The Certification Role of Large Customers in the New Issues Market

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ABSTRACT

Using a sample of 1,429 IPOs from 1997 to 2005, this paper examines the certification role of large customers in the new issues market. We find that IPO firms that have product market relationships with large customers experience higher valuation at the time of their IPOs compared to those without such relationships. This higher valuation is more pronounced when product market relationships are able to alleviate IPO uncertainties or ease product market frictions, when synergistic gains from the relationships are larger, and when large customers have stronger certifying abilities. We also find that IPO valuation is higher when product market relationships are effectively governed by interfirm arrangements such as customer equity ownership in IPO firms, long-term purchase agreements, and strategic alliances. The results are remarkably similar when we examine post-IPO long-run operating performance instead of IPO valuation. Finally, we find that large customers realize significant positive abnormal returns around their suppliers' preliminary prospectus filing dates, suggesting that some of the benefits from product market relationships accrue to large customers.

The recent literature shows that large customers play an important role in various corporate decisions including capital structure choice (Kale and Shahrur, 2007; Shantanu, Dasgupta, and Kim; 2008), and the adoption of antitakeover provisions (Cremer, Nair, and Peyer, 2006). These studies show that unlike investors in financial markets, customers in product markets care more about long-term non-financial strategic factors than short-term accounting profits. For example, customers in downstream markets may have stronger incentives to secure a stable provision of their product components specific to their needs (Tirole, 1988; Chevalier and Goolsbee, 2005) than to maximize short-term profits from the transactions. However, in spite of evidence on the role of large customers in various corporate decisions, we know very little about the role of large customers in the new issues market. This is remarkable given that a majority of initial public offering (IPO) firms maintain close trading relationships with their large customers and sell a substantial portion of their products/services to them.[1]

IPOs provide an ideal laboratory to investigate the role of large customers in corporate security offerings. The literature on transaction cost economics dating back to Coase (1937) and Williamson (1985) suggests that large customers exert strong control power over their IPO suppliers. IPO firm assets are highly specific to certain customers and many IPO firms operate in asset specificity-intensive high tech and durable industries. In addition, since IPO firms have severe information asymmetry problems, it is difficult for these firms to access financial markets, which forces them to rely heavily on large customers for their financing and operations. Furthermore, firms in the relatively early stages of their life cycles, such as IPO firms, face a highly uncertain business environment and thus have to make investment decisions prior to the resolution of unrealized demand for their products. This uncertainty incentivizes IPO firms to internalize large transaction costs by forming bilateral customer-supplier relationships (Rangan, Corey, and Cespedes, 1993). All

[1] In our sample, 65% of IPO firms have at least one large customer that accounts for a substantial portion of

these arguments suggest that IPO suppliers are likely to depend heavily on their large customers and large customers are likely to exert significant control over their suppliers. Our data confirms this theoretical prediction. In the sample of all IPOs between 1997 and 2005, we find 65% of IPO firms have a substantial portion of their sales with at least one large customer, which assures that IPO firms having large customers is a prevalent phenomenon, rather than exceptional.

In this paper we provide new evidence on the role of large customers by examining the effect of customer-supplier relationships on IPO firm valuation (offer price) and post-IPO long-run operating performance.[2] Specifically, we begin by identifying large public corporate customers as those who are responsible for over 10% of IPO firms' annual revenues, as specified in the Financial Accounting Standard Board (FASB) disclosure rules. We then investigate whether IPO firm valuation and long-run operating performance are different between IPO firms with large public corporate customers and IPO firms without large corporate customers. We posit that large customers serve as certifying entities in reducing uncertainty inherent in supplier IPOs and thus alleviate product market frictions that may otherwise adversely affect IPO valuation (certification hypothesis). We further test the certification hypothesis by investigating the source of this value-enhancing effect of large customers on IPO supplier valuation. The certification hypothesis predicts that such an effect will be more pronounced when IPOs have high uncertainty. We also examine whether the benefits arising from supplier IPOs also accrue to customers by examining the effect of suppliers' IPOs on customer value.

Large customers are able to serve as credible certifying entities for their suppliers for several

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their sales.

[2] The valuation effect of having a large customer is likely to be incorporated in the IPO offer price rather than the IPO first-day price (i.e., IPO underpricing). The rationale is as follows. Since the customer-supplier relationship is reported in the initial IPO prospectus, all parties to the IPO (the issuer, the underwriter, and outside investors) are aware of such relationships. Information on product market relationships is therefore incorporated in the initial price range and in the demand indications contained in the underwriter's book following the road show. When the price of the IPO is set, all market participants evaluate the economic value

reasons. By maintaining close product market relationships with IPO suppliers, large customers have greater access to proprietary information about IPO firms and thus are particularly knowledgeable about the IPO firms' operations and future industry prospects. Recent popular information sharing practices between firms in adjacent stages of production/distribution also allow large customers to continuously obtain private information about IPO suppliers. Moreover, customers have strong incentives to choose financially healthy and well-qualified suppliers when they establish product market relationships, and to monitor their suppliers after a relationship has been established.[3] Various interfirm arrangements such as customer equity ownership in suppliers, long-term purchasing agreements, and strategic alliances also create close ties between customers and their suppliers, facilitating information flows among them (Filson and Morales, 2001). These information advantages and interfirm arrangements should enable large customers to serve as a valuable certifying entity for their IPO suppliers.[4]

We find that, in general, our results are consistent with the certification hypothesis. In particular, we find that IPO firms that maintain product market relationships with a large public customer observe both higher valuation at the time of the IPO and better post-IPO long-run operating performance than those with no such relationships[5].

(cost) of having downstream customers and price this information into the offering price.

[3] Tirole (1988) argues that durable customer-supplier relationships can involve high levels of asset specificity, which makes it costly for customers to switch suppliers.

[4] For example, Kaynar, a private supplier of Boeing, agreed to give Boeing all financial data about the firm on a quarterly basis prior to going through its IPO. This case suggests that a customer (e.g., Boeing) may be willing to take nontrivial steps to ensure the health of its supplier (e.g., Kaynar). This case also suggests that large customers' bargaining power over their IPO suppliers can be used to obtain proprietary information about IPO suppliers so as to monitor their financial soundness, reinforcing a large customers' certifying role in financial markets.

[5] One may argue that the valuation effects are from the firm's endogenous disclosure choice, rather than real effects from having large customers. However, this is not the case since all IPO firms report their large customers in their initial IPO prospectus and subsequent SEC filings in an almost standardized format, possibly to avoid outside investors' legal actions in charge of the issuer's concealing material information which may affect IPO stock performance. Therefore, our study is different from the studies in the accounting literature which deal with the consequences of firm's disclosure policy such as Guo, Lev, and Zhou (2004).

Further analysis shows that IPO firm characteristics, the certifying ability of customers, product market characteristics, and several interfirm arrangements play an important role in explaining the valuation and long-run operating performance of IPO firms with a large public corporate customer. In particular, we find that IPO firms with a large public corporate customer that have low leverage, high asset specificity, high uncertainty, high customer sales, and a high Herfindahl index experience both higher valuation at the time of the IPO and better post-IPO operating performance than IPO firms without a large corporate customer. IPO firm valuation (post-IPO operating performance) is also higher when a customer's certifying ability is stronger, that is, if the customer is larger in size, has a higher Herfindahl index, and has a higher announcement return around its IPO supplier's preliminary prospectus (S-1) filing date.

Turning to interfirm arrangements between large customers and their IPO suppliers, we find that large customers use various financial and product market arrangements to strengthen their relationships. We also find that interfirm arrangements such as customer equity ownership in IPO firms, long-term purchasing agreements, and strategic alliances have a significant positive effect on IPO firm valuation. The positive effects of interfirm arrangements on IPO firm valuation is more pronounced when IPO firms operate in uncertain business environments, suggesting that customer certification services are more valuable when IPOs face greater uncertainty.

Next, we investigate whether customer-supplier relationships also benefit customers. To the extent that customers and suppliers shares gains from the product market relationships, one would expect that some of the benefits from supplier IPOs also accrue to their customers. Consistent with this conjecture, we find that large customers realize significant positive abnormal returns of 1.06% around their supplier IPOs' preliminary prospectus filing dates. This result further supports the certification hypothesis. Moreover, customer abnormal returns increase as suppliers' post-IPO investments in customer-specific assets (i.e., property, plant, and equipment) increase, suggesting

that one of the main sources for the increase in customer value is an IPO supplier's intensified investment in the assets specific to customer needs. The market's ex ante valuation of certification effects is also higher when customers have long-term purchasing agreements or a strategic alliance with their IPO suppliers, particularly when IPO suppliers have higher uncertainty. However, the valuation effect is statistically insignificant when interfirm arrangements take the form of financial arrangements such as customer equity ownership in IPO suppliers and customer loans to IPO suppliers. These results suggest that product market arrangements play a more important role than financial arrangements in explaining wealth gains from customer-supplier relationships.

To rule out alternative explanations for our findings, we perform several robustness checks. First, IPOs during the internet bubble period may have been affected by the possible investor irrationality, so the results from this period might be different from those from non-bubble periods. To address this issue, we estimate all regressions in the paper including year dummies. As an alternative test, we reestimate all regressions excluding IPOs during the bubble period. We find that our results are qualitatively unaffected. Next, if the customer-suppler relationship is endogenously determined, inference derived from our OLS regressions can be biased and lead to inconsistent conclusions. To examine whether the potential endogeneity of the customer-supplier relationship can change the conclusions of the paper in a significant way, we reestimate the regressions in the paper using a propensity score matching technique and a two-stage least squares (2SLS) regression approach. We find that our results are robust to this endogeneity issue.

In evaluating the certifying role of large customers in the new issues market, we contribute to the existing literature in several important ways. First, to the best of our knowledge, our paper is the first to present empirical evidence on the role of large customers in the new issues market. Second, our paper sheds new light on the determinants of IPO firm valuation. In particular, our paper shows that large customers alleviate product market frictions and decrease the uncertainty associated with

IPO suppliers, contributing to the increase in IPO firm valuation. This positive large customer effect is more pronounced when the product market relationships are effectively governed by interfirm arrangements such as customer equity ownership in the IPO firm, long-term purchasing agreements, and strategic alliances. Third, we document that the IPO is an inter-industry phenomenon that affects not only the value of firms going public but also the value of firms in the downstream industries, suggesting that the IPO generates synergistic gains to firms in both upstream and downstream industries. Fourth, by investigating how a firm's going public decision influences customer value, our analysis shows that the customer-supplier product market relationship interacts with the new issues market, and that this interaction benefits IPO firms' customers. Thus, our paper further extends the strand of the literature that addresses the interaction between the product market and the financial market (Brander and Lewis, 1986; Chevalier, 1995; Campello, 2003).

The rest of this paper is organized as follows. In Section 1, we develop the hypotheses to be tested. Section 2 describes the data and sample characteristics. In Section 3 we present the empirical results. In Section 4 we provide the results from robustness tests. Section 5 summarizes and concludes the paper.

1. Hypothesis Development

In this section, we present testable implications of the certification hypothesis. We first present hypotheses on how IPO supplier, large customer, product market, and interfirm arrangement characteristics affect IPO firm valuation. Following Purnanandam and Swamanathan (2004), we measure IPO firm valuation as the ratio of the IPO firm's offer price to EBITDA at the time of the IPO to that of an industry, size, and EBITDA matched firm's price to EBITDA. We also present hypotheses on how these determinants affect customer value.

1.1 Determinants of IPO Supplier Valuation

1.1.1 IPO Firm and Customer Characteristics

The certification hypothesis suggests that large customers' bargaining power over their IPO suppliers may be beneficial to IPO suppliers if the customers use their power to certify the suppliers' quality and to signal their commitment to providing monitoring services as in Kaynar case that is reported in footnote 4. Further, the role of large customers in enhancing a supplier's IPO valuation is expected to be increasing in their ability to certify the IPO suppliers' quality. For instance, when a large percentage of an IPO firm's total sales is to the large customer, when the customer is larger relative to its IPO supplier, when the customer has a high Herfindahl index, and when the customer shares in the gains from its supplier's IPO (i.e., the customer realizes a high announcement return on its supplier's filing of the preliminary prospectus), the customer's certifying ability is likely to be strong, resulting in a high IPO firm valuation.

Large customers may exert positive influence on IPO suppliers' relative valuation by alleviating product market frictions that are imposed on IPO firms. Product market frictions occur when the firms' investment and operation using open market transactions incur huge transaction costs, so that profit-maximizing firms are not able to make efficient investment and operation decisions. IPO firms can ease these frictions by forming bilateral customer-supplier relationships and internalizing transaction costs.[6] Transaction cost theory suggests that asset specificity, the degree to which it is difficult to change the use of assets from one customer to another, is the key factor that drives high transaction costs (Williamson, 1985). We use various measures for asset specificity, such as R&D intensity, the ratio of property, plant, and equipment (PPE) to total assets, and a dummy variable for whether customers are in relationship industries as defined by Cremer, Nair, and Peyer (2006).[7] We

[6] Coase (1937) conceptualizes transaction costs on the market and shows that these costs motivate profit-maximizing firms to vertically integrate rather than conduct open market transactions.

