The Power of Economic Network: Investor Recognition through Supply-Chain Relationships

Abstract

Firms gain visibility and shareholder base by establishing economic relationships with reputable trading partners. We find that supplier firms enjoy a boost in news coverage and a subsequent reduction in advertising expense when they disclose trading relationships with large and well-known customer firms. After relationship establishment, supplier firms are more likely to be held by the same institutional investor and covered by the same analyst following their customer firms. We show that managers are aware of this effect and selectively disclose relationships that benefit their firms' visibility. Our findings highlight the role of product-market network as an important channel through which small and young firms gain investor recognition and improve their operating environment.

Keywords: Investor Recognition; Economic Network; Customer-Supplier Relationship
JEL Classification: L14; G11

1 Introduction

Merton (1987) shows that when assets under investors' radars differ between one another, investors will optimize their portfolio holdings by using the subset of securities they know. As a result, stocks known by more investors are in higher demand and therefore should, ceteris paribus, have higher value. Motivated by this theory, existing empirical research has validated the predicted relationship between investor recognition and firm value. For example, an increase in a firm's investor base has been linked to subsequent stock price appreciations in the the U.S. market (Foerster and Karolyi, 1999) and the Japanese market (Amihud, Mendelson, and Uno, 1999). Building on research in consumer bias, Green and Jame (2013) find that firms with short and easy-to-pronounce names generally have a higher breadth of ownership and valuation ratio.[1]

Given the extant evidence that a higher degree of investor recognition is desirable from a firm's perspective, managers are incentivized to influence their firms' visibility. For established firms, maintaining and improving investor recognition can be achieved through heavy advertisement spending (e.g., Grullon, Kanatas, and Weston, 2004; Lou, 2014) and investor relations (e.g., Bushee and Miller, 2012; Solomon, 2012).[2] However, for smaller and younger firms, gaining investor recognition through costly advertisement and investor relation programs may prove challenging. This is because small and young firms are often financially constrained; meanwhile, they suffer from prohibitively high external financing costs precisely because they are not well-recognized by investors (Chemmanur and Yan, 2009). This leads to a "chicken or egg" dilemma because they can neither raise external capital without sufficient investor recognition, nor invest in investor recognition program without sufficient capital. As a result, small and young firms must explore alternative channels through which they can gain investor recognition without massive spending in advertisement or investor relations.

This paper shows that the economic network of firms, i.e., companies they do business with, is an important channel through which they acquire investor recognition. We argue that small and less visible firms, especially those in upper stream industries, are able to gain investor recognition by establishing product-market relationships with well-known customers. The following example is an intuitive epitome for our main argument. Watts Water Technologies, a company that makes plumbing and heating products, voluntarily disclosed Home Depot as its important customer in its 2001 fiscal year annual report, after which we

[1] Using household-level data from Sweden, Bodnaruk and Ostberg (2009) find support for Merton's (1987) theory by showing that the return premium on less recognized firms is related to the shadow cost of incomplete information.

[2] Large, publicly traded companies often have dedicated IR officers (IROs), who oversee most aspects of shareholder meetings, press conferences, private meetings with investors, (known as "one-on-one" briefings), investor relations sections of company website, and company annual reports.

observe a jump in its press coverage from 2001 to 2002 (see Figure 1).[3] The news coverage of Watts Water Technologies continually increased in the following years as the company gained exposure via its product-market relationship with Home Depot. In fact, the news media recognizes this important relationship as evidenced by the published article on June 5, 2006 by Dow Jones News Services, "Watts' products can be found everywhere from the plumbing aisle of the local Home Depot Inc. (HD) store, to waste water treatment plants in China."

[Figure 1 about here]

We generalize the notion in the example above by identifying customer-supplier relationships in the Compustat Segment Customer File from 1980 to 2009, where a firm has to disclose sales to its important customers.We define a firm as a *principal customer* if its existence is reported by a supplier firm in the database. Given that relationships in the database are between dependent suppliers and their principal customers, customer firms are generally much larger and more well-known than their supplier firms. This makes the relationships database that we construct suitable for examining how a supplier firm's degree of investor recognition is affected after it discloses a new relationship with an important trading partner. Using this empirical setup, we examine three important issues. First, we document various pieces of evidence showing that smaller and less visible supplier firms gain significant investor recognition by establishing trading relationships with larger and more visible customer firms. Second, we show that managers are cognizant of this recognition transfer channel and manage it by selectively disclosing names of companies that benefit their firms' visibility. Third, we show that the increase in firms' investor recognition via the product-market relationship substantially improves their operating environment.

In order to show that less visible firms gain significant investor recognition via the product-market relationship, we start by documenting changes in a supplier firm's visibility following its newly established customer-supplier relationships. We use the number of newspaper articles written on a firm in the Factiva database as a proxy for the firm's level of visibility with investors (Fang and Peress, 2009). We find that after the supplier firm discloses its relationship with a principal customer firm, its news coverage level increases tremendously. The magnitude of news coverage increase on the supplier firm is economically significant. Results from the regression analysis suggest that relative to a similar firm in the same industry, the level of news coverage increase is about 9% per year for each principal

[3]The annual report filed by Watts Water Technologies on March 14, 2002 quotes "... although no single customer accounted for more than 10% of the Company's net sales in fiscal 2001, The Home Depot accounted for approximately $54.5 million or 9.8% of the total net sales."

customer that it shares an economic partnership with. Focusing our analysis exclusively on top news sources (e.g., Wall Street Journal, New York Times, USA Today, and Reuters News) yields a similar result.

To further pin down the direct effect of product-market relationships on firms' visibility, we examine changes in supplier firms' news coverage that result from their customer-supplier relationships. For this analysis, we restrict our sample to news articles where both the supplier firm and its principal customer are mentioned in the same text. We refer to this joint coverage as the customer-related news on a supplier firm and estimate its relative change at the customer-supplier relationship pair level. We find that, on average, customer-related news coverage level increases by about 3.7% per year (t-stat of 5.5) after the supplier firm discloses their relationship. This magnitude, however, substantially increases if we focus on highly visible customer firms .[4] That is, all else equal, a highly visible customer firm brings 17% more news coverage for the supplier firm.

Next, we explore the impact of supplier firms' newly disclosed relationship on institutional cross-holdings and analyst cross-coverage. Using the institutional holdings data from the 13F filings and analyst coverage data from I/B/E/S, we find that shares of a supplier firm are more likely to be held by institutional investors of its principal customers, and the supplier firm is more likely to be followed by analysts covering its principal customers. Our tests are carried out in a sample where previously established institutional holdings and analyst followings are removed. Therefore, our results come directly from new cross-holdings and cross-coverage.

Given that supplier firms' visibility depends on companies they reportedly have economic ties with, it is natural to ask whether managers are aware of this effect, and thereby selectively disclose relationships that benefit their firms' visibility. To verify this we make use of the marginal cut-off in the disclosure requirement enforced in the Statement of Financial Accounting Standards (SFAS) No. 14. Before 1998 firms were required to disclose the existence and names of external customers representing more than 10% of their total revenues. However, in practice, we find that customer firms making up less than 10% of a supplier firm's total revenues are often voluntarily reported. We compare characteristics of customer firms that motivate their suppliers to voluntarily disclose their existence against those that are reported in compliance with the SFAS No. 14 rule. We restrict our attention to customer firms that are at the margins, i.e., +/-1%, of the 10% cut-off rule in order to ensure that they are, on average, of equal importance to the supplier firm's cash flow. We find that between voluntarily and involuntarily disclosed customer firms, the former has significantly

[4] A customer firm is deemed highly visible (i.e., *Famous Customer*) if its news coverage from top sources falls in the top 5% of all customer firms.

higher levels of press coverage, institutional ownership, and analyst following. For instance, the number of news articles per year written on a voluntarily reported principal customer firm is about 32% higher relative to a principal customer firm that marginally met the 10% cut-off disclosure requirement. We find consistent results when we look at other dimensions of investor recognitions. Specifically, institutional ownership and analysts following of voluntarily disclosed principal customers are, respectively, 10 and 12 percent higher relative to those that are mandatorily disclosed. Overall, we find strong evidence suggesting that managers are cognizant of how their firm's trading relationships influence the degree of investor recognition that their firms receive.

Our last set of empirical tests examine whether the proposed channel of investor recognition diffusion, i.e., economic network based on supply chains, substantially impacts supplier firms' operating environments. We examine three avenues. First, we show that the increase in supplier firms' visibility, as an outcome of establishing relationships with well-known customers, is related to a significant decrease in their advertising expenses in the year following their reported relationship. Interestingly, despite the decrease in advertising expenses, we find that supplier firms benefiting from increased visibility experience a significant increase in total sales to non-principal customers. These findings suggest that the impact of the economic network on a supplier firm's visibility, which is by nature indirect, can substitute for ones obtained through direct advertisement channels in terms of attracting consumer and investor recognitions. The second economic impact that we examine is how the increase in supplier firms' visibility fundamentally mitigates information asymmetry by lowering the cost of external financing. Myers and Majluf (1984), among others, suggest that the negative announcement effect of SEOs is associated with the information asymmetry between firms and investors. Consistent with the notion that investor recognition fundamentally improves the information environment and mitigates information asymmetry, we find that the SEO announcement effects of supplier firms are significantly less negative than their peers without principal customers. Finally, we examine how the reported trading relationship of a supplier firm affects its likelihood to be listed on option exchanges. Following the method in Mayhew and Mihov (2004), we find the likelihood that exchanges will list options on a firm's equity increases by threefold after it reportedly becomes a dependent supplier of a publicly traded firm.

The rest of this paper is organized as follows. Section 2 discusses the contributions of our paper in relation to the existing literature. Section 3 describes the data, and sample selection. Section 4 presents the empirical evidence that suppliers gain investor recognition through the economic network. Section 5 discusses the economic outcome of improved investor recognition. Section 6 concludes.

2 Relations to existing literature and contributions

The findings of this paper are related to several strands of literature. The first is the channels through which firms acquire investor recognition and increase their shareholder base. For instance, Grullon, Kanatas, and Weston (2004) find that product-market advertising increases the breadth of stock ownership, while Chemmanur and Yan (2009) and Lou (2014) find that firms' product-market advertising improve their equity valuations. Similarly, Bushee and Miller (2012) find that managers of small and less-visible firms could successfully improve their firms investor following through investor relations (IR) programs. We contribute to this literature by showing that relationships between firms in the product market are an important channel through which supplier firms, especially those that are smaller and younger, can improve their visibility and investor following. We emphasize that the channel of recognition acquisition that we introduce is through the product-market network. Unlike previous studies, firms do not gain investor recognition by increasing communications with their potential investors, e.g., advertising or IR programs, but rather through the peer effect of being a trading partner of a larger and more well-known firm.

Our paper is related to the broader literature on the factors influencing investment decisions of institutional investors (e.g., Gompers and Metrick, 2001), as well as coverage decisions of financial analysts (e.g., O'Brien and Bhushan, 1990; De Franco, Hope, and Larocque, 2014). We contribute by showing that new investment decisions of institutional investors, and new coverage decisions of sell-side analysts are influenced by the product-market relationship. These findings suggest that the universe of stocks under an investor's radar can be shaped by the new relationship established in the product market. Interestingly, our findings that institutional investors tend to cross-hold firms that share product-market relationships are rather counter-intuitive from a risk-management perspective. This is because investment in firms in the same supply-chain network likely exacerbates the portfolios systemic risk. Similarly, our finding that analysts tend to cross-cover customer and supplier firms sharing a product-market relationship is somewhat surprising because customer and supplier firms usually belong to different industries, while analysts are incentivized to become an industry specialist due to the All-star industry ranking (e.g., Boni and Womack, 2006; Fang and Yasuda, 2014).[5] Thus, we show the firms' product-market relationship provides an explanation to the seemingly counter-intuitive behaviors of why institutions cross-hold systematically linked firms and why analysts cross-cover stocks from different industries.

Our paper is also related to the growing literature documenting the impact of economic

[5]Institutional Investor's Magazine, and the Wall Street Journal annually rank sell-side analysts based on their performance in each industry.

relationships on firms' values and corporate decisions.[6] We find that supplier firms benefiting from the increase in investor recognition through the product-market relationship experience substantial improvement in their operating costs, such as lower advertising expense. Grullon, Kanatas, and Weston (2004) find that firms with larger advertising expenditures have a larger number of institutional investors. We find a similar effect when a supplier firm establishes a relationship with a principal customer firm; all this occurs without the need for extra advertising expenses to attract new investors.

Finally, the findings in this paper contribute to the literature documenting the information flow within economically linked firms. Existing studies find that various types of information percolate along the supply chain, which include equity returns (Cohen and Frazzini, 2008), bankruptcy risk (Hertzel, Li, Officer, and Rodgers, 2008), the likelihood of merger and acquisition (e.g., Cen, Dasgupta, and Sen, 2013; Ahern and Harford, 2014), corporate innovation (Chu, Tian, and Wang, 2014), and the probability of managerial turnover (Intintoli, Serfling, and Shaikh, 2014). We add to this literature by showing that the product-market relationship is a vital channel for supplier firms to gain investor recognition.

