firm/Year	Firm/Year
Observations	10,451	10,451	10,451	10,451	9,776
Adjusted R^2	0.157	0.323	0.207	0.208	0.219

1) Variable definitions are presented in 〈Table 1〉.
2) Panel A of this table reports the regression results for estimating Equation (1) with five dependent variables: ROA, ATO, PM, GM, and SGA. Panel B reports the results after replacing WC_UnEqDelta with WC_EqDelta. T-statistics are presented in the parentheses. *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

〈Table 6〉 Customer‑Supplier Dynamics Depending on the Level of Customers' Long-Term CEO Incentives

	(1)	(2)
	With Low Long-term Incentives Customers	*With High Long-term Incentives Customers*
Dep. Var	*LnSale*	*LnSale*
WC_LnSale	0.042***	0.201***
	(3.63)	(10.13)
LnMV	0.734***	0.724***
	(41.39)	(39.89)
Flev	0.092***	0.068***
	(11.26)	(7.15)
LnAge	0.238***	0.290***
	(5.79)	(8.20)
Conglo	0.107	0.265***
	(1.06)	(3.84)
SG	-0.320***	-0.210***
	(-7.28)	(-3.26)
CC	-1.362***	-1.612***
	(-7.16)	(-9.59)
Intercept	0.244*	-1.704***
	(1.72)	(-7.50)
Test for difference in the coef. of *WC_LnSale*	p-value 〈 0.0001	
Fixed effects	Industry/Year	Industry/Year
Cluster	Firm/Year	Firm/Year
Observations	5,310	5,314
Adjusted R^2	0.772	0.816

1) Variable definitions are presented in 〈Table 1〉.
2) This table presents the results of estimating Equation (3). Column (1) reports the estimation results for the supplier firms with the lower-than-median weighted-average CEO long-term incentives in their major customer firms. Column (2) reports the estimation results for the supplier firms with higher-than-median weighted-average CEO long-term incentives in their major customer firms. *T*-statistics are presented in the parentheses. *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

whether customer firms' long-term CEO incentives are associated with how closely the sales of the supplier firms mirror the sales of their customer firms. The idea is that the more control a customer firm exercises over trans-action prices, the less sensitive its supplier's sales will be to the customer's sales, because of the large profit margin that the customer receives. If the compensation structure of major customers affects their contract arrange-

ment with suppliers in a way that alleviates short-term oriented excessive price-cuts, we should observe a relatively strong association between major customers' sales and suppliers' sales. To examine the prediction, we test whether the degree of co- movement of major customers' sales and suppliers' sales varies depending on the major customers' long-term CEO incentives by employing the following empirical model (3) separately for firms with high long-term incentive customers and firms with low long- term incentive customers:

$$LnSale_{i,t} = \beta_0 + \beta_1 WC\_LnSale_{i,t}$$
$$+ \beta_2 LnMV_{i,t} + \beta_3 FirmAge_{i,t} + \beta_4 Flev_{i,t}$$
$$+ \beta_5 Conglo_{i,t} + \beta_6 SG_{i,t} + \beta_7 CC_{i,t}$$
$$+ Year\ FE + Industry\ FE + \varepsilon_{i,t} \qquad (3)$$

If the results support our prediction, the coefficient of the major customers' sales (WC_LnSale) would be more significant for the firms with high long-term incentive customers.

In line with this prediction, we observe that the association between major customers' sales (WC_LnSale) and supplier firms' sales ($LnSale$) is stronger when customers' managerial incentives have a long-term orientation,

with the economic magnitude and statistical significance of the With High Long-term Incentives Customers group greater than those of the With Low Long-term Incentives Customers group. The difference test indicates that, at the one percent level, the coefficient of WC_LnSale is significantly different between the Column (1) and Column (2).[4]

The results suggest that myopic customer firms likely put pressure on suppliers to lower transaction prices in order to increase short-term profits, weakening the association between the customer firms' sales amount and the suppliers' sales amount. In contrast, customer firms with long-term oriented incentive structures pursue sustainable growth by avoiding lowballing strategies.