[7] Santarelli (1991) and Shelanski and Klein (1995) suggest the ratio of R&D expenditures to total assets as a

expect IPO firms with high asset specificity (high R&D/assets, high PPE/assets, and operating in a relationship industry) to have high relative valuation when they maintain product market relationships with large customers.

The certification hypothesis also suggests that IPO firms with high uncertainty (high IPO industry stock volatility) that have large customers realize high valuation at the time of their IPOs since the certification benefits are likely to be more valuable for these firms. Following the previous literature, we measure industry uncertainty by the average monthly stock volatility of the Fama and French (1997) industry in the year of the IPO.

The certification hypothesis additionally predicts that product market characteristics play an important role in explaining IPO firm valuation. For example, IPO firms in less competitive industries (high Herfindahl index) are likely to obtain more benefits from having large customers than other types of IPO firms since the benefits from certification are less likely to be eroded by intense competition. Also, IPO firms operating in different industries than their customers (non-horizontal customers) are predicted to generate more synergistic gains by forming durable customer-supplier relationships since their operations and investments are more closely related with those of their customers in upstream markets.

Note that a supplier's IPO can cause a customer to incur some strategic costs. For example, the IPO literature shows that many IPO firms are delisted from stock exchanges or acquired by other firms several years after their IPO (Ritter and Welch, 2002). This suggests that risky IPO firms that have product market relationships with large customers can impose unexpected interruption in the provision of production components to large customers. To the extent that this risk is priced in the

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measure of asset specificity since firms whose products have close substitutes are likely to spend less on R&D activity. In contrast, Berger, Ofek, and Swary (1996) use the ratio of machinery and equipment to total assets as a measure for asset specificity. Since information on machinery and equipment is not available for most of our customers in the COMPUSTAT database, we use the ratio of PPE to total assets as a proxy for the extent of asset specificity. The correlation between PPE and machinery and equipment for the firms with both

market, we expect risky suppliers to have low value at the time of their IPOs. We use the leverage ratio as a measure of a firm's risk.

The duration of customer-supplier relationships can also affect IPO firm valuation. To the extent that the durable product market relationship enables large customers to obtain a competitive advantage over other market participants in colleting information about IPO suppliers, this information advantage will allow long-term relationship customers to provide better certification services. Thus, we expect IPO firms that maintain long-term relationships with large customers to have higher valuation than other IPO firms.

1.1.2 Interfirm Arrangements

The incentives of customers to certify the quality of their IPO suppliers are likely to be significantly increased if the product market relationships between customers and IPO suppliers are effectively governed by interfirm arrangements, such as customer equity ownership in suppliers, customer loans to suppliers, long-term purchasing agreements, and strategic alliances (Chan, Kensinger, Keown and Martin, 1997; Fee, Hadlock and Thomas, 2006). These arrangements can alleviate conflicts of interest between large customers and their IPO suppliers, helping to coordinate interests of both parties and facilitating information flow between them (Filson and Morales, 2001). Thus, we expect IPOs to have higher valuation when customers and suppliers are effectively governed by interfirm arrangements. To the extent that the role of interfirm arrangements in alleviating conflicts of interest between large customers and their IPO suppliers is greater for IPO firms with higher uncertainty, we expect the positive effect of interfirm arrangements on IPO valuation to be more pronounced if IPO firms operate in more uncertain environments as measured by IPO industry stock volatility.

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variables available is 0.985.

1.2 Determinants of Customer Value

To the extent that value created due to a large customer's certification services also accrues to large customers, the certification hypothesis implies that supplier IPOs benefit customers as well as suppliers. To examine the implication of this argument, we use customer abnormal returns around their supplier IPOs' preliminary prospectus filing dates. The certification hypothesis predicts that large customers experience a positive valuation effect on these dates. We also predict that the factors that contribute to IPO firm valuation in a positive way affect customer announcement returns in the same direction.

Another factor we consider to be an important determinant of customer announcement returns is the extent of a customer's financial constraints, as measured by customer leverage and customer credit rating. Since resources generated by supplier IPOs are more likely to benefit customers that lack financial resources for their firms' investment and operation, customer announcement returns will be higher if customer leverage is higher or if customer credit rating is below investment grade.

2. Data and Summary Statistics

2.1 Data

We obtain the initial sample of IPOs from the Security Data Corporation (SDC) new issues database from 1997 to 2005. We start the sample period in 1997 because it is the first year that the Edgar database reliably provides access to preliminary prospectuses for IPO firms. Unit offerings, closed-end funds, Real Estate Investment Trusts (REITs), American Depository Receipts (ADRs), IPO firms headquartered outside the U.S., and firms with an offer price below $5 are excluded from the sample. These screens yield 1,704 IPOs as our preliminary sample. To estimate IPO valuation, we further restrict our sample IPO firms to those that have both sales (COMPUSTAT data item 12)

and EBITDA (COMPUSTAT data item 13) in the fiscal year prior to the IPO. This further reduces our sample size to 1,429 firms.[8]

Using the COMPUSTAT segment database, we identify whether these 1,429 IPO firms have large customers. FASB disclosure rules require firms to report the identities of all the customers responsible for over 10% of their annual revenues along with the total amount of revenues from each such customer. We use this information in the COMPUSTAT segment database to identify the large customers of each IPO firm.[9] When a particular IPO firm has multiple large customers, we identify the customer that purchases the largest amount as our sample customer.[10] To determine whether a corporate customer is publicly traded or privately held, we manually match the names of large customers in the COMPUSTAT segment database with those of all firms in the COMPUSTAT database. We code IPO firms with corporate customers that do not match firms in COMPUSTAT as having large private corporate customers. We are very conservative in our matching to avoid mistakes that reduce the reliability of our results.

We obtain stock return information from the Center for Research in Security Prices (CRSP) and financial information from COMPUSTAT.

2.2 Choosing Matching Firms

As a valuation benchmark for our sample IPO firms, we use matching firms that are publicly traded in the same industry as the IPO firms. Our matching technique most closely follows that of

[8] Unlike prior literature on IPO valuation, we do not exclude firms with negative earnings in the year prior to the IPO from our analysis. We include these firms to avoid potential sample selection bias in our sample of firms with large customers. We find that eliminating these firms does not change our results.

[9] Given that information on large customers is not available prior to their suppliers' IPOs, we identify large customers based on post-IPO information. However, the interval between the first SEC reporting date and the issuance date is usually less than two months, with an average of 1.4 months in our sample. The customer-supplier relationship is not expected to change drastically over this short a period. Most of the large customers disclosed in the COMPUSTAT database are also present in the IPO preliminary prospectus.

[10] The average number of large public customers listed in the COMPUSTAT database for our data set is three. We also find that certain IPO prospectuses provide long lists of customers - as many as 10 in some cases.

Purnanandam and Swamanathan (2004). For our universe of matching firms, we consider all COMPUSTAT listed firms that have been public at least three years. We eliminate all non-standard share classes as well as REITS, ADRs, and closed-end funds. We then utilize the SIC codes to classify firms into the Fama and French (1997) 48 industry classification scheme. Within each year and industry, we generate three portfolios based on the terciles of firm sales in the year. We then sort each sales portfolio into three additional portfolios based on firm profitability (EBITDA/sales). Thus, each industry-year has a total of nine portfolios.[11]

After generating our portfolios for the universe of firms, we place each IPO into its corresponding industry-size-profitability portfolio the year before the IPO. We match each IPO firm to the benchmark firm with the closest value of firm sales in the year before the IPO. We then create a benchmark ratio of IPO firm valuation at the time of the IPO to the valuation of a comparable firm. Note that unlike in Purnanandam and Swamanathan (2004), this ratio is not intended to be the IPO valuation to intrinsic value ratio. Rather, this ratio is meant to serve as a useful benchmark for the valuation of the IPO firm more in the spirit of Kim and Ritter (1999). We use two main ratios to calculate this benchmark, namely, price to EBITDA and price to sales. Thus, the valuation takes the form of:

$$\text{Relative valuation}_{\text{EBITDA}} = \left(\frac{\text{IPO offer price}_t \times \text{Shares Outstanding}_t}{\text{IPO EBITDA}_{t-1}} \right) \Big/ \left(\frac{\text{Benchmark price}_t \times \text{Shares outstanding}_t}{\text{Benchmark EBITDA}_{t-1}} \right)$$

or

$$\text{Relative valuation}_{\text{sales}} = \left(\frac{\text{IPO offer price}_t \times \text{Shares Outstanding}_t}{\text{IPO sales}_{t-1}} \right) \Big/ \left(\frac{\text{Benchmark price}_t \times \text{Shares outstanding}_t}{\text{Benchmark sales}_{t-1}} \right).$$

We do not consider a price/earnings ratio as an alternative measure of relative valuation because many of the firms in our sample have zero or negative earnings.

However, a detailed breakdown of customers by revenues is typically less detailed in the prospectus.

[11] Similar to Purnanandam and Swamanathan (2004), we create 2x2 portfolios when there are fewer than

2.3 Summary Statistics

Table I reports the frequency of our sample IPOs by existence of a large corporate customer, year, industry, and industry relatedness between the large corporate customers and the IPO firm. Panel A reports that the 1,429 sample IPOs are broken down into 479 IPOs with no large corporate customers and 950 IPOs with large corporate customers. Of the 950 IPOs with large corporate customers, 720 IPOs are associated with privately held customers and 230 IPOs are associated with publicly held customers.[12]

Panel B of Table I shows that the number of IPOs in our sample is highest in 1997 and declines in the second half of the sample. A breakdown of the sample by IPO firm industry indicates that the majority of IPO firms are in technology, healthcare, or wholesale/retail industries.

We report the extent of industrial relatedness between IPO firms and their customers for the sample of 230 IPOs with large public corporate customers in Panel C of Table I. A large percentage of our sample of IPO firms (46.5%) have SIC codes that are completely different from those of their large public corporate customers. This implies that most customer-supplier relationships in our sample represent non-horizontal (i.e., vertical) relationships. IPO firms that share the same four-digit (three-digit) SIC code industry as their large public corporate customer account for 12.7% (17.4%) of the sample.

Panel A of Table II reports deal characteristics separately for the 479 IPO firms without large customers, 720 IPOs with large private customers, and 230 IPOs with large public corporate customers. We find that the average offer size of $146.5 million for firms without large customers is significantly larger than that for firms with large private and large public corporate customers, with

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three firms in any portfolio.

[12] For instance, when Krispy Kreme Doughnuts went public April 4, 2000, it had Kroger Company, a public firm, listed as a large customer in the segment-level data. In contrast, when eBay went public on September

offer sizes of $96 million and $96 million, respectively. We also find that in general, there is little difference between the underwriter rank of the firms with large public corporate customers and without large customers based on the updated rankings provided by Loughran and Ritter (2004). However, IPO firms with large public corporate customers tend to sell less of their stock compared to IPO firms with large private corporate customers and IPO firms without large customers. This is consistent with Cremer, Nair, and Peyer (2006), who argue that suppliers with large public customers have incentives to secure stable ownership in order to retain large customers that are afraid of sudden interruption in the provision of their product components due to a potential takeover of their suppliers. We find that IPOs without large customers, with large private customers, and with large public customers are backed by venture capitalists 49%, 44%, and 53% of the time, respectively.

In Panel B of Table II, we examine the IPO firm characteristics. The means of market capitalization for firms without large customers, with large private customers, and with large public customers are largely similar at $871 million, $656 million, and $851 million, respectively. The average total assets are largest for IPO firms without large corporate customers ($2.1 billion), followed by IPO firms with large private corporate customers ($541 million) and IPO firms with large public corporate customers ($327 million).[13] These results suggest that IPO firms without large corporate customers have enough resources to build up their own distributional channels, so they might have less need for maintaining bilateral relationships with large customers. The mean ratio of EBITDA to total assets is highest for IPO firms with large public corporate customers (9%), but lowest for IPO firms without large corporate customers (6.4%). The percent of firms with negative earnings is fairly close across the three groups, with IPO firms without large corporate

24, 1998, no customer accounted for 10% or more of its sales.

[13] Note that this figure is heavily skewed. Winsorizing at the 99th percentile reduces the mean for IPO firms without large customers to $649 million.

customers being highest (46.6%). The median ratio of R&D expenditures to total assets and the median ratio of PPE to total assets are highest for IPO firms with large public corporate customers, suggesting that these firms operate with high asset specificity. Similarly, compared to other types of IPO firms, IPO firms with large public customers have a higher presence in technology and relationship industries as defined by Cremers, Nair, and Peyer (2007). IPO firms with large public corporate customers also have significantly higher industry stock volatility compared to the other two groups. This is consistent with the view that IPO firms in uncertain business environments are more likely to form a durable relationship with large customers. The normalized Herfindahl indices of the three groups of IPO firms are not significantly different. Leverage ratios are also not significantly different between IPO firms without large customers and IPO firms with large public customers.