3 Data Construction

SFAS No. 14 (before 1998) and SFAS No. 131 (after 1998) require firms to disclose the existence of sales to individual external customers representing more than 10% of total firm revenues. In practice, a firm can voluntarily identify principal customers who account for less than 10% of total revenues.[7] We define a firm as a *principal customer*, or as PC in short, if it has been reported as a customer of one or more supplier firms in the Compustat Segment Customer File. Similarly, a firm is defined as a dependent supplier if it has one or more principal customers in the database. All supplier firms identified in the database are public companies. However, corporate principal customer firms can be private or public firms. Following the same approach used in Banerjee, Dasgupta, and Kim (2008) and Cohen and Frazzini (2008), we manually match corporate customer names with the Compustat identifiers (i.e., GVKEYs) whenever possible.This process allows us to identify 65,248 customer-supplier-year pairs between 1980 and 2009 where the customer firms are listed companies with Compustat GVKEYs.

[6]Existing studies have documented the influence of peer effect on the capital structure decision (Leary and Roberts, 2014) and dividend policy (Popadak, 2012).

[7]Although SFAS No. 131 does not require firms to disclose the names of principal customers after 1998, most suppliers continue to do so in their 10-Ks. Our paper provides an explanation to why firms may voluntarily disclose their customer names. Also, Ellis, Fee, and Thomas (2012) provide a detailed discussion on the proprietary costs of disclosing customer names.

Our news data is obtained from Factiva. We collect news items in two steps. In the first step, we create a mapping between the Compustat/CRSP firm identifiers (i.e., GVKEY for Compustat and PERMNO for CRSP) and the Factiva firm identifiers (i.e., Factiva IDs) by matching company names. We only keep companies that exist in all of these three databases. In the second step, we collect news items for the matched companies between 1980 and 2009. We restrict our search to news items in English and exclude republished news and recurring pricing or market data. For each news item, we obtain information on news headline, news date, word count, and news source.

We obtain analyst forecast data from the unadjusted Historical Detailed File of I/B/E/S between 1989 and 2009.[8] Our institutional holding data is obtained from Thomson Reuters 13F database available on WRDS. The sample consists of institution-quarter observations between 1980 and 2009. Information on investment style of the institutions are obtained from Brian Bushee's website; the data identifies financial institutions as Quasi-Indexers and non Quasi-Indexers. Information on optioned stocks is obtained from Ivey OptionMetrics. We also use SDC Platinium of Thomson Reuters to find information on seasoned equity offerings of securities.

In addition to the databases mentioned above, security characteristics, such as stock return/price, return volatility, stock turnover, firm age, and momentum are retrieved from CRSP. Firm characteristics, such as book to market, return on assets, book leverage, book value of equity, and dividend yield, are collected from Compustat. Detailed definitions of variables used in our study can be found in Appendix C.

Table 1 reports the summary statistics on firm characteristics and institutional holdings. Panel A of Table 1 reports the summary statistics for institutional holdings. On average, the financial institutions have relatively stable holdings in their portfolios. The average holding age is about half of the fund age. On average, Quasi-Indexer funds are bigger than non Quasi-Indexer funds. Quasi-Indexer institutions form 53.4% of our sample of institution-quarter observations.

Panel B of Table 1 presents a few firm characteristics of three samples: all Compustat firms, dependent suppliers and principal customers. We report mean, median, and standard deviation of all firm characteristics that are used as control variables in our empirical tests. Our comparison suggests that principal customers tend to be larger and older firms that have more extensive media and analyst coverage and higher levels of institutional holdings relative to an average Compustat firm. On the other hand, dependent suppliers tend to be smaller

[8]Although I/B/E/S started covering analyst forecasts before 1989, we begin our sample in 1989 because prior to this period, I/B/E/S coverage is limited and the reported forecast dates are often delayed. For a more thorough discussion of I/B/E/S data issues prior to 1989 see Clement and Tse (2005) and Cooper, Day, and Lewis (2001).

and younger firms that have less extensive media and analyst coverage and lower levels of institutional holdings relative to an average Compustat firm. For example, a typical customer firm's market capitalization is $6.9 billion vs. an average market capitalization of $992 million for a typical supplier firm. Customer firms are mentioned on average 882 times per year in the news while the supplier firms are mentioned on average only 77 times per year.[9] In a similar vein, customers are followed on average by 11 analysts while the corresponding number for an average supplier firm is only 5.59 analysts. Given the differences in firm characteristics, it is not surprising that we observe a lot of reputable large firms, such as WalMart, Apple, AT&T, Microsoft and Google, in customer firms. However, most suppliers are unknown to us. Both the comparison based on firm characteristics and the eyeballing of customer and supplier lists hint to the possibility that suppliers can benefit from the investor recognition of their well-known principal customers by being involved into the economic network of these large customers.

We argue that relationships with reputable PCs can improve suppliers' investor recognition. One potential concern is that suppliers selected by reputable PCs might have better performance than other firms ex-ante and, therefore, would have a higher level of investor recognition irrespective of whether they are chosen by reputable PCs or not. The summary statistics in Panel B clearly rule out such a possibility. For example, selected suppliers have lower profitability (i.e., ROA) and dividend yield than an average firm in Compustat. In an untabulated test, we run a formal selection test for supplier and we find no evidence that firms with better operating performance are more likely to become suppliers for reputable customers. This result is perhaps not surprising given that reputable customers have a superior bargaining power and firms that can survive and grow by themselves may not be willing to work with reputable customers.

It is important to point out that dependent suppliers and principal customers are of mutual importance to each other. Specifically, for an average dependent supplier firm, the mean sales to principal customers account for 28.7% of its total sales; for an average principal customer firm, the purchases from dependent suppliers account for 1.27% of its costs of goods sold (COGS)[10]. Therefore, investors are likely to view the concrete and important customer-supplier relationships as a credible economic network, which would facilitate the "diffusion" of investor recognition along the supply chain.

[Table 1 about here]

[9]In Appendix B, Table A.I lists the total number of news articles for the top 20 principal customers in Panel A. A relatively small number of firms attract a large amount of news coverage.

[10]The importance of a dependent supplier to its principal customers may not be fully reflected by the percentage of COGS from that supplier. The importance often lies in the fact that the supplied components are uniquely designed and often patented. Therefore, it is costly for customers to replace their suppliers.

4 Economic network and investor recognition

In this section, we focus on documenting evidence of investor recognition transfer through supply-chain relationships. In subsection 4.1 we show evidence of better press coverage for supplier firms with (versus without) principal customers. In subsection 4.2 we study the portfolio selection decisions of financial institutions and show an institution is more likely to include a supplier firm's stock in its portfolio if the institution holds at least one of the customers in its portfolio. Finally, in subsection 4.3 we conduct a similar exercise on the decision of a financial analyst to cover a supplier firm and show that a supplier firm has better oddsa higher likelihood of being covered by a financial analyst if the analyst has experience with the customers of the supplier firm.

4.1 News coverage

We examine the change in news coverage level on a supplier firm after its economic relationship with a principal customer (PC) is estabalished. We define the first year that a supplier firm establishes its relationship with a PC as the event year (or year zero). Table 2 reports the means of relative changes in news coverage on a supplier firm from event year 1 to event year 8. We report two measures of relative change in news coverage. The first is the simple difference $N_k - N_{-1}$ between the number of news articles in the k^{th} year after the PC establishment and the year before the PC establishment. The second measure is the log percentage change in news coverage calculated as $\ln[(1 + N_k) / (1 + N_{-1})]$.

The results in Table 2 clearly suggest that the PC establishment has an immediate impact on the news coverage of supplier firms. On average, a supplier firm is covered by 59 news articles (N_{-1}) in the year before the PC establishment. This number increases to 66 (N_0) in the PC establishment year. This effect is both economically and statistically significant. Looking at the log percentage change in news coverage, the magnitude of increase is about 14% in the first year with a t-stat 9.76. Further, it is also clear that this increase continues after the PC establishment. Specifically, the news coverage keeps increasing as the PC relationship continues to develop.

[Table 2 about here]

To account for the impact of other factors affecting news and media coverage (e.g., Fang and Peress (2009)) and to remove the time trend of news coverage associated with particular industries, we conduct a multivariate analysis with time and industry fixed effects. First of all, we properly measure the PC duration to reflect the fact that one supplier firm may

have multiple principal customers. We use both a value-weighted PC duration and an equal-weighted PC duration. Value-weighted duration is a sales-weighted duration of individual PC durations based on sales to all principal customers for that supplier. Similarly, equal-weighted PC duration uses equal weights for individual PC durations. Secondly, for each supplier firm, we create a benchmark non-PC firm based on industry affiliation (i.e., two-digit SIC industries) and firm size (i.e., total assets) using propensity score matching.[11] Our main variable of interest is a difference-in-difference news coverage variable for supplier firm i with principal customers, defined as

$$\Delta N_{i,mf,k} \equiv \ln\left[(1+N_{i,k})/(1+N_{i,-1}))\right] - \ln\left[(1+N_{mf,k})/(1+N_{mf,-1})\right],$$

where $\ln\left[(1+N_{i,k})/(1+N_{i,-1}))\right]$ represents the percentage change in news coverage on the supplier firms between k years after and the year before PC establishment, and the news coverage change for the matched non-PC firm represented by $\ln\left[(1+N_{mf,k})/(1+N_{mf,-1})\right]$.[12] We regress $\Delta N_{i,mf,k}$ on PC duration variables to understand the impact of the PC relationship on supplier firm's news coverage using the following model

$$\Delta N_{i,mf,k} = a + b_1 \times \textit{PC-duration}_{i,k} + \text{Control variables}_{i,k} + \epsilon_{i,k},$$

where we use both value-weighted and equal-weighted durations for *PC-duration*. Following the determinants of media coverage in Fang and Peress (2009), we include several control variables in year k to control for other dimensions of the firm characteristics, such as sales (*ln(Total Sales)*), analyst coverage (*Analyst Coverage*), analyst forecast dispersion (*Analyst Forecast Dispersion*), institutional ownership (*Institutional Ownership*), stock return volatility ($Volatility$), book leverage (*Book Leverage*), book-to-market ratio (B/M), and return on assets (ROA).

The results are reported in Table 3. In general, the coefficients on PC duration in different specifications are all statistically significant and economically meaningful. For example, from column (2) the coefficient associated with value-weighted PC duration is 0.083 (t-stat=3.22). This represents the marginal impact of PC duration on supplier's news coverage after controlling for the other factors affecting news coverage and industry-specific time

[11] In Table A.I of Appendix B, we report the distribution of the total assets for supplier firms and corresponding matching firms (without principal customers) in Panel B. In our regression analysis we also directly control for the supplier's size through its sales. We do not control for sales and total assets simultaneously because of the high correlation between these two variables (greater than 0.75).

[12] The reason we add 1 to the measure is to make sure it is well defined when the number of news articles is zero. Alternatively, we can define the excess news coverage using raw a number as $\Delta N_{i,mf,k} \equiv (N_{i,k} - N_{i,-1}) - (N_{mf,k} - N_{mf,-1})$ and the conclusion of the analysis based on this raw number measure is the same.

trends in news coverage. One additional year of PC duration corresponds to an 8.3% increase in news articles covering the supplier firm, relative to other firms without PCs. Translating into raw number of news articles, this represents an average increase of 5 more news articles covering the supplier firm, relative to the pre-PC establishment year. The results of using equal-weighted PC duration in columns (3) and (4) are very similar to those in columns (1) and (2).

[Table 3 about here]

Note that the results in Table 3 use news coverage from all sources in Factiva. To further understand the impact of PC on the visibility of supplier firms, we conduct additional analysis using news coverage from Factiva's *top sources* only. The main idea is that news articles from top news sources have much broader dissemination than a regular news source, and this will have a much larger impact on improving the visibility of supplier firms than other news articles. Specifically, Factiva's top sources include the major news and business publications, such as Wall Street Journal, New York Times, USA Today, Washington Post, LA Times, ABC News, Barron's, Bloomberg Business Week, Chicago Tribune, CNBC, CNN, Forbes, Market Watch, NBC News, New York Post, Time, Reuters News, Dow Jones News Services, Associated Press Newswires, Business Wire, and PR Newswire. We re-run the regressions as in Table 3 and report the new results in Table 4. As expected, having PCs does improve supplier firm's news coverage from top news sources. From column (2) of Table 4, we can see that the coefficient on value-weighted duration is 6.1% (t-stat=2.49). Note that in the pre-PC establishment year, the average number of top source news articles is 27. Therefore, one additional year of PC relationship represents around 2 more news articles from top sources on the supplier firm, relative to the pre-PC year. This marginal impact is still economically large, representing roughtly 40% of the marginal impact from all news sources (5 from previous analysis in Table 3). The results based on equal-weighted duration are similar and reported in columns (3) and (4) of Table 4.

[Table 4 about here]

Overall, the above empirical results suggest that having *long-term* principal-customer relationship is a very important channel for supplier firms to gain visibility through more news coverage, especially the coverage from top news sources that have broad readership. Further, our results suggest that the positive effect of relationships with PCs on news coverage is persistent after relationship establishment.

