The Value Effect of Serving Overconfident Customers

Yiwei Fang
Illinois Institute of Technology
565 W Adams St., Chicago, IL 60661
Email address: yfang15@stuart.iit.edu

Iftekhar Hasan
Professor of Finance and Corrigan Chair in International Business and Finance
Fordham University and Bank of Finland
1790 Broadway, 11th Floor, New York, NY 10019
Email address: ihasan@fordham.edu

Chih-Yung Lin
College of Management
Yuan Ze University
No. 135, Yuandong Rd, Zhongli District, Taoyuan City, Taiwan 320
Email address: d95723009@ntu.edu.tw

Jiong Sun
Department of Consumer Science
Purdue University
812 West State Street, West Lafayette, IN 47907
Email address: sun664@purdue.edu

The Value Effect of Serving Overconfident Customers

Abstract This paper examines whether serving customers with overconfident CEOs enhances or reduces supplier firm value. Driven mainly by high information asymmetry (proxied by analyst coverage, firm asset, firm age, and idiosyncratic risk), results show that major customers' CEO overconfidence can significantly increase firm value for informationally opaque suppliers. We also find that this value-enhancing effect occurs through the channels of customers' high levels of innovation (proxied by R&D intensity, patents, and citations), but not through their high levels of investment. Overall, our findings indicate that serving overconfident customers benefits shareholders due to a positive spillover effect from customers firms' aggressive search for growth opportunities.

Key words: CEO overconfidence; supply chains; firm value; information asymmetry; innovation

1. Introduction

CEO overconfidence has been found to have profound effects on corporate policy. For instance, Malmendier and Tate (2005) empirically demonstrate that CEO overconfidence can cause corporate investment distortions due to overestimation of firms' future cash flows. They further show that overconfident CEOs tend to overestimate their skills, especially concerning their ability to generate higher returns. As a result, they are likely to pursue value-destroying mergers and acquisitions (M&As) and pay excessive amounts for target companies (Malmendier and Tate, 2008). On the contrary, Hirshleifer, Low, and Teoh (2012) show that overconfident firms have greater return volatility, invest more in innovative activities, achieve greater success in innovations, and thus increase their firm value. These pioneering studies have generated considerable interest in understanding the implications of overconfident CEOs on firm performance. It remains unexplored, however, how such firms' managerial biases affect their major trading partners, in particular their suppliers.

Major trading relationships create important economic interdependence, especially for firms that rely on a few major customers for a large portion of their sales (Titman, 1984; Kale and Shahrur, 2007; Banerjee, Dasgupta, and Kim, 2008). The literature has shown that such economic links cause strong correlations in valuation changes (Banerjee, Dasgupta, and Kim, 2008; Fee and Thomas, 2004; Hertzel et al. 2008), suggesting that major customers' performance outlook will affect the stock market's assessment of their suppliers' future performance. When a customer firm is managed by an overconfident CEO, such managerial biases will likely influence investors' opinions of the valuation of upstream suppliers. Thus, we predict that customer CEOs' overconfidence will affect the firm value of their suppliers.

The extant literature suggests that overconfident firms always have a strong tendency toward aggressive corporate investment such as M&As and innovative activities,[1] and this tendency toward overinvestment is a "double-edged sword" for such firms. On one hand, Malmendier and Tate (2005, 2008) suggest that firms with overconfident CEOs overinvest relative to the first-best level of investment in equilibrium, because they are convinced of their ability to generate higher returns on investment projects. This overinvestment problem tends to decrease overconfident firms' performance levels, which can have a negative spillover effect on their suppliers and, thus, has the potential to hurt the latter's firm value.

On the other hand, overconfident firms tend to have a higher likelihood of success in obtaining higher payoffs by choosing riskier projects when facing rich growth opportunities. Focusing on innovative industries, Hirshleifer, Low, and Teoh (2012) show that overconfident firms invest more in innovative activities and thus achieve greater success in innovation.[2] Overconfident firms may also like to expand market and take risky projects, which bring higher returns than other firms. Hence, with great growth opportunities, overconfident CEOs are more effective in exploiting growth opportunities and translating them into firm performance. We term this phenomenon the "growth-seeking effect," which enhances overconfident firms' performance and has a positive spillover effect on suppliers. Therefore, serving overconfident customers is likely to enhance the firm value of their suppliers.

To examine these contrasting predictions, we assemble a sample of U.S. firms

[1] In this paper, we refer to firms with overconfident CEOs as overconfident firms and to those whose CEOs are not overconfident as non-overconfident firms.

[2] Similarly, Gervais, Odean, and Heaton (2011) suggest a positive role for overconfidence: it encourages managers to take sufficient risk on behalf of shareholders. Using a sample of U.S. banks, Ho et al. (2016) find that CEO overconfidence leads to higher return on assets in a period of prosperity.

that report their major customers.[3] We then construct a CEO overconfidence measure for the customer firms based on a stock-options-based proxy using Standard & Poor's ExecuComp database. We adopt the same criteria as Campbell, et al. (2011) and Ho, et al. (2016). If a CEO postpones exercising stock options that are more than 100 percent in the money at least twice during his/her tenure, we classify him or her as an overconfident CEO after the first time the exercise is postponed. The rationale behind the options-based measure is that a manager who chooses to hold deep-in-the-money stock options after the vesting period is likely to be overconfident regarding the firm's future prospects.[4] Our final sample comprises 300 customers, 1,213 suppliers, and 4,881 firm-year observations from 1993 to 2012.

Our baseline results indicate that, over the sample period, firm value (Q) of suppliers can increase by 0.14 when they serve overconfident customers, after controlling for supplier and customer characteristics. As the average firm value (Q) in our sample is about 1.82, 0.14 translates into a 7.71% increase in average firm value. The effect is statistically significant at the 1% level. These findings suggest that the value-enhancing effect of serving overconfident customers is not only statistically significant but is also economically important.

We document a contingency factor for our baseline results, which is the information environment faced by suppliers. Finance theory emphasizes that firms with severe information asymmetry problems are difficult to assess by financial markets (Ritter, 1991; Ritter and Welch, 2002; Chan, Menkveld, and Yang, 2008). As a result, in the environment of high information asymmetry, connections with

[3] In accordance with SFAS 14, public firms are required to disclose names of their principal customers, which are defined as customers that contribute to at least 10% of the total revenue of the firm, or if sales to a customer is material to the business of the firm.

[4] The options-based measure has been widely used in recent empirical research (Malmendier and Tate, 2005, 2008; Campbell et al. 2011; Malmendier, Tate, and Yan, 2011; Hirshleifer, Low, and Teoh, 2012; Ho et al. 2016).

reputable underwriters or customers can help solve the asymmetry problem and convey a positive signal to the market (Carter and Manaster, 1990; Krigman, Shaw, and Womack, 2001; Fernando, Gatchev, and Spindt, 2005; Fang, 2005). The economic literature concerning transaction costs also suggests that large customers exert strong control over small suppliers that face information asymmetry problems (Coase, 1937; Williamson, 1985). Based on these arguments, investors only use customers' information to adjust their estimates about suppliers' future growth potential when these suppliers are more opaque and hard to value. We therefore propose that serving overconfident customers can be viewed as a positive signal of customer firms' future growth opportunities only if their suppliers have high information asymmetry.

We use analyst coverage as primary measure to proxy for information asymmetry (Kross, Ro, and Schroeder, 1990; Hong, Lim, and Stein, 2000; Gleason and Lee, 2003; Zhang, 2008; Chen, Cheng, and Lo, 2010). We also use firm assets, firm age, and idiosyncratic risk as alternative measures to test our arguments. Supporting our predictions, we find that the value-enhancing effect of serving overconfident customers on suppliers occurs only when the suppliers have no analyst coverage, smaller firm assets, younger firm age, and higher idiosyncratic risk. That is, the benefits of overconfident customers to their suppliers mainly result from the information asymmetry between suppliers and investors.

One of the advantages of our research design is that we are able to disentangle causality from correlation. We can do so because supplier firms are much smaller than their major customers (firm size of the former is about 2% of the latter, on average), and thus it is unlikely that suppliers have any influence on the behavior characteristics of customers' CEOs, such as overconfidence. Thus, reverse causality is not a concern in our study. However, we conduct a battery of sensitivity tests to rule out alternative

explanations and omitted variable biases, including alternative model specifications and firm-fixed-effect regressions. More importantly, we find consistent results when we adopt the difference-in-difference framework. Specifically, we show that a positive change of Tobin's Q occurs when a supplier switches to a new major customer with an overconfident CEO, compared with suppliers who serve a new major customer with a non-overconfident CEO. In another robustness test, we re-do our regressions using different time periods, including financial crisis years (2007-2009), dot-com bubble years (2000-2003), and normal time periods (other years). We find that the value-enhancing effect for suppliers is more pronounced during normal time periods, but is not so during the financial crisis nor the dot-com bubble. These findings imply that, during negative market conditions (bear markets), investors are more concerned with fundamentals and, therefore, the behavior characteristics of customer firm managers do not influence their valuation of suppliers as strongly as in normal times. Lastly, our results are also robust when we perform a subsample analysis for high-tech vs. other industries.

To explore the underlying mechanisms of the value-enhancing effect on suppliers, we investigate two channels through innovation and investment. Prior studies have shown that overconfident CEOs tend to aggressively expand markets (e.g., M&As), invest intensively in new projects (e.g., intensive capital expenditure), and conduct innovations (Malmendier and Tate, 2005; 2008; Hirshleifer, Low, and Teoh, 2012). We argue that the innovation and investment behaviors of overconfident customer CEOs are likely to send different signals to the market and influence investors' options regarding suppliers' firm value. To elaborate, we first examine whether or not serving overconfident customers with a higher level of innovation has a larger enhancing effect on the firm value of suppliers. Drawing on the work of Hirshleifer, Low, and Teoh (2012), we employ R&D intensity, patents, and citations

as a proxy for innovation.

Second, we investigate whether or not serving overconfident customers with a higher level of investment has a larger value-enhancing effect on supplier firms. Following the studies of Malmendier and Tate (2005, 2008) and Ferris, Jayaraman, and Sabherwal (2013), we use the ratio of capital expenditure on acquisitions, the asset-growth ratio, the sales-growth ratio, and the ratio of net property, plant and equipment (PPE) as a proxy for investment. The results show that serving overconfident customers with higher R&D intensity and number of patents and citations has a value-enhancing effect, whereas serving overconfident customers with higher levels of investment has no such effect. This finding is in line with the work of Hirshleifer, Low, and Teoh (2012), who report that overconfident firms focus more on innovative activities and achieve greater success with such innovations, thus increasing their firms' valuation. Our results on the firm value of suppliers also complements theirs, suggesting that serving overconfident customers with higher levels of innovation indicates a larger future growth opportunity and hence enhances supplier firm value.

Finally, we explore whether or not the economic importance of the supply-chain relationship affects the firm value of suppliers. We predict that suppliers that are dependent on major customers would be more affected by their managerial biases. We argue that the effect of serving overconfident customers should be larger when the supply-chain relationship is more economically important to the supplier. We confirm this prediction by finding that the value-enhancing effect is stronger when the relationship becomes more important to a supplier, e.g., when the firm makes more sales (as a percentage of the customer's cost of goods sold) to the customer or when

the customer has a larger firm size.[5]

Our work contributes to the literature in three ways. First, our research links the managerial characteristics of customers with the firm value of suppliers. Prior studies have shown that CEO overconfidence has a real effect on corporate decisions. We extend the literature to the context of supply chains and demonstrate a spillover effect of CEO overconfidence to their trading partners. Few studies have looked at the influence of managerial characteristics along the supply chain. Our study shows that overconfident customers significantly increase the firm values of their suppliers and especially so for suppliers with high information asymmetry. Moreover, our findings indicate that overconfident customers have a positive spillover effect on their suppliers, which also complements the existing CEO overconfidence literature.[6]

Second, our paper complements a growing literature examining the impact of customer events on an upstream supplier firm's performance. For example, suppliers suffer significant losses when customers declare bankruptcy (Hertzel et al. 2008) or engage in horizontal mergers (Fee and Thomas, 2004, Shahrur, 2005). Similar to these studies, our paper provides evidence that the financial market takes supply-chain interdependencies into account when predicting firms' future performance. Differing from these studies, we argue that personal traits of customers' top executives also impact the firm value of upstream suppliers.

Third, our paper also relates to the literature showing that nonfinancial stakeholders have a significant impact on a firm's decisions and values. For instance, Chen, Kacperczyk, and Ortiz-Molina (2011) have shown that labor unions increase

[5] These results of the supply-chain relationship also help assess the validity of our value-enhancing effect.

[6] The influence of CEO overconfidence on corporate decisions can be found in Malmendier and Tate (2005, 2008), Geol and Thakor (2008), Gervais, Heaton, and Odean (2011), Malmendier, Tate, and Yan (2011), Hirshleifer, Low, and Teoh (2012), Schrand and Zechman (2012), Ahmed and Duellman (2013), and Banerjee, Humphery-Jenner, and Nanda (2016).

labor adjustment costs and make wages stickier, which results in higher operating leverage and cost of equity. However, Chen, Kacperczyk, and Ortiz-Molina (2012) find that labor unions lower a firm's cost of debt. Dhaliwal, et al. (2016) show a positive association between customer concentration and a supplier's cost of equity. Different from the focus of their studies, however, our evidence suggests that overconfident customers with higher levels of innovation enhance the firm value of suppliers.

The remainder of this paper is organized as follows. Section 2 develops the empirical hypotheses; Section 3 explains the CEO overconfidence measure and data; Section 4 presents the empirical results; and Section 5 concludes the paper.

2. Hypothesis Development

2.1 The effect of overconfident customers on suppliers

In the psychology literature, the theory on CEO overconfidence is based on the "better-than-average" effect. Psychological studies suggest that overconfident people generally tend to overestimate their wisdom or skills in comparison to an average benchmark.[7] Such people tend to be unrealistically optimistic about future outcomes and have narrow confidence intervals when predicting uncertain events. Previous studies have shown, both empirically and theoretically, that this managerial character trait has a remarkable influence on corporate policies.