The characteristics for the sample of 230 large public corporate customers are reported in Panel C of Table II. These firms are very large with an average market capitalization of $64 billion and total assets of $47 billion. The firms are highly valued on average with a Tobin's Q of 4.76. The mean (median) ratio of customer assets to IPO firm assets is 2,020 (482) times, implying that the customers tend to be much larger than the IPO firms they purchase from. The total cost of goods sold for large customers averages $24.9 billion, with the average purchase from the IPO firms being $69.2 million. Thus, the average customer purchases only about 1% of their total cost of goods sold from the IPO firm. On the other hand, IPO firm sales to their large customer divided by total IPO firm sales averages 62%. This heavy dependency of IPO suppliers on large customers may give customers significant bargaining power over their IPO suppliers even without any formal contractual devices as observed by Blois (1972). Finally, the mean customer Herfindahl index is 0.23, implying that large public customers are on average in the highly concentrated industries.

2.4 Customer-IPO Supplier Interfirm Arrangements

Table III provides summary statistics of the various interfirm arrangements between large public customers and their IPO suppliers. We divide interfirm arrangements into two groups, financial arrangements and product market arrangements. Of several financial arrangements, post-IPO customer equity holdings in IPO firms (34 cases) and post-IPO customer preferred stock holdings in IPO firms (14 cases) are reported most frequently, followed by customer warrants and options holdings in IPO firms (13 cases) and customer loans to IPO firms (12 cases).

We also find that product market arrangements are more prevalently used mechanisms than financial arrangements in governing customer-IPO supplier relationships. For example, 153 IPO firms with large public customers have some sort of strategic alliance with suppliers, such as licensing agreements (58 cases), development agreements (42 cases), and marketing agreements (53 cases). An additional 50 IPO firms have a long-term purchasing agreement with their customers at the time of their IPO. These results suggest that large customers prefer product market arrangements to financial arrangements to create close ties with their IPO suppliers and to mitigate potential contractual frictions arising from the product market relationships. These results are also consistent with those of Blois (1972), who argues that, unlike financial investors who need significant financial ownership to exert control over a firm, large customers do not need such ownership since suppliers' heavy dependence on their large customers endows the large customers with high bargaining power.

For additional perspective, in Table III we classify interfirm arrangements by the number of arrangements between large public customers and their IPO suppliers. Only about a third of IPO firms with large public customers (72 cases) have no interfirm arrangements. Another third of IPOs (82 cases) has one interfirm arrangement. The rest (76 cases) have more than one interfirm arrangement. Thus, the majority of IPO firms with large public customers have at least one type of

interfirm arrangement to govern product market relationships with their customers.

3. Empirical Results

3.1 Relative Valuation of IPO Firms

In this section we examine the relative valuation of IPO firms in our sample. If an IPO firm has the same valuation as the comparable firm matched on industry, sales, and EBITDA/sales, then the IPO relative valuation ratio would be equal to one. However, unlike Purnanandam and Swamanathan (2004), we do not expect the value of an IPO firm to be the same as the value of a matching firm. Rather, similar to Zheng (2007), we propose that the IPO firm is quite different from any public firm it is matched to and that it should have a relative valuation above one since IPO firms tend to have a higher growth rate than matching firms. Likewise, IPO firms will soon have a large infusion of cash, enabling these firms to invest in various projects for a low cost of capital relative to a firm that is already public. Nevertheless, as long as any errors in the valuation method are orthogonal to the presence of a large customer for the IPO firm, this relative valuation method can provide a useful benchmark to estimate IPO firm valuation.

As discussed in the previous section, we consider two methods of relative firm valuation. We use the ratio of IPO firm price to EBITDA divided by the ratio of matching firm price to EBITDA as well as the ratio of IPO firm price to sales divided by the ratio of matching firm price to sales. The results are reported in Panels A and B of Table IV, respectively. Similar to Purnanandam and Swamanathan (2004), we find very highly skewed relative valuation numbers, with means far exceeding medians for both measures. Therefore, we focus on the medians of the valuation measures for interpretation of our results. The median relative valuation using the price to EBITDA measure is 2.17 for the total sample. Firms with no large customers have a median valuation of 2.05 while firms with large private and large public customers have valuations of 2.19 and 2.48,

respectively. The test of the median difference shows that IPO firms with large public customers have a statistically significant higher valuation than IPO firms without large customers. We find similar results for the valuation measure using price to sales: IPO firms with large public customers have a significantly higher valuation (3.28) compared to IPO firms with large private customers (2.34) or IPO firms without large customers (2.31). These results are consistent with the certification hypothesis.

3.2 Abnormal Announcement Returns for Large Customers on IPO Filing and Issuance Dates

In this section we examine the effect of the initial IPO S-1 filing and the issuance of stock on customer value. To assess the valuation effect of these events, we follow Brown and Warner (1980) and compute abnormal returns using a market model. We obtain market model estimates by using 255 trading days of returns data, beginning 302 trading days before and ending 46 days before the IPO supplier's S-1 filing (issuance) date. We use as the market return the CRSP equally-weighted return. We cumulate the daily abnormal return (AR) to obtain the cumulative abnormal return (CAR) from day t_1 before the IPO supplier's prospectus filing (issuance) date to day t_2 after the IPO supplier's S-1 filing (issuance) date. We use the *t*-statistic to test the hypothesis that the average CAR is equal to zero, and the Patel *z*-statistic to test the hypothesis that the CARs are distributed symmetrically around zero.

Panel A of Table V reports the CARs for the customers around the S-1 filing date. On average, shareholders of customers earn statistically significant positive gains. The average CAR (-1, 1) and CAR (-3, 3) are 0.71% and 1.06%, both of which are statistically significant at the 0.05 level. Since the average asset value of the customers is about 2,000 times that of the IPO firms, these returns seem to be both statistically and economically significant. These results, together with those in Table IV, suggest that supplier IPOs benefit not only the suppliers themselves, but also customers in

downstream markets, supporting the certification hypothesis.

Panel B of Table V presents the CARs for customers on the issuance date. The results show that the mean and median CARs are mostly small and not significant. These results suggest that the effect of a supplier IPO event on customers' market value of equity is already fully reflected on the prospectus filing date.

3.3 Determinants of IPO Valuation

To understand better the cross-sectional variation in IPO valuation, we present the estimates from multivariate regressions. The Appendix summarizes the definitions of the variables used in this and other regressions. Since the univariate results in Table IV show that the relative valuation of IPO firms is highly skewed, we use as the dependent variable log (relative valuation of IPO firms). Since the results using relative valuation based on price to EBITDA and those using relative valuation based on price to sales are qualitatively similar, we report the results based on the former measure only. Following Chemmanur and Krishnan (2007), we include the following variables as determinants of IPO firm valuation: the underwriter rank based on the rankings from Loughran and Ritter (2004) (*Underwriter rank*); the logarithm of the number of shares issued in the offering times the offer price (*Log (IPO proceeds)*); a dummy variable taking a value of one if the IPO is backed by a venture capital firm (*Venture backed*); and the percent of the offering sold in the IPO (*Fraction sold*). In addition, since we do not eliminate IPO firms with negative earnings in our sample, we include a dummy variable taking a value of one if the IPO firm had negative earnings in the year before the IPO (*Negative earnings*). Our main variable of interest is the dummy variable that takes a value of one if the IPO firm has a large customer and zero otherwise (*Large customer*). We further separate this dummy variable for large customers into a dummy variable for large public customers (*Large public customer*) and a dummy variable for large private customers (*Large private customer*).

Due to concerns about autocorrelation of residuals over time, we also include dummy variables for each year and estimate standard errors clustered by year.[14] We expect that adding year dummies also helps to control for any potential effect of the internet boom on IPO valuation as this effect is likely to be stripped out by year 1999 and 2000 dummy variables. The regression results for the total sample of 1,429 IPOs are reported in Table VI.

Model (1) contains the results of our baseline regression. We find that the major determinants of IPO firm valuation are i) whether the IPO is venture backed and ii) the percentage of the shares sold in the IPO. We also find that IPO firms with large customers have a significantly higher valuation that those without large customers. The coefficient on *large customer* is 0.292, which is significant at the 0.01 level. With a mean relative valuation of 19.02, this coefficient implies that the mean firm would increase its valuation to 25.47 if it had a large customer. This result supports the certification hypothesis.

To examine whether there is a difference in valuation between having a large private customer and having a large public customer, we separate the dummy variable for large customers in model (1) into a dummy variable for large public customers and a dummy variable for large private customers. The coefficients on these two dummy variables measure, respectively, the difference in valuation between IPO firms with large public corporate customers and IPO firms without large corporate customers, and the difference between IPO firms with large private corporate customers and IPOs without large corporate customers. The results are reported in model (2). The coefficients on both dummy variables are positive and significant at the 0.01 level, suggesting a higher valuation for IPO firms with both types of large customers

In models (3) through (10), we examine whether the valuation of IPO firms with large public

[14] Petersen (2007) provides guidance with respect to when the use of clustered standard errors might prove necessary. Our panel has some evidence of autocorrelated standard errors, although our results are quantitatively similar if we do not use the adjustment for standard errors.

customers is different across IPO firm characteristics. We divide IPOs with large public corporate customers into two subgroups according to the sample median of several key IPO firm characteristics and examine whether valuation is higher for a subgroup of IPO firms with certain characteristics. In model (3), we find that IPO firms with lower leverage that have large public customers experience higher valuation than IPO firms without large customers, but those with higher leverage that have large public customers do not. Financial leverage is of vital importance for suppliers that want to maintain durable product market relationships with their customers since low leverage reduces financial distress risk and thus allows them to utilize valuable relationships (Titman, 1984). Therefore, IPO firms will benefit more when they secure product market relationships with their customers by choosing low leverage.

Models (4) and (5) show that asset specificity is an important determinant of IPO firm valuation. We find that only IPO firms with large public corporate customers for which R&D intensity is above the sample median and those for which PPE investment is above the sample median experience significantly higher valuation than IPO firms without large corporate customers. These results strongly support the certification hypothesis.

Model (6) shows that a high percentage of an IPO firm's total sales to the large customer leads to an increase in IPO firm valuation, again supporting the certification hypothesis.

In model (7), we examine the effect of industry volatility on IPO firm valuation. We find that IPO firms with large public corporate customers for which the industry stock volatility is above the sample median have higher relative valuation than IPO firms without large corporate customers. This result suggests that when volatile business environments increase IPO uncertainty, the presence of a large public customer helps to alleviate some of the concerns arising from such uncertainty.

When the IPO firm industry has a higher Herfindahl index, synergistic gains to both large customers and their IPO suppliers are less likely to be attenuated by product market competition. As

such, the relative valuation of the IPO firm is expected to be higher. Model (8) shows that this is indeed the case.

In model (9), we find that if the IPO firm with a large public corporate customer is in a relationship industry as defined by Cremers, Nair, and Peyer (2007), it has higher valuation. To the extent that firms in relationship industries are particularly likely to value continuing business with the same customer over time, this result is also consistent with the certification hypothesis.

Model (10) shows that the IPO valuation is higher when there is a non-horizontal customer-supplier relationship, suggesting that customers and suppliers in adjacent phases of production are able to govern their relationships more effectively.

Next we examine the effect of customer firm characteristics on IPO firm valuation. In models (11) and (12), we find that IPO firms with large public corporate customers experience higher valuation when these customers have stronger abilities in certifying the quality of IPO firms (customers are larger relative to IPO suppliers or are in high Herfindahl index industries). We also find in model (13) that customers with a high abnormal return around the S-1 filing date are better in certifying the IPO firm value. In the last model, we examine the effect of durable customer-IPO supplier relationships on IPO valuation. Consistent with the certification hypothesis, we find that IPO firms with large public corporate customers for which the relationship has been maintained longer than the sample median experience higher valuation than IPO firms without large public corporate customers. These results support the certification hypothesis.

Overall, the results in Table VI show that IPO firms with large public customers have higher valuation when their large customers help alleviate IPO uncertainties and ease product market frictions faced by IPO firms. Also, the ability of large customers to certify the quality of an IPO supplier, the extent of product market synergistic gains, the prospect of durable customer-IPO supplier relationships, and the efficient governance of customer-IPO supplier relationships play an

important role in explaining the cross-sectional variation of IPO firm valuation. The results also suggest that large customers' bargaining power over their IPO suppliers is beneficial to the IPO suppliers as the certification hypothesis predicts.

Interfirm arrangements could enhance customer and supplier wealth through facilitating information flow, alleviating conflicts of interest, or synchronization of operations. In Table VII, we investigate the effect of interfirm arrangements on IPO firm valuation. Since we can examine the role of interfirm arrangements in IPO firm valuation only for the subset of IPO firms with large public customers, our tests in Table VII are conducted over this subsample. We find in models (1) through (4) that IPO firm valuation is positively related to a dummy variable for customer equity ownership in IPO firms, a dummy variable for long-term purchasing agreements, and a dummy variable for strategic alliance.[15] These results suggest that interfirm arrangements facilitate fluent information flows between large customers and their IPO suppliers and thus help align IPO firm operations with those of large customers. However, the coefficient on a dummy variable for loans from large customers is not significant, suggesting that loans do not play an important role in aligning customer and supplier operations.