To ensure that suppliers' increase of media coverage is indeed driven by relationships with principal customers, we conduct a test based on textual analysis. We search through the news

articles for the supplier firms and only keep those that actually have their customer names mentioned. Then we try to understand the impact of PC duration on this customer-related news coverage. Since each supplier firm may have more than one customer, we conduct this analysis at the customer-supplier pair level, in contrast to the supplier level in the previous two tables. More importantly, at the customer-supplier pair level analysis, we can identify which customers are more visible than others and further test the importance of customer visibility on improving the supplier visibility.

This analysis involves 1,656 customer-supplier pairs and 11,124 customer-supplier-year observations. We define customer-related excess news coverage as

$$\Delta N_{i,k,pc} \equiv \ln\left[(1 + N_{i,k,pc})/(1 + N_{i,-1,pc}))\right],$$

where $N_{i,k,pc}$ ($N_{i,-1,pc}$) denotes the number of supplier i's news coverage mentioning its customer name pc in the k^{th} year after (or the year before) the PC establishment. Unlike the previous analysis, we cannot create a matching non-PC firm here since the non-PC firm does not have a customer name identified by definition. We use the following model for this analysis and also control for time and industry fixed effects:

$$\Delta N_{i,k,pc} = a + b_1 \times \textit{PC-duration}_{i,k,pc} + b_2 \times \textit{Famous Customer}_{i,k,pc} + \text{Control variables}_{i,k} + \epsilon_{i,k},$$

where *Famous Customer* is a dummy variable that equals to 1 if this customer's top source news coverage is among the top 5% of all customers in year k and 0 otherwise.[13]

The results are presented in Table 5. The coefficients on PC-duration is around 3.6% and highly statistically significant (t-stat over 5), suggesting the customer-related news coverage increases by 3.6% for one additional year of PC-relationship. More interestingly, from column (4) we can see that the coefficient associated with *Famous Customer* is 16.9% (t-stat=2.65), suggesting that having a famous customer increases a supplier firm's famous-customer-related news coverage by 16.9%, equivalent to the effect of more than 4 years of a PC relationship.[14] Our results suggest that the PC relationship enters the information set of information intermediaries such as news agencies and it helps the supplier gain visibility through more news coverage. Most importantly, the more visible customers have a larger impact on improving a supplier's visibility.

[Table 5 about here]

[13]The results are similar if we define famous customer using its news coverage from all sources.

[14]Of course, the raw number of articles mentioning customer names will not be too big, on average about 4.5 articles per year or about 6% of supplier's overall news coverage. However, the impact of gaining investor or consumer visibility may be well beyond the raw number of articles, especially when it's associated with famous customers.

4.2 Institutional holding

In this subsection we study the effect of the customer-supplier relationship on the portfolio decisions of the institutions. We study institutional investors for two reasons: First, financial institutions are a group of sophisticated investors, and previous studies suggest that they have a higher ability and a faster speed in processing information than retail investors.[15] Showing the role of customer-supplier relationships on institutional holdings would be the most direct evidence that product-market-based economic networks affect investor recognition. Second, thanks to the disclosed information in 13f filings, we are able to identify the quarterly holdings of institutional investors. Therefore, data are available for us to test whether institutional investors with customer knowledge are more likely to invest in suppliers after the relationship establishment. Specifically, if suppliers indeed gain investor recognition through economic networks with PCs, institutional investors, particularly those with customer knowledge, should be the first group of investors reacting to the changes in product-market-based economic networks.

To test the hypothesis mentioned above, we form triplets of *Supplier, Institution, Quarter*. Our sample includes 196,548,763 triplets. For each triplet we construct a dummy *In_Portfolio* which takes 1 if the institution is holding the supplier firm in that quarter and zero otherwise. We also construct another dummy, *Cus_Exp*, which takes the value 1 if the institution holds any of the supplier's PCs during the quarter. As a robustness test, we form a continuous variable, *Pct_Sales*, which is defined as

$$Pct\_Sales = \sum_{\substack{i\in \\ \text{customers in the} \\ \text{institution's portfolio}}} \frac{\text{Sales to Customer } i}{\text{Supplier's Annual Sales}}. \tag{1}$$

Since the decision of which securities to hold in an institution's portfolio is affected by both institutional characteristics and an individual security's characteristics, we control for both sets of characteristics in our tests. We pick these control variables in the spirit following Gompers and Metrick (2001). In addition, we introduce another dummy *IntraIndHolding*, which takes the value 1 if at least one of the customers which are cross-held by an institution is in the same SIC2 industry as the supplier. We include this variable since we believe that suppliers and customers belonging to the same industry can affect the decision of the institution to hold both customer and supplier firms' stocks. For example, if a supplier and its customer are in the same industry, the institutions might refrain from holding both stocks in the portfolio due to diversification concerns; at the same time, if an institution's

[15]For example, Cohen, Gompers, and Vuolteenaho (2002) show that institutional investors react more positively to positive cash-flow news and exploit the under-reaction of individual investors to the news.

manager has better expertise in a specific industry, the similarity of supplier's and customer's industry might lead the manager to simultaneously hold both stocks in the portfolio. We include *IntraIndHolding* to see which effect is stronger empirically. We also control for how recognized the supplier is on the market by including the number of analysts that cover a supplier in our study. A supplier is covered by an analyst in a quarter if the analyst reports at least one quarterly or annual report on the firm. We expect supplier firms that are followed by more analysts to be more likely to be held by institutions.

We run a Fama-McBeth logistic regression as in Equation (2) to study the effect of an institution's exposure to holding the customers on the decision of the institution to hold the supplier firm's stock in its portfolio.

$$\begin{aligned} Logit(P(In\_Portfolio)_t) =& \alpha_t + \beta_t(Cus\_Exp_t \text{ or } Pct\_Sales_t) \\ &+ \sum_{n=1}^{N} \gamma_{n,t} Inst\_Char_{n,t} + \sum_{m=1}^{M} \phi_{m,t} Sup\_Char_{m,t} \\ &+ \lambda_t IntraIndHold_t + \kappa_t Analyst\ Coverage_t + \epsilon_t \end{aligned} \tag{2}$$

Since our hypothesis is that institutions with customer knowledge are more likely to hold suppliers after relationships form, we only include in our sample the triplets where the institutions did not hold the supplier in period $t-1$. Specifically, we throw out all the triplets for which the supplier has been previously held by an institution, to rule out the possibility that our results are driven by a persistent simultaneous cross-holding of customers and suppliers.

Most of our control variables are persistent over time. Therefore, following Gompers and Metrick (2001), we do not report any time-series statistics other than odds ratios across all quarters since the coefficient estimates are not independent across quarters. Instead, we report the number of positive/negative coefficients and the number of statistically significant positive/negative coefficients for all 120 quarterly cross-sectional regressions in Table 6. Column (1) of the table reports the result for *Cus_Exp* as the key independent variable and column (2) reports the results for *Pct_Sales* as the key independent variable.

[Table 6 about here]

Results in Table 6 show that the coefficients for *Cus_Exp* are positive and statistically significant in 118 out of 120 quarters. This pattern suggests that if an institution has past experience with customers, the institution is more likely to include the supplier firm's stock in its portfolio after relationship establishment. This can also be seen from the average odds ratio of 2.478 for *Cus_Exp*. This means that the odds of an institution holding a supplier

firm's stock is 2.478 times higher if the institution holds at least one of the customers of the supplier firm. We find a similar result based on our continuous measure for customer-supplier relationships. Our results in column (2) suggest that having a stronger relation with customers improves the odds of a supplier firm's security being held by an institution.

Looking at the results for our control variables, we observe that if a supplier and its customer firms are in the same industry, the institution is less likely to hold them in its portfolio at the same time (e.g., average odds ratio of 0.946 and 0.928 in regressions (1) and (2), respectively). This is consistent with the notion that diversification concerns may prevent institutions from simultaneously holding suppliers and customers that belong to the same industry. We also observe that the coefficient for the number of analysts following a supplier firm is generally positive and statistically significant in most quarters.[16] This pattern suggests that, if more analysts follow a supplier firm, it makes the supplier firm more likely to be held by institutional investors. This result makes intuitive sense since financial institutions gather a significant percentage of their market research data from analyst reports.

As robustness checks, we run the same set of regressions for the full sample, the sample of Quasi-Indexers, and the sample of non Quasi-Indexers as defined by Brian Bushee.[17] While our previous results are robust in all samples, we observe that our effect is stronger among non Quasi-Indexer institutional investors relative to Quasi-Indexers. This pattern is consistent with the notion that institutional investors (e.g., non-indexers) with active strategies are more likely to incorporate network-based information than institutional investors with passive strategies (e.g., indexers).[18]

4.3 Analyst coverage

Research divisions of investment banks (i.e., sell-side analysts) determine their coverages of firms based on demand from their clients, i.e., institutional investors. In the previous subsection, we show that institutional investors, particularly those with customer experience, are more likely to hold suppliers after relationships form. Following the same notion, we argue that, if the customer-supplier relationship results in higher levels of investor recognition for the supplier firms, this would also induce a higher likelihood for financial analysts to initiate coverage of supplier firms. Specifically, we expect that a higher level of demand for

[16] Positive in 98 out of 120 quarters and statistically significant in 86 of them based on the result of regression in Column (1).

[17] The results are not tabulated in the paper and are available upon request.

[18] Quasi-Indexer institutions are characterized as institutions that hold large, diversified portfolios and trade very infrequently (see Bushee (1998) for the detailed characterisation of Quasi-Indexer institutions.) The infrequency of their trades makes them less likely to react to any kind of news including network-based news.

information on the supplier firm would induce more analysts to follow the supplier firm. Further, if an analyst is covering the customer firm, we expect that she is more likely to initiate coverage of the supplier firm relative to other analysts with no customer experience. This is mainly because analysts covering customer firms have a lower cost in discovering the establishment of customer-supplier relationships and understanding the role of suppliers in these relationships. On the other hand, analysts covering customer firms are serving financial institutions holding customer firms and, therefore, are more likely to respond to and cater to the demand of financial institutions with customer experience to invest in stocks of suppliers. Our test is different from the one done by Guan, Wong, and Zhang (2014) where they show analysts have a higher propensity to cover the customer firm if they already cover the supplier. While the tests are in the same spirit, we test the other way around based on the knowledge that customers are much larger firms, and analysts are likely to cover customers much sooner than they cover suppliers.

We form a sample of *Supplier, Analyst, Quarter* triplets. Our sample consists of 295,904,878 triplets. Similar to our approach in the tests of institutional cross-holdings, our results in this subsection are based on the subsample of triplets where the supplier firms are never covered by an analyst or are only newly covered by an analyst. This reduced sample addresses the concern that our results from the full sample might be driven by persistence in cross-coverage of supplier and customer firms by some analysts. For each of these triplets we define a dummy called *Is_Covered* which takes the value 1 if the analyst reports at least one quarterly or annual financial report on the supplier firm and 0 otherwise. For each triplet we define a dummy variable, *Cus_Exp*, which is set to 1 when at least one of the customers of the supplier firm is covered by the financial analyst, and set to 0 otherwise. We also use *Pct_Sales*, percentage of sales of the supplier to the customer firms, which are covered by the financial analyst in a similar fashion as the one done in equation (1). This variable proxies the strength of the supplier firm's relationship with the customers that are covered by a financial analyst.

To investigate the effect of economic links among firms on supplier firms being covered by a financial analyst we run a Fama-McBeth logistic regression with *Is_Covered* as the dependent variable and *Cus_Exp* or *Pct_Sales* as the independent variable. We control for a host of supplier characteristics in our logistic regression. Since financial analysts generally tend to focus on a specific industry we also include a dummy variable that indicates whether the supplier firm and its customers belong to the same SIC2 industry.[19] We define another

[19] *Institutional Investor Magazine* classifies analysts into 65 groups based on the industry affiliation of the firms that the analysts follow. In untabulated results, we use this industry identification to form our dummy variable and the results are very similar to ones reported based on SIC2 industry classification.

dummy variable, *IntraIndCov*, which takes 1 if the supplier firm and at least one of the customers followed by the financial analyst are in the same industry, and takes 0 otherwise. Since financial analysts usually focus on a specific industry, we expect a supplier and customer being members of the same industry to improve the odds of the supplier being covered by the analyst. Considering that the analyst reports are mainly prepared for use by financial institutions, we also expect the percentage of institutional ownership of the supplier firm's security, *Institutional Ownership*, to positively affect the odds of the supplier being covered by a financial analyst. For this reason we include the percentage of institutional ownership in our logistic regression. Equation (3) shows our logistic regression:

$$\begin{aligned} Logit(P(Is\_Covered)_t) =& \alpha_t + \beta_t(Cus\_Exp_t \text{ or } Pct\_Sales_t) + \lambda_t IntraIndCov_t \\ &+ \sum_{m=1}^{M} \phi_{m,t} Sup\_Char_{m,t} + \kappa_t Institutional\ Ownership_t + \epsilon_t \end{aligned} \quad (3)$$

[Table 7 about here]

We run the above specification in a subsample where the analyst did not cover the supplier firm in period *t-1* to ensure that our result is not contaminated by persistent analyst coverage over time. In other words, our result reflects analysts' decisions of coverage initiation. Table 7 reports the average odds ratio, the number of positive/negative coefficients, as well as number of statistically significant positive/negative coefficients.[20] As expected, *Cus_Exp* loads positively (has an average odds ratio of 13.877) and is statistically significant in all the 84 quarters of our sample. This means being economically linked to a customer firm which is followed by an analyst significantly improves the odds of the supplier firm being covered by the same analyst. Similarly, the coefficients of *Pct_Sales* are statistically significant in 83 out of 84 quarters. This further shows that the strength of the economic link between the supplier and its principal customers proxied by *Pct_Sales* improves the odds of the supplier being covered by a financial analyst. Among other independent variables, a supplier stock's percentage of institutional ownership also loads positively and is positive and statistically significant in 69 out of 84 quarters. This shows that the demand by institutional investors is an important contributing factor in the analysts' decisions to cover a supplier firm. Our test does not provide concrete results on *IntraIndCov*, i.e. we can't establish that a customer and supplier belonging to the same industry improves the odds of the supplier being covered by the same analyst that covers the supplier firm.