4.2.3 Major Customers' Long-term Incentives and Suppliers' Working Capital Management Efficiency

So far, our results support the assertion that the long-term incentives given by major customers to their CEOs can benefit suppliers by establishing concurrent profitability. However, our second set of hypotheses points to these

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4) Considering that the measure of WC_LnSale is the combination of the percentage of sales from major customers and the sales of major customers, one can raise endogeneity issues in the interpretation of the test results. Specifically, if the sales percentage from major customers is significantly higher for the group of firms with high long-term incentive customers, then the strong relationship between $LnSale$ and WC_LnSale for the group may be driven not by the effect of customer firms' long-term incentives, but by the effects of sales percentage. To address the concerns, we conduct t-tests to compare the sales percentage from major customers of the two groups of firms and find that the percentage is significantly higher for the firms with low long-term incentive customers, mitigating the potential endogeneity issues related to the interpretation of the results.

incentives' potentially adverse effects on suppliers' operational efficiency. In ⟨Table 7⟩, we test Hypothesis 2a by examining the effects of the customers' long-term incentives on suppliers' working capital management efficiency. In Column (1), *WC_UnEqDelta* are negatively associated with *ITO*, suggesting that, when major customers have long-term orientations, suppliers hold inventory in excess of their expected sales volume. Also, Column (2) shows that *WC_UnEqDelta* is significantly positively associated with *ICP*, indicating that it takes a relatively long time for the suppliers to cash out from inventory holdings. These results lend support to the notion that dependent suppliers' commitment to the long-term relationship with major customers leads to reductions in their inventory-management efficiencies.

⟨Table 7⟩ The Effects of Major Customers' Long-term CEO Incentives on Suppliers' Working Capital Management Efficiency

	(1)	(2)	(3)	(4)	(5)
Dep. Var	*ITO*	*ICP*	*IHLD*	*RHLD*	*CHLD*
WC_UnEqDelta	-1.166*	7.649***	0.004**	0.009***	-0.008*
	(-1.93)	(3.18)	(2.09)	(4.66)	(-1.81)
LnMV	0.821**	-0.238	-0.016***	-0.012***	0.006***
	(2.58)	(-0.25)	(-14.40)	(-9.55)	(2.87)
Flev	0.006	-1.385***	0.002***	0.003***	-0.012***
	(0.03)	(-4.27)	(2.84)	(5.54)	(-10.22)
LnAge	-2.575***	3.538*	0.018***	0.018***	-0.049***
	(-3.06)	(1.90)	(5.30)	(5.44)	(-8.00)
Conglo	3.526*	-4.091	-0.013	-0.005	-0.030*
	(1.96)	(-0.93)	(-1.52)	(-0.65)	(-1.78)
SG	10.282***	1.722	0.000	0.009**	0.024***
	(8.55)	(0.74)	(0.13)	(2.34)	(2.82)
CC	20.501**	-109.443***	-0.115***	-0.134***	0.354***
	(2.50)	(-6.16)	(-6.85)	(-7.95)	(9.75)
Intercept	17.475***	74.304***	0.188***	0.188***	0.339***
	(6.71)	(8.03)	(16.06)	(15.82)	(16.73)
Fixed effects	Industry/Year	Industry/Year	Industry/Year	Industry/Year	Industry/Year
Cluster	Firm/Year	Firm/Year	Firm/Year	Firm/Year	Firm/Year
Observations	8,970	10,582	10,586	10,617	10,642
Adjusted R^2	0.271	0.257	0.431	0.319	0.338

1) Variable definitions are presented in ⟨Table 1⟩.
2) This table reports the regression results for estimating Equation (1) with five dependent variables: *ITO*, *ICP*, *IHLD*, *RHLD*, *CHLD*. T-statistics are presented in the parentheses. *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