To understand the sources of benefits obtained by the IPO firm from having interfirm arrangements with their large customers, we use interaction terms between the interfirm arrangements and a dummy variable for high IPO industry stock volatility. Models (5) through (8) show that the positive effect of interfirm arrangements on IPO firm valuation is particularly strong when the IPO firms are in more volatile industries, suggesting that the benefits of having interfirm arrangements are more pronounced when the IPO firm faces higher uncertainty.

[15] One concern with this result is that the higher valuation for the IPO firm with a large customer is simply the result of the IPO firm having a strategic alliance. To address this issue, we conduct our tests in Table VI after excluding IPO firms with strategic alliances. We find that IPO firm valuations are enhanced by having

3.4 Determinants of Customer Abnormal Returns

The previous section examines the factors that affect IPO firm valuation. In this section, we investigate whether some of these factors influence the abnormal returns of customers on the prospectus filing date. As the certification hypothesis suggests, if supplier IPOs create gains from product market relationships and customers can enjoy some of these gains, we expect that the factors that increase IPO valuation also play a role in increasing customer market value.

Table VIII presents the estimates from multivariate regressions using customer CAR (-3, 3) as the dependent variable.[16] In model (1), we find that customers that purchase a higher percent of their cost of goods sold from their IPO suppliers realize a higher stock price response, suggesting that customers that have greater integration with their IPO suppliers obtain more synergistic gains from the product market relationships. We also find that customers that have fewer financing alternatives, as measured by a credit rating of BBB or below, have a higher stock price response than customers that have more financing alternatives. This result indicates that customers with less access to external financing benefit more from supplier IPOs.

IPO supplier characteristics also have a significant effect on customer returns. Customer returns are higher when IPO suppliers are larger, suggesting that customers realize higher wealth gains when economic benefits that they can obtain from product market relationships are larger. In contrast, customers realize lower returns when they have relationships with firms that are expected to benefit less from their certification services, such as those that are older and those that use highly ranked underwriters. The negative relation between customer returns and underwriter ranking also suggests that, as a certifying entity, large customers play a substitute role vis-à-vis prestigious investment banks. Customer returns are also lower when IPO suppliers maintain a higher fraction of

large customers even if we eliminate these IPO firms.

[16] We use as the dependent variable the CAR (-3, 3) rather than the CAR (-1, 1) since there appears to be drift in customer stock price response around the event date.

debt in their capital structures. To the extent that highly levered suppliers have high financial distress risk, product market relationships with these suppliers can impose potential costs of unexpected interruption in the provision of production components. Thus, in this case, customers are not likely to value customer-supplier relationships highly. Similarly, when the market anticipates that IPO suppliers are likely to be delisted after the IPO, large customers experience more negative stock price responses.

In model (2), we add the ratio of PPE to total assets and the post-IPO change in the ratio of PPE to total assets for IPO firms as additional explanatory variables. We find that the coefficient on the ratio of PPE to total assets is not significant, but the coefficient on the post-IPO change in the ratio of PPE to total assets is positive and significant at the 0.05 level. This latter result suggests that IPO suppliers' future investment in relationship-specific assets is one of the important sources of customer value creation arising from supplier IPOs.

In models (3) and (4), we include the IPO firm Herfindahl index and a non-horizontal dummy variable, respectively. The coefficients on these variables are not significant.

In model (5), we add a dummy variable for durable relationships. We find that the longer the IPO supplier–customer relationship, the greater the benefit of a supplier's going public decision to the customer.

In models (6) through (9), we examine the effect of interfirm arrangements on customer returns. We find that the coefficients on product market arrangements (i.e., long-term purchasing agreements and strategic alliances) are positive and significant, but those on financial arrangements (i.e., customer equity ownership in IPO firms and customer loans to IPO firms) are not significant. When we interact these interfirm arrangements with the measure for the extent of a customer's financial constraints (i.e., leverage) in models (10) through (13), we find that the coefficients on the interaction terms between customer leverage and a dummy variable for customer equity stake in

IPO firms and between customer leverage and a dummy variable for long-term purchasing agreements are positive and significant. These results indicate that financially constrained customers obtain greater benefits from supplier IPOs when interfirm arrangements coordinate the actions of large customers and their IPO suppliers in a more efficient way. However, the effect of leverage on customer returns is statistically indistinguishable between customers with a strategic alliance (loans to IPO suppliers) and customers without a strategic alliance (loans to IPO suppliers).

3.5 IPO Firm Operating Performance

The high valuation of IPO firms with large public customers reported in Tables IV and VI could be due either to their inherent high valuation, or to their value being irrationally overpriced in the market. In this section, we examine the long-run operating performance of our IPO firms to help distinguish between these two competing views. If large customers certify the quality of IPO firms and customer-supplier relationships are able to internalize product market frictions that are costly to IPO firms, we expect that the long-run operating performance of IPO firms with large customers is better than the long-run operating performance of IPO firms without large customers. In contrast, market overvaluation suggests no difference in long-run operating performance between these two groups of IPO firms. To address this issue, we follow Gonzalez and James (2007) and examine the ratio of EBITDA to sales of the IPO firms in the year of the IPO and the three years after the IPO.

Panels A and B of Table IX report raw and Fama and French (1997) industry-adjusted ratios of EBITDA to sales for the three years following the IPOs, respectively. We use as the industry adjustment the median ratio of EBITDA to sales for firms operating in the same two-digit SIC code as the IPO firm. In Panel A, we find that in year 1, the first fiscal year-end after the IPO, IPO firms with large public customers have a significantly higher ratio of EBITDA to sales than those without large customers. However, the performance of these two groups of IPO firms in the subsequent two

years is not significantly different. In Panel B, we find that IPO firms with large public customers outperform IPO firms without large customers in years 0, 1, and 2. Thus, it appears that there is a long-term benefit to having a large public customer.

To better understand the cross-sectional variation in the industry-adjusted ratio of EBITDA to sales for the one year following the IPOs, we present the estimates from multivariate regressions and report the results in Table X.[17] We use the same explanatory variables as in Table VI except that we include a lagged value of the ratio of EBITDA to sales as an additional explanatory variable.

Overall, we find that the results are remarkably similar to those in Table VI, further supporting the certification hypothesis: key characteristics of IPOs with large public corporate customers that are positively (negatively) related to IPO valuation also have positive (negative) effects on long-run operating performance. The three exceptions are the results in models (5), (9), and (14). In these models, we find that IPO firms with lower PPE/assets, IPO firms not in a relationship industry, and IPO firms with short-term relationships with a large public customer experience a larger increase in operating performance than other types of IPO firms.

4. Robustness Tests

To check the robustness of the results, we conduct several additional tests. Below, we briefly summarize the results of these tests.

4.1 Bubble Effects

We are concerned about the inclusion of the internet bubble period in our sample since this period might disproportionately drive our results. Although we expect that the inclusion of year dummies in the previous regressions controls for the potential bubble effect on valuation, as a

[17] In untabulated tests, we also experiment with the industry-adjusted ratio of EBITDA to sales for the three

robustness test we reestimate the tests in Tables VI, VII, VIII, and X eliminating those IPOs that occur during the 1999-2000 period.[18] For Table VI, we find that the results in models (1), (3), (4), (6), (8), (11), and (13) do not change. In model (2), IPO firms with a large public corporate customer have higher valuations, but the coefficient is not significant (p-value=0.17). Similarly, in models (5), (7), (9), (10), (12), and (14), the significance of the coefficients of interest drops below the 0.10 level. This decrease in significance is not surprising, however, in that the sample size is reduced from 1,429 to 872. The regressions in Tables VII and VIII experience a very large reduction in sample size when we eliminate IPOs during the bubble period, from 230 to 121. In Table VII, many of the coefficients are no longer significant at the conventional levels; only models (5) and (8) have significant coefficients on the variables of interest. This is likely due in part to the high use of interfirm arrangements during the bubble period. In Table VIII, we find that the results are largely unchanged by eliminating the bubble period except for models (2) and (12). For Table X, we find that the coefficients on the variables of interest are still significant in models (1), (2), (3), (4), (5), (6), (9), (11), (12), (13), and (14), although in some cases the level of significance is reduced to 10% (models (2), (4), and (5)). Overall, these results suggest that the findings we document in this paper are not being driven by the bubble period and thus are not sensitive to the inclusion of the bubble period.

4.2 Endogeneity of Customer-Supplier Relationships and Propensity Score Matching

Thus far we have presumed that the customer-supplier relationship is an exogenous variable. However, if having a large customer is chosen disproportionately by IPO firms with high valuation (operating performance), or if there are other IPO firm characteristics that can predict both the IPO

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years following the IPOs and find that the results are qualitatively similar.

[18] In tests not reported here, we also perform the tests using other alternative definitions of the bubble period: 1998 to 2000 and 1998 to March 2000. We find no appreciable influence of the definition of the bubble period

firm choosing to have a large public customer and the IPO valuation (operating performance), then our estimated coefficients in the OLS regression will be inconsistent.

To control for this endogeneity problem, we use a propensity score matching technique as in Lee and Wahal (2004). They use the propensity score matching technique to control for the selection bias of IPO firms choosing whether to obtain venture backing.[19] Since we face a similar selection problem (i.e., IPO firms choose whether to have large customers) as that in Lee and Wahal (2004), we follow their approach to address the endogeneity issue. Note that we use IPO firm characteristics along multiple dimensions to ensure that each IPO firm with a large public customer is optimally matched with an IPO firm without a large customer. We first use a set of IPO firm characteristics that help predict whether the IPO firm will have a large public customer. These characteristics are then used to calculate a propensity score. We use a probit model as in Rosenbaum and Rubin (1983) and Heckman, Ichimura, and Todd (1997, 1998) and match each IPO firm with a large public customer to an IPO firm without a large public customer.[20] Next, following Lee and Wahal (2004), we use a one-to-one matching technique with replacement.

The instruments we employ for the propensity score matching technique should reliably predict the likelihood with which a firm will have a large public customer. Consistent with our earlier arguments, for instruments in our propensity matching we use a dummy for the IPO firm being in a relationship industry, the IPO firm's Herfindahl index, firm PPE/assets, R&D/assets, industry stock volatility, and a dummy for negative IPO firm earnings. Panel A of Table XI reports the results from this propensity score matching technique. Consistent with the previous results, we find that the IPO firms with large public customers have a significantly higher valuation and significantly higher

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on the robustness of our results.

[19] Other papers in the finance literature using this technique include Hellman, Lindsey, and Puri (2008), Drucker and Puri (2005), and Mikkelson and Partch (2003).

[20] We eliminate IPO firms with large private customers to simplify the matching technique. Since the focus of our paper is on the forming of relationships with large public customers, we are most concerned with why

operating performance relative to IPO firms without large customers.

4.3 Endogeneity of Customer-Supplier Relationships and Instrument Variables Approach

One drawback of the propensity score matching technique is that it does not consider omitted variable bias. If there is an unobservable variable that is correlated with the firm's propensity to have a large public customer and the firm's valuation, then the presence of a large customer is not exogenous to the firm valuation. To control for this endogeneity, we utilize a 2SLS regression using the variables from the propensity score matching technique as the instruments. The first-stage regression uses a probit model and predicts whether the IPO firm will have a large customer. The second-stage regression then uses the IPO valuation as the dependent variable and the predicted value from the first-stage regression as an instrumented variable. Thus, with this approach, the predicted value from the first-stage regression is no longer correlated with the error term of the second-stage regression, providing consistent coefficient estimates. The results are reported in Panel B of Table XI. We find that the coefficient on a dummy variable for large public corporate customers in the second-stage regression is positive and significant, suggesting that IPO firms with large public customers have higher valuations than those without large customers. This result further supports the certification hypothesis.

4.4 Selection Bias and Instrument Variables Approach

There is another potential difficulty with our earlier estimates in evaluating the IPO firm long-run operating performance. Specifically, there is a selection bias in our OLS estimates since not all IPO firms survive after the IPO. If the IPO firms with missing operating performance are disproportionately those with large customers that would have performed poorly, or if they are

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firms form relationships with large public customers as opposed to not forming any relationships.

disproportionately those without large customers that would have performed well, then there is a selection bias in our OLS estimates. To correct for this bias, we follow Heckman (1979) and report the results in Panel C of Table XI. Consistent with our earlier OLS regressions, we find that the IPO firms with large public customers have significantly higher operating performance than those without large customers, even after controlling for the selection bias.

5. Summary and Conclusions

In this paper we examine the certification role of large customers in their suppliers' IPOs. We focus on IPOs among various forms of corporate security offerings because IPOs provide an ideal setting for the study of the certification role of large customers - large customers have a high degree of access to proprietary information about their IPO suppliers. Moreover, IPO suppliers tend to operate in a highly uncertain business environment, which further enables large customers to serve a valuable certifying role vis-à-vis their IPO supplier.