[20] In untabulated results, we observe similar economical and statistical significance for our variables interest when the regression is ran over the full sample.

4.4 Managers' strategic disclosures

In previous subsections, we show that firms with PCs are likely to be covered by more news articles, more financial analysts, and held by more institutional investors relative to their peers with no PCs. These results provide direct evidence that the product-market-based economic networks allow suppliers, which are typically much smaller and less well-known firms, to gain investor recognitions. In this subsection, we examine whether supplier firms' managers understand this effect and take advantage of it by selectively disclosing their relationships with certain principal customers that are likely to improve their investor recognitions.

SFAS No. 14 (1976-1997) requires a firm to disclose the names of all principal customers that take more than 10% of its total sales.[21] In addition to the required disclosure, a lot of supplier firms also voluntarily disclose customer firms that purchase less than 10% of their total sales.[22] Obviously, the voluntary disclosure of principal customers in the latter case is not a random decision, i.e., if the managers of suppliers understand the effect of supply-chain relationships on consumer recognition and investor recognition, they will selectively disclose reputable customers only, as compared to the first case where they have to disclose all principal customers without any discretion. Therefore, we predict that reported customers under voluntary disclosure (under the 10% cut-off case) are likely to be more reputable on average than the reported customers under required disclosure.

One complication here is that the size of customers affects the likelihood of whether their purchase exceeds the 10% cut-off. If we simply compare the customers under voluntary disclosure and required disclosure without controlling for the relationship strength, the mechanical correlation between the size of customers and the percentage sales in supplier's total sales would dominate, and we would not be able to detect how managers of suppliers selectively disclose customers to maximize consumer and investor recognitions.

To address this complication, we examine 2,411 pairs of customer-supplier relationships before 1998 where the percentage sales to customers in supplier's total sales are bound between 9% and 11%. Under this setting, the relationship strength across all observations is almost at the same level. The difference lies only in the fact that a supplier has to disclose a PC's name when a PC purchases more than 10% of its total sales, and it can selectively disclose a PC's name if it purchases less than the 10% cut-off. Under this research design, the

[21] While SFAS No. 131 replaced SFAS No. 14 in 1997, a firm was only required to disclose the "existence" of principal customers that purchase more than 10% of the supplier's total sales. Put differently, a firm could choose to disclose or hide the names of principal customers after 1997 (see Ellis, Fee, and Thomas (2012)), which would not allow us to carry the test described in this subsection.

[22] In our sample of customer-supplier relationships disclosed prior to 1997, 21.30% of the disclosed relationships do not meet the 10% threshold, i.e., they are disclosed on a voluntary basis.

comparison of customers under voluntary (9%-10%) and required (10% to 11%) disclosure is not likely affected by the strength of customer-supplier relationships and the mechanical correlation between the size of customers and the percentage sales in supplier's total sales. Instead, this setting will allow us to detect the different firm characteristics of principal customers in required disclosure and voluntary disclosure, as an outcome incentivized by supplier's maximization of investor recognition.

[Table 8 about here]

Our results are reported in Table 8. In this test the customer reputation is proxied by media coverage, analyst coverage and institutional holdings, following our discussions in previous three sub-sections. Since all three variables are right-skewed in distribution, we take their logarithm forms as our dependent variables. The key independent variable, Dummy($Pct\ Sale > 10\%$), is equal to 1 when the purchase of a customer takes more than 10% of a supplier's total sales and 0 otherwise. To make sure that our results are not contaminated by how a customer chooses its dependent supplier, we incorporate three firm characteristics of the suppliers that have known effects in the relationship establishment and termination: firm size (book value of total sales), profitability (ROA), and leverage (book leverage), as well as the firm characteristics that may impact the coverage of media, analysts and institutional investors as in previous tables. In addition, we also control for both the year-fixed effects and the industry-fixed effects to remove impacts from market-wide and industry-specific common factors.

Consistent with our prediction, our results suggest that, while the relationship strength is controlled, customers selectively reported by the suppliers under voluntary disclosure are covered in more news articles, covered by more analysts and held by more institutional investors than customers reported under required disclosure. For example, in terms of media coverage, the number of newspaper articles covering customers under required disclosure is 32.2% lower than that for customers selectively disclosed by suppliers under voluntary disclosure. We find similar results based on analyst coverage (i.e., 11.7% lower) and institutional holdings (i.e., 9.8% lower).

Results in this subsection suggest that the managers of supplier firms understand and exploit the effect of product-market-based economic networks on investor recognition. Specifically, we show that, when managers have a choice, they tend to selectively disclose more reputable customers to achieve a higher level of investor recognition.

5 Economic outcomes

In previous sections, we show that economic networks with reputable customers allow suppliers to gain investor recognition. However, it is not yet clear how suppliers can benefit from the improved investor recognition. In this section, we provide some direct evidence on this issue.

5.1 Investor recognition and consumer awareness

There exists a huge overlap between main participants in the financial market, i.e., investors and main participants in the product market, i.e., consumers. Therefore, it is not surprising that improvement in investor recognition is often correlated with the improvement in consumer awareness. Following this notion, we first examine the economic outcome of improved investor recognition in the product market. In this subsection, we focus on two dependent variables: the growth rate of sales to non-principal customers, and the percentage of total advertisement expense in total sales. One can regard the first variable as a measure capturing how investor recognition and consumer awareness affect the sales and revenue of a firm, i.e., once being involved in the supply chain of a reputable customer firm, the supplier firm is more likely to be known and accepted by other clients as they gradually gain media coverage, analyst coverage and institutional holdings. Therefore, the growth rate of sales to non-principal customers is likely to be higher than that of total sales for firms without principal customers.

Using data from Compustat in the period between 1980 to 2009, We formally test this conjecture in Table 9. In our specification, we include the firm and the year fixed effects in addition to a few common characteristics of supplier firms, to rule out the possibility that our results are driven by a trend in the economy or a trend associated with certain firm characteristics. Specifically, the coefficient of *PC Dummy* represents the within-firm variation in the growth rate of sales to non-principal customers as a consequence of relationship establishment and termination with principal customers, relative to the growth rate of total sales for firms without principal customers. Consistent with our conjecture, our result in Column (1) of Table 9 suggests that when a supplier establishes relationships with principal customers, the growth rate of its sales to non-principal customers is 15.3 percentage points higher than the growth rate of total sales for firms without principal customers.

We next focus on the percentage of total advertisement expense in total sales, which captures how investor recognition and consumer awareness affect the cost side. Advertisement, by its definition, aims to promote investor recognition and consumer awareness of a firm in financial and product markets. Therefore, advertisement and supply chain relationship

with reputable customers can be viewed as substitutes in promoting investor recognition and consumer awareness. We expect that firms with principal customers can save their advertisement expense while achieving the same level of sales as their peers without principal customers.

In the test reported in columns (3) and (4) of Table 9, we focus on a sub-sample of firms whose advertisement expenses are available in Compustat. After controlling for the firm and year fixed effects, we show that the advertisement expense ratio of firms with principal customers is 0.6 percentage point lower than that of firms without principal customers. Given the average advertisement expense ratio is 3.4% in the full sample, this difference can be translated into a 17.6% reduction in advertisement expense for firms with principal customers, while achieving the same level of sales as their peers without principal customers.

[Table 9 about here]

5.2 Investor recognition and security issuance

In addition to the product market, investor recognition can also be reflected in various aspects in the financial market. Improved investor recognition will significantly increase the demand of securities, including existing ones, such as stocks and bonds traded in the market, and future ones, such as new bank loans and new security listings. Existing studies have already provided some indirect evidence consistent with the increased demand of securities as an outcome of improved investor recognition for firms establishing relationships with principal customers. For example, Cen, Dasgupta, Elkamhi, and Pungaliya (2014) suggest that firms with long-term principal customers tend to have a lower bank loan spread than other borrowers. Dhaliwal, Judd, Serfling, and Shaikh (2014) and Wang and Wang (2014) suggest that firms with principal customers tend to have a lower cost of equity than their peers without principal customers.

Improved investor recognition, as an outcome of relationships with principal customers, not only increases the level of demand (i.e., the quantity) but also changes the "quality" of demand. Specifically, improved investor recognition, exhibited by more extensive media, better analyst coverage and higher institutional holdings, would fundamentally improve the information environment of a firm and mitigate information asymmetry between investors and managers.

We provide two direct tests to examine how improved investor recognition, as an outcome of relationships with principal customers, affects the issuance of new securities. First of all, we examine whether investors react differently while firms with principal customers issue

seasoned equity offerings. Next, we examine whether firms with principal customers are more likely to have option listings in the derivative market.

5.2.1 Seasoned equity offering announcement effect

The announcement effect of seasoned equity offerings (SEOs) is a classical setting to test the role of information asymmetry in equity issuance (e.g., see studies summarized by two survey papers Eckbo, Masulis, and Norli (2007) and Ritter (2003)). If improved investor recognition reduces the level of information asymmetry between investors and managers of issuing firms, our hypothesis above would predict that firms with principal customers are likely to experience less negative announcement returns than their peers without principal customers.

We retrieve SEO data from the SDC Platinum for a sample period between 1980 and 2009. The dependent variables are the cumulative abnormal returns based on the market model and Fama-French & Carhart four-factor model in periods $[T-1, T+1]$ and $[T-2, T+2]$. Here, date T is the date of SEO announcement and $[T-k, T+k]$ refers to a sample period from k trading days before to k trading days after the SEO announcement day. We adopt the sample screening criterion and suggested independent variables in Gao and Ritter (2010) and Karpoff, Lee, and Masulis (2013), and we require that all independent variables must be available. This yields a sample of 5,039 SEOs in our test.

Our result in column (1) suggests that the average SEO announcement return for firms with principal customers, as measured by market model abnormal returns in a period $[T-1, T+1]$, is one percentage point higher than the average return of their peers without principal customers. This result is robust irrespective of the choice of benchmark models or the choice of the duration for announcement event windows. Overall, our results suggest that improved investor recognition, as an outcome of relationship establishments with principal customers, not only increases the overall demand level of securities, but also improves the information asymmetry between investors and managers, and fundamentally changes the "quality" of demand.

[Table 10 about here]

5.2.2 Likelihood of option listing

The equity options market is an important venue for price discovery. Option contracts are used by investors as hedging instruments, as well as speculating bets on future changes in their underlying securities (see Easley, O'Hara, and Srinivas, 1998). In this subsection, we

examine the influence of a firm's economic network on the likelihood that its equity will be listed on option exchanges, and thereby accessible to option investors.

Mayhew and Mihov (2004) study exchanges' option-listing decisions and find that they tend to select stocks that are more visible and receive greater attention as proxied by greater trading volume, size, and volatility. We hypothesize that in addition to stock characteristics documented in Mayhew and Mihov (2004), firms with significant cash flow links to other firms are more likely to be recognized by option exchanges as being "relevant" to the investing public, making them more likely to be selected for option listing. We test this hypothesis using our customer-supplier relationships. We examine whether supplier firms are more likely to have an option listed on their equity after having established a product-market relationship with a principal customer firm.

We obtain option-related information from Ivey OptionMetrics. We consider the date that options started trading on an equity as the listing date. Our sample consists of 1,453 option listing events on U.S. ordinary common shares from January 1996 to December 2009. We start our analysis in 1996 when Optionmetrics data begins and concludes when our customer-supplier database ends in 2009. The CBOE outlines a list of requirements for stocks that are eligible for option listing. In order to control for the mechanical effect of exchanges' listing rules, our sample consists only of firms that meet the exchanges' requirement for option listing. We summarize the trading requirements of stocks eligible for option listing and how we construct the sample eligible stocks in Appendix A. Figure A.1 in the appendix plots the time series of the universe of stocks eligible for option listing.

We estimate the logit model on a universe of firms that are *eligible* for option listing. The likelihood that option stock i is selected for option listing is modeled as

$$\begin{aligned} L\left(List_{i,t}\right) &= \beta_0 + \beta_1 \text{PC Dummy}_{i,t} + \beta_2 \text{Publicly listed principal Customer}_{i,t} \\ &\quad \ldots + \beta_3 ln(Market\ cap)_{i,t} + \beta_4 Volume_{i,t} + \text{Other controls} + \varepsilon_t, \end{aligned} \tag{4}$$

where $L\left(List\right)$ is the log-odds ratio that the firm i will be selected for option listing during this month. The model is estimated at the firm-month level using option listing events from 1996 through 2010. Table 11 reports the results.