Recently, the impact of CEO overconfidence on corporate investment decisions has received increasing attention. Previous studies have found that overconfident managers tend to make risky investments because they believe that they have more precise knowledge of future events than they actually have and that they are able to

[7] See Larwood and Whittaker (1977), Svenson (1981), and Alicke (1985) for theory development and discussions.

generate higher returns on their investment projects than is feasible (Malmendier and Tate, 2005, 2008; Goel and Thakor, 2008). We argue that such CEO overconfidence will affect trading partners, and particularly suppliers, whose sales rely on these firms. Specifically, customers' aggressive corporate actions inform suppliers of their private information or beliefs concerning their anticipated future growth, which then leads to a potential bias in suppliers' estimates about their future market. These biased estimates can lead, in turn, to suppliers making suboptimal decisions, which can negatively affect their future performance. Hence, we predict that customer CEO overconfidence is likely to have a negative spillover effect on their suppliers.

To the contrary, another literature stream suggests that overconfident firms have a higher likelihood of success in obtaining higher payoffs by choosing riskier projects when facing rich growth opportunities. For instance, Goel and Thakor (2008) show that the choice of a riskier project by an overconfident CEO increases his promotion probability because of the likelihood of extreme payoffs. Using subsamples of innovative industries, Hirshleifer, Low, and Teoh (2012) show that overconfident firms invest more in innovative activities and thus achieve greater success in innovation. Similarly, using a sample of U.S. banks, Ho, et al. (2016) find that CEO overconfidence leads to a higher return on assets in a period of prosperity. Galasso and Simcoe (2011) also report a positive association between CEO overconfidence and citation-weighted patent counts. Thus, with great growth opportunities, overconfident CEOs are more effective in exploiting growth opportunities and translating them into firm performance, which we term the "growth-seeking effect." Since customer growth implies suppliers' future sales growth, the growth-seeking effect will enhance overconfident firms' performance levels and is likely to have a positive spillover effect on their suppliers. Therefore, since overconfident customers could bring either benefits or costs to their suppliers, we expect both negative and

positive associations between overconfident customers and the firm value of suppliers. Based on the above arguments, we propose the following conflicting hypothesis:

Hypothesis 1a: Serving overconfident customers hurts supplier firm value.

Hypothesis 1b: Serving overconfident customers enhances supplier firm value.

2.2. Contingency of information asymmetry

The type of information environment faced by suppliers can be a crucial condition for customer CEO overconfidence to play a significant role on suppliers. Finance theory emphasizes that it is harder for outside investors to evaluate firms with severe information asymmetry (Ritter, 1991; Ritter and Welch, 2002; Chan, Menkveld, and Yang, 2008). In such cases, the signaling effect from affiliating with a reputable entity becomes crucial (Carter and Manaster, 1990; Fernando, Gatchev, and Spindt, 2005; Fang, 2005). For example, large customers serve as credible certifying entities for their suppliers in the new-issues market and, as a result of this certification effect, suppliers with large customers receive higher valuation than those without such a relationship (Johnson, Kang, and Yi, 2010). It is also well documented in the economics literature that large customers exert strong control over small suppliers that face information asymmetry problems (Coase, 1937; Williamson, 1985). Hence, investors may rely on the performance record of these major customers to adjust their estimates of the future growth opportunities and value of smaller suppliers that are less known to the market. Thus,

Hypothesis 2: The value-enhancing effect of serving overconfident customers mainly derives from high information asymmetry between the firm and investors.

2.3. Possible channels

The existing literature has shown that overconfident customers have a strong preference for innovation and investment, and both phenomena could cause a spillover effect onto their suppliers. Thus, we further examine how the two potential channels (i.e., innovation and investment) might affect supplier firm value.

Hirshleifer, Low, and Teoh (2012) show that overconfident firms have greater return volatility, invest more in innovative activities, and achieve greater success in innovation, all of which increase their firm values. This phenomenon suggests that a value-enhancing effect could come from the innovation behavior of overconfident customers. Following the study of Hirshleifer, Low, and Teoh (2012), to examine this channel, we use R&D intensity, patents, and citations as a proxy for innovation. If the innovation channel works we should then observe that only overconfident customers with higher levels of innovation have a value-enhancing effect on supplier firm value. Thus,

Hypothesis 3: The positive effect on supplier firm value, if any, is stronger when overconfident customers have more innovation activities.

On the other hand, Malmendier and Tate (2005, 2008) find that CEO overconfidence also leads to overinvestment. Following the studies of Malmendier and Tate (2005, 2008) and Ferris, Jayaraman, and Sabherwal (2013), we use the ratio of capital expenditure to acquisition, the asset-growth ratio, the sales-growth ratio, and the ratio of PPE as a proxy for level of investment. Suppliers whose performance is highly dependent on their major customers can be influenced by their customers' actions and hence make suboptimal decisions. In this instance we should observe that overconfident customers with a higher level of investment cause greater value reduction for suppliers. Thus,

Hypothesis 4: The negative effect on supplier firm value, if any, is stronger when overconfident customers have more intensive investment activities.

3. Data and summary statistics

3.1. Overconfidence measure

We use a stock options-based proxy for CEO overconfidence, constructing the measure from Standard & Poor's ExecuComp database between 1993 and 2012. We adopt the same criteria for the CEO overconfidence indicator as Campbell et al (2011) and Ho, et al. (2016).[8] We categorize three levels of managerial overconfidence: high, moderate, and low overconfidence, using 100% and 30% moneyness as the cutoff points. A CEO is identified as highly overconfident if he or she postpones the exercise of 100% in-the-money options at least twice during the tenure period, and is appointed to the highly overconfident category the first time this behavior is observed.[9]

Next, a CEO has low overconfidence when he or she exercises stock options that are less than 30% in the money and does not maintain any exercisable options that are more than 30% in the money. Similarly to the measure of high overconfidence, we require that CEOs exhibit this conservative options-exercising behavior at least twice during the tenure period, and assign them to the low overconfidence category when they first exhibit this behavior. Finally, after identifying high- and low-

[8] This is a revised version of the stock options-based overconfidence measure from Malmendier and Tate (2005, 2008), in which overconfident CEOs are those who delay in the exercise of deep in-the-money exercisable options.

[9] We compute options moneyness as follows: Realizable values per option are estimated from the total realizable value of exercisable options divided by the number of exercisable options. Then, the estimated average exercise prices of the options are computed from the fiscal year-end stock price minus the realizable value per option. Hence, the percentages of average moneyness are obtained from per-option realizable value divided by the estimated average exercise price. We employ a methodology similar to that described above to measure the percentage of moneyness of exercised options.

overconfidence categories, other CEOs who hold and/or exercise options with moneyness between 30 and 100% are classified as moderately overconfident.

Following Goel and Thakor (2008), Campbell, et al. (2011), and Hirshleifer, Low, and Teoh (2012) who have theoretically and empirically found that only highly overconfident CEOs exhibit a strong preference for innovation and investment, we characterize high-overconfidence CEOs as the overconfident group, and characterize moderate- and low-overconfidence CEOs as the non-overconfident group.

3.2 Major supplier-customer relationships in product markets

The data source for our sample of supplier-customer relationships is Compustat segment files. Pursuant to Financial Accounting Standard No. 14, a firm is required to report names of customers to whom sales are greater than 10% of the firm's total sales. Following previous studies (Fee and Thomas, 2004; Fee, Hadlock, and Thomas, 2006; Hertzel, et al. 2008), we adopt a conservative approach to match the names of customers.[10] As argued in the literature, the potential costs of misidentifying noncustomer firms as customers are greater than those of failing to identifying a limited number of actual customers. Because the periodicity of disclosure is annual, we form supply firm/major customer dyads for each calendar year. In cases where one supplier has multiple major customers in one year, we keep the largest customer and discard the others. Hence, the observations in the final sample are on the supplier-year level.

[10] Compustat segment files contain such disclosure information. However, the file format does not allow the direct use of such information, because customer names are often abbreviated, and several different names refer to the same firm. Furthermore, many major customers are subsidiaries of a large conglomerate. Augmented by an automated text-matching algorithm, we visually inspect each firm's major customer information file one by one, and carefully match a reported customer name to a GVKEY in Compustat. This process may involve some discretion when matching abbreviated names to GVKEYs. To avoid measurement errors, we exclude a pair when it is not possible to confirm that the firm is a match by comparing the abbreviation with previous years' customer descriptions.

3.3 Information asymmetry measures

Brennan and Subrahmanyam (1995), Hong and Kacperczyk (2010), Kelly and Ljungqvist (2012), and Derrien and Kecskes (2013) suggest that financial analysts acquire and disseminate information to the general public, which helps reduce the information asymmetry between firms and investors. By contrast, Barry and Brown (1985), Griffin and Lemmon (2002), Zhang (2006), Ferreiea and Laux (2007), and Fu (2009) argue that firm size, firm age, and idiosyncratic risk can proxy for information asymmetry. Larger firms also have more diversified available information in the market than small firms. Firms with longer history and lower idiosyncratic risk tend to have richer available information in the market.

Our primary proxy for the information environment is a dummy variable indicating whether or not there is any analyst coverage for the suppliers. We obtain analyst information from the I/B/E/S database. Following He and Tian (2013), for each firm's fiscal year, we compute a raw measure of analyst coverage as the simple average of the 12 monthly numbers of earnings forecasts given by the I/B/E/S summary file. In addition, we also employ three alternative proxies for information asymmetry, including firm assets (*Asset*), number of years since IPO (*Firm age*), and standard deviation of residuals from regressing weekly stock returns on weekly market returns (*Idiosyncratic risk*). Table 1 summarizes the variable definitions.

<Insert Table 1 here >

3.4 Sample description

We start with all U.S. companies whose data can be found in both the Standard & Poor's Compustat and ExecuComp databases. Regulated utilities and financial firms (SIC 4000-4999 and SIC 6000-6999) are excluded from our sample. Because of constraints on data availability in the ExecuComp database, we choose 1993 as the

first year of the sample. After matching supply-chain relationship and the CEO overconfidence measure, the final sample includes 4,881 supplier-year observations from 1,213 unique suppliers and 300 unique customers for the time period 1993–2012. To prevent outliers from biasing the results, we winsorize accounting variables at 1 percentile and 99 percentile.

Table 2 reports summary statistics on the main variables. Our main variable of interest is *C_OC*, which represents whether or not the customer firm has an overconfident CEO. The mean is 0.6, suggesting that 60% of the sample (based on supplier-customer-year observations) is associated with overconfident customers. This statistic indicates that our sample is well balanced between overconfident and non-overconfident customers.

Panel B reports summary statistics on supplier firm characteristics. It shows that the average firm value (*Q*) of suppliers is about 1.8; logarithm of total assets (*S_totalassets*) is 5.5; financial leverage (*S_bookleverage*) is 20%; R&D intensity (*S_RDtosale*) is 12.6%; investment intensity (*S_capextoasset*) is about 5.5%; sales growth (*S_salesgrowth*) is 14.6%; equity risk (*S_equity_volatility*) is 7.9%; and ROA (*S_ROA*) is 3.5%. These variables are included in our regressions to measure suppliers' financial performance and characteristics. The statistics are in a reasonable range. Compared with suppliers, customers in our sample are larger in total assets and are more highly leveraged. The profitability (*C_ROA*) is also greater for customers than for suppliers. These statistics are consistent with the existing literature, which suggests that major customers are often much larger than their suppliers and have considerably higher power in the supply-chain relationship (Fee and Thomas 2004; Fee, Hadlock, and Thomas, 2006; Hertzel et al. 2008). The statistics of firm characteristics are similar to those reported in Hirshleifer, Low, and Teoh (2012).

To measure supply-chain relationships, we use two proxies. One is

Sc_yearuptonow, which measures the number of years' duration of the existing relationship. The average of our sample is 6.7, which suggests that the customer has been a major customer for the supplier for 6.7 years by the observation year. The second measure is *Pct_salectosale*, which is the percentage of supply-chain transaction sales to the total sales of the supplier. The mean of *Pct_salectosale* is 23%, because we keep only the largest customer if one supplier has multiple major customers in a given year. The high value of this variable also indicates that the supplier-customer relationships in our sample are important business partnerships.

Panel E summarizes the proxies for information asymmetry. The average number of analysts covering suppliers is 9.7. Firm age of the suppliers on average is 17, and idiosyncratic risk is approximately 7.2%. We also use firm size (*Asset*) as a proxy for information asymmetry. All these measures are for suppliers.

Panel F reports the variables that we use for channel tests. For the innovation channel, we examine the ratio of customers' R&D to sales (*C_RD*), which has a mean of 3.4%. In addition, we also measure innovation activities by number of citations and patents of the customer firms (*C_ Citation and C_ Patent*). The mean of these two are 2.4 and 2.3, respectively. In terms of the investment channel, we examine total capital expenditure (*C_Capex*), capital expenditure on acquisition (*C_Acq*), and net property, plant and equipment (*C_Ppe*), all scaled by total assets. Lastly, we calculate two growth measures to proxy for asset growth (*C_Assetg*) and sales growth (*C_Saleg*). For an average customer, the asset growth rate is 11.9% and sales growth is 11.5%, both of which indicate rapid growth speed.

<Insert Table 2 here >

Table 3 presents univariate comparisons of firm characteristics between two subsamples: firms with OC customers vs. firms without OC customers. We calculate the mean difference and report the *t*-statistics. We find that supplier firm value is

significantly higher for the OC sample than for the non-OC sample, with $p<5$ % significance. Moreover, suppliers serving OC customers are also smaller and riskier. Customers with OC CEOs tend to have lower debt and higher ROA. Regarding the relationship duration, the OC sample has significantly shorter duration than the non-OC sample. Examining information asymmetry, we find that suppliers serving OC customers have similar analyst coverage compared with those serving non-OC customers. However, the firm age is younger and idiosyncratic risk is higher for suppliers serving OC customers. The comparisons on customer firm characteristics suggest significant differences between the OC and non-OC groups. As Panel E reports, OC customers have higher R&D and invest more intensively in various types of assets. The findings are consistent with a previous study by Hirshleifer, Low, and Teoh, 2012.

<Insert Table 3 here >

Finally, Table 4 reports Pearson correlations. Customer overconfidence is positively and significantly correlated with suppliers' Tobin's Q and equity risk. It is also positively related to customers' ROA, but is negatively associated with their debt ratio. Overconfident customers are also negatively associated with supplier-customer relationship duration. Supplier firm value (Q) is negatively associated with its debt ratio, but positively associated with R&D intensity, sales growth rate, and equity risk. On the other hand, supplier firm value is negatively associated with customer firm size, debt ratio, and profitability. Relationship duration is negatively associated with supplier Q, and percentage of transaction sales is positively related to supplier Q. As expected, most control variables are systematically associated with supplier Q. No multicollinearity problem appears to exist, because all the pairwise correlation coefficients are smaller than 0.5.