We find that IPO firms with a large public customer experience higher valuation at the time of the IPO than those without a large customer. The cross-sectional regression analysis shows that for IPO firms with lower leverage, with high asset specificity, with high uncertainty, and with a high Herfindahl index, such firms with a large public customer experience higher valuation than similar IPO firms without a large customer. IPO firm valuation is also higher when customers have a stronger certifying ability, as indicated by larger size, a higher Herfindahl index, and higher announcement returns around IPO suppliers' preliminary prospectus filing dates. These results suggest that IPO firm valuation increases if product market relationships are able to alleviate IPO uncertainty or ease product market frictions, if synergistic gains from the relationships are large, or if large customers have strong certifying abilities.

We also find that IPO firm valuation is higher when product market relationships are effectively governed by interfirm arrangements such as customer equity ownership in IPO firms, long-term purchase arrangements, and strategic alliances, particularly when IPO firms face higher uncertainty in their operation.

The results are remarkably similar when we examine post-IPO long-run operating performance instead of IPO valuation.

Finally, we find that large customers realize a significant positive abnormal return of 1.06% around their supplier IPOs' preliminary prospectus filing dates, suggesting that some of the benefits arising from the product market relationships also accrue to large customers. Moreover, customer abnormal returns are higher when customers have long-term purchasing agreements or strategic alliances with their IPO suppliers.

Overall, these results strongly support the hypothesis that large customers serve as an important certifying entity that reduces their suppliers' IPO uncertainty.

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Table I
Frequency distribution of IPOs by existence of large corporate customers, by year, industry, and industrial relatedness between large corporate customers and IPO firms

The sample consists of 1,429 IPOs reported in the Securities Data Corporation (SDC) New Issues database between 1997 and 2005. All REITs, unit offerings, closed-end funds, ADRs, firms not covered by CRSP, firms that belong to either the financial services or utilities industries, and IPOs with an offer price below $5 are excluded from the sample. We use the COMPUSTAT Segment Customer database to identify whether the IPO firms have large corporate customers. A large corporate customer is defined as a customer whose sales account for more than 10% of the IPO firm's total sales. When there are multiple large corporate customers for each IPO firm, the customer that purchases the largest amount is identified as the sample customer. To determine whether a corporate customer is publicly traded or privately held, we match the names of large corporate customers in the COMPUSTAT Segment Customer database with those of all firms in COMPUSTAT.

Panel A: Total sample of IPOs by existence of large corporate customers

Total number of IPOs:	1,429
IPOs with no large corporate customers	479
IPOs with large corporate customers	950
IPOs with large private corporate customers	720
IPOs with large public corporate customers	230

Panel B: Total sample of IPOs (subsample of IPOs with large public corporate customers) by year and industry

Year	Technology Industry	Wholesale and Retail	Healthcare	Other	Total
1997	112 (28)	35 (1)	30 (3)	159 (19)	336 (51)
1998	60 (8)	23 (2)	15 (2)	69 (4)	167 (16)
1999	195 (45)	26 (1)	7 (0)	75 (4)	303 (50)
2000	173 (44)	7 (2)	30 (5)	44 (8)	254 (59)
2001	15 (2)	3 (0)	12 (1)	25 (4)	55 (7)
2002	15 (3)	7 (1)	8 (2)	16 (2)	46 (8)
2003	10 (5)	4 (1)	2 (1)	26 (2)	42 (9)
2004	34 (6)	17 (0)	32 (1)	43 (5)	126 (12)
2005	24 (6)	13 (2)	18 (4)	45 (6)	100 (18)
Total	638 (147)	135 (10)	154 (19)	502 (54)	1,429 (230)

Panel C: Subsample of IPOs with large public corporate customers by industrial relatedness between large public corporate customer and IPO firm	
Customer and IPO firm are in the same four-digit SIC codes	29 (12.7%)
Customer and IPO firm are in the same three-digit SIC codes	40 (17.4%)
Customer and IPO firm are in the same two-digit SIC codes	20 (8.7%)
Customer and IPO firm are in the same one-digit SIC code	33 (14.3%)
Customer and IPO firm are in different industries	107 (46.5%)
Total	230 (100.0%)

Table II
Sample characteristics

The sample consists of 1,429 IPOs reported in the Securities Data Corporation (SDC) New Issues database between 1997 and 2005. All REITs, unit offerings, closed-end funds, ADRs, firms not covered by CRSP, firms that belong to either the financial services or utilities industries, and IPOs with an offer price below $5 are excluded from the sample. We use the COMPUSTAT Customer Segment database to identify whether the IPO firms have large public corporate customers. A large public corporate customer is defined as a customer whose sales account for more than 10% of the IPO firm's total sales. When there are multiple large corporate customers for each IPO firm, the customer that purchases the largest amount is identified as the sample customer. To determine whether a corporate customer is publicly traded or privately held, we match the names of large corporate customers in the COMPUSTAT Segment Customer database with those of all firms in COMPUSTAT. ***, **, and * denote that the test statistics are significantly different from zero at the 0.01, 0.05, and 0.10 levels, respectively.

Panel A: Deal characteristics

	IPO firms with no large corporate customers (N=479): a		IPO firms with large private corporate customers (N=720): b		IPO firms with large public corporate customers (N=230): c		Test of difference (b – a)		Test of difference (c – a)		Test of difference (c – b)	
	Mean	Median	Mean	Median	Mean	Median	*t*-test	Wilcoxon z-test	*t*-test	Wilcoxon z-test	*t*-test	Wilcoxon z-test
IPO proceeds ($ millions)	146.5	63.0	95.7	50.0	96.0	54.3	2.62**	4.40***	1.69*	2.18**	0.01	1.44
							(0.01)	(0.00)	(0.09)	(0.03)	(0.50)	(0.15)
Underwriter rank	7.87	9	7.69	8	7.87	8	1.77*	2.14**	0.00	0.93	1.37	0.73
							(0.07)	(0.03)	(0.50)	(0.35)	(0.17)	(0.46)
Percent of equity sold	29.62%	24.35%	31.29%	26.73%	25.19%	22.15%	1.43	2.45**	2.96**	2.47**	4.31***	4.68***
							(0.15)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)
Percent of firms with venture capital backing	49.48%	–	43.79%	–	53.04%	–	1.95*	–	0.89	–	2.47**	–
							(0.05)		(0.19)		(0.01)	

Panel B: IPO firm characteristics

	IPO firms with no large corporate customers (N=479): a		IPO firms with large private corporate customers (N=720): b		IPO firms with large public corporate customers (N=230): c		Test of difference (b – a)		Test of difference (c – a)		Test of difference (c – b)	
	Mean	Median	Mean	Median	Mean	Median	*t*-test	Wilcoxon z-test	*t*-test	Wilcoxon z-test	*t*-test	Wilcoxon z-test
Market capitalization ($ millions)	871	333	656	223	851	374	1.92* (0.06)	4.76*** (0.00)	0.12 (0.45)	0.70 (0.49)	1.49 (0.12)	4.30*** (0.00)
Total assets ($ millions)	2,125	135	541	95	327	101	2.31** (0.03)	4.70*** (0.00)	1.55 (0.12)	2.72** (0.01)	0.76 (0.22)	1.18 (0.24)
Total sales ($ millions)	494	34	208	29	258	31	3.16*** (0.00)	0.88 (0.38)	1.50 (0.12)	0.39 (0.69)	0.80 (0.21)	0.47 (0.64)
Earnings / total assets	0.0636	0.0000	0.0695	0.0156	0.0904	0.0582	0.81 (0.42)	2.31** (0.02)	2.87*** (0.00)	5.39*** (0.00)	2.17** (0.03)	4.03*** (0.00)
Percent of firms with negative earnings	46.56%	–	40.28%	–	40.43%	–	2.15** (0.03)	–	1.53 (0.12)	–	0.04 (0.48)	–
Research and development / total assets	0.1941	0.0052	0.1669	0.0219	0.2091	0.1035	0.58 (0.55)	1.46 (0.14)	0.19 (0.42)	4.89*** (0.00)	1.71* (0.09)	4.01*** (0.00)
Property, plant, and equipment / total assets	0.1826	0.1134	0.2123	0.1366	0.1851	0.1389	2.52** (0.01)	3.42*** (0.00)	0.17 (0.43)	2.14** (0.03)	1.84* (0.06)	0.53 (0.60)
Leverage ratio (total debt / total assets)	0.3310	0.1929	0.4189	0.3667	0.3347	0.2005	4.14*** (0.00)	4.06*** (0.00)	0.13 (0.45)	0.45 (0.65)	3.08*** (0.00)	2.77** (0.01)
Percent of technology firms	33.19%	–	42.22%	–	53.48%	–	3.15*** (0.00)	–	5.26*** (0.00)	–	3.00*** (0.00)	–
Industry monthly stock volatility	19.82%	19.31%	20.25%	18.99%	22.42%	22.27%	1.05 (0.15)	1.16 (0.25)	4.61*** (0.00)	4.36*** (0.00)	4.33*** (0.00)	4.24*** (0.00)
Percent of public firms in IPO industry with large customers	36.03%	43.73%	41.55%	43.73%	49.94%	48.69%	5.98*** (0.00)	4.29*** (0.00)	11.53*** (0.00)	10.19*** (0.00)	8.12*** (0.00)	7.80*** (0.00)
Herfindahl index	0.1959	0.1336	0.1886	0.1459	0.2056	0.1762	0.80 (0.42)	0.39 (0.69)	0.78 (0.42)	1.15 (0.25)	1.51 (0.12)	1.79* (0.07)
Percent of IPO firms in relationship industry	34.86%	–	42.08%	–	47.39%	–	2.51** (0.01)	–	3.22*** (0.00)	–	1.41 (0.14)	–

Panel C: Large public corporate customer characteristics (N=230)		
	Mean	Median
Market capitalization ($ billions)	63.5	32.6
Total assets ($ billions)	46.9	21.9
Tobin's Q	4.76	1.24
Customer assets / IPO firm assets (times)	2,020	482
Cost of goods sold ($ millions)	24,900	13,200
Purchase from IPO firm ($ millions)	69.2	11.6
Percent of customer cost of goods sold from IPO firm (%)	0.92	0.04
Purchases from IPO firm / IPO firm sales (%)	62.37	57.16
Customer Herfindahl index	0.2261	0.1953

Table III
Interfirm arrangements between IPO firms and large public corporate customers

The sample consists of 230 IPOs in which IPO firms have large corporate customers that are publicly traded at the time of the preliminary prospectus filing (S-1) date of the IPO between 1997 and 2005. All REITs, unit offerings, closed-end funds, ADRs, firms not covered by CRSP, firms that belong to either the financial services or utilities industries, and IPOs with an offer price below $5 are excluded from the sample. We use the COMPUSTAT Customer Segment database to identify whether the IPO firms have large corporate customers. A large corporate customer is defined as a customer whose sales account for more than 10% of the IPO firm's total sales. When there are multiple large corporate customers for each IPO firm, the customer that purchases the largest amount is identified as the sample customer. To determine whether a corporate customer is publicly traded or privately held, we match the names of large corporate customers in the COMPUSTAT Segment Customer database with those of all firms in COMPUSTAT.

	Sample size	Percent of sample (%)
Financial arrangements		
Equity in IPO held by customer	34	14.7
Post-IPO preferred stock holdings in IPO firm by customer	14	6.09
Warrants / options holdings in IPO firm by customer	13	5.65
Loan from customer	12	5.22
Product market arrangements		
Long-term purchasing agreement	50	21.74
Strategic alliance	153	66.52
Licensing agreement	58	25.22
Development agreement	42	18.26
Marketing agreement	53	23.04
IPO firm is a preferred supplier of customer	7	3.04
Frequency of arrangements		
Firms with no interfirm arrangement	72	31.30
Firms with one interfirm arrangement	82	35.65
Firms with two interfirm arrangements	44	19.13
Firms with three interfirm arrangements	13	5.65
Firm with four or more interfirm arrangements	19	8.20

Table IV
Relative valuation of IPO firms

The sample consists of 1,429 IPOs reported in the Securities Data Corporation (SDC) New Issues database between 1997 and 2005. All REITs, unit offerings, closed-end funds, ADRs, firms not covered by CRSP, firms that belong to either the financial services or utilities industries, IPOs with an offer price below $5, and IPOs without earning or sales data in the year before the IPO are excluded from the sample. We use the COMPUSTAT Segment Customer database to identify whether the IPO firms have large corporate customers. A large corporate customer is defined as a customer whose sales account for more than 10% of the IPO firm's total sales. When there are multiple large corporate customers for each IPO firm, the customer that purchases the largest amount is identified as the sample customer. To determine whether a corporate customer is publicly traded or privately held, we match the names of large corporate customers in the COMPUSTAT Segment Customer database with those of all firms in COMPUSTAT. In Panel A (B), IPO firm offer value / matching firm value is the ratio of shares outstanding times the offer price to EBITDA (sales) for the IPO firm divided by the ratio of market capitalization to EBITDA (sales) for a matching firm. The matching firms are selected based on sorting the Fama and French (1997) industry into three portfolios based on sales in the year before the IPO. These portfolios are then sorted into three additional portfolios based on EBITDA/sales, ultimately producing a matrix of 3x3 portfolios for each industry. Then within each portfolio, the firm with sales closest to the IPO firm is considered as the matching firm. ***, **, and * denote that the differences are significantly different from zero at the 0.01, 0.05, and 0.10 levels, respectively.