In the first regression model (I), *Principal Customer* is an indicator variable equal to one if the firm i has disclosed its relationship with a principal costumer firm in the previous year, and zero otherwise. The other independent variables in equation (4) are one-month lagged firm characteristics that have been shown in Mayhew and Mihov (2004) to affect exchanges' option listing decisions. All regressions include the year and the industry fixed

effects. Standard errors on the coefficients are clustered at the firm and year levels. We find that the coefficient on *Principal Customer* is positive and highly significant indicating the likelihood that a firm will have option listing increases after its trading relationship with a principal customer firm is known to the public.

The second regression model (II) in Table 11 reports results with an additional indicator variable, *Publicly listed principal customer*, which takes the value of one when at least one of the principal-customer firms that trade with firm i is publicly listed. Because exchanges' option listing decisions often bias towards stocks receiving greater investor attention, we expect that firm i's likelihood of being recognized by option exchanges as a relevant firm for option listing would increase if it trades with a publicly listed principal-customer firm. This is exactly what we find. The coefficient on *Publicly listed principal customer* is positive and significant. Its magnitude is almost twice as large as that on *Principal Customer* suggesting the likelihood that a firm will have an option listed increases tremendously if it is known as an important supplier to a large publicly traded firm.

In the third regression model (III), we define the strength of a trading relationship as the percentage of supplier firm's sales to their corporate customers. We therefore do not limit our analysis to the network impact of principal-customer firms. *Pct Sale to customer* is the average percentage of sales that firm i makes to each corporate customer in the previous year, relative to its total sales. A high value of *Pct Sale to customer* indicates that the supplier firm engages in significant trading relationships with other firms in its network. They are, therefore, likely considered as relevant firms for option listing. Overall, the results in this section highlight the important of firms' relationships in the product-market network in influencing exchanges' option listing decisions.

[Table 11 about here]

6 Conclusions

This paper examines the role of the economic network as an important channel through which a firm gains investor recognition. In the proposed channel, firms do not gain visibility by increasing communications with their potential investors, e.g., advertisement and IR programs, but rather through establishing supply-chain relationships with large and well-known customer firms. We identify important relationships between customer-supplier firms in the product market using the Compustat Segment Customer File from 1980 to 2009. The relationships reported in the database are disclosed by dependent supplier firms, which are usually smaller and less well-known than their customer firms. Utilizing this empirical

setting, we show that relationships established by supplier firms in the product market significantly impact their firms' visibility, investor followings, and operating environment.

Using the number of newspaper article written on a firm in the Factiva database as a proxy for visibility, we show that press coverage on a supplier firm increases immediately after it discloses a relationship with a well-known customer firm. Relatedly, we find that the likelihood that an institutional investor (analyst) will cross-hold (cross-cover) both the customer and its dependent supplier firms surges after the customer-supplier relationship forms. Besides establishing evidence that a small and young firm can increase its visibility and investor base through the product-market relationship, we show that managers are cognizant of this channel of recognition transfer. Using the marginal cut-off in the disclosure requirement enforced by FASB, we show that customer firms that are voluntarily disclosed have greater news coverage, are held by more institutional investors, and are covered by more analysts than customer firms disclosed under compulsory disclosure.

This paper contributes to the growing literature on how firms can increase their visibility and investor following by highlighting the role of economic network as a channel that can substantially improve the degree of investor recognition, especially for small and young firms in the product market. While recent studies find that managers can successfully improve their firm's visibility and shareholder base through advertising and investor relations programs, such approaches may not be financially feasible for small and young firms. On the other hand, we show that a supplier firm can significantly reduce their advertising expenses and cost of equity issuance when it discloses a trading relationship with a well-known customer firm. Overall, we find that relationships between firms in the product market are an important channel for recognition diffusion and provide supplier firms with benefits beyond those quantifiable through sales.

References

Ahern, Kenneth R., and Jarrad Harford, 2014, The importance of industry links in merger waves, *The Journal of Finance* 69, 527–576.

Amihud, Yakov, Haim Mendelson, and Jun Uno, 1999, Number of shareholders and stock prices: Evidence from japan, *The Journal of finance* 54, 1169–1184.

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

Bodnaruk, Andriy, and Per Ostberg, 2009, Does investor recognition predict returns?, *Journal of Financial Economics* 91, 208–226.

Boni, Leslie, and Kent L. Womack, 2006, Analysts, industries, and price momentum, *Journal of Financial and Quantitative Analysis* 41, 85–109.

Bushee, Brian J., 1998, The influence of institutional investors on myopic R&D investment behavior, *Accounting review* pp. 305–333.

——— , and Gregory S. Miller, 2012, Investor relations, firm visibility, and investor following, *The Accounting Review* 87, 867–897.

Cen, Ling, Sudipto Dasgupta, Redouane Elkamhi, and Raunaq S. Pungaliya, 2014, Reputation and loan contract terms: The role of principal customers, *University of Toronto and HKUST, Working Paper*.

Cen, Ling, Sudipto Dasgupta, and Rik Sen, 2013, Discipline or disruption? stakeholder relationships and the effect of takeover threat, *University of Toronto and HKUST, Working Paper*.

Chemmanur, Thomas, and An Yan, 2009, Product market advertising and new equity issues, *Journal of Financial Economics* 92, 40–65.

Chu, Xiongqiang, Xuan Tian, and Wenyu Wang, 2014, Learning from customers: corporate innovation along the supply chain, *Indiana University, Working Paper*.

Clement, Michael B., and Senyo Y. Tse, 2005, Financial analyst characteristics and herding behavior in forecasting, *The Journal of finance* 60, 307–341.

Cohen, Lauren, and Andrea Frazzini, 2008, Economic links and predictable returns, *The Journal of Finance* 63, 1977–2011.

Cohen, Randolph B., Paul A. Gompers, and Tuomo Vuolteenaho, 2002, Who underreacts to cash-flow news? evidence from trading between individuals and institutions, *Journal of Financial Economics* 66, 409–462.

Cooper, Rick A., Theodore E. Day, and Craig M. Lewis, 2001, Following the leader:: a study of individual analysts earnings forecasts, *Journal of Financial Economics* 61, 383–416.

De Franco, Gus, Ole-Kristian Hope, and Stephannie Larocque, 2014, Analysts choice of peer companies, *Review of Accounting Studies* pp. 1–28.

Dhaliwal, Dan S., J. Scott Judd, Matthew A. Serfling, and Sarah Shaikh, 2014, Customer concentration risk and the cost of equity capital, *Available at SSRN 2391935*.

Easley, David, Maureen O'Hara, and P.S. Srinivas, 1998, Option volume and stock prices: Evidence on where informed traders trade, *The Journal of Finance* 53, 431–465.

Eckbo, B. Espen, Ronald W. Masulis, and Øyvind Norli, 2007, Security offerings, *Handbook of Empirical Corporate Finance: Empirical Corporate Finance* Vol. 1b., 233–373.

Ellis, Jesse A., C. Edward Fee, and Shawn E. Thomas, 2012, Proprietary costs and the disclosure of information about customers, *Journal of Accounting Research* 50, 685–727.

Fang, Lily, and Joel Peress, 2009, Media coverage and the cross-section of stock returns, *The Journal of Finance* 64, 2023–2052.

Fang, Lily, and Ayako Yasuda, 2014, Are stars opinions worth more? the relation between analyst reputation and recommendation values, *Journal of Financial Services Research* 46, 235–269.

Foerster, Stephen R., and G. Andrew Karolyi, 1999, The effects of market segmentation and investor recognition on asset prices: Evidence from foreign stocks listing in the united states, *The Journal of Finance* 54, 981–1013.

Gao, Xiaohui, and Jay R. Ritter, 2010, The marketing of seasoned equity offerings, *Journal of Financial Economics* 97, 33–52.

Gompers, Paul A., and Andrew Metrick, 2001, Institutional investors and equity prices, *The Quarterly Journal of Economics* 116, 229–259.

Green, T. Clifton, and Russell Jame, 2013, Company name fluency, investor recognition, and firm value, *Journal of Financial Economics* 109, 813 – 834.

Grullon, Gustavo, George Kanatas, and James P. Weston, 2004, Advertising, breadth of ownership, and liquidity, *Review of Financial Studies* 17, 439–461.

Guan, Yuyan, M. H. Franco Wong, and Yue Zhang, 2014, Analyst following along the supply chain, *Review of Accounting Studies* pp. 1–32.

Hertzel, Michael G., Zhi Li, Micah S. Officer, and Kimberly J. Rodgers, 2008, Inter-firm linkages and the wealth effects of financial distress along the supply chain, *Journal of Financial Economics* 87, 374 – 387.

Intintoli, Vincent, Matthew A. Serfling, and Sarah Shaikh, 2014, CEO turnovers and disruptions in customer-supplier relationships, *University of Arizona, working paper.*

Karpoff, Jonathan M., Gemma Lee, and Ronald W. Masulis, 2013, Contracting under asymmetric information: Evidence from lockup agreements in seasoned equity offerings, *Journal of Financial Economics* 110, 607–626.

Leary, Mark T., and R. Roberts, Michael, 2014, Do peer firms affect corporate financial policy?, *The Journal of Finance* 69, 139–178.

Lou, Dong, 2014, Attracting investor attention through advertising, *Review of Financial Studies.*

Mayhew, Stewart, and Vassil Mihov, 2004, How do exchanges select stocks for option listing?, *The Journal of Finance* 59, 447–471.

Merton, Robert C., 1987, A simple model of capital market equilibrium with incomplete information, *The journal of finance* 42, 483–510.

Myers, Stewart C., and Nicholas S. Majluf, 1984, Corporate financing and investment decisions when firms have information that investors do not have, *Journal of Financial Economics* 13, 187 – 221.

O'Brien, Patricia C., and Ravi Bhushan, 1990, Analyst following and institutional ownership, *Journal of Accounting Research* 28, pp. 55–76.

Popadak, Jillian A., 2012, Dividend payments as a response to peer influence, *Working paper, Duke University.*

Ritter, Jay R., 2003, Investment banking and securities issuance, *Handbook of the Economics of Finance* 1, 255–306.

Solomon, David H., 2012, Selective publicity and stock prices, *The Journal of Finance* 67, 599–638.

Wang, Jin, and Xiaoqiao Wang, 2014, Supplier immobility, operating leverage, and cost of equity, in *Wilfrid Laurier University, Working Paper*.

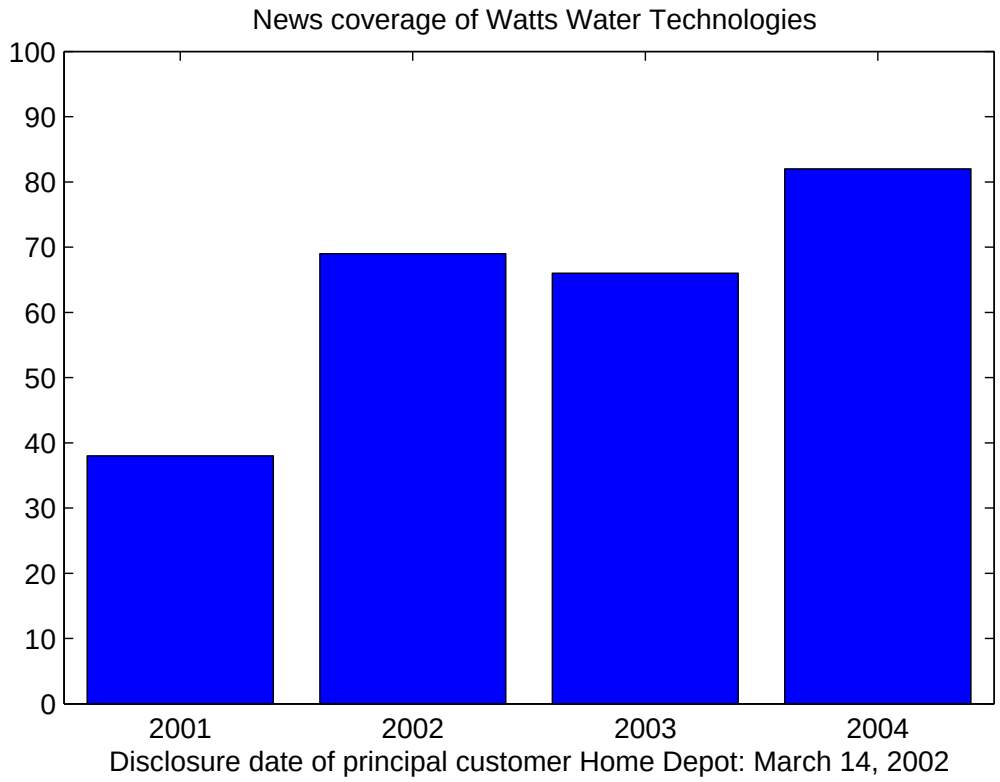

Figure 1. Example for Watts Water Techonologies: This figure plots the number of news articles in the Factiva database for Watts Water Techonologies from one year prior to the disclosure of its principal customer, Home Depot, to a couple of years after (2001 to 2004).