<Insert Table 4 here>

4. Empirical Results

4.1. The effect of overconfident customers for supplier firm value

Our first objective is to investigate how overconfident customers affect firm value. Following Hirshleifer, Low, and Teoh (2012), we use the ordinary least squares regression:

$$Q_{i,t} = \alpha_1 + \alpha_2\, C\_OC_{i,t-1} + \boldsymbol{\beta}'\boldsymbol{Z}_{i,t-1} + \nu_i + \mu_t + \varepsilon_{i,t}\ , \qquad (1)$$

where $Q_{i,t}$ is the firm value for supplier *i* in year *t*. $C\_OC_{i,t-1}$ is a dummy variable that equals 1 if firm *i* has an overconfident customer at time *t*-1 and zero otherwise; $Z_{i,t-1}$ is a vector of control variables from firm *i* in year *t*-1; ν and μ represent industry and year fixed effects, respectively; and ε is the random error. Industries are identified based on a two-digit SIC code and we meanwhile control industry fixed effects for customer and supplier. The inclusion of industry dummies controls for industry characteristics, such as product types, competition environment, growth opportunity, and risk-taking. Year dummies are used to control for time-varying economic factors that influence firm value.

Table 5 reports the OLS regression results. The first model only controls for industry and year fixed effects. Column (2) controls for a set of supplier firm characteristics.[11] Column (3) adds customer characteristics, and Column (4) adds relationship characteristics. In parentheses are *t*-statistics based on standard errors adjusted for heteroskedasticity (White, 1980) and firm clustering (Petersen, 2009). Superscripts *, **, and *** denote significance at the 10, 5, and 1 percentage levels, respectively.

[11] In a robustness test, we also include supplier CEO characteristics, including age, tenure, and managerial ability. Our sample size is reduced significantly because many of the suppliers are not S&P1500 firms and have no data on CEO characteristics. However, our results still hold using the smaller sample. Results are available upon request.

We find that the coefficients of *C_OC* are positive and significant at a 1% level across all models. Based on the estimate in Column (4), the coefficient is 0.1401 (p<1% and *t*-value=2.72), which means that firms with overconfident customers enhance the firm value by 0.1401 over firms without overconfident customers after controlling for suppliers and customers characteristics. The average firm value (*Q*) in our sample is about 1.8174, indicating that a firm with overconfident customers increases its firm value by about 7.7088 % (0.1401 / 1.8174= 7.7088%). The magnitude of the effect is large compared with previously reported evidence. For example, Anderson and Reed (2003) report that a firm value increases by 10.07% when it is a family firm compared with non-family firms.

<Insert Table 5 here >

The coefficients on the control variables are generally consistent with those reported in the extant literature (Hirshleifer, Low, and Teoh, 2012). Firms with low leverage, more R&D, high sales growth, and high profitability experience higher value. In addition, customers' total assets, profitability, and supply-chain relationship duration are negatively associated with supplier firm value. Overall, the results from Table 5 imply that shareholders tend to have a higher valuation for a firm when that firm's major customer is managed by an overconfident CEO. The results are supportive of our hypothesis H1b.

4.2. The value-enhancing effect and information asymmetry

In this section we test Hypothesis 2, which argues that the value-enhancing effect of serving overconfident customers mainly originates from high information asymmetry. To do so, we divide our sample into two groups: high information-asymmetry firms vs. low information-asymmetry firms. Following the existing literature, we use analyst coverage as the primary proxy for information asymmetry

(Kelly and Ljungqvist, 2012; Derrien and Kecskes, 2013). If H2 holds, we should find that the value-enhancing effect of serving overconfident customers occurs only when firms have no analyst coverage. The estimation model we use is the same as in equation (1). The results based on analyst coverage are reported in Table 6.

As Table 6 shows, the coefficients of *C_OC* on firm value are statistically significant (p<1%) only for the group where suppliers have no analyst coverage, which suggests a high information-asymmetry environment. Columns (1) and (2) both find that the magnitude of the effects are about the same as in Table 5, which indicates that our findings in Table 5 are mainly driven by the high information-asymmetry firms. Columns (3) and (4) show that, when firms have analyst coverage (and hence are more transparent), their firm value is not significantly affected by CEO overconfidence. In other words, customer CEO behavior only affects investors' views of suppliers that are hard to evaluate.

<Insert Table 6 here >

4.2.1 Alternative proxies for information asymmetry

As a robustness check, Table 7 reports the results using alternative proxies for information asymmetry, e.g. firm assets, firm age, and idiosyncratic risk. The information available in the market is more diversified for larger than for smaller firms, and those firms with longer history and lower idiosyncratic risk tend to have richer information available in the market (Barry and Brown, 1985; Griffin and Lemmon, 2002; Zhang, 2006; Ferreiea and Laux, 2007; Fu, 2009).

We divide our sample into three subsamples: high, medium, and low information asymmetry, based on firm size, firm age, and idiosyncratic risk. Results suggest that customer overconfidence has the strongest impact on firm value when the firms belong to the high information-asymmetry group. Taking Column (1) for example, the

coefficients of *C_OC* for small-sized suppliers is 0.3439, which is statistically significant at $p<1\%$. Interpreting the economic magnitude, this effect translates into 18.9% (0.3439 / 1.8174 =18.9226%) improvement in Tobin's Q. We find similar results in Columns (2) and (3), which represent young firms and high-idiosyncratic-risk suppliers. The economic magnitude and statistical significance is largest for the small-asset group. Taken together, results in Table 7 provide additional support for our hypothesis H2.

<Insert Table 7 here>

4.2.2 Addressing endogeneity

The central concern surrounding most empirical studies in the fields of management and finance is endogeneity. Specifically, corporate decisions are not made at random, but are usually deliberate decisions by firms or their managers to self-select into their preferred choices. This is termed the self-selection bias. Also, biased estimators can result if some unobservable variables affecting firm decisions are not incorporated in the regression.

The omitted-variable bias could occur if certain firms (suppliers) tend to be more profitable than others because of some unobserved firm characteristics potentially associated with customer CEO overconfidence. In our model, we control for various firm financial characteristics; however, we cannot completely rule out the omitted-variable concern. As a robustness check, we take advantage of a panel data setup and use a fixed-effect technique. Our sample consists of panel data with firm-year observations with multiple observations of the same firm over different years. If the unobservable attributes are fixed over time, we can control for them by including firm fixed effects. We also include year dummies to control for time-varying, economy-wide effects. Furthermore, we are not concerned about omitted variables on the customers' side, because we include many of their financial characteristics but do not

find them to be significant. In other words, they do not seem to affect suppliers' firm value in an important way.

Besides omitted variables, there could be other sources of endogeneity, such as reverse causality. Reverse causality refers to the possibility that firm value leads to overconfident CEOs. Firms that invest aggressively are more likely to hire someone as CEO who has the ambition to invest and grow the firm aggressively (such people are more likely to be overconfident). In our study, however, it is easy to disentangle causality from correlation. Our focal supplier firms are much smaller and less powerful than their major customers, and thus it is unlikely that they have any influence on either the selection of their customers' CEOs or these CEOs' decisions once appointed. In our estimation, all the firm characteristics and relationship variables are lagged one year to the testing year to reduce any reverse causality coming from the focal firm itself.

Table 8 presents regression results for the influences of overconfident customers on firm value by controlling firm fixed effect. Similar to Table 6, we also divide our sample into two groups: high vs. low information-asymmetry suppliers. As Table 8 shows, the coefficients of *C_OC* on supplier firm value are statistically significant (p<5%) for the group where suppliers have no analyst coverage in Columns (1) and (2), whereas they are not statistically significant in Columns (3) and (4). Thus, these results are similar with those in Table 6, indicating that our main findings are not influenced by the omitted-variable bias.

<Insert Table 8 here>

Although we include firm fixed effects to control for the potential omitted-variable problem, it cannot fully rule out the self-selection bias question. To address this potential concern, we use a difference-in-difference (DiD) approach to examine how the supplier's firm value would change when its major customer changes,

conditioned on the level of overconfidence of the customer CEO. We first identify a subsample of suppliers that change their major customers. We then define suppliers whose new major customer has an overconfident CEO as the treatment group, whereas suppliers whose new major customer does not have an overconfident CEO as the control group.

To select the control group, we carefully match all the control variables that are included in the baseline model based on propensity score matching method (Houston et al., 2014; Irani and Oesch, 2014; Hasan et al., 2014). In particular, we run probit regressions for each year, where the dependent variable is a dummy variable that equals 1 for the treatment group, and 0 otherwise. The independent variables include all the control variables in the baseline model. According to the propensity score calculated from the probit regression, we match each supplier in the treatment group with another supplier in the control group with replacement. Following Houston et al. (2014) and Hasan et al. (2014), we use the matching methods with Nearest neighbors (n = 1) and Nearest neighbors (n = 2) to select the matched samples. The empirical model is as follow:

$$\Delta Q_{i,t} = \alpha_1 + \alpha_3 D_{OC\,i,t-1} + \boldsymbol{\beta}' \boldsymbol{Z}_{i,t-1} + \mu_t + \varepsilon_{i,t}\,, \qquad (2)$$

where $\Delta Q_{i,t}$ is the change ratio of firm value for firm *i* from year *t-1* to *t*. $D_{OC\,i,t-1}$ is a dummy variable that equals 1 if new customer *i* is an overconfident firm and zero otherwise; $\boldsymbol{Z}_{i,t-1}$ is a vector of control variables from firm *i* in year *t*-1; μ capture fixed effects of year; and ε is the random error.

The coefficient of D_{OC} (α_3) captures the difference-in-difference estimation in supplier firm value between treatment and control groups conditional on whether or not the new customer is an overconfident CEO. To support our baseline findings, we predict a positive coefficient on D_{OC} (α_3), which indicates that suppliers experience

an increase in firm value after serving a new customer with an overconfident CEO compared with those suppliers serving a new customer without an overconfident CEO.

Table 9 presents a DiD analysis for the influence of overconfident customers on firm values by using the customer change data. Panels A and B presents the results of the whole sample and the sample of firms without analyst coverage.[12] In all models, we find that the coefficients of D_{OC} are positive and significant at a 1 % level across all models. Based on the estimate in Column (4), the coefficient is 0.6132 (p<1% and *t*-value=3.20), which means that suppliers experience an increase in firm value after serving a new customer with an overconfident CEO compared with those serving a new customer without an overconfident CEO. Together, the findings in this section support our H1b and H2. More importantly, the propensity-score matching and DiD regressions allow us to resolve any endogeneity concerns.

<Insert Table 9 here>

4.3. The value-enhancing effect: Innovation channels

Our results thus far provide strong evidence that a value-enhancing effect accrues from serving overconfident customers, and this effect is mainly derived from high information-asymmetry suppliers. We now test the innovation channel. As Hypothesis 3 predicts, the value-enhancing effect of serving overconfident customers occurs through their innovation behaviors. If this hypothesis holds, we would expect the value-enhancing effect to be more pronounced for firms serving overconfident customers with higher levels of innovation. The estimation models use OLS regressions with interaction terms between customer overconfidence and innovation

[12] We do not show the results of firms with analyst coverage due to the small sample size (less than 20 observations).

measures. We use three proxies for innovation, namely R&D expenditure, patents and citations. The model is specified as equation (2).

$$Q_{i,t} = \alpha_1 + \alpha_2 C\_OC_{i,t-1} + \alpha_3 C\_OC_{i,t-1} \times C_{Innovation_{i,t-1}}$$

$$+\alpha_4 C\_Innovation_{i,t-1} + \boldsymbol{\beta}' \boldsymbol{Z}_{i,t-1} + \nu_i + \mu_t + \varepsilon_{i,t}\ , \qquad (3)$$

$$[C\_Innovation_{i,t-1} = C\_RD_{i,t-1} \text{ or } C\_Patent_{i,t-1} \text{ or } C\_Citation_{i,t-1}]$$

where $Q_{i,t}$ is the firm value for supplier *i* in year *t*. $C\_OC_{i,t-1}$ is a dummy variable that equals 1 if firm *i* has an overconfident customer at time *t*-1 and zero otherwise; $C\_Innovation_{i,t-1}$ is the innovation channels of customer *i* in year *t*-1; $Z_{i,t-1}$ is a vector of control variables from firm *i* in year *t*-1; ν and μ represent industry and year fixed effects, respectively; and ε is the random error. In addition, innovation channels are $C\_RD_{i,t-1}$ (R&D intensity of customer *i* in year *t*-1), $C\_Patent_{i,t-1}$ (the patents of customer *i* in year *t*-1), and $C\_Citation_{i,t-1}$ (the citations of customer *i* in year *t*-1).

The interaction terms are $C\_OC_{i,t-1} \times C\_RD_{i,t-1}$, $C\_OC_{i,t-1} \times C\_Patent_{i,t-1}$, and $C\_OC_{i,t-1} \times C\_Citation_{i,t-1}$ in the equation (2), respectively. The coefficients of these interaction terms capture the channel effects. Positive coefficients suggest that the effects of customer overconfidence increase with the innovation activities.

Models (1) − (2) and (7) − (8) of Table 10 report the OLS regression results relating R&D expenditure and its interactive effects with customer overconfidence. We divide our sample into two groups based on the information environment using analyst coverage as the criterion. Columns (1) and (2) denote high information-asymmetry suppliers. The coefficients of $C\_OC_{i,t-1} \times C\_RD_{i,t-1}$ are 2.48 (p<5%) in Column (1) when we do not control for relationship characteristics of the supply chain, and 2.56 (p<5%) in Column (2) when we include additional controls for type of relationship. Both coefficients are positive and statistically significant and indicate

that the value-enhancing effect of serving overconfident customers becomes stronger as the customer's R&D intensity increases. Thus, our hypothesis H3 that innovation is a possible channel for value enhancement is supported. However, as shown in Columns (7) and (8), we do not find results for suppliers that face low information-asymmetry problems. This is consistent with our previous finding that serving overconfident customers only increases firm value when the firm is difficult for outsiders to evaluate.