Panel A. IPO firm offer value / matching firm value (using EBITDA)

	Sample size	Mean (*t*-statistics)	25th percentile	Median (*z*-statistics)	75th percentile
Total sample of IPOs	1,429	19.02	0.83	2.17	6.65
IPOs with no large corporate customers: a	479	16.40	0.75	2.05	6.54
IPOs with large private customers: b	720	19.98	0.84	2.19	6.64
IPOs with large public customers: c	230	21.46	0.98	2.48	7.49
Test of difference (b - a)		3.58		0.14	
		(1.31)		(0.66)	
Test of difference (c - a)		5.06		0.43	
		(1.33)		(1.93)**	
Test of difference (c – b)		1.48		0.29	
		(1.07)		(1.52)	

Panel B. IPO firm offer value / matching firm value (using sales)

	Sample size	Mean (*t*-statistics)	25th percentile	Median (*z*-statistics)	75th percentile
Total sample of IPOs	1,429	28.79	0.88	2.48	8.02
IPOs with no large corporate customers: a	479	43.94	0.85	2.31	8.20
IPOs with large private customers: b	720	23.93	0.85	2.34	7.60
IPOs with large public customers: c	230	12.43	1.11	3.28	8.45
Test of difference (b - a)		-20.01		0.03	
		(0.50)		(0.36)	
Test of difference (c - a)		-31.51		0.97	
		(0.73)		(1.72)*	
Test of difference (c – b)		-11.50		0.94	
		(0.15)		(2.16)**	

Table V
Cumulative abnormal returns (CARs) for large public corporate customers around the preliminary prospectus filing date (S-1) and issuance date of IPOs

The sample consists of 230 IPOs in which the IPO firms have large corporate customers that are publicly traded at the time of the preliminary prospectus filing (S-1) of the IPO between 1997 and 2005. All REITs, unit offerings, closed-end funds, ADRs, firms not covered by CRSP, firms that belong to either the financial services or utilities industries, and IPOs with an offer price below $5 are excluded from the sample. We use the COMPUSTAT Customer Segment database to identify whether the IPO firms have large corporate customers. A large corporate customer is defined as a customer whose sales account for more than 10% of the IPO firm's total sales. When there are multiple large corporate customers for each IPO firm, the customer that purchases the largest amount is identified as the sample customer. To determine whether a corporate customer is publicly traded or privately held, we match the names of large corporate customers in the COMPUSTAT Segment Customer database with those of all firms in COMPUSTAT. Abnormal returns are computed using the market model. We use the CRSP equally-weighted index as the market return. ***, **, and * denote that the test statistics are significantly different from zero at the 0.01, 0.05, and 0.10 levels, respectively.

Panel A: Abnormal returns for large public corporate customers around the preliminary prospectus filing date (AD) of the IPO

Event window	Mean	*t*-test (*p*-value)	Median	Patel *z*-test (*p*-value)
AD-1	0.23%	1.13 (0.26)	0.09%	0.63 (0.52)
AD	0.36%	1.78* (0.08)	-0.03%	1.74* (0.08)
AD+1	0.12%	0.60 (0.55)	-0.09%	0.65 (0.51)
AD-1 to AD+1	0.71%	2.03** (0.04)	0.09%	1.75* (0.08)
AD-3 to AD+3	1.06%	1.98** (0.05)	0.30%	1.81* (0.07)

Panel B: Abnormal returns for large public corporate customers around the issuance date (ID)of the IPO

Event window	Mean	*t*-test (*p*-value)	Median	Patel *z*-test (*p*-value)
ID-1	0.09%	0.45 (0.65)	0.09%	1.07 (0.28)
ID	0.23%	1.15 (0.24)	-0.09%	0.31 (0.75)
ID+1	0.15%	0.77 (0.44)	-0.03%	1.03 (0.30)
ID-1 to ID+1	0.47%	1.37 (0.17)	0.14%	1.40 (0.16)
ID-3 to ID+3	0.83%	1.58 (0.11)	0.33%	1.95* (0.06)

Table VI
Multivariate regression of IPO relative valuation on explanatory variables

The sample consists of 1,429 IPOs reported in the Securities Data Corporation (SDC) New Issues database between 1997 and 2005. All REITs, unit offerings, closed-end funds, ADRs, firms not covered by CRSP, firms that belong to either the financial services or utilities industries, IPOs with an offer price below $5, and IPOs without earning or sales data in the year before the IPO are excluded from the sample. We use the COMPUSTAT Segment Customer database to identify whether the IPO firms have large corporate customers. A large corporate customer is defined as a customer whose sales account for more than 10% of the IPO firm's total sales. When there are multiple large corporate customers for each IPO firm, the customer that purchases the largest amount is identified as the sample customer. To determine whether a corporate customer is publicly traded or privately held, we match the names of large corporate customers in the COMPUSTAT Segment Customer database with those of all firms in COMPUSTAT. The dependent variable is the ratio of IPO firm offer value to matching firm value. IPO firm offer value / matching firm value is the ratio of shares outstanding times the offer price to EBITDA for the IPO firm divided by the ratio of market capitalization to EBITDA for a matching firm. The matching firms are selected based on sorting the Fama and French (1997) industry into three portfolios based on sales in the year before the IPO. These portfolios are then sorted into three additional portfolios based on EBITDA/sales, ultimately producing a matrix of 3x3 portfolios for each industry. Then within each portfolio, the firm with sales closest to the IPO firm is considered as the matching firm. The regression includes dummy variables for each year. White heteroskedasticity-consistent standard errors clustered by year are reported below the regression coefficients. ***, **, and * denote the significance of the parameter estimates at the 0.01, 0.05, and 0.10 levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Underwriter rank	-0.059	-0.057	-0.056	-0.059	-0.057	-0.057	-0.058	-0.058	-0.056
	(0.036)	(0.035)	(0.035)	(0.036)	(0.035)	(0.035)	(0.035)	(0.034)	(0.035)
Log (IPO proceeds)	0.134	0.115	0.117	0.117	0.114	0.114	0.116	0.119	0.115
	(0.101)	(0.092)	(0.094)	(0.093)	(0.091)	(0.094)	(0.091)	(0.090)	(0.092)
Venture capital backed (dummy)	0.436***	0.389**	0.381**	0.389**	0.391**	0.385**	0.391***	0.395**	0.392***
	(0.121)	(0.117)	(0.115)	(0.120)	(0.120)	(0.115)	(0.112)	(0.119)	(0.115)
Fraction sold	-0.477***	-0.486***	-0.484***	-0.493***	-0.489***	-0.486***	-0.483***	-0.492***	-0.482***
	(0.067)	(0.054)	(0.053)	(0.057)	(0.054)	(0.055)	(0.055)	(0.058)	(0.051)
Negative earnings (dummy)	0.458	0.378	0.366	0.364	0.375	0.358	0.373	0.375	0.286
	(0.264)	(0.231)	(0.229)	(0.225)	(0.231)	(0.232)	(0.231)	(0.228)	(0.080)
Large customer (dummy)	0.292**								
	(0.087)								
Large public customer (dummy)		0.309***							
		(0.076)							
Large private customer (dummy)		0.284***	0.267***	0.261***	0.266***	0.289***	0.270***	0.265***	0.384***
		(0.079)	(0.073)	(0.073)	(0.076)	(0.081)	(0.078)	(0.075)	(0.231)
Characteristics of IPO firms with large public corporate customers									
High leverage IPO (dummy)			0.013						
			(0.181)						
Low leverage IPO (dummy)			0.472***						
			(0.110)						
High R&D / assets IPO (dummy)				0.348***					
				(0.073)					
Low R&D / assets IPO (dummy)				0.131					
				(0.292)					
High PPE / assets IPO (dummy)					0.295**				
					(0.107)				
Low PPE / assets IPO (dummy)					0.231*				
					(0.122)				
High percent of sales IPO (dummy)						0.453***			
						(0.091)			
Low percent of sales IPO (dummy)						0.029			
						(0.206)			
High industry stock volatility IPO (dummy)							0.529***		
							(0.095)		
Low industry stock volatility IPO (dummy)							0.082		
							(0.138)		
High Herfindahl index IPO (dummy)								0.407***	
								(0.066)	
Low Herfindahl index IPO (dummy)								0.107	
								(0.200)	
IPO in relationship industry (dummy)									0.443*
									(0.207)
IPO not in relationship industry (dummy)									0.192
									(0.158)

Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample size	1,429	1,429	1,429	1,429	1,429	1,429	1,429	1,429	1,429
Adjusted-R^2	12.49	12.45	12.68	12.49	12.37	12.62	12.69	12.56	12.54

	(10)	(11)	(12)	(13)	(14)
Underwriter rank	-0.058	-0.056	-0.057	-0.056	-0.057
	(0.035)	(0.034)	(0.035)	(0.034)	(0.035)
Log (IPO Proceeds)	0.117	0.121	0.115	0.113	0.115
	(0.093)	(0.096)	(0.092)	(0.092)	(0.092)
Venture capital backed (dummy)	0.389**	0.380***	0.388	0.390***	0.390**
	(0.116)	(0.112)	(0.120)	(0.115)	(0.117)
Fraction sold	-0.488***	-0.497***	-0.488	-0.487***	-0.486***
	(0.054)	(0.055)	(0.058)	(0.053)	(0.053)
Negative earnings (dummy)	0.283	0.367	0.285	0.380	0.380
	(0.078)	(0.240)	(0.079)	(0.228)	(0.229)
Large customer (dummy)					
Large public customer (dummy)					
Large private customer (dummy)	0.377***	0.276***	0.377	0.265***	0.281***
	(0.231)	(0.070)	(0.231)	(0.076)	(0.082)
Characteristics of IPO firms with large public corporate customers					
Non-horizontal public customer (dummy)	0.390**				
	(0.141)				
Horizontal public customer (dummy)	0.182				
	(0.227)				
Large public corporate customer characteristics					
High customer assets / IPO assets (dummy)		0.555***			
		(0.164)			
Low customer assets / IPO assets (dummy)		-0.016			
		(0.188)			
High Herfindahl index customer (dummy)			0.338**		
			(0.113)		
Low Herfindahl index customer (dummy)			0.279		
			(0.157)		
High customer S-1 CARs (-3, 3) (dummy)				0.378**	
				(0.142)	
Low customer S-1CARs (-3, 3) (dummy)				0.148	
				(0.159)	
Durable relationship characteristics					
Long-term relationship (dummy)					0.339**
					(0.146)
Short-term relationship (dummy)					0.272**
					(0.072)
Year dummies	Yes	Yes	Yes	Yes	Yes
Sample size	1,429	1,429	1,429	1,429	1,429
Adjusted-R^2	12.51	12.85	12.45	12.44	12.46

Table VII
Multivariate regression of IPO relative valuation on interfirm arrangement variables