Table 1. Summary statistics: This table reports the summary statistics of the variables used throughout our study. The sample period is 1980 to 2009. Panel A reports the distributions of institutional characteristics in our sample of institution-quarter observations. We obtain our data on financial institutions from Thomson Reuters 13f dataset. Using Brian Bushee's classification of financial institutions, we identify the institution as quasi-indexers and non quasi-indexers The mean, median, and standard deviation within each group are reported. Panel B reports the mean, median and standard deviation of firm characteristics for all firms, principal customers and dependent suppliers. For each fiscal year the number of news articles per year, market capitalization, book-to-market ratio, dividend yield, return on assets, advertisement share of sales, book leverage, and inclusion in the S&P500 index are presented. For each quarter the number of analysts following the firm and percentage of institutional ownership of the firm's stock are demonstrated. Last, for each month, we show volatility of monthly returns during the past two years, turnover, age, buy and hold return for the previous three months, and buy and hold return for the previous year excluding the last three months. Detailed definitions of variables are provided in Appendix C.

Panel A: Financial Institutions Characteristics

	All Institutions			Quasi-Indexers			Non Quasi-Indexers		
	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.
Average Holding Age (Quarters)	15.74	12.36	12.73	19.19	16.35	12.94	11.74	8.06	11.23
Portfolio Size (Million $)	3,430	374	20,100	4,130	386	23,600	2,630	357	15,000
Fund Age (Quarters)	32.15	24.00	27.61	36.15	29.00	27.83	27.51	18.00	26.62
Number of inst. per quarter	1403.38	1160.50	728.49	779.02	749.00	331.61	650.33	449.00	406.65

Panel B: Firm Characteristics

	All Firms			Customer Firms			Supplier Firms		
	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.
# of News Articles/Year	178.48	21	1051.41	882.41	92	2767.28	77.08	31	133.35
Market Cap (Million $)	1237.787	128.783	3889.411	6887.132	2316.755	9327.411	991.902	121.653	3323.883
B/M	0.635	0.513	0.680	0.480	0.404	0.490	0.588	0.464	0.659
Dividend Yield	0.013	0.000	0.025	0.015	0.006	0.021	0.008	0.000	0.022
ROA	-0.007	0.050	0.245	0.077	0.087	0.131	-0.014	0.056	0.251
Advertisement	0.034	0.015	0.059	0.037	0.022	0.047	0.041	0.018	0.064
Book Leverage	0.228	0.179	0.221	0.249	0.233	0.184	0.216	0.163	0.220
S&P Dummy	0.076	0.000	0.265	0.425	0.000	0.494	0.063	0.000	0.242
Analyst Coverage	5.642	4.000	5.831	11.063	9.000	8.466	5.594	4.000	5.788
Institutional Ownership	0.398	0.303	5.097	0.614	0.613	3.182	0.377	0.315	0.358
Volatility (Last two years)	0.032	0.014	0.138	0.018	0.009	0.038	0.039	0.021	0.078
Turnover	0.120	0.059	0.476	0.169	0.100	0.345	0.148	0.076	0.834
Age (month)	150.651	96.000	163.483	280.508	201.000	255.145	143.561	93.000	154.535
Momentum (-3,0)	0.028	0.000	0.345	0.032	0.020	0.254	0.032	0.000	0.379
Momentum (-12,-3)	0.111	0.023	0.690	0.125	0.065	0.507	0.131	0.000	0.792

Table 2. Increase in news coverage after PC establishment: This table presents the average changes of news coverage on supplier firms between the k^{th} year after and the year before the principal customer relationship is established. N_k (N_{-1}) denotes the number of news articles in the k^{th} year after (the year before) the PC establishment. The mean of N_{-1} is 59.27. The t-statistic of testing $H_0 : N_k - N_{-1} = 0$ or $H_0 : \ln\left[(1+N_k)/(1+N_{-1})\right] = 0$ is reported in parenthesis.

k	0	1	2	3	4	5	6	7	8
$N_k - N_{-1}$	6.59	15.31	22.82	28.10	40.70	43.42	52.41	59.70	65.99
	(5.26)	(7.40)	(9.16)	(9.19)	(10.42)	(12.06)	(12.48)	(12.02)	(9.21)
$\ln\left[\frac{(1+N_k)}{(1+N_{-1})}\right]$	0.14	0.29	0.38	0.52	0.67	0.80	0.99	1.12	1.23
	(9.72)	(13.73)	(16.61)	(16.87)	(19.43)	(20.27)	(23.48)	(25.13)	(24.94)

Table 3. Excess news coverage from all news sources and PC duration: This table presents the results of regressing excess news coverage on the duration of the PC relationship. We conduct propensity-score matching for each firm year in our PC sample based on two-digit SIC and total assets. The excess news coverage is defined as $\ln[(1+N_k)/(1+N_{-1})] - \ln[(1+N_{mf,k})/(1+N_{mf,-1})]$. The $\ln[(1+N_k)/(1+N_{-1})]$ denotes the supplier firm's percentage change of news coverage between the k^{th} year after and the year before the PC establishment. Similarly, $\ln[(1+N_{mf,k})/(1+N_{mf,-1})]$ is the news coverage change for the matched non-PC firm. VW-duration (EW-duration) is a sales-weighted (equally-weighted) duration measure based on sales to all principal customers. Other control variables are defined in Appendix C. We include industry- and year-fixed effects in all specifications. The t-stats reported in parentheses are calculated using firm-level clustered standard errors. The statistical significance levels of 1%, 5%, and 10% are indicated with ***, **, and *, respectively.

	(1)	(2)	(3)	(4)
Customer-supplier relationship				
VW-duration	0.090***	0.083***		
	(3.53)	(3.22)		
EW-duration			0.090***	0.080***
			(3.41)	(2.99)
Control variables				
ln(Total Sales)		0.004		0.001
		(0.10)		(0.03)
Analyst Coverage		0.013		0.015
		(0.78)		(0.95)
Analyst Forecast Dispersion		-0.068*		-0.065*
		(-1.95)		(-1.81)
Institutional Ownership		0.754***		0.735***
		(2.62)		(2.65)
Volatility		0.238***		0.234***
		(2.66)		(2.64)
Book Leverage		-0.321*		-0.341*
		(-1.72)		(-1.86)
B/M		-0.004***		-0.004***
		(-4.44)		(-4.32)
ROA		0.007		0.004
		(0.12)		(0.07)
Industry-Fixed Effects	Yes	Yes	Yes	Yes
Time-Fixed Effects	Yes	Yes	Yes	Yes
Observations	10074	9492	10541	9915
Adj. R-Squared	0.056	0.064	0.054	0.063

Table 4. Excess news coverage from top news sources and PC duration: This table presents the results of regressing excess news coverage from top news sources on the duration of the PC relationship. All the explanatory variables are defined in the same way as in Table 3. The news coverage measures are based on coverage by Factiva's top sources which include the major news and business publications, such as, Wall Street Journal, New York Times, USA Today, Washington Post, LA Times, ABC News, Barron's, Bloomberg Business Week, Chicago Tribune, CNBC, CNN, Forbes, Market Watch, NBC News, New York Post, Time, Reuters News, Dow Jones News Services, Associated Press Newswires, Business Wire, and PR Newswire. We include industry- and year fixed-effects in all specifications. The t-stats reported in parentheses are calculated using firm-level clustered standard errors. The statistical significance levels of 1%, 5%, and 10% are indicated with ***, **, and *, respectively.

	(1)	(2)	(3)	(4)
Customer-supplier relationship				
VW-duration	0.070***	0.061**		
	(2.93)	(2.49)		
EW-duration			0.071***	0.060**
			(2.84)	(2.38)
Control variables				
ln(Total Sales)		0.019		0.011
		(0.59)		(0.35)
Analyst Coverage		0.008		0.006
		(0.52)		(0.43)
Analyst Forecast Dispersion		-0.060*		-0.056*
		(-1.89)		(-1.69)
Institutional Ownership		0.791***		0.813***
		(3.14)		(3.31)
Volatility		0.248***		0.244***
		(3.18)		(3.16)
Book Leverage		-0.323**		-0.334**
		(-1.99)		(-2.08)
B/M		-0.003***		-0.003***
		(-3.37)		(-3.17)
ROA		-0.001		-0.003
		(-0.02)		(-0.05)
Industry-Fixed Effects	Yes	Yes	Yes	Yes
Time-Fixed Effects	Yes	Yes	Yes	Yes
Observations	10074	9492	10541	9915
Adj. R-Squared	0.052	0.063	0.050	0.060

Table 5. Customer-related excess news coverage and PC duration: This table presents the results of regressing customer-related excess news coverage on the duration of the PC relationship. For each customer-supplier pair, we count the supplier's news articles that contain the customer's name as customer-related news coverage. We define the customer-related excess news coverage similar to the previous table with the only difference being that customer-related excess news coverage is at the customer-supplier pair level. The duration is also at the customer-supplier level. *Famous Customer* is a dummy variable that takes the value of 1 if the customer's news coverage from top sources falls in the top 5% of all customers, and 0 otherwise. All the other explanatory variables are defined the same as in Table 3. We include industry- and year-fixed effects in all specifications. The t-stats reported in parentheses are calculated using supplier-customer pair level clustered standard errors. The statistical significance levels of 1%, 5%, and 10% are indicated with ***, **, and *, respectively.

	(1)	(2)	(3)	(4)
Customer-supplier relationship				
Duration	0.037***	0.035***	0.037***	0.036***
	(5.58)	(5.47)	(5.81)	(5.68)
Famous Customer		0.149**		0.169***
		(2.34)		(2.65)
Control variables				
ln(Total Sales)			0.050*	0.049*
			(1.86)	(1.82)
Analyst Coverage			0.004	0.004
			(0.48)	(0.52)
Analyst Forecast Dispersion			-0.027	-0.028
			(-0.88)	(-0.94)
Institutional Ownership			0.260***	0.260***
			(3.88)	(3.90)
Volatility			0.130***	0.133***
			(3.79)	(3.86)
Book Leverage			-0.085	-0.079
			(-0.92)	(-0.86)
B/M			0.000	0.000
			(0.62)	(0.65)
ROA			-0.545***	-0.544***
			(-5.17)	(-5.19)
Industry-Fixed Effects	Yes	Yes	Yes	Yes
Time-Fixed Effects	Yes	Yes	Yes	Yes
Observations	11124	11124	10198	10198
Adj. R-Squared	0.159	0.161	0.186	0.189

Table 6. Cross-holding of customer and supplier firms by institutions: This table reports the results of Fama-McBeth regression to explain the impact of customer experience on institutions' decision to hold suppliers. The sample period is from 1980 to 2009, during which the regression variables are available. The regression specification is

$$Logit(P(In\_Portfolio)_t) = \alpha_t + \beta_t(Cus\_Exp_t \text{ or } Pct\_Sales_t) + \sum_{n=1}^{N} \gamma_{n,t} Inst\_Char_{n,t} + \sum_{m=1}^{M} \phi_{m,t} Sup\_Char_{m,t} \lambda_t IntraIndHold_t + \kappa_t Analyst\ Coverage_t + \epsilon_t$$

Our observations are organized based on every possible triplet of *Supplier, Institution, Quarter* in our sample period. The dependent variable is a dummy that takes 1 if the institution reports holding the supplier firm's stock at that quarter, and 0 otherwise. *Cus_Exp* (Customer Experience) dummy equals to 1 if the institution reports holding at least one of the customers of the supplier firm during the quarter, and 0 otherwise. Pct_Sales_t is percentage of sales of a supplier to all its customers that are cross-held by the institution. *Inst_Char* is a vector that contains institutional characteristics (Institution Size and Average Holding Age). *Sup_Char* is a vector that contains supplier characteristics. *IntraIndHold* dummy is set to 1 when the supplier and at least one of the customers that are cross-held by the institution belong to the same 2-digit SIC code. Detailed definitions of all control variables are provided in Appendix C. Importantly, the results tabulated here are based on the sub-sample of triplets for which the supplier is either never held by the institution or only newly held by the institution. We report the average odds ratio, the number of positive and negative coefficients, and the number of statistically significant (at the 90% level) positive and negative coefficients (in parentheses) for all cross-sectional regressions.