Columns (3) through (5) show the associations between major customers' long-term CEO incentives and three current asset components: inventory, receivables, and cash: *WC_UnEqDelta* is positively associated with *IHLD* and *RHLD* and negatively associated with *CHLD*. In other words, suppliers hold their working capital in the form of inventory and receivables at the expense of cash holdings, a situation that can hinder their flexible adjustment of asset compositions and can raise their operating risks. The results in ⟨Table 7⟩ suggest the possibility

⟨Table 8⟩ The Effects of Major Customers' Long-term CEO Incentives on Suppliers' Cost Elasticity

Dep. Var	(1) *CogsChange*	(2) *SgaChange*
WC_UnEqDelta	0.006	0.007**
	(1.51)	(2.27)
WC_UnEqDelta*SaleChange	**−0.084***	**−0.042***
	(−8.74)	**(−5.47)**
SaleChange	0.876***	0.445***
	(12.14)	(8.83)
LnMV	0.006***	0.012***
	(5.24)	(7.75)
Flev	−0.003**	−0.006***
	(−2.67)	(−5.61)
LnAge	−0.014***	−0.037***
	(−4.42)	(−8.96)
Conglo	−0.009	−0.005
	(−1.33)	(−0.63)
SG	0.034	0.080**
	(0.72)	(2.55)
CC	0.071*	−0.044*
	(1.77)	(−2.00)
Intercept	0.023**	0.089***
	(2.21)	(5.69)
Fixed effects	Industry/Year	Industry/Year
Cluster	Firm/Year	Firm/Year
Observations	10,635	9,897
Adjusted R^2	0.533	0.436

1) Variable definitions are presented in ⟨Table 1⟩.
2) This table reports the regression results for estimating Equation (2) with dependent variables: *CogsChange* and *SgaChange*. *T*-statistics are presented in the parentheses. *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

that suppliers inefficiently manage their assets when the suppliers' major customer firms follow a long-term orientation in their business relations with the suppliers.

4.2.4 Major Customers' Long-term Incentives and Suppliers' Cost Elasticity

Suppliers' concession to long-term oriented major customers can also affect suppliers' cost elasticity. Regarding our test of Hypothesis 2b, ⟨Table 8⟩ shows how major customers' ungranted equity delta is associated with suppliers' cost adjustment relative to sales change. In Columns (1) and (2), we observe that the interaction term between *WC_UnEqDelta* and *SaleChange* is significantly negatively associated with *CogsChange* and *SgaChange*. The results imply that major customers' long-term orientation prevents suppliers from reacting promptly to the adjustment in short-term demand (Irvine et al., 2016; Cohen & Li, 2020). Since the suppliers are likely to pursue customer-specific investments to reserve sufficient capacity in prevention of resource shortage, the investments likely result in suppliers' suboptimal adjustment in business costs and raise additional operating risks.

In sum, our results suggest that the long-term incentives of major customers' CEOs can be a two-edged sword for suppliers considering the incentives' multi-dimensional economic consequences for suppliers' concurrent profitability,

operating performance, and cost-management efficiency.

Ⅴ. Conclusion

In this study, we examine the relationship between major customers' long-term CEO incentives and supplier firms' business performance. The results present that supplier firms' concurrent profitability improves as their major customers increase long-term CEO equity incentives. The high profit margins can be attributed to high gross margins rather than reduction in operating expenses. We further find that, when customers offer their CEOs higher equity incentives, the association between the customer sales amount and the supplier sales amount is stronger, suggesting that long-term oriented customers provide the relative price protections to suppliers.

In contrast, customers that offer their CEOs high long-term incentives often demand that their supplier strengthen its dedication to a reliable supply of resources, resulting in a situation in which the supplier's management of working capital declines in efficiency. We find that customers' unvested equity delta is associated with suppliers' relatively low inventory turnover and long inventory-to-cash conversion cycles, resulting in extra carrying of inventory. The suppliers' inefficient man-

agement of working capital leads to a reduction in their cash holdings, negatively affecting their operating flexibility. Also, suppliers' commitment to their relationships with major customers results in cost rigidity for suppliers, raising their operating risks. When considered collectively, our results suggest that major customers' long-term CEO incentives can have multifaceted consequences for suppliers.

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