The sample consists of 230 IPOs in which IPO firms have large corporate customers that are publicly traded at the time of the preliminary prospectus filing (S-1) date of the IPO between 1997 and 2005. All REITs, unit offerings, closed-end funds, ADRs, firms not covered by CRSP, firms that belong to either the financial services or utilities industries, IPOs with an offer price below $5, and IPOs without earning or sales data in the year before the IPO are excluded from the sample. We use the COMPUSTAT Segment Customer database to identify whether the IPO firms have large corporate customers. A large corporate customer is defined as a customer whose sales account for more than 10% of the IPO firm's total sales. When there are multiple large corporate customers for each IPO firm, the customer that purchases the largest amount is identified as the sample customer. To determine whether a corporate customer is publicly traded or privately held, we match the names of large corporate customers in the COMPUSTAT Segment Customer database with those of all firms in COMPUSTAT. The dependent variable is the ratio of IPO firm offer value to matching firm value. IPO firm offer value / matching firm value is the ratio of shares outstanding times the offer price to EBITDA for the IPO firm divided by the ratio of market capitalization to EBITDA for a matching firm. The matching firms are selected based on sorting the Fama and French (1997) industry into three portfolios based on sales in the year before the IPO. These portfolios are then sorted into three additional portfolios based on EBITDA/sales, ultimately producing a matrix of 3x3 portfolios for each industry. Then within each portfolio, the firm with sales closest to the IPO firm is considered as the matching firm. The regression includes dummy variables for each year and the Fama and French (1997) industry of the IPO firm. White heteroskedasticity-consistent standard errors clustered by year are reported below the regression coefficients. ***, **, and * denote the significance of the parameter estimates at the 0.01, 0.05, and 0.10 levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Underwriter rank	-0.007	-0.019	0.029	0.014	-0.010	-0.031	0.028	0.005
	(0.046)	(0.048)	(0.063)	(0.068)	(0.042)	(0.047)	(0.063)	(0.063)
Log (IPO proceeds)	-0.176	-0.156	-0.188	-0.130	-0.178	-0.172	-0.187	-0.136
	(0.114)	(0.120)	(0.115)	(0.148)	(0.105)	(0.103)	(0.115)	(0.137)
Venture capital backed (dummy)	0.483	0.483	0.446	0.424	0.510	0.492	0.448	0.414
	(0.282)	(0.275)	(0.260)	(0.240)	(0.294)	(0.281)	(0.263)	(0.240)
Fraction sold	-0.384***	-0.366***	-0.230	-0.218	-0.388***	-0.394**	-0.241	-0.253
	(0.076)	(0.080)	(0.133)	(0.139)	(0.073)	(0.097)	(0.137)	(0.140)
Negative earnings (dummy)	-0.045	-0.015	0.077	0.103	-0.021	0.006	0.083	0.135
	(0.525)	(0.507)	(0.452)	(0.488)	(0.562)	(0.540)	(0.461)	(0.503)
Characteristics of IPO firms with large public corporate customers								
IPO firm leverage	-0.157	-0.157	-0.237	-0.257	-0.216	-0.099	-0.211	-0.231
	(0.274)	(0.286)	(0.263)	(0.243)	(0.272)	(0.291)	(0.254)	(0.244)
IPO in relationship industry (dummy)	0.320	0.308	0.249	0.278	0.305	0.285	0.241	0.227
	(0.341)	(0.360)	(0.339)	(0.329)	(0.348)	(0.366)	(0.335)	(0.313)
High industry stock volatility IPO (dummy): a	0.168	0.233	0.530	0.512	0.039	-0.011	0.382	0.449
	(0.368)	(0.336)	(0.380)	(0.379)	(0.368)	(0.359)	(0.417)	(0.388)
Large public corporate customer characteristics								
Customer leverage	1.035***	0.945**	0.931**	0.995***	0.977***	0.802***	0.903**	0.876***
	(0.262)	(0.309)	(0.344)	(0.291)	(0.270)	(0.337)	(0.334)	(0.260)
Customer with investment credit rating (dummy)	-0.099	-0.098	-0.077	-0.066	-0.080	-0.116	-0.076	-0.097
	(0.222)	(0.199)	(0.223)	(0.217)	(0.206)	(0.199)	(0.220)	(0.209)
Interfirm characteristics								
Equity ownership in IPO firm by customer (dummy): b	0.483*				-0.259			
	(0.236)				(0.336)			
Long term purchasing agreement (dummy): c		0.424**				-0.096		
		(0.179)				(0.146)		
Strategic alliance (dummy): d			0.369*				0.266	
			(0.188)				(0.227)	
Loan from customer (dummy): e				-0.528				-1.256*
				(0.598)				(0.586)
a * b					1.097***			
					(0.324)			
a * c						1.117***		
						(0.265)		
a * d							0.205	
							(0.252)	
a * e								1.438*
								(0.752)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample size	230	230	230	230	230	230	230	230
Adjusted-R^2	20.48	20.58	19.86	19.50	22.58	21.23	21.83	20.29

Table VIII
Multivariate regression of cumulative abnormal returns (CARs) for large public corporate customers around IPO preliminary prospectus filing (S-1) date on explanatory variables

The sample consists of 230 IPOs in which IPO firms have large corporate customers that are publicly traded at the time of the preliminary prospectus filing (S-1) date of the IPO between 1997 and 2005. All REITs, unit offerings, closed-end funds, ADRs, firms not covered by CRSP, firms that belong to either the financial services or utilities industries, and IPOs with an offer price below $5 are excluded from the sample. We use the COMPUSTAT Customer Segment database to identify whether the IPO firms have large public corporate customers. A large public corporate customer is defined as a customer whose sales account for more than 10% of the IPO firm's total sales. When there are multiple large corporate customers for each IPO firm, the customer that purchases the largest amount is identified as the sample customer. To determine whether a corporate customer is publicly traded or privately held, we match the names of large corporate customers in the COMPUSTAT Segment Customer database with those of all firms in COMPUSTAT. Abnormal returns are computed using the market model. We use the CRSP equally-weighted index as the market return. The dependent variable is the CAR (-3, 3). ***, **, and * denote that the test statistics are significantly different from zero at the 0.01, 0.05, and 0.10 levels, respectively.

	(1)	(2)	(3)	(4)	(5)
Large public corporate customer characteristics					
Log (customer market capitalization)	0.005**	0.006	0.005**	0.005**	0.005**
	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)
Purchases from IPO firm / customer total cost of goods sold	29.246*	25.222*	29.423*	28.135*	28.465*
	(13.434)	(13.227)	(13.409)	(13.771)	(13.722)
Customer leverage	3.478**	3.530**	3.565***	3.544**	3.136**
	(1.098)	(1.399)	(1.028)	(1.075)	(1.059)
Customer with investment credit rating (dummy)	-2.658*	-2.404**	-2.722**	-2.723**	-2.581**
	(1.160)	(0.984)	(1.145)	(1.159)	(1.100)
Characteristics of IPO firms with large public corporate customers					
Log (IPO supplier assets)	0.561***	0.669*	0.486**	0.490**	0.413**
	(0.163)	(0.293)	(0.179)	(0.173)	(0.172)
Underwriter rank	-0.426*	-0.389*	-0.387*	-0.380*	-0.357*
	(0.180)	(0.195)	(0.182)	(0.184)	(0.179)
IPO firm leverage	-2.126***	-2.779***	-2.223***	-2.113***	-2.311***
	(0.527)	(0.670)	(0.591)	(0.624)	(0.610)
Delisting of IPO firms within 3 years of IPO (dummy)	-1.938***	-0.248	-1.790***	-1.822***	-1.578***
	(0.443)	(1.217)	(0.423)	(0.395)	(0.362)
Log (1+IPO firm age)	-0.387*				
	(0.211)				
IPO firm PPE / assets		-0.787			
		(2.357)			
Change in IPO firm PPE / assets		1.009**			
		(0.434)			
IPO firm Herfindahl index			-1.931		
			(3.698)		
Non-horizontal public customer (dummy)				-0.835	
				(0.552)	
Durable relationship characteristics					
Long-term relationship (dummy)					1.444*
					(0.659)
Year Dummies	Yes	Yes	Yes	Yes	Yes
Sample size	230	230	230	230	230
Adjusted-R^2	9.82	10.17	9.81	9.86	10.16

	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Large public corporate customer characteristics								
Log (customer market capitalization)	0.005**	0.005**	0.005**	0.005**	0.007**	0.004*	0.003	0.006**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)
Purchases from IPO firm / customer total cost of goods sold	31.022**	29.551*	27.955*	32.181*	32.178*	29.813*	23.306	32.972**
	(13.156)	(13.702)	(13.434)	(14.144)	(14.640)	(13.287)	(13.997)	(13.986)
Customer leverage: a	3.369**	3.507**	3.183**	3.475**	0.919	0.364	2.392*	4.087**
	(1.261)	(1.084)	(1.166)	(1.044)	(1.698)	(1.835)	(1.241)	(1.333)
Customer with investment credit rating (dummy)	-2.657**	-2.728**	-2.658**	-2.595*	-2.603**	-2.411*	1.083	-2.622**
	(1.094)	(1.156)	(1.148)	(1.133)	(0.939)	(1.067)	(1.310)	(1.134)
Characteristics of IPO firms with large public corporate customers								
Log (IPO supplier total assets)	0.451**	0.490**	0.477**	0.497**	0.420*	0.526**	0.456**	0.566**
	(0.176)	(0.195)	(0.172)	(0.182)	(0.188)	(0.206)	(0.170)	(0.175)
Underwriter rank	-0.392**	-0.397*	-0.366*	-0.398*	-0.522**	-0.400*	-0.338	-0.408*
	(0.184)	(0.197)	(0.191)	(0.187)	(0.163)	(0.194)	(0.184)	(0.188)
IPO firm leverage	-2.406***	-2.065**	-2.237***	-2.258***	-1.783*	-2.463***	-2.236**	-2.384***
	(0.580)	(0.616)	(0.647)	(0.607)	(0.789)	(0.508)	(0.684)	(0.707)
Delisting of IPO firms within 3 years of IPO (dummy)	-1.727***	-1.731***	-1.633***	-1.782***	-1.939**	-1.988***	-1.771***	-1.736***
	(0.340)	(0.439)	(0.368)	(0.410)	(0.654)	(0.460)	(0.429)	(0.447)
Interfirm characteristics								
Equity ownership in IPO firm by customer (dummy): b	-0.983				-9.101**			
	(1.515)				(3.459)			
Long-term purchasing agreement (dummy): c		0.980*				-3.827		
		(0.466)				(2.816)		
Strategic alliance (dummy): d			1.125**				4.658*	
			(0.484)				(2.163)	
Loan from customer (dummy): e				-1.245				2.568
				(1.322)				(1.518)
a * b					22.104***			
					(6.262)			
a * c						11.281*		
						(5.937)		
a* d							-5.443*	
							(2.761)	
a*e								-10.746
								(6.409)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample size	230	230	230	230	230	230	230	230
Adjusted-R^2	9.86	9.93	10.02	9.79	12.99	11.64	12.41	10.12

Table IX
Tests of differences in post-IPO operating performance (EBITDA/sales) for IPO firms

The sample consists of 1,429 IPOs reported in the Securities Data Corporation (SDC) New Issues database between 1997 and 2005. All REITs, unit offerings, closed-end funds, ADRs, firms not covered by CRSP, firms that belong to either the financial services or utilities industries, IPOs with an offer price below $5, and IPOs without earning or sales data in the year before the IPO are excluded from the sample. We use the COMPUSTAT Segment Customer database to identify whether the IPO firms have large corporate customers. A large corporate customer is defined as a customer whose sales account for more than 10% of the IPO firm's total sales. When there are multiple large corporate customers for each IPO firm, the customer that purchases the largest amount is identified as the sample customer. To determine whether a corporate customer is publicly traded or privately held, we match the names of large corporate customers in the COMPUSTAT Segment Customer database with those of all firms in COMPUSTAT. Year 0 refers to the fiscal year prior to the IPO. Industry-adjusted operating performance is measured by subtracting the industry median EBITDA / sales from the IPO firm EBITDA / sales. Industry is defined as in Fama and French (1997). ***, **, and * denote that the test statistics are significantly different from zero at the 0.01, 0.05, and 0.10 levels, respectively.

Panel A. Operating performance

	IPO firms without large corporate customers: a		IPO firms with large private corporate customers: b		IPO firms with large public corporate customers: c		Test of difference Wilcoxon z-test	Test of difference Wilcoxon z-test	Test of difference Wilcoxon z-test
	Median	Sample size	Median	Sample size	Median	Sample size	(b-a)	(c-a)	(c-b)
Year 0	0.0428	479	0.0606	720	0.0580	230	2.01**	1.22	0.29
Year 1	0.0617	441	0.0723	708	0.0746	226	2.18**	1.88*	0.21
Year 2	0.0597	383	0.0611	650	0.0406	212	0.50	0.18	0.27
Year 3	0.0435	306	0.0413	539	0.0304	172	0.62	0.06	0.48

Panel B. Industry-adjusted operating performance

	IPO firms without large corporate customers: a		IPO firms with large private corporate customers: b		IPO firms with large public corporate customers: c		Test of difference Wilcoxon z-test	Test of difference Wilcoxon z-test	Test of difference Wilcoxon z-test
	Median	Sample size	Median	Sample size	Median	Sample size	(b-a)	(c-a)	(c-b)
Year 0	-0.0324	479	-0.0160**	720	-0.0090**	230	2.07**	2.18**	0.76
Year 1	-0.0241	441	-0.0000**	708	0.0232***	226	2.36**	3.00***	1.41
Year 2	-0.0124	383	-0.0068	650	0.0164**	212	1.15	1.95**	1.10
Year 3	-0.0366	306	-0.0095	539	-0.0010	172	1.43	1.57	0.47

Table X
Multivariate regression of post-IPO operating performance of IPO firms on explanatory variables