<Insert Table 10 here >

Models (3) − (4) and (9) − (10) of Table 10 present that results using patents as proxies. Results are consistent with R&D expenditure. The coefficients on $C\_OC_{i,t-1} \times C\_Patent_{i,t-1}$ are positive and statistically significant at the 5% level. Interpreting the economic magnitude, for example, Column (4) of Table 10 suggests that the coefficient of the interaction term is 0.53. If we keep *C_OC* as 1, then a one-unit increase in customer patents increases supplier Tobin's Q by 0.53. Given that the mean of supplier Tobin's Q is 1.8174, the effect translates into an increase of supplier firm value by 30%, which is large. Examining Columns (9) and (10), we do not find significant results for suppliers in the low information-asymmetry category.

In addition, Models (5)−(6) and (11)−(12) of Table 10 present results using citations as proxies. The results of citations are similar to those of R&D expenditure and patents; however, the coefficients of the interaction term are smaller and are significant at the 10% level.

4.4. The value-enhancing effect: Investment channels

This section investigates the investment channel (H4), which, if it holds, would indicate that higher investment intensity by the customer firm can enhance the effect of customer overconfidence on the supplier's firm value. Following the studies of

Malmendier and Tate (2005, 2008) and Ferris, Jayaraman, and Sabherwal (2013), we use the capital expenditure ratio, the ratio of capital expenditure on acquisitions, the ratio of PPE, the asset-growth ratio, and the sales-growth ratio as measures to proxy for investment activities. The model is specified as equation (3).

$$Q_{i,t} = \alpha_1 + \alpha_2 C\_OC_{i,t-1} + \alpha_3 C\_OC_{i,t-1} \times C\_Investment_{i,t-1} + \alpha_4 C\_Investment_{i,t-1} + \boldsymbol{\beta}' \boldsymbol{Z}_{i,t-1} + \nu_i + \mu_t + \varepsilon_{i,t}\ , \quad (4)$$

$$[C\_Investment_{i,t-1} = C\_Capex_{i,t-1} \text{ or } C\_Aqc_{i,t-1} \text{ or } C\_Ppe_{i,t-1} \text{ or } C\_Assetg_{i,t-1} \text{ or } C\_Saleg_{i,t-1}]$$

where $Q_{i,t}$ is the firm value for supplier *i* in year *t*. $C\_OC_{i,t-1}$ is a dummy variable that equals 1 if firm *i* has an overconfident customer at time *t*-1 and zero otherwise; $C\_Investment_{i,t-1}$ is the investment of customer *i* in year *t*-1; $Z_{i,t-1}$ is a vector of control variables from firm *i* in year *t*-1; ν and μ represent industry and year fixed effects, respectively; and ε is the random error. In addition, investment channels are $C\_Capex_{i,t-1}$ (Capital expenditure / total assets), $C\_Aqc_{i,t-1}$ (Capital expenditure on acquisition / total assets), $C\_Ppe_{i,t-1}$ (Net PPE / total assets), $C\_Assetg_{i,t-1}$ (Percentage of asset increase of customers from the previous year), and $C\_Saleg_{i,t-1}$ (Percentage of sales increase of customers from the previous year).

The interaction terms are $C\_OC_{i,t-1} \times C\_Capex_{i,t-1}$, $C\_OC_{i,t-1} \times C\_Aqc_{i,t-1}$, $C\_OC_{i,t-1} \times C\_Ppe_{i,t-1}$, $C\_OC_{i,t-1} \times C\_Assetg_{i,t-1}$, and $C\_OC_{i,t-1} \times C\_Saleg_{i,t-1}$ in equation (3), respectively. The coefficients of these interaction terms capture the channel effects. Positive coefficients suggest that the effects of customer overconfidence increase with investment activities.

Models (1) and (6) of Table 11 report the OLS regression results relating capital expenditure and its interactive effects to customer overconfidence. We divide our

sample into two groups based on the information environment using analyst coverage as the criterion. As shown in Columns (1) and (6), however, we do not find significant results to support our H4 that the value-enhancing effect of serving overconfident customers occurs because of their investment behaviors. Moreover, we similarly do not find significant results of interaction terms in Models (2)−(5) and (7)−(10), suggesting that the other four investment measures also reject our H4.

<Insert Table 11 here >

In sum, Table 9−10 show that serving overconfident customers with higher R&D intensity, patents, and citations has a value-enhancing effect, whereas serving overconfident customers with higher levels of investment has no such effect. The findings are in line with those of Hirshleifer, Low, and Teoh (2012), who report that overconfident firms invest more in innovative activities and achieve greater success in innovations, thus increasing their firm values. Our results on the firm value of suppliers also complement theirs, suggesting that overconfident customers with higher levels of innovation also contribute to their suppliers' firm value.

4.5. The economic importance of trading partners

Our main results show that major customers' CEO overconfidence can significantly increase firm value for informationally opaque suppliers. In this section, we further investigate whether or not the economic importance of the supply-chain relationship affects the firm values of suppliers. If our value-enhancing hypothesis is correct, we should observe that such an effect should be stronger for suppliers who are more dependent on these customers for sales. This evaluation could also help assess the validity of our value-enhancing effect.

We test this argument by using two measures of customer economic importance, e.g., the percentage of transaction sales to total customer's cost of goods sold

(*salepct_cogs*) and customers' firm size (*C_totalassets*). Using the median value of customers' *salepct_cogs* and *C_totalassets*, we divide our sample into two subsamples: high and low economic importance. If the supply-chain relationship significantly influences the firm values of suppliers, we should observe the fact that the value-enhancing effect is greater in the high-economic-importance subsamples.

Table 12 examines the influence of overconfident customers on firm values by considering the economic importance of trading partners. In Columns (1) and (2), the coefficients of *C_OC* on firm value are statistically significant at the 1 and 5% levels for the group where customers have high economic importance. More importantly, the values of coefficients of *C_OC* in Columns (1) and (2) are significantly larger than these values in Table 6. Our results confirm that the economic importance of customers enhances the effect of customer CEO behavior on the firm values of suppliers.

However, in Columns (3) and (4), the coefficients of *C_OC* on firm value are statistically insignificant and significant at the 10% level for the group where customers have low economic importance. In addition, in Columns (5)-(8), we do not find significant results for suppliers in the low-information-asymmetry category.

<Insert Table 12 here >

4.6 Additional robustness tests

In Table 13 we report subsample results for different time periods using OLS regressions. We find that *C_OC* is significantly and positively associated with suppliers' firm value only during the normal time. The coefficient is 0.1727 with a significance level at the 1% level. Compared with our baseline regression results, the magnitude of the effect during normal economic times is larger. However, we also document that during the financial crisis (2007-2009) and the dot-com bubble (2000-

2003), it made no difference whether customer CEOs were overconfident or not. The results together imply that behavioral characteristics of customer CEOs do not play an important role in influencing investors' beliefs concerning supplier firm value when the stock market is volatile (bearish).

<Insert Table 13>

In Table 14 we report subsample OLS regression results for high-tech vs. other industries. Our results hold for both types of industry, suggesting the value-enhancing effect of customers exists across the board. The significance level is higher for non-high tech firms, however; whereas the economic magnitude is larger for high tech firms. The results are consistent with those of the innovation channel, which argues that the value-enhancing effect of serving an overconfident customer is driven by the spillover effect from customers' aggressively seeking growth opportunities.

5. Conclusion

Prior literature has documented that CEO overconfidence has real effects on corporate decision-making such as innovation and investment. However, the debate continues regarding whether managerial overconfidence enhances or diminishes firm performance. Our paper complements this growing literature by focusing on the spillover effect of customer CEO overconfidence on the firm value of suppliers whose sales to the former account for more than 10% of the latter's total sales.

Our empirical results show that firms gain higher valuation when they serve overconfident customers than those serving non-overconfident customers. However, we also find that this value-enhancing effect only occurs when these firms have no analyst coverage, smaller firm assets, younger firm age, and higher idiosyncratic risk, suggesting that information asymmetry and reputation issues are the main reasons

why overconfident customers benefit their suppliers. Our results are robust under various firm-level controls and using firm fixed effects. In exploring the innovation and investment channels, we find that serving overconfident customers with higher R&D intensity, patents, and citations has a stronger value-enhancing effect, whereas serving overconfident customers with higher levels of investment does not enhance firm value. This finding complements the work of Hirshleifer, Low, and Teoh (2012), who report that overconfident firms invest more in innovative activities and achieve greater success in innovation, thus increasing their firm value. We take their work a step further by suggesting that serving overconfident customers benefits shareholders due to a positive spillover effect from their customers' aggressively seeking growth opportunities.

References

Ahmed, A. S., S. Duellman, 2013. Managerial overconfidence and accounting conservatism. *J. Accounting Res.* **51** 1–30.

Alicke, M., 1985. Global self-evaluation as determined by the desirability and controllability of trait adjectives. *J. Personality and Social Psychology* **49** 1621–1630.

Anderson, R., D. Reeb, 2003. Founding-Family ownership and firm performance: Evidence from the S&P 500. *J. Finance* **58** 1301–1328.

Banerjee, S., S. Dasgupta, Y. Kim, 2008. Buyer-supplier relationships and the stakeholder theory of capital structure. *J. Finance* **63** 2507–2552.

Banerjee, S, M. Humphery-Jenner, V. Nanda, 2016. Restraining Overconfident CEOs though Improved Governance: Evidence from the Sarbanes-Oxley Act, *Rev. Financial Stud.* forthcoming.

Barry, C. B., S. J. Brown, 1985. Differential information and security market equilibrium. *J. Financial and Quant. Analysis* **20** 407–422.

Brennan, M. J., A. Subrahmanyam, 1995. Investment analysis and price formation in securities markets. *J. Financial Econom.* **38** 361–381.

Campbell, T. C., M. F. GallmeyerS. A. Johnson, J. Rutherford, B. Stanley, 2011. CEO optimism and forced turnover. *J. Financial Econom.* **101** 695–712.

Carter, R. B., S. Manaster, 1990. Initial public offerings and underwriter reputation, *J. Finance* **45** 1045–1067.

Chan, K., A. J. Menkveld, Z. Yang, 2008. Information asymmetry and asset prices: Evidence from the China foreign share discount. *J. Finance* **63** 159–196.

Chen, H., M. Kacperczyk, H. Ortiz-Molina, 2011. Labor unions, operating flexibility, and the cost of equity. *J. Financial and Quant. Analysis* **46** 25–58.

Chen, H., M. Kacperczyk, H. Ortiz-Molina, 2012. Do Nonfinancial stakeholders affect the pricing of risky debt? *Rev. of Finance* **16** 347–383.

Chen, X., Q. Cheng, K. Lo, 2010. On the relationship between analyst reports and corporate disclosures: Exploring the roles of information discovery and interpretation. *J. Accounting and Econom.* **49** 206–226.

Coase, R. H., 1937. The nature of the firm. *Economica* **4** 386–405.

Derrien, F., A. Kecskes, 2013. The real effects of financial shocks: evidence from exogenous changes in analyst coverage. *J. Finance* **68** 1407–1440.

Dhaliwal, D. S., J. S. Judd, M. A. Serfling, S. A. Shaikh, 2016. Customer concentration risk and the cost of equity capital. *J. Accounting and Econom.* **61** 23–48.

Fang, L., 2005. Investment bank reputation and the price and quality of underwriting services. *J. Finance* **60** 2729–2761.

Fee, C. E., S. Thomas, 2004. Sources of gains in horizontal takeovers: Evidence from customer, supplier, and rival firms. *J. Financial Econom.* **74** 423–460.

Fee, C. E., C. J. Hadlock, S. E. Thomas, 2006. Corporate Equity Ownership and the Governance of Product Market Relationships. *J. Finance* **61** 1217–1252.

Fernando, C. S., V. A. Gatchev, P. A. Spindt, 2005. Wanna dance? How firms and underwriters choose each other. *J. Finance* **60** 2437–2469.

Ferreiea, M., P. Laux, 2007. Corporate governance, idiosyncratic risk, and information flow. *J. Finance* **62** 951–989.

Ferris, S. P., N. Jayaraman, S. Sabherwal, 2013. CEO overconfidence and international merger and acquisition activity. *J. Financial and Quant. Analysis* **48** 137–164.

Fu, F., 2009. Idiosyncratic risk and the cross-section of expected stock returns. *J. Financial Econom.* **91** 24–37.

Gallasso, A., S. S. Timothy, 2011. CEO overconfidence and innovation. *Management Sci.* **57** 1469–1484.

Gervais, S., J. B. Heaton, T. Odean, 2011. Overconfidence, compensation contracts, and capital budgeting. *J. Finance* **66** 1735–1777.

Goel, A. M., A. V. Thakor, 2008. Overconfidence, CEO selection, and corporate governance. *J. Finance* **63** 2737–2784.

Gleason, C. A., C. M. C. Lee, 2003. Analyst forecast revisions and market price discovery. *The Accounting Rev.* **78** 193–225.

Griffin, J. M., M. L. Lemmon, 2002. Book-to-market equity, distress risk, and stock returns. *J. Finance* **57** 2317–2336.

He, J., X. Tian, 2013. The dark side of analyst coverage: the case of innovation. *J. Financial Econom.* **109** 856–878.

Hertzel, M. G., Z., Li, M. S. Officer, K. J. Rodgers, 2008. Inter-firm linkages and the wealth effects of financial distress along the supply chain. *J. Financial Econom.* **87** 374–387.

Hirshleifer, D. A., A. Low, S. H. Teoh, 2012. Are overconfident CEOs better innovators? *J. Finance* **67** 1735–1777.

Ho, P. H., C. W. Huang, C. Y. Lin, J. F. Yen, 2016. CEO overconfidence and financial crisis: Evidence from bank lending and leverage. *J. Financial Econom.* **120** 194–209.

Hong, H., T. Lim, J. C. Stein, 2000. Bad news travels slowly: Size, analyst coverage, and the profitability of momentum strategies. *J. Finance* **55** 265–295.

Hong, H., M. Kacperczyk, 2010. Competition and bias, *Quart. J. Econom.* **125** 1683–1725.

Houston, J. F., Jiang, L., Lin, C., and Ma, Y., 2014. Political connections and the cost of bank loans. *Journal of Accounting Research* **52**, 193–243.

Johnson, W. C., J. Kang, S. Yi, 2010. The certification role of large customers in the new issues market. *Financial Management* **39** 1425–1474.

Kale, J. R., H. Shahrur, 2007. Corporate capital structure and the characteristics of suppliers and customers. *J. Financial Econom.* **83** 321–365.

Kelly, B., A. Ljungqvist, 2012. Testing asymmetric-information asset pricing models. *Rev. Financial Stud.* **25** 1366–1413.