	Newly-held or Never-held Subsample											
	Fama-McBeth (1)						Fama-McBeth (2)					
	Avg Odds Ratio	P-Value	Positive (Significant)		Negative (Significant)		Avg Odds Ratio	P-Value	Positive (Significant)		Negative (Significant)	
Relation Characteristics												
Cus_Exp	2.478	0.000	120	(118)	0	(0)						
Pct_Sales							4.521	0.000	119	(115)	1	(0)
IntraIndHold	0.946	0.000	43	(17)	77	(55)	0.928	0.000	32	(15)	88	(61)
Institution Characteristics												
ln(Institution Size)	1.796	0.000	120	(120)	0	(0)	1.862	0.000	120	(120)	0	(0)
Holding Age(Weighted Avg)	0.931	0.000	1	(1)	119	(119)	0.935	0.000	2	(2)	118	(117)
Supplier Characteristics												
ln(Market Cap)	1.953	0.000	120	(120)	0	(0)	1.971	0.000	120	(120)	0	(0)
ln(B/M)	1.013	0.470	63	(28)	57	(29)	1.040	0.001	76	(49)	44	(18)
Dividend Yield	1.114	0.000	31	(14)	89	(60)	1.002	0.000	24	(12)	96	(60)
Stock Price	0.998	0.000	21	(6)	99	(73)	0.997	0.000	19	(4)	101	(72)
S&P500 Dummy	1.083	0.000	71	(49)	49	(28)	1.043	0.143	63	(36)	57	(33)
Volatility (last two years)	96.825	0.000	36	(12)	84	(50)	96.613	0.000	28	(9)	92	(59)
Log(Firm age in months)	0.980	0.002	40	(20)	80	(51)	0.997	0.425	52	(30)	68	(42)
Momentum (-3,0)	1.430	0.000	104	(85)	16	(10)	1.426	0.000	101	(86)	19	(11)
Momentum (-12,-3)	1.135	0.000	99	(77)	21	(9)	1.128	0.000	98	(83)	22	(10)
Turnover	1.208	0.000	119	(119)	1	(1)	1.206	0.000	119	(119)	1	(1)
Analyst Coverage	1.015	0.000	98	(86)	22	(13)	1.015	0.000	96	(84)	24	(12)

Table 7. Cross-coverage of customer and supplier firms by analysts: This table reports the results of Fama-McBeth regression to explain the impact of customer experience on analysts' decision to cover suppliers. The sample period is 1989 to 2009, during which the regression variables are available. The regression specification is

$$Logit(P(Is\_Covered)_t) = \alpha_t + \beta_t(Cus\_Exp_t \text{ or } Pct\_Sales_t) + \lambda_t IntraIndCov_t + \sum_{m=1}^{M} \phi_{m,t} Sup\_Char_{m,t} + \gamma_t Institutional\ Ownership_t + \epsilon_t$$

Our observations are organized based on every possible triplet of *Supplier, Analyst, Quarter*. The dependent variable, $Is\_Covered$, is a dummy that takes 1 if the analyst covers the supplier at that quarter, and 0 otherwise. Cus_Exp (Customer Experience) dummy is equal to 1 if the analyst covers at least one customer of the supplier firm during the quarter. Pct_Sales_t is the percentage of sales of a supplier to customers that are covered by the analyst. Sup_Char is a vector that contains supplier characteristics. Here, we report the result of the regression over the subset of suppliers that were never covered by the analyst or were only newly covered by the analyst. We also control for the similarity of the customer and supplier industry by introducing the $IntraIndCov$ dummy which takes 1 when the supplier and one of its cross-covered customers belong to the same industry as identified by the *Institutional Investor Magazine* and 0 otherwise. Column (1) reports the results using the Cus_Exp as the key independent variable, and column (2) reports the results using Pct_Sales as the key independent variable. Detailed definitions of all control variables are provided in Appendix C. We report the average odds ratio, the number of positive and negative coefficients, and the number of statistically significant (at the 90% level) positive and negative coefficients (in parentheses) for all cross-sectional regressions.

	Never Covered or Newly Covered Subsample											
	Fama-McBeth (1)						Fama-McBeth (2)					
	Avg Odds Ratio	P-Value	Positive (Significant)		Negative (Significant)		Avg Odds Ratio	P-Value	Positive (Significant)		Negative (Significant)	
Relation Characteristics												
Cus_Exp	13.877	0.000	84	(84)	0	(0)						
Pct_Sales							223.306	0.000	84	(83)	0	(0)
IntraIndCov	0.981	0.081	36	(16)	48	(17)	0.988	0.138	37	(17)	47	(17)
Supplier Characteristics												
ln(Market Cap)	1.612	0.000	84	(84)	0	(0)	1.616	0.000	84	(84)	0	(0)
ln(B/M)	0.960	0.001	28	(12)	56	(32)	0.974	0.015	34	(13)	50	(30)
Dividend Yield	0.517	0.000	20	(8)	64	(38)	0.509	0.000	20	(7)	64	(37)
Stock Price	0.993	0.000	5	(1)	79	(43)	0.993	0.000	5	(1)	79	(44)
S&P500 Dummy	0.848	0.000	18	(2)	66	(36)	0.847	0.000	17	(2)	67	(37)
Volatility (last two years)	1.214	0.000	30	(3)	54	(14)	1.244	0.000	29	(4)	55	(13)
Log(Firm Age in months)	0.859	0.000	6	(2)	78	(59)	0.863	0.000	8	(2)	76	(59)
Momentum (-3,0)	0.976	0.019	38	(15)	46	(25)	0.977	0.020	43	(15)	41	(26)
Momentum (-12,-3)	1.002	0.532	43	(14)	41	(10)	1.003	0.554	42	(14)	42	(8)
Supplier Turnover	1.103	0.000	84	(72)	0	(0)	1.104	0.000	84	(72)	0	(0)
Institutional Ownership	2.657	0.000	81	(69)	3	(0)	2.779	0.000	81	(73)	3	(0)

Table 8. Customer characteristics for relationships around the margin of disclosure requirement: This table reports the difference in customer characteristics while the relationship strength is around the margin of disclosure requirement. The dependent variables in columns (1)-(3) are defined as follows: ln(1+*Num News*) is the logarithm of one plus the total number of news covering the customer in year t; ln(1+*Num Analysts*) is the logarithm of one plus the number of analysts covering the customer firm at the end of year t; and ln(1+%*InstOwn*) is the logarithm of one plus the percentage institutional ownership at the end of year t. In this test we only focus on the customer-supplier relationships where the percentage sales to the customer in the supplier's total sales are between 9% and 11%. When this percentage is equal to or higher than 10%, Dummy(*Pct Sale* >10%) equals 1; when this percentage is below 10%, Dummy(*Pct Sale* >10%) equals 0. Other control variables, including the natural logarithm of the supplier's total sales (*Supplier ln(Total Sales)*), supplier's return on assets (*Supplier ROA*) and supplier's book leverage (*Supplier Book Leverage*) reflect information for the fiscal year end $t-1$. Detailed definitions of control variables are provided in Appendix C. We include the year fixed effects and industry fixed effects in all specifications. T-statistics reported in parentheses are based on standard errors after the adjustments for clustering at the firm and the year levels. The superscripts ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Variables	ln(1+Num News)	ln(1+Num Analysts)	ln(1+%InstOwn)
Dummy(Pct_Sale > 10%)	-0.322***	-0.117***	-0.098**
	(-3.71)	(-3.60)	(-2.26)
Supplier ln(Total Sales)	0.213***		
	(5.12)		
Supplier Book Leverage	-0.193		
	(-0.69)		
Supplier ln(Market Cap)		0.045***	0.006
		(2.69)	(0.29)
Supplier B/M	-0.022	0.033	-0.005
	(-1.14)	(1.20)	(-0.15)
Supplier Dividend Yield		0.003***	-0.000
		(3.97)	(-0.20)
Supplier Stock Price		0.000	0.000***
		(1.46)	(11.07)
Supplier S&P500 Dummy		0.083	0.149
		(1.24)	(1.46)
Supplier Volatility (last quarter)	0.044	0.049	-0.013
	(0.34)	(0.94)	(-0.23)
Supplier ln(Age)		0.000	-0.000
		(0.36)	(-0.61)
Supplier Momentum (-3,0)		0.006	0.021
		(0.22)	(0.68)
Supplier Momentum (-12,-3)		-0.053*	-0.040
		(-1.92)	(-1.49)
Turnover		-0.012	-0.030*
		(-0.96)	(-1.92)
Supplier Institutional Ownership	0.348	0.129	
	(1.50)	(1.38)	
Supplier Analyst Coverage	-0.019		-0.006
	(-1.52)		(-1.05)
Supplier Analyst Forecast Dispersion	-0.022		
	(-0.18)		
Supplier ROA	-0.682**		
	(-2.39)		
Year-Fixed Effects	Yes	Yes	Yes
Industry-Fixed Effects	Yes	Yes	Yes
Observations	1,750	2,411	2,411
Adj. R-squared	0.263	0.149	0.077

Table 9. Customer-supplier relationships and economic outcomes: The sample period for this test is from 1980 to 2009. The dependent variable in Columns (1) and (2) is the growth rate of sales to non-principal customers (i.e., growth rates of total sales minus sales to principal customers) and the dependent variable in Columns (3) and (4) is the advertisement expense scaled by total sales. Both dependent variables reflect information for year $t + 1$. The key independent variable, PC Dummy, is a dummy variable that equals one if a firm has at least one principal customer in year t, and zero otherwise. All independent variables, which are defined in Appendix C, reflect information for year t. We incorporate year-fixed effects and industry-fixed (based on SIC 2-digit classification) effects in Columns (1) and (3). We incorporate year fixed effects and firm-fixed effects in Columns (2) and (4). T-statistics reported in parentheses are based on standard errors clustered at the firm and the year levels. The superscripts ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Variables	(1)	(2)	(3)	(4)
	Non-PC Sales Growth		Ad. Expense/Total Sales	
PC Dummy	0.153***	0.267***	-0.006***	-0.003***
	(17.42)	(18.44)	(-4.51)	(-3.09)
ln(Market Cap)	-0.009***	-0.152***	-0.002***	-0.001*
	(-4.77)	(-17.34)	(-5.52)	(-1.65)
ln(Age)	-0.172***	-0.333***	0.001	0.003**
	(-36.16)	(-23.13)	(1.15)	(2.52)
ROA	-0.507***	-0.347***	-0.013***	-0.003
	(-19.87)	(-8.39)	(-5.48)	(-1.12)
B/M	0.000	0.001**	0.000	0.000
	(0.80)	(2.00)	(0.59)	(1.14)
Book Leverage	-0.091***	-0.089***	-0.001	0.000
	(-5.05)	(-3.10)	(-0.51)	(0.28)
Industry-Fixed Effect	Yes	No	Yes	No
Firm-Fixed Effect	No	Yes	No	Yes
Year-Fixed Effect	Yes	Yes	Yes	Yes
Observations	153,475	153,475	53,247	53,247
Adj. R-squared	0.063	0.193	0.190	0.783

Table 10. Customer-supplier relationships and the announcement effect of seasoned equity offerings: The sample period for this test is from 1980 to 2009. The dependent variables in columns (1) and (2) are cumulative abnormal returns (CARs) of the SEO announcement effects based on market model, and the ones in columns (3) and (4) are CARs based on the Fama-French and Carhart four factor model. We investigate two window periods: $(T-1, T+1)$ and $(T-2, T+2)$, where $T-k$ denotes k trading days before the announcement date T and $T+k$ denotes k trading days after the announcement date. The key independent variable, PC Dummy, is a dummy variable that equals one if a firm has at least one principal customer, and zero otherwise. All independent variables, which are defined in Appendix C, reflect information corresponding to the previous fiscal year end before the SEO announcements. We incorporate both the year- and the industry-fixed effects in all specifications. T-statistics reported in parentheses are based on standard errors after the adjustments for clustering at the year levels. The superscripts ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Variables	(1) CAR (T-1, T+1) MKT Model	(2) CAR (T-2, T+2) MKT Model	(3) CAR (T-1, T+1) FF4 Model	(4) CAR (T-2, T+2) FF4 Model
PC Dummy	0.010***	0.009***	0.011***	0.010***
	(3.60)	(2.82)	(3.95)	(3.04)
ln(Market Cap)	0.003***	0.004***	0.002*	0.003**
	(2.82)	(3.82)	(1.98)	(2.19)
Relative Size	0.033***	0.061***	0.027**	0.050***
	(2.97)	(4.18)	(2.48)	(4.03)
Pct Secondary Shares	-0.021***	-0.027***	-0.017***	-0.022***
	(-4.68)	(-5.69)	(-3.35)	(-4.22)
Number of Issues in Last Year	-0.002	-0.003	-0.001	-0.003
	(-1.12)	(-1.33)	(-0.61)	(-1.40)
B/M	0.001	0.000	-0.000	-0.001
	(0.38)	(0.11)	(-0.10)	(-0.48)
Book Leverage	-0.003	-0.002	-0.001	-0.000
	(-0.58)	(-0.24)	(-0.14)	(-0.02)
ROA	-0.001	-0.000	-0.001	-0.002
	(-0.12)	(-0.01)	(-0.22)	(-0.30)
Asset Tangibility	0.014***	0.012**	0.011**	0.007
	(3.42)	(2.15)	(2.68)	(1.08)
Turnover (T-90, T-11)	-0.335**	-0.497***	-0.084	-0.18
	(-2.56)	(-3.47)	(-0.61)	(-1.12)
Shelf Dummy	0.024***	0.027***	0.020***	0.023***
	(7.19)	(6.63)	(5.88)	(5.30)
Year-Fixed Effects	Yes	Yes	Yes	Yes
Industry-Fixed Effects	Yes	Yes	Yes	Yes
Observations	5,039	5,039	5,039	5,039
Adj. R-squared	0.035	0.035	0.024	0.023