Krigman, L., W. S. Shaw, K. L. Womack, 2001. Why do firms switch underwriters? *J. Financial Econom.* **60** 245–284.

Kross, W., B. Ro, D. Schroeder, 1990. Earnings expectations: The analysts' information advantage. *The Accounting Rev.* **65** 461–476.

Larwood, L., W. Whittaker, 1977. Managerial myopia: self-serving biases in organizational planning. *J. Applied Psychology* **62** 194–198.

Malmendier, U., G. Tate, 2005. CEO overconfidence and corporate investment. *J. Finance* **60** 2661–2700.

Malmendier, U., G. Tate, 2008. Who makes acquisitions? CEO overconfidence and the market's reaction. *J. Financial Econom.* **89** 20–43.

Malmendier, U., G. Tate, J. Yan, 2011. Overconfidence and early-life experiences: The effect of managerial traits on corporate financial policies. *J. Finance* **66** 1687–1733.

Petersen, M., 2009. Estimating standard errors in finance panel data sets: Comparing approaches. *Rev. Financial Stud.* **22** 435–480.

Ritter, J., 1991. The long-run performance of initial public offerings. *J. Finance* **46** 3–

27.

Ritter, J., I. Welch, 2002. A review of IPO activity, pricing, and allocations. *J. Finance* **57** 1795–1828.

Schrand, C. M., S. L. Zechman, 2012. Executive overconfidence and the slippery slope to financial misreporting. *J. Accounting and Econom.* **53** 311–329.

Shahrur, H., 2005. Industry structure and horizontal takeovers: analysis of wealth effects on rivals, suppliers, and corporate customers. *J. Financial Econom.* **76** 61–98.

Svenson, O., 1981. Are we all less risky and more skillful than our fellow drivers? *Acta Psychologica* **47** 143–148.

Titman, S., 1984. The effect of capital structure on a firm's liquidation decision. *J. Financial Econom.* **13** 137–151.

White, H., 1980. A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica* **48** 817–838.

Williamson, O. E., 1985. The Economic Institutions of Capitalism. Free Press, New York.

Zhang, X. F., 2006. Information uncertainty and stock returns. *J. Finance* **61** 105–137.

Zhang, Y., 2008. Analysts' responsiveness and the post earnings announcement drift. *J. Accounting and Econom.* **46** 201–215

Table 1 Variable definition

Variable	Definition	Data Source
Panel A: CEO overconfidence		
C_OC	A dummy variable that equals one if the firm has an overconfident customer and zero otherwise. An overconfident firm is a firm whose CEO postpones exercising highly in-the-money options at least twice during his or her tenure. CEOs are identified as highly overconfident the first time they start to exhibit this behavior. Following Campbell et al. (2011), we choose 100% moneyness as the cutoff point to identify CEOs as highly overconfident.	ExecuComp
Panel B: Firm characteristics		
Q	Total assets + market value of equity– book value of common equity – deferred taxes / Total assets.	Comp
S_totalassets	Logarithm of total assets.	Comp
S_bookleverage	Long-term debt + debt in current liabilities / total assets.	Comp
S_RDtosale	R&D expenditure / total sales.	Comp
S_capextoasset	Capital expenditure / total assets.	Comp
S_salegrowth	Percentage of sales increase from the previous year.	Comp
S_equity_volatility	Standard deviation of weekly stock returns in a given year.	Comp
S_ROA	Net income / total asset.	Comp
Panel C: Customer characteristics		
C_totalassets	Logarithm of customer total assets.	Comp
C_bookleverage	Long-term debt + debt in current liabilities / total assets.	Comp
C_ROA	Net income / total asset.	Comp
Panel D: Sale relationships		
Sc_yearuptonow	Number of years that the trading relationship lasts up to now.	
Pct_salectosale	Percentage of transaction sales to total sales of suppliers.	
Panel E: Information Asymmetry		
Analyst coverage	Number of analyst coverage.	I/B/E/S
Firm size	Logarithm of total assets.	Comp
Firm age	Number of years since IPO.	Comp
Idiosyncratic risk	Standard deviation of residuals from regressing weekly stock returns on weekly market returns.	CRSP
Panel F: Innovations and investments of Customer		
C_RD	R&D expenditure / total sales.	Comp
C_ Citation	No. of citations received from patents applied during fiscal year.	Comp
C_ Patent	No. of patents applications filed during fiscal year.	Comp
C_Capex	Capital expenditure / total assets.	Comp
C_Aqc	Capital expenditure on acquisition / total assets.	Comp
C_Ppe	Net property, plant and equipment / total assets.	Comp
C_Assetg	Percentage of assets increase of customers from the previous year.	Comp
C_Saleg	Percentage of sales increase of customers from the previous year.	Comp

* CRSP: Center for Research in Security Prices; Comp: Compustat.

Table 2 Summary statistics

This table presents summary statistics for the variables used in this study over the period of 1993–2012. *C_OC* is a dummy variable that equals one if firm has an overconfident customer and zero otherwise. The definitions of other variables are in Table 1.

Variable	Mean	S.D.	25th	Median	75th
Panel A: CEO overconfidence					
C_OC	0.6091	0.4880	0.0000	1.0000	1.0000
Panel B: Firm characteristics					
Q	1.8174	1.2409	1.0945	1.4367	2.0578
S_totalassets	5.4569	1.9028	4.0749	5.2453	6.7264
S_bookleverage	0.1948	0.1728	0.0279	0.1725	0.3193
S_RDtosale	0.1257	0.5879	0.0000	0.0144	0.0941
S_capextoasset	0.0555	0.0629	0.0199	0.0363	0.0662
S_salegrowth	0.1460	0.3217	-0.0193	0.0902	0.2469
S_equity_volatility	0.0787	0.0370	0.0517	0.0726	0.0979
S_ROA	0.0351	0.1240	0.0114	0.0620	0.0978
Panel C: Customer characteristics					
C_totalassets	9.9970	1.5485	9.0501	10.1827	11.2661
C_bookleverage	0.2314	0.1387	0.1256	0.2404	0.3040
C_ROA	0.0817	0.0527	0.0560	0.0886	0.1051
Panel D: Sale relationships					
Sc_yearuptonow	6.7359	5.4249	3.0000	5.0000	9.0000
Pct_salectosale	0.2303	0.1431	0.1323	0.1800	0.2729
Panel E: Information Asymmetry					
Analyst coverage	9.7233	8.3718	3.4600	7.0000	13.6200
Firm size	5.4569	1.9028	4.0749	5.2453	6.7264
Firm age	17.0000	14.8021	7.0000	13.0000	24.0000
Idiosyncratic risk	0.0719	0.0347	0.0462	0.0662	0.0908
Panel F: Innovations and investments of Customer					
C_RD	0.0340	0.0601	0.0000	0.0056	0.0497
C_ Citation	2.3863	2.6085	0.0000	1.0986	4.9127
C_ Patent	2.3022	2.6508	0.0000	1.0433	4.6878
C_Capex	0.0754	0.0570	0.0328	0.0679	0.1073
C_Aqc	0.0235	0.0685	0.0000	0.0007	0.0167
C_Ppe	0.3254	0.2238	0.1085	0.2833	0.5579
C_Assetg	0.1190	0.1980	0.0270	0.0933	0.1494
C_Saleg	0.1147	0.1476	0.0342	0.1003	0.1670

Table 3 Firm characteristics for firms with and without overconfident customers

This table presents the mean and mean difference between firms with and without overconfident customers over 1993–2012. Variable definitions are provided in Table 1. Superscripts *, ** and *** denote significance of the *t*-test for the difference in the means between the two subsamples at the 10%, 5%, and 1% levels, respectively.

Variable	Firms with OC Customers	Firms without OC Customers	Difference	*t*-value
Panel A: Firm characteristics				
Q	1.8444	1.7733	0.0712**	(1.98)
S_totalassets	5.4828	5.6055	-0.1227**	(-2.20)
S_bookleverage	0.1914	0.1956	-0.0042	(-0.82)
S_RDtosale	0.1318	0.1158	0.0160	(0.92)
S_capextoasset	0.0541	0.0563	-0.0022	(-1.21)
S_salegrowth	0.1487	0.1440	0.0047	(0.50)
S_equity_volatility	0.0811	0.0740	0.0071***	(6.15)
S_ROA	0.0337	0.0381	-0.0044	(-1.22)
Panel B: Customer characteristics				
C_totalassets	10.0274	10.0988	-0.0714	(-1.60)
C_bookleverage	0.2224	0.2391	-0.0167***	(-4.16)
C_ROA	0.0890	0.0725	0.0165***	(11.07)
Panel C: Sale relationships				
Sc_yearuptonow	6.4410	7.3449	-0.9039***	(-5.63)
Pct_salectosale	0.2279	0.2306	-0.0027	(-0.64)
Panel D: Information Asymmetry				
Analyst coverage	9.4025	10.1735	-0.7709	(-1.22)
Firm size	5.4828	5.6055	-0.1227**	(-2.20)
Firm age	17.4866	18.2362	-0.7496*	(-1.65)
Idiosyncratic risk	0.0744	0.0672	0.0071***	(6.62)
Panel E: Innovations and investments of Customer				
C_RD	0.0369	0.0285	0.0084***	(4.69)
C_ Citation	2.3870	2.3883	-0.0012	(-0.01)
C_ Patent	2.2722	2.3513	-0.0791	(-0.78)
C_Capex	0.0835	0.0607	0.0228***	(14.10)
C_Aqc	0.0272	0.0188	0.0083***	(4.07)
C_Ppe	0.3496	0.2871	0.0624***	(7.61)
C_Assetg	0.1400	0.0804	0.0596***	(10.48)
C_Saleg	0.1300	0.0893	0.0407***	(9.76)

Table 4 Correlation matrix

This table presents the Pearson correlation coefficient matrix of the variables from 1993 to 2012. The variable definitions can be found in the Table 1. Superscripts * and ** denote significance at the 5% and 1% levels, respectively.

	C_OC	*Q*	*S_totalassets*	*S_bookleverage*	*S_RDtosale*	*S_capextoasset*	*S_salegrowth*	*S_equity_volatility*	*S_ROA*	*C_totalassets*	*C_bookleverage*	*C_ROA*	*Sc_yearuptonow*	*Pct_salectosale*
C_OC	1.00													
Q	0.03*	1.00												
S_totalassets	-0.03*	-0.03	1.00											
S_bookleverage	-0.01	-0.23**	0.18**	1.00										
S_RDtosale	0.01	0.18**	-0.06**	-0.12**	1.00									
S_capextoasset	-0.02	-0.01	-0.02	0.12**	-0.05**	1.00								
S_salegrowth	0.01	0.16**	-0.04**	-0.01	0.03*	0.15**	1.00							
S_equity_volatility	0.09**	0.05**	-0.44**	-0.08**	0.12**	0.00	0.08**	1.00						
S_ROA	-0.02	-0.02	0.19**	0.06**	-0.37**	0.08**	0.16**	-0.32**	1.00					
C_totalassets	-0.02	-0.15**	0.28**	0.15**	-0.07**	-0.03*	-0.06**	-0.18**	0.06**	1.00				
C_bookleverage	-0.06**	-0.12**	-0.10**	0.16**	-0.06**	0.04*	-0.06**	-0.10**	0.07**	0.28**	1.00			
C_ROA	0.16**	-0.08**	0.01	0.04**	0.03	0.00	0.06**	-0.02	0.05**	0.07**	-0.19**	1.00		
Sc_yearuptonow	-0.08**	-0.16**	0.14**	0.05**	-0.09**	-0.11**	-0.12**	-0.20**	0.11**	0.25**	0.15**	0.03*	1.00	
Pct_salectosale	-0.01	0.03*	-0.24**	-0.06**	0.17**	0.02	0.06**	0.12**	-0.10**	0.01	0.04**	0.03*	0.07**	1.00

Table 5 Overconfident customers and firm values

This table presents ordinary least squares (OLS) regression results for the influences of overconfident customers on firm values. The empirical model is:

$$Q_{i,t} = \alpha_1 + \alpha_2 C\_OC_{i,t-1} + \boldsymbol{\beta}' \boldsymbol{Z}_{i,t-1} + \nu_i + \mu_t + \varepsilon_{i,t}$$

where $Q_{i,t}$ is the firm value for firm *i* in year *t*. $C\_OC_{i,t-1}$ is a dummy variable that equals 1 if firm *i* has an overconfident customer at time *t*-1 and zero otherwise; $\boldsymbol{Z}_{i,t-1}$ is a vector of control variables from firm *i* in year *t*-1; ν and μ capture fixed effects of industry and year, respectively; and ε is the random error. Variable definitions are provided in Table 1. In parentheses are *t*-statistics based on standard errors adjusted for heteroskedasticity (White, 1980) and firm clustering (Petersen, 2009). Superscripts *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. To save space, we do not report the coefficients for industry and year dummies.

Model	(1)	(2)	(3)	(4)
Constant	1.3290***	1.0451***	1.8552***	1.8051***
	(5.47)	(4.20)	(4.85)	(4.53)
C_OC	0.1522***	0.1464***	0.1456***	0.1401***
	(2.96)	(2.82)	(2.82)	(2.72)
S_totalassets		0.0233	0.0339*	0.0348*
		(1.22)	(1.78)	(1.80)
S_bookleverage		-1.4662***	-1.4264***	-1.4142***
		(-8.19)	(-8.02)	(-7.99)
S_RDtosale		0.2157***	0.2145***	0.2122***
		(3.72)	(3.73)	(3.69)
S_capextoasset		0.1493	0.1876	0.1562
		(0.41)	(0.52)	(0.44)
S_salegrowth		0.4291***	0.4333***	0.4135***
		(5.00)	(5.04)	(4.87)
S_equity_volatility		0.2530	0.2414	-0.0093
		(0.30)	(0.28)	(-0.01)
S_ROA		0.6366**	0.6484**	0.6883**
		(1.99)	(2.09)	(2.21)
C_totalassets			-0.0748**	-0.0644**
			(-2.46)	(-2.11)
C_bookleverage			-0.3912	-0.3564
			(-1.62)	(-1.48)
C_ROA			-1.4648**	-1.4022**
			(-2.51)	(-2.40)
Sc_yearuptonow				-0.0146***
				(-3.43)
Pct_salectosale				-0.0023
				(-0.01)
Control For				
Industry fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
Obs.	4,881	4,404	4,404	4,404
Adj-R^2	0.1399	0.1958	0.2025	0.2053

Table 6 Overconfident customers and firm values: Information asymmetry

This table presents ordinary least squares (OLS) regression results for the influences of overconfident customers on firm values by considering the information asymmetry level of the firms. The empirical model is:

$$Q_{i,t} = \alpha_1 + \alpha_2 C\_OC_{i,t-1} + \boldsymbol{\beta}' \boldsymbol{Z}_{i,t-1} + \nu_i + \mu_t + \varepsilon_{i,t}$$

where $Q_{i,t}$ is the firm value for firm *i* in year *t*. $C\_OC_{i,t-1}$ is a dummy variable that equals 1 if firm *i* has an overconfident customer at time *t*-1 and zero otherwise; $\boldsymbol{Z}_{i,t-1}$ is a vector of control variables from firm *i* in year *t*-1; ν and μ capture fixed effects of industry and year, respectively; and ε is the random error. Variable definitions are provided in Table 1. In parentheses are *t*-statistics based on standard errors adjusted for heteroskedasticity (White, 1980) and firm clustering (Petersen, 2009). Superscripts *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. To save space, we do not report the coefficients for industry and year dummies.