Table 11. Likelihood of option listing: We estimate the firm's probability of having option listed based on the logistic regression model in (4).This table summarizes the results. The dependent variable in the logistic regression is the dummy variable that is equal to 1 if the firm has an option listed in the current month, and 0 otherwise. The estimation sample consists of U.S. firms in 1996-2009 that meet option listing requirements according to the NYSE AMEX Rule 915. We report results from three regression specifications examining different proxies used to measure the strength of the principal customer relationship. In columns (1) and (2), the strength of a firm's economic network is measured by its relationship with a principal-customer firm. We define firm i as having a principal customer, i.e. economic trading partner, if one of the customer firms that it trades with accounts for 10% or more of its total sales in the previous year. *PC Dummy* is an indicator variable equal to one if firm i disclosed its economic relationship with a principal costumer firm in the previous year, and zero otherwise. *Publicly listed principal customer* is an indicator variable equal to one if firm i has at least one principal-customer firm which is publicly listed, and zero otherwise. In column (3), the strength of firm i's economic network is measured by its total sales to their disclosed customer firms. *Pct_Sales*is the percentage of sales that firm i makes to all corporate customers in the previous year, relative to the total sales. We include several one-month lagged firm-level characteristics that have been shown to influence exchanges' option listing decisions (see Mayhew and Mihov (2004)). Detailed definitions of these variables are provided in Appendix C. Industry- and year-fixed effects are included in all specifications. Robust t-statistics, clustered at both the firm and year levels are reported in brackets below each estimate. Number of observations refers to the number of firm-months used in the estimation. We report the pseudo R-squared for each regression model. The superscripts ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Probability of option listing		
	(1)	(2)	(3)
PC Dummy	0.579***	0.454***	
	(8.25)	(5.77)	
Publicly listed principal customer		0.202**	
		(2.14)	
Pct_Sales			0.934***
			(6.67)
ln(Market cap)	0.927***	0.931***	0.922***
	(13.87)	(13.86)	(13.63)
Volume	0.317***	0.316***	0.318***
	(5.33)	(5.27)	(5.39)
Abnormal Volume	0.556***	0.556***	0.554***
	(15.68)	(15.59)	(15.66)
Volatility	0.586***	0.587***	0.581***
	(8.39)	(8.38)	(8.28)
Abnormal Volatility	1.073***	1.079***	1.114***
	(3.36)	(3.39)	(3.52)
Time Fixed Effects	Yes	Yes	Yes
Observations	106,860	106,860	106,860
Pseudo R-squared	0.212	0.212	0.211

Appendices

Appendix A. Stocks Eligible for Option Listing

This section of the appendix describes the construction of the universe of stocks that are eligible for option listing. As per the 2010 requirement for option listing by the NYSE AMEX Rule 915, the security must be duly registered on a National Market System, i.e. "NMS stock", and characterized by a substantial number of outstanding shares which are widely held and actively traded. We summarize the trading requirements of stocks eligible for option listing below:

(1) There are a minimum of 7,000,000 shares of public floats.

(2) There are a minimum of 2,000 holders of the underlying security.

(3) Trading volume (in all markets in which the underlying security is traded) has been at least 2,400,000 shares in the preceding twelve months.

(4) The market price per share of the underlying security has been at least $3.00 for the previous five consecutive business days preceding the date on which the Exchange submits a certificate to the Options Clearing Corporation for listing and trading.

We collect data from various sources to identify the universe of stocks eligible for option listing at any time point from January 1996 to December 2010. The number of stocks in the eligible universe changes monthly depending on their compliance with the listing requirements. We obtain data on share price, volume, number of shares outstanding, exchange listing, and number of common shareholders at the end of each month for the all underlying securities in the CRSP database. ADRs, country funds, REIT, and closed-end funds are excluded since they are not considered in our IPO sample. We use data on trading volume, share price, and exchange listing history to filter out stocks that are ineligible for option listing. We use the number of common shareholders as a conservative proxy to identify ineligible stocks that do not meet the minimum 2,000 shareholders requirement. However, we do not find the minimum shareholders requirement to be a key binding criteria after removing firms that do not meet the minimum public floats and trading volume requirements.

Finally, the public float criterion states that a minimum of 7,000,000 shares must be owned by persons other than those required to report their holdings under Section 16(a) of the Securities Exchange Act of 1934. To establish eligibility based the public float criterion, we calculate the number of shares held by insiders at the end of each month using the data

downloaded from Thomson Reuter's Insider Filing Data Feed (IFDF). The number of public floats is calculated by subtracting the number of shares outstanding with the number of shares held by insiders. Using the above criteria, we find the number of stocks eligible for option listing varies significantly through time.

Figure A.1 in the appendix plots the time series of the universe of stocks eligible for option listing from January 1996 to December 2010. The dark solid line indicates the total number of stocks that meet the requirement for option listing. The line marked by '+', on the other hand, indicates the number of stocks that have options listed. The difference between these two lines illustrates the number of non-optioned stocks that are eligible for option listing. The number of stocks eligible for option listing varies significantly through time. There are 2,669 stocks eligible for option listing in January 1996. Among them, 1260 have already been optioned. By the end of the sample, 1923 out of the total 2,669 eligible stocks have options listed. Using a similar method, Mayhew and Mihov (2004) construct a universe of stocks eligible for option listing from 1973 to 1996. Our sample therefore starts approximately when their sample ends. Nevertheless, we find that our 1996's sample size of eligible stocks is similar to theirs.

Appendix B. Additional Figures and Tables

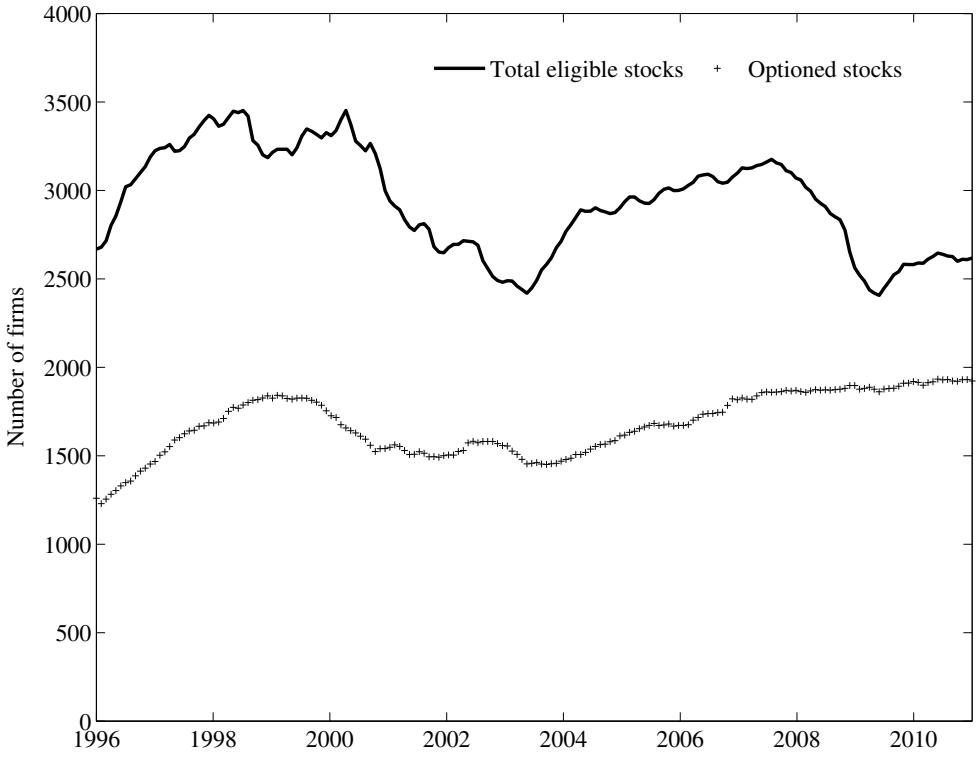

Figure A.1. Universe of stocks eligible for option listing: The solid line plots the monthly total of number of stocks, meeting the eligibility requirements for option listing. The line marked by '+' represents the monthly total number of stocks that have options listed. The difference between the two lines represents the stocks that are eligible for option listing, but do not yet have options listed.

Table A.I. Principal customer firms with highest level of press coverage: In Panel A of this table, we list the top 20 principal customer firms that have the largest number of news articles. In Panel B, we report the distribution for the dependent supplier firms' total assets and the corresponding matching firms' total assets.

Panel A: Top Principal Customers

Firm Name	Number of news articles	First year as a PC	Last year as a PC
General Motors Co	357,147	1976	2009
Microsoft Corp	337,837	1991	2009
Ford Motor Co	332,033	1976	2009
General Electric Co	255,892	1976	2009
International Business Machines Corp	232,953	1976	2009
Daimler AG	219,842	1980	2009
Citigroup Inc	212,955	1978	2009
Royal Dutch Shell PLC	202,403	1978	2009
BP PLC	182,858	1977	2009
Toyota Motor Corp	168,412	1987	2009
JPMorgan Chase & Co	166,030	1996	2009
Intel Corp	164,766	1978	2009
Merrill Lynch & Co Inc	146,735	1977	2009
Bank of America Corp	142,258	1980	2009
BT Group PLC	141,722	1982	2008
Wal-Mart Stores Inc	139,690	1978	2009
Hewlett-Packard Co	133,928	1979	2009
Exxon Mobil Corp	132,011	1977	2009
Siemens AG	130,229	1978	2009
Apple Inc	128,893	1981	2009

Panel B: Dependant Suppliers

Percentile	$\ln(\text{Asset}_{\text{supplier}})$	$\ln(\text{Asset}_{\text{matchfirm}})$	$\text{Asset}_{\text{supplier}}$ ($ mil)	$\text{Asset}_{\text{matchfirm}}$ ($ mil)
p10	1.74	2.67	5.72	14.43
p20	2.41	3.47	11.13	32.06
p30	2.93	4.19	18.72	66.09
p40	3.46	5.24	31.90	188.37
p50	3.97	5.31	53.10	201.70
p60	4.51	6.82	90.99	918.61
p70	5.10	6.92	164.24	1,016.27
p80	5.91	7.08	366.98	1,187.84
p90	7.07	8.27	1,173.98	3,899.50

Appendix C. Variable Definitions

Variable	Short Description	Detailed Definition
Cus_Exp	Customer experience	A dummy which takes 1 if an institution/analyst holds/covers at least one of the customers of the supplier (Sources: IBES, 13f Institutional Holding, and Compustat Segment Customer File)
Pct_Sales	Percentage sales	See equation (1) for the definition (Source: Compustat Segment Customer File)
IntraIndHold	Intra-industry holding	A dummy which takes 1 if the supplier and at least one of the customers held by the institution belong to the same Fama-Frech 48 industry (Sources: 13f Institutional Holding and Compustat Segment Customer File)
IntraIndCov	Intra-industry coverage	A dummy which takes 1 if the supplier and at least one of the customers covered by the analyst belong to the same industry defined by *ggind* (Sources: IBES and Compustat Segment Customer File)
Market Cap	Market capitalization	$SHROUT \times \|PRC\|$ (Source: CRSP))
B/M	Book to market ratio	Book equity / Market equity (Sources: CRSP and Compustat)
Dividend Yield	Dividend yield	DVPSX_F /PRCC_F (Source: Compustat)
S&P500 Dummy	S&P500 dummy	Dummy which takes one if the security is included in the S&P500 index (Source: Compustat)
Volatility	Volatility of Returns	Volatility of monthly returns over the past two years (Source: CRSP)
Age	Firm age	Number of months since the first time a firm has a return reported on CRSP (Source: CRSP)
Momentum (-3,0)	Momentum	Buy and hold return over the last three months (Source: CRSP)
Momentum (-12, -3)	Momentum	Buy and hold return over the last year except the last three months (Source: CRSP)
Turnover	Turnover	$VOL/SHROUT$ (Source: CRSP)
Analyst Coverage	Number of analysts	Number of analysts that filed at least one quarterly or annual report on the firm during a quarter (Source: IBES)
Institutional Ownership	Institutional ownership	Percentage of stocks owned by financial institutions (Source: 13f Institutional Holding)
Total Sales	Annual total sales	SALE (Source: Compustat)
Analyst Forecast Dispersion	Analyst forecast dispersion	Standard deviation of earnings reported by analysts (Source: IBES)
Book Leverage	Book leverage	$(DLTT + DLC)/AT$ (Source: Compustat)
ROA	Return on assets	$EBITDA/AT$ (Source: Compustat)
PC Dummy	Principal customer	Dummy takes 1 if a supplier discloses a customer (Source: Compustat Segment Customer File)
Relative Size	Relative size	Size of the offering over the number of shares outstanding prior to the issue (Source: CRSP)
Pct Secondary Shares	% of secondary shares	Percentage of the secondary shares out of the total offering (Source: SDC Platinum New Issues Database)
Number of Issues in Last Year	Number of issues	Number of offerings in the last year (Source: SDC Platinum New Issues Database)

Variable	**Description**	**Definition**
Asset Tangibility	Asset tangibility	$PPENT/AT$ (Source: Compustat)
Turnover (t-90, t-11)	Average turnover	Average turnover over the three months prior to the offering except the 10 days before the offering (Source: CRSP)
Shelf Dummy	Shelf offering	Dummy takes 1 if the offering is a shelf offering (Source: SDC Platinum New Issues Database)
Publicly listed principal customer	Publicly listed principal customer dummy	Indicator set to 1 if the supplier has at least one publicly listed customer
Volume	Trade volume	Average daily trade volume over the last year
Abnormal Volume	Abnormal Volume	Average daily trade volume over the prior month divided by average daily volume over the prior year
Abnormal Volatility	Abnormal return volatility	Volatility of daily return over the prior month divided by volatility of return over the prior year