	Panel A: High Information Asymmetry		Panel B: Low Information Asymmetry	
	Firms without analyst coverage		Firms with analyst coverage	
Model	(1)	(2)	(3)	(4)
Constant	1.8449***	1.7196***	1.1636*	1.3104**
	(4.40)	(3.93)	(1.83)	(1.99)
C_OC	0.1529***	0.1460**	0.0811	0.0798
	(2.66)	(2.54)	(0.72)	(0.71)
S_totalassets	0.0401*	0.0445**	-0.0300	-0.0419
	(1.94)	(2.12)	(-0.54)	(-0.77)
S_bookleverage	-1.4228***	-1.4010***	-1.3448***	-1.3658***
	(-7.22)	(-7.15)	(-2.83)	(-2.85)
S_RDtosale	0.2234**	0.2163**	0.2017***	0.2122***
	(2.56)	(2.50)	(5.53)	(5.64)
S_capextoasset	0.1051	0.0918	-0.0804	-0.2221
	(0.28)	(0.25)	(-0.06)	(-0.17)
S_salegrowth	0.4147***	0.3957***	0.4787***	0.4839***
	(4.15)	(3.99)	(2.74)	(2.82)
S_equity_volatility	0.5367	0.2875	-1.8002	-1.9295
	(0.57)	(0.31)	(-0.90)	(-0.94)
S_ROA	0.5693	0.5973	0.7685	0.8337
	(1.56)	(1.64)	(1.36)	(1.50)
C_totalassets	-0.0844***	-0.0765**	0.0214	0.0290
	(-2.60)	(-2.35)	(0.25)	(0.33)
C_bookleverage	-0.3563	-0.3025	-0.8763	-0.8503
	(-1.34)	(-1.14)	(-1.41)	(-1.34)
C_ROA	-1.5857**	-1.5142**	-1.0026	-0.9237
	(-2.22)	(-2.10)	(-0.93)	(-0.87)
Sc_yearuptonow		-0.0149***		-0.0119
		(-3.24)		(-0.96)
Pct_salectosale		0.1067		-0.4872
		(0.43)		(-0.96)
Control For				
Industry fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
Obs.	3,708	3,708	696	696
Adj-R^2	0.1897	0.1924	0.2610	0.2625

Table 7 Overconfident customers and firm values: Alternative proxies for information asymmetry

This table presents ordinary least squares (OLS) regression results for the influences of overconfident customers on firm values by considering the information asymmetry level of the firms. The empirical model is:

$$Q_{i,t} = \alpha_1 + \alpha_2 C\_OC_{i,t-1} + \boldsymbol{\beta}' \boldsymbol{Z}_{i,t-1} + \nu_i + \mu_t + \varepsilon_{i,t}$$

where $Q_{i,t}$ is the firm value for firm i in year t. $C\_OC_{i,t-1}$ is a dummy variable that equals 1 if firm i has an overconfident customer at time t-1 and zero otherwise; $\boldsymbol{Z}_{i,t-1}$ is a vector of control variables from firm i in year t-1; ν and μ capture fixed effects of industry and year, respectively; and ε is the random error. Variable definitions are provided in Table 1. In parentheses are t-statistics based on standard errors adjusted for heteroskedasticity (White, 1980) and firm clustering (Petersen, 2009). Superscripts *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. To save space, we do not report the coefficients for industry and year dummies.

	Panel A: High Information Asymmetry			Panel B: Medium Information Asymmetry			Panel C: Low Information Asymmetry		
	Small Asset	Small Firm age	High Idiosyncratic risk	Medium Asset	Medium Firm age	Medium Idiosyncratic risk	Large Asset	Large Firm age	Low Idiosyncratic risk
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Constant	3.0756***	2.2060***	2.5417***	1.7092***	2.0697***	1.5804**	1.8408***	2.9731***	0.9694**
	(3.71)	(3.93)	(3.50)	(2.88)	(3.03)	(2.54)	(2.78)	(3.19)	(2.44)
C_OC	0.3439***	0.1923**	0.1845*	0.1193	0.1031	0.1505*	0.0636	0.0654	0.1136
	(2.90)	(2.08)	(1.93)	(1.54)	(1.04)	(1.78)	(0.78)	(0.63)	(1.59)
S_totalassets	-0.3965***	-0.0532	-0.1052***	0.0094	0.0349	0.0366	0.0381	0.0502*	0.0318
	(-3.79)	(-1.54)	(-2.83)	(0.16)	(0.93)	(1.01)	(0.95)	(1.68)	(1.63)
S_bookleverage	-1.8509***	-1.2520***	-1.3967***	-1.2948***	-1.4039***	-1.4810***	-1.2777***	-1.1972***	-0.9108***
	(-4.92)	(-5.03)	(-5.02)	(-5.15)	(-4.05)	(-5.46)	(-4.26)	(-3.41)	(-4.20)
S_RDtosale	0.0980	0.0825	0.1829**	0.2648***	0.6987***	0.2254**	1.0489***	2.0801***	2.0534***
	(0.97)	(1.47)	(2.43)	(3.96)	(3.67)	(2.15)	(3.54)	(4.33)	(3.60)
S_capextoasset	1.0073	0.5037	0.1072	-0.1840	0.1086	0.1473	-0.3965	0.3448	0.4707
	(1.16)	(1.16)	(0.19)	(-0.39)	(0.13)	(0.27)	(-0.73)	(0.37)	(0.81)
S_salegrowth	0.6907***	0.4499***	0.4525***	0.3492***	0.4664***	0.4132***	0.1103	0.3544*	0.1774
	(3.61)	(3.58)	(3.41)	(3.53)	(3.34)	(3.19)	(0.74)	(1.68)	(1.12)
S_equity_volatility	-0.0567	-0.8712	2.3399*	1.9388	1.4842	5.8471	-1.1054	-1.1626	2.6003
	(-0.03)	(-0.69)	(1.78)	(1.61)	(0.86)	(1.61)	(-0.71)	(-0.73)	(0.87)
S_ROA	-0.8799**	-0.4713	-0.0238	1.4495***	1.9985***	0.9783	4.4782***	3.0514***	6.7138***
	(-1.99)	(-1.44)	(-0.07)	(3.48)	(3.80)	(1.61)	(5.68)	(4.33)	(9.27)
C_totalassets	-0.0318	-0.0655*	-0.0363	-0.0527	-0.0532	-0.0697	-0.0942**	-0.1006	-0.0636**

	(-0.52)	(-1.71)	(-0.69)	(-1.48)	(-0.90)	(-1.59)	(-2.02)	(-1.54)	(-2.11)
C_bookleverage	-0.2683	-0.4800	-0.5740	-0.3434	0.3711	-0.0247	0.3133	-1.1832**	0.3489
	(-0.53)	(-1.23)	(-1.43)	(-0.99)	(0.80)	(-0.06)	(0.76)	(-2.34)	(1.31)
C_ROA	-3.0647*	-0.3747	-1.4450	-0.8491	-0.7513	-1.4144*	-0.7424	-5.1046***	0.7838
	(-1.87)	(-0.55)	(-1.61)	(-1.36)	(-0.78)	(-1.67)	(-0.92)	(-3.01)	(0.90)
Sc_yearuptonow	-0.0290***	-0.0198	-0.0186**	-0.0061	-0.0223***	-0.0164***	-0.0121**	-0.0079	-0.0103**
	(-2.64)	(-1.52)	(-2.21)	(-1.03)	(-2.71)	(-2.62)	(-2.00)	(-1.10)	(-2.00)
Pct_salectosale	0.0056	0.2101	-0.0957	-0.1386	-0.3680	0.1385	-0.5952	-0.0794	-0.5677**
	(0.01)	(0.59)	(-0.29)	(-0.51)	(-0.90)	(0.32)	(-1.51)	(-0.16)	(-2.04)
Control For									
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	1,019	1,544	1,469	1,874	1,271	1,412	1,511	1,313	1,523
Adj-R^2	0.1974	0.1975	0.1806	0.2099	0.2370	0.1952	0.3932	0.3417	0.4323

Table 8 Overconfident customers and firm values: Firm fixed effect

This table presents ordinary least squares (OLS) regression results for the influences of overconfident customers on firm values by considering the information asymmetry level of the firms. The empirical model is controlling the firm fixed effect:

$$Q_{i,t} = \alpha_1 + \alpha_2 C\_OC_{i,t-1} + \boldsymbol{\beta}' \boldsymbol{Z}_{i,t-1} + \omega_i + \mu_t + \varepsilon_{i,t}$$

where $Q_{i,t}$ is the firm value for firm *i* in year *t*. $C\_OC_{i,t-1}$ is a dummy variable that equals 1 if firm *i* has an overconfident customer at time *t*-1 and zero otherwise; $\boldsymbol{Z}_{i,t-1}$ is a vector of control variables from firm *i* in year *t*-1; ω and μ capture fixed effects of firm and year, respectively; and ε is the random error. Variable definitions are provided in Table 1. In parentheses are *t*-statistics based on standard errors adjusted for heteroskedasticity (White, 1980) and firm clustering (Petersen, 2009). Superscripts *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. To save space, we do not report the coefficients for industry and year dummies.

	Panel A: High Information Asymmetry		Panel B: Low Information Asymmetry	
	Firms without analyst coverage		Firms with analyst coverage	
Model	(1)	(2)	(3)	(4)
Constant	2.7775***	2.7237***	3.5577	3.6622
	(2.80)	(2.70)	(1.19)	(1.19)
C_OC	0.1224**	0.1199**	0.1531	0.1549
	(2.25)	(2.15)	(1.20)	(1.19)
S_totalassets	0.0205	0.0249	-0.1594**	-0.1620**
	(1.01)	(1.11)	(-2.19)	(-2.22)
S_bookleverage	-1.0832***	-1.0690***	-1.3891**	-1.4045**
	(-4.97)	(-5.01)	(-2.56)	(-2.55)
S_RDtosale	0.3194***	0.3127***	0.2539	0.2635
	(6.56)	(6.08)	(1.43)	(1.50)
S_capextoasset	0.2479	0.2460	-0.4520	-0.5169
	(0.73)	(0.74)	(-0.34)	(-0.39)
S_salegrowth	0.3014***	0.2904***	0.4719**	0.4752**
	(3.48)	(3.47)	(2.48)	(2.53)
S_equity_volatility	-0.2754	-0.3815	-5.8585***	-5.8484***
	(-0.41)	(-0.59)	(-2.71)	(-2.64)
S_ROA	1.1372***	1.1543***	1.5371**	1.5517**
	(2.92)	(3.02)	(2.50)	(2.50)
C_totalassets	-0.0113	-0.0162	-0.0780	-0.0852
	(-0.08)	(-0.12)	(-0.19)	(-0.20)
C_bookleverage	0.4949	0.4920	-1.3607	-1.3081
	(0.63)	(0.62)	(-1.42)	(-1.33)
C_ROA	-1.1814**	-1.1600**	-4.3549***	-4.3134***
	(-2.12)	(-2.15)	(-3.39)	(-3.23)
Sc_yearuptonow		-0.0097**		-0.0023
		(-2.28)		(-0.14)
Pct_salectosale		0.1722		-0.2311
		(0.62)		(-0.33)
Control For				
Firm fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
Obs.	3,708	3,708	696	696
Adj-R^2	0.2905	0.2913	0.3917	0.3898

Table 9 Overconfident customers and firm values: Difference-in-difference analysis in customer change

This table presents difference-in-difference analysis for the influences of overconfident customers on firm values by using the customer change data. We employ the Propensity Score Matching (PSM) method to choice the matched sample. For each supplier has a new overconfident customer, the matched sample from supplier has a new non-overconfident customer is selected based on the estimated probabilities, where the PSM model considers all the control variables. For robustness, we use one treatment sample to one matched sample in Models (1) and (3), whereas we use one treatment sample to two matched sample in Models (2) and (4). The empirical model is as follows:

$$\Delta Q_{i,t} = \alpha_1 + \alpha_3 D_{OC_{i,t-1}} + \boldsymbol{\beta}' \boldsymbol{Z}_{i,t-1} + \mu_t + \varepsilon_{i,t}$$

where $\Delta Q_{i,t}$ is the change ratio of firm value for firm *i* from year *t-1* to *t*. $D_{OC_{i,t-1}}$ is a dummy variable that equals 1 if new customer *i* is an overconfident firm and zero otherwise; $\boldsymbol{Z}_{i,t-1}$ is a vector of control variables from firm *i* in year *t*-1; μ capture fixed effects of year; and ε is the random error. Variable definitions are provided in Table 1. In parentheses are *t*-statistics based on standard errors adjusted for heteroskedasticity (White, 1980) and firm clustering (Petersen, 2009). Superscripts *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. To save space, we do not report the coefficients for industry and year dummies.

	Panel A: Whole sample		Panel B: Firms without analyst coverage	
Model	(1)	(2)	(3)	(4)
Constant	0.7955	-0.1929	-0.1436	-0.8357
	(0.52)	(-0.12)	(-0.11)	(-0.59)
D_{OC}	0.8423***	0.6280***	0.6173***	0.6132***
	(4.38)	(3.03)	(3.67)	(3.20)
S_totalassets	-0.1641**	-0.0968	-0.0954*	-0.0790
	(-2.51)	(-1.45)	(-1.69)	(-1.43)
S_bookleverage	1.1122*	0.7767	0.5714	0.5652
	(1.77)	(1.31)	(1.01)	(0.98)
S_RDtosale	0.1303	0.0727	-0.2094	-0.4429
	(0.54)	(0.27)	(-0.66)	(-1.17)
S_capextoasset	-1.0116	-1.3362	-1.2378	-1.8405*
	(-1.02)	(-1.15)	(-1.31)	(-1.78)
S_salegrowth	0.0597	0.2233	-0.8685***	-0.6930
	(0.12)	(0.41)	(-2.63)	(-1.64)
S_equity_volatility	-11.0557***	-11.5809***	-10.1514***	-11.6762***
	(-3.88)	(-3.67)	(-3.41)	(-3.46)
S_ROA	-2.4823***	-2.2001**	-1.5441*	-1.4760
	(-2.81)	(-2.18)	(-1.83)	(-1.41)
C_totalassets	-0.0377	0.0540	0.0754	0.1433*
	(-0.44)	(0.61)	(1.05)	(1.91)
C_bookleverage	0.3317	0.6478	0.1678	0.6151
	(0.35)	(0.72)	(0.18)	(0.67)
C_ROA	-4.3918*	-1.3486	-5.2882*	-4.2560
	(-1.77)	(-0.54)	(-1.91)	(-1.58)
Sc_yearuptonow	0.0873***	0.0296	0.0761**	0.0331
	(2.66)	(1.05)	(2.58)	(1.17)
Pct_salectosale	1.2330	0.6575	2.0271**	1.9602**
	(1.47)	(0.75)	(2.40)	(2.18)
Control For				
Year fixed effect	Yes	Yes	Yes	Yes
Obs.	176	196	148	159
Adj-R^2	0.3588	0.1817	0.4286	0.2655

Table 10 Overconfident customers and firm values: Innovation channels

This table presents ordinary least squares (OLS) regression results for the influences of overconfident customers on firm values by considering the channel of R&D intensity. The empirical model is:

$$Q_{i,t} = \alpha_1 + \alpha_2 C\_OC_{i,t-1} + \alpha_3 C\_OC_{i,t-1} \times C\_Innovation_{i,t-1} + \alpha_4 C\_Innovation_{i,t-1} + \boldsymbol{\beta}' \boldsymbol{Z}_{i,t-1} + \nu_i + \mu_t + \varepsilon_{i,t}$$

where $Q_{i,t}$ is the firm value for firm *i* in year *t*. $C\_OC_{i,t-1}$ is a dummy variable that equals 1 if firm *i* has an overconfident customer at time *t*-1 and zero otherwise; $C\_Innovation_{i,t-1}$ is the innovation channels of customer *i* in year *t*-1; $\boldsymbol{Z}_{i,t-1}$ is a vector of control variables from firm *i* in year *t*-1; ν and μ capture fixed effects of industry and year, respectively; and ε is the random error. Innovation channels are *C_RD* (R&D intensity of customer *i* in year *t*-1), *C_ Patent* (the patents of customer *i* in year *t*-1), and *C_ Citation* (the citations of customer *i* in year *t*-1). Variable definitions are provided in Table 1. In parentheses are *t*-statistics based on standard errors adjusted for heteroskedasticity (White, 1980) and firm clustering (Petersen, 2009). Superscripts *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. To save space, we do not report the coefficients for industry and year dummies.

	Panel A: High Information Asymmetry						Panel B: Low Information Asymmetry					
	Firms without analyst coverage						Firms with analyst coverage					
	C_RD		*C_ Patent*		*C_ Citation*		*C_RD*		*C_ Patent*		*C_ Citation*	
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Constant	1.8302***	1.7095***	1.6126***	1.5545**	1.7667***	1.6997***	1.3121**	1.4355**	2.0151	2.4910*	2.0721	2.4816*
	(4.39)	(3.95)	(2.63)	(2.47)	(2.87)	(2.68)	(2.03)	(2.17)	(1.40)	(1.74)	(1.56)	(1.88)
C_OC	0.0601	0.0504	-0.0185	-0.0313	0.0205	0.0083	-0.0177	-0.0109	0.1680	0.1964	0.1538	0.1847
	(0.93)	(0.78)	(-0.20)	(-0.34)	(0.23)	(0.09)	(-0.11)	(-0.07)	(0.86)	(0.96)	(0.77)	(0.90)
C_OC × *C_ Innovation*	2.4804**	2.5590**	0.0500**	0.0532**	0.0387*	0.0420*	2.5458	2.3340	-0.0545	-0.0558	-0.0514	-0.0524
	(2.42)	(2.49)	(2.15)	(2.26)	(1.65)	(1.76)	(1.22)	(1.09)	(-1.24)	(-1.26)	(-1.14)	(-1.18)
C_ Innovation	-0.5205	-0.5931	-0.0402	-0.0362	-0.0015	0.0021	-2.9871	-2.7240	0.0071	0.0360	0.0101	0.0327
	(-0.46)	(-0.52)	(-1.38)	(-1.24)	(-0.05)	(0.07)	(-1.21)	(-1.09)	(0.07)	(0.36)	(0.11)	(0.38)
S_totalassets	0.0369*	0.0410*	0.0497**	0.0498**	0.0499**	0.0500**	-0.0279	-0.0393	-0.0401	-0.0639	-0.0368	-0.0611
	(1.79)	(1.94)	(2.12)	(2.06)	(2.12)	(2.06)	(-0.50)	(-0.72)	(-0.57)	(-0.90)	(-0.53)	(-0.87)
S_bookleverage	-1.4133***	-1.3924***	-1.5287***	-1.4945***	-1.5286***	-1.4925***	-1.3456***	-1.3654***	-1.1804**	-1.2640**	-1.1942**	-1.2760**
	(-7.21)	(-7.14)	(-5.65)	(-5.50)	(-5.64)	(-5.48)	(-2.83)	(-2.85)	(-2.43)	(-2.53)	(-2.46)	(-2.56)
S_RDtosale	0.2129**	0.2062**	0.3311***	0.3268***	0.3325***	0.3281***	0.2032***	0.2130***	0.1752***	0.2038***	0.1764***	0.2041***
	(2.49)	(2.43)	(2.64)	(2.61)	(2.68)	(2.65)	(5.41)	(5.45)	(3.72)	(4.12)	(3.76)	(4.12)
S_capextoasset	0.0833	0.0718	0.0966	0.1388	0.1151	0.1547	-0.1459	-0.2729	2.9989	2.7160	2.9916	2.7143
	(0.23)	(0.20)	(0.14)	(0.20)	(0.17)	(0.23)	(-0.11)	(-0.22)	(1.59)	(1.52)	(1.59)	(1.52)
S_salegrowth	0.4041***	0.3852***	0.3224**	0.3050**	0.3247**	0.3064**	0.4921***	0.4951***	0.1858	0.1910	0.1852	0.1921
	(4.06)	(3.91)	(2.45)	(2.33)	(2.47)	(2.34)	(2.74)	(2.80)	(0.98)	(0.99)	(0.98)	(1.01)
S_equity_volatility	0.3997	0.1454	1.6226	1.3789	1.5316	1.2727	-1.9106	-2.0286	-0.5610	-0.6688	-0.4852	-0.5992

	(0.42)	(0.16)	(1.30)	(1.11)	(1.22)	(1.02)	(-0.95)	(-0.98)	(-0.27)	(-0.31)	(-0.23)	(-0.28)
S_ROA	0.5915	0.6195*	1.1684***	1.2096***	1.1681***	1.2108***	0.7472	0.8113	0.4592	0.4734	0.4587	0.4738
	(1.64)	(1.72)	(2.89)	(3.01)	(2.88)	(3.00)	(1.34)	(1.47)	(0.73)	(0.76)	(0.73)	(0.77)
C_totalassets	-0.0803**	-0.0720**	-0.0671	-0.0650	-0.0924*	-0.0894*	0.0094	0.0180	-0.0503	-0.0627	-0.0596	-0.0638
	(-2.53)	(-2.27)	(-1.33)	(-1.30)	(-1.85)	(-1.80)	(0.11)	(0.21)	(-0.29)	(-0.37)	(-0.37)	(-0.41)
C_bookleverage	-0.2245	-0.1709	0.2431	0.3070	0.2535	0.3215	-1.0424	-1.0024	-1.4280	-1.2608	-1.4428	-1.2667
	(-0.86)	(-0.65)	(0.64)	(0.82)	(0.67)	(0.86)	(-1.52)	(-1.43)	(-1.48)	(-1.35)	(-1.50)	(-1.36)
C_ROA	-1.3748*	-1.3023*	-1.2617*	-1.2099	-1.2608*	-1.2052	-1.3443	-1.2289	-0.1825	0.2154	-0.1918	0.1963
	(-1.96)	(-1.84)	(-1.67)	(-1.60)	(-1.68)	(-1.61)	(-0.84)	(-0.79)	(-0.10)	(0.13)	(-0.11)	(0.12)
sc_yearuptonow		-0.0151***		-0.0148**		-0.0153***		-0.0114		-0.0209		-0.0209
		(-3.32)		(-2.58)		(-2.67)		(-0.92)		(-1.17)		(-1.18)
pct_salectosale		0.0911		-0.0360		-0.0324		-0.4584		-1.1973*		-1.1910*
		(0.36)		(-0.13)		(-0.12)		(-0.91)		(-1.89)		(-1.88)
Control For												
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	3,708	3,708	2,262	2,262	2,262	2,262	696	696	475	475	475	475
Adj-R^2	0.1931	0.1959	0.2072	0.2100	0.2069	0.2099	0.2610	0.2620	0.2353	0.2483	0.2351	0.2480

Table 11 Overconfident customers and firm values: Investment channels

This table presents ordinary least squares (OLS) regression results for the influences of overconfident customers on firm values by considering the investment channels. The empirical model is:

$$Q_{i,t} = \alpha_1 + \alpha_2 C\_OC_{i,t-1} + \alpha_3 C\_OC_{i,t-1} \times C\_Investment_{i,t-1} + \alpha_4 C\_Investment_{i,t-1} + \boldsymbol{\beta}' \boldsymbol{Z}_{i,t-1} + \nu_i + \mu_t + \varepsilon_{i,t}$$

where $Q_{i,t}$ is the firm value for firm *i* in year *t*. $C\_OC_{i,t-1}$ is a dummy variable that equals 1 if firm *i* has an overconfident customer at time *t*-1 and zero otherwise; $C\_Investment_{i,t-1}$ is the investment of customer *i* in year *t*-1; $\boldsymbol{Z}_{i,t-1}$ is a vector of control variables from firm *i* in year *t*-1; ν and μ capture fixed effects of industry and year, respectively; and ε is the random error. Investment channels are *C_Capex* (Capital expenditure / total assets), *C_Aqc* (Capital expenditure on acquisition / total assets), *C_Ppe* (Net PPE / total assets), *C_Assetg* (Percentage of assets increase of customers from the previous year), and *C_Saleg* (Percentage of sales increase of customers from the previous year). Variable definitions are provided in Table 1. In parentheses are *t*-statistics based on standard errors adjusted for heteroskedasticity (White, 1980) and firm clustering (Petersen, 2009). Superscripts *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. To save space, we do not report the coefficients for industry and year dummies.

	Panel A: High Information Asymmetry					Panel B: Low Information Asymmetry				
	Firms without analyst coverage					Firms with analyst coverage				
	C_Capex	*C_Aqc*	*C_Ppe*	*C_Assetg*	*C_Saleg*	*C_Capex*	*C_Aqc*	*C_Ppe*	*C_Assetg*	*C_Saleg*
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant	1.7048***	1.9865***	1.2583**	1.6140***	1.7070***	1.7913***	1.1856*	2.7678**	1.0648*	1.4577**
	(3.74)	(4.39)	(2.17)	(3.94)	(3.90)	(2.80)	(1.85)	(2.25)	(1.67)	(2.17)
C_OC	0.1944*	0.1491**	0.1890	0.1063*	0.1525**	0.0157	0.2048	-0.0646	-0.0228	0.0679
	(1.94)	(2.35)	(1.37)	(1.73)	(2.26)	(0.08)	(1.54)	(-0.29)	(-0.16)	(0.49)
$C\_OC \times C\_Investment$	-0.7575	-0.1424	-0.3221	0.2799	-0.0769	1.5138	-0.7035	0.3391	0.8832	0.1150
	(-0.75)	(-0.18)	(-1.00)	(0.94)	(-0.22)	(0.70)	(-0.69)	(0.51)	(1.49)	(0.20)
$C\_Investment$	0.5285	-0.1563	0.2046	0.0662	0.1198	-3.2310	-0.9235	-0.6057	-0.1098	-0.5354
	(0.56)	(-0.26)	(0.55)	(0.36)	(0.37)	(-1.49)	(-1.05)	(-0.49)	(-0.27)	(-1.57)
S_totalassets	0.0444**	0.0432**	0.0499**	0.0439**	0.0446**	-0.0450	-0.0291	-0.0674	-0.0421	-0.0424
	(2.11)	(2.00)	(2.12)	(2.10)	(2.12)	(-0.82)	(-0.49)	(-0.97)	(-0.77)	(-0.78)
S_bookleverage	-1.3996***	-1.3636***	-1.4807***	-1.4031***	-1.4013***	-1.3385***	-1.2434**	-1.1723**	-1.2916***	-1.3537***
	(-7.15)	(-6.84)	(-5.59)	(-7.17)	(-7.15)	(-2.81)	(-2.28)	(-2.39)	(-2.87)	(-2.79)
S_RDtosale	0.2156**	0.2069**	0.3507**	0.2186**	0.2164**	0.2170***	0.3248***	0.2117***	0.2201***	0.2129***
	(2.49)	(2.22)	(2.51)	(2.50)	(2.49)	(5.75)	(2.75)	(4.12)	(5.56)	(5.67)
S_capextoasset	0.0984	0.1441	0.1211	0.0805	0.0817	-0.1983	-0.9026	2.5526	-0.2922	-0.2185
,	(0.27)	(0.36)	(0.18)	(0.22)	(0.22)	(-0.15)	(-0.61)	(1.41)	(-0.22)	(-0.16)
S_salegrowth	0.3959***	0.4527***	0.2907**	0.3906***	0.3943***	0.4894***	0.5315***	0.2294	0.4634***	0.4997***

	(3.99)	(4.14)	(2.27)	(3.98)	(3.95)	(2.83)	(2.91)	(1.27)	(2.72)	(2.87)
S_equity_volatility	0.3219	0.2410	1.3997	0.3111	0.3022	-2.1849	-1.7769	-0.7702	-1.7087	-1.6155
	(0.34)	(0.25)	(1.16)	(0.33)	(0.33)	(-1.06)	(-0.81)	(-0.35)	(-0.82)	(-0.79)
S_ROA	0.6026*	0.6492*	1.2361***	0.6104*	0.5960	0.8747	0.6898	0.6355	0.8287	0.8789
	(1.65)	(1.67)	(3.07)	(1.71)	(1.64)	(1.55)	(1.15)	(1.02)	(1.52)	(1.57)
C_totalassets	-0.0756**	-0.0863**	-0.0558	-0.0698**	-0.0764**	0.0333	-0.0056	-0.0565	0.0563	0.0238
	(-2.32)	(-2.56)	(-1.32)	(-2.30)	(-2.34)	(0.38)	(-0.06)	(-0.44)	(0.68)	(0.27)
C_bookleverage	-0.2924	-0.3281	0.3176	-0.2502	-0.2997	-0.9176	-0.7044	-1.0427	-0.7135	-0.8968
	(-1.07)	(-1.20)	(0.85)	(-0.98)	(-1.12)	(-1.43)	(-1.05)	(-1.11)	(-1.08)	(-1.41)
C_ROA	-1.4912**	-1.5189*	-1.1635	-1.6435**	-1.5512**	-0.7635	-0.8957	-0.0492	-0.6436	-0.7307
	(-2.06)	(-1.91)	(-1.55)	(-2.26)	(-2.15)	(-0.71)	(-0.73)	(-0.03)	(-0.59)	(-0.67)
sc_yearuptonow	-0.0150***	-0.0138***	-0.0149***	-0.0144***	-0.0147***	-0.0135	-0.0083	-0.0182	-0.0118	-0.0137
	(-3.26)	(-3.03)	(-2.69)	(-3.12)	(-3.16)	(-1.02)	(-0.60)	(-1.02)	(-0.94)	(-1.07)
pct_salectosale	0.1103	0.1326	-0.0296	0.1038	0.1071	-0.4497	-0.8045	-1.1744*	-0.4271	-0.5235
	(0.44)	(0.51)	(-0.11)	(0.41)	(0.43)	(-0.90)	(-1.42)	(-1.89)	(-0.84)	(-1.03)
Control For										
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	3,708	3,364	2,378	3,708	3,708	696	607	503	696	696
Adj-R^2	0.1922	0.1994	0.2115	0.1938	0.1920	0.2632	0.2744	0.2438	0.2750	0.2627

Table 12 Overconfident customers and firm values: The economic importance of the trading partners

This table presents ordinary least squares (OLS) regression results for the influences of overconfident customers on firm values by considering the economic importance of the trading partners. To proxy the extent of relationship importance, we use (1) whether percentage of transaction sales to total customer's cost of goods sold (*salepct_cogs*) is greater than the sample median and (2) firm size of customer (*C_totalassets*) is greater than the sample median as the judging criteria. Customers with higher *salepct_cogs* and larger *C_totalassets* are considered as high economic importance of the trading partners. Variable definitions are provided in Table 1. In parentheses are *t*-statistics based on standard errors adjusted for heteroskedasticity (White, 1980) and firm clustering (Petersen, 2009). Superscripts *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. To save space, we do not report the coefficients for industry and year dummies.

	Panel A: High Information Asymmetry				Panel B: Low Information Asymmetry			
	Firms without analyst coverage				Firms with analyst coverage			
Subsamples	High *salepct_cogs*	High *C_totalassets*	Low *salepct_cogs*	Low *C_totalassets*	High *salepct_cogs*	High *C_totalassets*	Low *salepct_cogs*	Low *C_totalassets*
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	2.3755***	1.7342**	1.6339*	1.9716**	1.7409*	2.4347	0.7784	3.1357**
	(3.95)	(2.10)	(1.95)	(2.22)	(1.69)	(1.24)	(0.53)	(2.40)
C_OC	0.2335***	0.1806**	0.1097	0.1602*	0.0194	0.2353	0.0876	0.0696
	(3.06)	(2.17)	(1.22)	(1.86)	(0.15)	(1.14)	(0.42)	(0.48)
S_totalassets	0.0775**	0.0096	-0.1031***	0.0546	-0.1392	-0.1208	-0.2269**	-0.0144
	(2.17)	(0.39)	(-2.82)	(1.62)	(-1.32)	(-1.37)	(-2.02)	(-0.19)
S_bookleverage	-1.4655***	-0.9773***	-1.1097***	-1.7290***	-1.2457	-1.3589**	-1.1644**	-1.5701**
	(-5.34)	(-4.21)	(-4.41)	(-5.39)	(-1.39)	(-2.22)	(-2.14)	(-2.07)
S_RDtosale	0.6349***	0.2578**	0.1194	0.1733	0.6171**	0.2357	0.3089***	0.1917***
	(3.90)	(2.20)	(1.58)	(1.42)	(2.10)	(1.17)	(8.24)	(3.67)
S_capextoasset	-0.1765	0.0932	0.2748	0.2340	0.3494	0.4189	-1.0871	0.2637
,	(-0.33)	(0.20)	(0.55)	(0.41)	(0.23)	(0.21)	(-0.64)	(0.13)
S_salegrowth	0.4270**	0.2203**	0.4151***	0.5026***	0.3709*	0.9773***	0.6558**	0.2931
	(2.43)	(1.97)	(3.87)	(3.16)	(1.80)	(3.49)	(2.33)	(1.43)
S_equity_volatility	-0.1623	0.4921	0.4388	-0.7150	-2.1344	-5.4691**	-3.2095	0.1295
	(-0.12)	(0.35)	(0.34)	(-0.55)	(-0.59)	(-2.32)	(-1.43)	(0.04)
S_ROA	1.1856*	0.6860	0.3854	0.5705	1.6394*	-0.5789	0.8510	1.5938**
	(1.89)	(1.37)	(0.96)	(1.21)	(1.91)	(-0.73)	(1.00)	(2.33)
C_totalassets	-0.0889**	-0.0833	-0.0564	-0.0991	0.0007	0.1476	0.3816**	-0.2892**
	(-2.10)	(-1.05)	(-0.75)	(-1.55)	(0.01)	(0.79)	(2.57)	(-2.07)
C_bookleverage	-0.3913	-0.3022	0.3562	-0.4100	-0.2386	-1.2350	-2.9767**	-1.5537**
	(-1.05)	(-0.62)	(0.76)	(-1.07)	(-0.28)	(-0.94)	(-2.55)	(-2.23)
C_ROA	-1.1913	-1.4396	-1.4290	-1.7309*	-0.0655	-4.1657*	-3.3675	0.3253

	(-1.30)	(-1.56)	(-1.32)	(-1.79)	(-0.05)	(-1.67)	(-1.64)	(0.23)
sc_yearuptonow	-0.0218***	-0.0099*	-0.0123*	-0.0263***	0.0111	-0.0059	-0.0435***	0.0235
	(-3.54)	(-1.77)	(-1.82)	(-3.46)	(0.46)	(-0.53)	(-3.05)	(0.91)
pct_salectosale	-0.1266	0.2997	0.2406	-0.0614	-0.7500	-0.4062	-0.7811	-0.7707
	(-0.40)	(0.76)	(0.58)	(-0.20)	(-1.04)	(-0.42)	(-1.06)	(-1.29)
Control For								
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	1,904	2,006	1,804	1,702	411	342	285	354
Adj-R^2	0.2613	0.1464	0.1775	0.2095	0.2734	0.2222	0.3306	0.3314

Table 13 Robustness Check (I): Control for market condition

This table presents ordinary least squares (OLS) regression results for the influences of overconfident customers on firm values by considering the market condition. To test the effect of market condition, the sample was divided into three subsamples: (1) Financial crisis (2007 to 2009), (2) Dot-Com bubble (2000 to 2003), and Normal time (other years). Variable definitions are provided in Table 1. In parentheses are *t*-statistics based on standard errors adjusted for heteroskedasticity (White, 1980) and firm clustering (Petersen, 2009). Superscripts *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. To save space, we do not report the coefficients for industry and year dummies.

	Panel A: High Information Asymmetry			Panel B: Low Information Asymmetry		
	Firms without analyst coverage			Firms with analyst coverage		
Subsamples	Financial crisis	Dot-com bubble	Normal time	Financial crisis	Dot-com bubble	Normal time
Model	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.1655	0.5476	2.1682***	0.6000	4.8081*	1.0207
	(0.18)	(0.63)	(4.10)	(0.15)	(1.98)	(1.51)
C_OC	0.1722	-0.1867	0.1727***	0.1889	0.2458	0.0767
	(1.26)	(-1.01)	(2.75)	(0.65)	(0.68)	(0.59)
S_totalassets	0.0157	0.0699*	0.0249	-0.0895	-0.0225	-0.0474
	(0.59)	(1.71)	(1.00)	(-0.82)	(-0.11)	(-0.68)
S_bookleverage	-0.8622**	-1.5774***	-1.1985***	-0.9101	-3.2703***	-1.0581
	(-2.45)	(-3.68)	(-5.78)	(-0.73)	(-2.83)	(-1.64)
S_RDtosale	0.9723**	0.4604***	0.1429*	0.8431***	0.1630***	0.3588*
	(2.37)	(3.07)	(1.81)	(2.66)	(3.01)	(1.69)
S_capextoasset	1.3491*	2.8441	-0.2939	5.0748	1.7779	-1.0479
,	(1.74)	(1.61)	(-0.81)	(0.79)	(0.63)	(-0.73)
S_salegrowth	0.4168*	0.2432	0.3853***	0.3102	-0.3563	0.5146**
	(1.93)	(1.22)	(3.25)	(0.67)	(-0.93)	(2.19)
S_equity_volatility	1.8061	-0.8161	-0.9622	-0.7325	-2.5364	-2.9750
	(0.69)	(-0.41)	(-0.91)	(-0.16)	(-0.41)	(-0.90)
S_ROA	1.7292***	0.7803	0.3602	-0.5392	3.2201**	0.8865
	(3.52)	(1.05)	(0.77)	(-0.47)	(2.13)	(1.06)
C_totalassets	0.0030	-0.0014	-0.1067***	0.2270	-0.3251	0.0298
	(0.05)	(-0.02)	(-2.81)	(0.61)	(-1.05)	(0.33)
C_bookleverage	0.5353	-0.8814	-0.3317	-3.4963*	-1.0490	-0.5241
	(0.86)	(-1.54)	(-1.00)	(-1.78)	(-0.51)	(-0.63)
C_ROA	-1.9583	-0.1018	-1.4767	-2.3398	-1.9814*	0.4714
	(-0.96)	(-0.11)	(-1.36)	(-0.72)	(-1.83)	(0.26)
sc_yearuptonow	-0.0051	-0.0175	-0.0169***	0.0276	-0.0377	-0.0040

	(-0.73)	(-1.46)	(-3.13)	(0.55)	(-1.00)	(-0.32)
pct_salectosale	-0.4108	-0.3910	0.3135	-2.0284**	-0.3994	-0.2397
	(-1.06)	(-0.89)	(1.03)	(-2.11)	(-0.32)	(-0.37)
Control For						
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	576	676	2,456	117	146	433
Adj-R^2	0.2827	0.2841	0.1723	0.2481	0.4403	0.1895

Table 14 Robustness Check (II): Control for the industry effect

This table presents ordinary least squares (OLS) regression results for the influences of overconfident customers on firm values by considering the industry effect. To test the industry effect, the sample was divided into two subsamples: (1) High technology industry and (2) Other industries. Variable definitions are provided in Table 1. In parentheses are *t*-statistics based on standard errors adjusted for heteroskedasticity (White, 1980) and firm clustering (Petersen, 2009). Superscripts *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. To save space, we do not report the coefficients for industry and year dummies.

	Panel A: High Information Asymmetry		Panel B: Low Information Asymmetry	
	Firms without analyst coverage		Firms with analyst coverage	
Subsamples	High technology industry	Other industries	High technology industry	Other industries
Model	(1)	(2)	(3)	(4)
Constant	1.2089	1.4795***	2.2644	2.0737***
	(1.15)	(3.63)	(1.04)	(2.83)
C_OC	0.3437*	0.1417**	-0.1400	0.0960
	(1.97)	(2.37)	(-0.31)	(0.77)
S_totalassets	0.0483	0.0330	-0.2441	0.0140
	(0.58)	(1.63)	(-1.06)	(0.23)
S_bookleverage	-2.5696***	-1.1773***	-2.6581*	-1.3560**
	(-3.87)	(-6.04)	(-1.83)	(-2.57)
S_RDtosale	2.0412**	0.2214***	-2.0077*	0.2121***
	(2.50)	(2.65)	(-2.02)	(5.61)
S_capextoasset	1.6478*	0.0842	4.6472	-1.5753
,	(1.81)	(0.20)	(1.41)	(-1.00)
S_salegrowth	0.7678***	0.3155***	-0.2207	0.5418***
	(2.63)	(2.92)	(-0.47)	(2.86)
S_equity_volatility	2.4269	-0.0192	-7.3255	-1.2961
	(0.78)	(-0.02)	(-1.37)	(-0.54)
S_ROA	-0.2486	1.1747***	-2.2289	0.8996
	(-0.40)	(2.94)	(-1.07)	(1.54)
C_totalassets	-0.0537	-0.0655**	0.2498*	-0.1072
	(-0.51)	(-2.14)	(1.75)	(-1.04)
C_bookleverage	-1.5657**	0.0735	-4.2871*	-1.0030
	(-2.54)	(0.28)	(-2.03)	(-1.48)
C_ROA	-3.5703**	-0.5895	1.9575	-1.4125
	(-2.10)	(-1.07)	(0.89)	(-1.13)
sc_yearuptonow	-0.0153	-0.0143***	-0.1070*	-0.0025
	(-1.04)	(-3.07)	(-2.00)	(-0.20)
pct_salectosale	-0.8617	0.1396	0.3785	-0.3464
	(-1.24)	(0.50)	(0.34)	(-0.65)
Control For				
Industry fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
Obs.	414	3,294	106	590
Adj-R^2	0.2602	0.1984	0.2889	0.3276