The sample consists of 1,429 IPOs reported in the Securities Data Corporation (SDC) New Issues database between 1997 and 2005. All REITs, unit offerings, closed-end funds, ADRs, firms not covered by CRSP, firms that belong to either the financial services or utilities industries, IPOs with an offer price below $5, and IPOs without earning or sales data in the year before the IPO are excluded from the sample. We use the COMPUSTAT Segment Customer database to identify whether the IPO firms have large corporate customers. A large corporate customer is defined as a customer whose sales account for more than 10% of the IPO firm's total sales. When there are multiple large corporate customers for each IPO firm, the customer that purchases the largest amount is identified as the sample customer. To determine whether a corporate customer is publicly traded or privately held, we match the names of large corporate customers in the COMPUSTAT Segment Customer database with those of all firms in COMPUSTAT. The dependent variable is the industry-adjusted operating performance, which is measured by subtracting the industry median EBITDA / sales in year 1 from the IPO firm EBITDA / sales in year 1. Year 0 refers to the fiscal year prior to the IPO. Industry is defined as in Fama and French (1997). ***, **, and * denote that the test statistics are significantly different from zero at the 0.01, 0.05, and 0.10 levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Pre-IPO EBITDA / sales	0.406***	0.406***	0.406***	0.406**	0.406**	0.406***	0.406**	0.406***	0.406***
	(0.064)	(0.064)	(0.064)	(0.064)	(0.064)	(0.064)	(0.064)	(0.064)	(0.064)
Underwriter rank	0.185	0.186	0.187	0.178	0.188	0.187	0.186	0.184	0.183
	(0.141)	(0.139)	(0.139)	(0.140)	(0.135)	(0.137)	(0.140)	(0.141)	(0.141)
Log (IPO proceeds)	0.404*	0.406*	0.409*	0.415*	0.418*	0.402*	0.407*	0.408*	0.407*
	(0.201)	(0.203)	(0.206)	(0.200)	(0.211)	(0.196)	(0.203)	(0.205)	(0.208)
Venture capital backed (dummy)	0.229	0.223	0.211	0.225	0.201	0.211	0.225	0.230	0.210
	(0.750)	(0.748)	(0.747)	(0.746)	(0.753)	(0.754)	(0.751)	(0.746)	(0.759)
Fraction sold	-0.444	-0.431	-0.430	-0.458	-0.447	-0.432	-0.430	-0.439	-0.452
	(0.367)	(0.341)	(0.334)	(0.359)	(0.337)	(0.336)	(0.337)	(0.363)	(0.371)
Negative earnings (dummy)	-0.662	-0.648	-0.667	-0.711	-0.654	-0.709	-0.651	-0.663	-0.671
	(0.937)	(0.956)	(0.942)	(0.912)	(0.965)	(0.916)	(0.951)	(0.952)	(0.926)
Large customer (dummy)	0.934**								
	(0.283)								
Large public customer (dummy)		1.094***							
		(0.262)							
Large private customer (dummy)		0.878**	0.843*	0.784	0.844*	0.906**	0.869*	0.787	0.870*
		(0.374)	(0.378)	(0.448)	(0.384)	(0.358)	(0.391)	(0.433)	(0.382)
Characteristics of IPO firms with large public corporate customers									
High leverage IPO (dummy)			0.639						
			(0.396)						
Low leverage IPO (dummy)			1.320**						
			(0.449)						
High R&D / assets IPO (dummy)				1.270***					
				(0.247)					
Low R&D / assets IPO (dummy)				0.277					
				(0.521)					
High PPE / assets IPO (dummy)					0.421				
					(0.458)				
Low PPE / assets IPO (dummy)					1.710**				
					(0.731)				
High percent of sales IPO (dummy)						1.572**			
						(0.532)			
Low percent of sales IPO (dummy)						0.243			
						(0.367)			
High industry stock volatility IPO (dummy)							1.227*		
							(0.598)		
Low industry stock volatility IPO (dummy)							0.957**		
							(0.368)		
High Herfindahl index IPO (dummy)								1.039**	
								(0.326)	
Low Herfindahl index IPO (dummy)								0.835	
								(0.587)	
IPO in relationship industry (dummy)									0.560
									(0.475)
IPO not in relationship industry (dummy)									1.553*
									(0.752)

Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample size	1,375	1,375	1,375	1,375	1,375	1,375	1,375	1,375	1,375
Adjusted-R^2	12.49	12.49	12.68	12.49	12.37	12.62	12.69	12.56	12.54

	(10)	(11)	(12)	(13)	(14)
Pre-IPO EBITDA / sales	0.406***	0.406***	0.406***	0.406***	0.406***
	(0.064)	(0.064)	(0.064)	(0.064)	(0.064)
Underwriter rank	0.186	0.188	0.190	0.190	0.187
	(0.140)	(0.141)	(0.136)	(0.140)	(0.137)
Log (IPO proceeds)	0.406*	0.416*	0.410*	0.402*	0.409*
	(0.204)	(0.205)	(0.200)	(0.201)	(0.204)
Venture capital backed (dummy)	0.224	0.208	0.206	0.224	0.199
	(0.751)	(0.756)	(0.742)	(0.752)	(0.761)
Fraction Sold	-0.432	-0.454	-0.468	-0.431	-0.451
	(0.342)	(0.361)	(0.362)	(0.338)	(0.355)
Negative earnings (dummy)	-0.647	-0.670	-0.650	-0.632	-0.698
	(0.956)	(0.926)	(0.956)	(0.974)	(0.910)
Large customer (dummy)					
Large public customer (dummy)					
Large private customer (dummy)	0.878**	0.859**	0.887**	0.861**	0.956**
	(0.374)	(0.371)	(0.370)	(0.373)	(0.337)
Characteristics of IPO firms with large public corporate customers					
Non-horizontal public customer (dummy)	1.112***				
	(0.323)				
Horizontal public customer (dummy)	1.027***				
	(0.233)				
Large public corporate customer characteristics					
High customer assets / IPO assets (dummy)		1.534**			
		(0.649)			
Low customer assets / IPO assets (dummy)		0.488			
		(0.418)			
High Herfindahl index customer (dummy)			1.710*		
			(0.787)		
Low Herfindahl index customer (dummy)			0.446		
			(0.463)		
High customer S-1 CARs (-3, 3) (dummy)				1.415**	
				(0.510)	
Low customer S-1 CARs (-3, 3) (dummy)				0.706**	
				(0.297)	
Durable relationship characteristics					
Long-term relationship (dummy)					0.360
					(0.356)
Short-term relationship (dummy)					1.976*
					(0.937)
Year dummies	Yes	Yes	Yes	Yes	Yes
Sample size	1,375	1,375	1,375	1,375	1,375
Adjusted-R^2	12.51	12.85	12.45	12.44	12.46

Table XI
Adjustment of endogeneity problems in estimating IPO valuation and IPO long-run operating performance

The sample consists of 1,429 IPOs reported in the Securities Data Corporation (SDC) New Issues database between 1997 and 2005. All REITs, unit offerings, closed-end funds, ADRs, firms not covered by CRSP, firms that belong to either the financial services or utilities industries, IPOs with an offer price below $5, and IPOs without earning or sales data in the year before the IPO are excluded from the sample. We use the COMPUSTAT Segment Customer database to identify whether the IPO firms have large corporate customers. A large corporate customer is defined as a customer whose sales account for more than 10% of the IPO firm's total sales. When there are multiple large corporate customers for each IPO firm, the customer that purchases the largest amount is identified as the sample customer. To determine whether a corporate customer is publicly traded or privately held, we match the names of large corporate customers in the COMPUSTAT Segment Customer database with those of all firms in COMPUSTAT. In Panels A and B, IPO firm offer value/matching firm value is the ratio of shares outstanding times the offer price to EBITDA for the IPO firm divided by the ratio of market capitalization to EBITDA for a matching firm. The matching firms are selected based on sorting the Fama and French (1997) industry into three portfolios based on sales in the year before the IPO. These portfolios are then sorted into three additional portfolios based on EBITDA/sales, ultimately producing a matrix of 3x3 portfolios for each industry. Then within each portfolio, the firm with sales closest to the IPO firm is considered as the matching firm. Industry-adjusted 1-year operating performance is the industry-adjusted operating performance that is measured by subtracting the industry median EBITDA/sales in year 1 from the IPO firm EBITDA / sales in year 1. Year 0 refers to the fiscal year prior to the IPO. Industry is defined as in Fama and French (1997). In Panel C, the dependent variable of the second-stage regression is the ratio of IPO firm offer value to matching firm value. In Panel D, the dependent variable of the second-stage regression is the industry-adjusted 1-year operating performance. White heteroskedasticity-consistent standard errors clustered by year are reported below the regression coefficients. ***, **, and * denote the significance of the parameter estimates at the 0.01, 0.05, and 0.10 levels, respectively.

Panel A: Propensity score matching (Instrumental variables: a dummy for the IPO firm in a relationship industry, IPO firm Herfindahl index, IPO firm PPE / assets, IPO firm R&D / assets, IPO industry stock volatility, and a dummy for negative IPO firm earnings)

	IPO firms with large public corporate customers		IPO firms without large customers		Test of difference	
	Mean	Median	Mean	Median	*t*-test (*p*-value)	Wilcoxon z-test (*p*-value)
IPO firm offer value / matching firm value (N=230)	21.46	2.48	8.26	2.38	2.02** (0.04)	1.90* (0.06)
Industry-adjusted 1-year operating performance (N=226)	-0.5238	0.0232	-1.5182	0.0041	2.58*** (0.00)	2.22** (0.03)

Panel B: 2SLS regression controlling for endogeneity of customer- supplier relationships

	First stage probit model (dependent variable = a dummy variable for large public customers)	Second stage (dependent variable = IPO firm offer value / matching firm value
Underwriter rank	0.028	-0.061*
	(0.027)	(0.033)
Log (IPO proceeds)	-0.057	0.123
	(0.054)	(0.087)
Venture capital backed (dummy)	0.047	0.382***
	(0.096)	(0.114)
Fraction sold	0.035	-0.485***
	(0.032)	(0.055)
Negative earnings (dummy)	-0.284***	0.392*
	(0.073)	(0.224)
Instrumental Variables		
IPO in relationship industry (dummy)	0.343**	
	(0.161)	
IPO firm Herfindahl index	0.236	
	(0.269)	
IPO firm PPE / assets	0.536***	
	(0.187)	
IPO firm R&D expenditures / assets	-0.005	
	(0.040)	
Industry stock volatility	7.411***	
	(0.775)	
Large public customer (dummy)		0.629***
		(0.238)
Year dummies	Yes	Yes
Sample size	1,429	1,429
Pseudo- or adjusted-R^2	23.53	9.48

Panel C: 2SLS regression controlling for sample selection bias

	First stage probit model (dependent variable = a dummy variable for observing operating performance)	Second stage (dependent variable = Industry-adjusted 1-year operating performance)
Pre-IPO EBITDA / sales	0.002*	0.406***
	(0.001)	(0.064)
Underwriter rank	0.015	0.186
	(0.060)	(0.140)
Log (IPO proceeds)	0.077	0.405**
	(0.103)	(0.201)
Venture capital backed (dummy)	-0.320	0.226
	(0.149)	(0.743)
Fraction sold	-0.306	-0.449
	(0.083)	(0.370)
Negative earnings (dummy)	-0.319***	-0.664
	(0.113)	(0.929)
Instrumental Variables		
IPO in relationship industry (dummy)	-0.030***	
	(0.153)	
IPO firm Herfindahl index	0.064	
	(0.452)	
IPO firm PPE / assets	-0.085**	
	(0.411)	
IPO firm R&D expenditures / assets	0.732	
	(0.368)	
Industry stock volatility	2.043***	
	(0.485)	
Large public customer (dummy)		0.935***
		(0.280)
λ		11.410
		(9.274)
Year dummies	Yes	Yes
Sample size	1,429	1,375
Pseudo- or adjusted-R^2	7.69	4.17

Appendix: Variable definitions

This appendix shows a detailed description of the construction of all the variables used in the tables.

Variable name	Definition
Deal characteristics	
IPO proceeds	Number of shares issued in the offering times the offer price.
Underwriter rank	Continuous variable based on the ranking system updated by Loughran and Ritter (2004). The ranking is based on the investment bank's location in the prospectus, with 9 being the highest ranking and 1 being the lowest ranking.
Venture capital backed (dummy)	A dummy variable taking a value of one if the IPO is backed by a venture capitalist and zero otherwise.
Fraction sold	The number of shares in the offering divided by the total shares outstanding after the IPO.
IPO firm characteristics	
IPO in (not in) relationship industry (dummy)	A dummy variable taking a value of one for IPO firms with large public corporate customers in (not in) two-digit SIC codes of 15-17, 34-39, 42, 47, 50-51, 55, 60-65, 67, 75-76, 87 (Cremer, Nair, and Peyer, 2007).
IPO firm Herfindahl index	Normalized Herfindahl-Hirschman index as defined by the sum of the squared market shares of all participants in the same industry as the IPO firm, normalized such that $H^* = (H - 1/N) / (1 - 1/N)$.
High (low) Herfindahl index IPO (dummy)	A dummy variable taking a value of one if the IPO firm with a large public corporate customer has a Herfindahl index above (below) the sample median.
Industry stock volatility	The mean standard deviation of monthly stock returns for all stock traded in the Fama and French (1997) industry of the IPO firm in the year of the IPO.
High (low) industry stock volatility IPO (dummy)	A dummy variable taking a value of one if the IPO industry in which the IPO firm has a large public corporate customer with above- (below-) median industry stock volatility and zero otherwise.
Technology industry (dummy)	A dummy variable taking a value of one if the IPO firm SIC code is any one of the following codes: 3571, 3572, 3575, 3577, 3578, 3661, 3663, 3669, 3671, 3677, 3675, 3677, 3678, 3679, 3812, 3823, 3825, 3826, 3827, 3829, 3841, 3845, 4812, 4813, 4899, 7371-7375, 7378, 7379 per Appendix D of Loughran and Ritter (2004).
Non-horizontal (horizontal) public customer (dummy)	A dummy variable taking a value of one if the IPO firm and the large public corporate customer do not have (have) the same three-digit SIC code.
Percent of firms in industry with large customers	The percent of firms in the same Fama and French (1997) industry disclosing large public corporate customers in their SEC filings.
High (low) percent of sales IPO (dummy)	A dummy variable taking a value of one if the percentage of IPO firm sales to their large public customer is above the sample median and zero otherwise.
Market capitalization	Number of shares outstanding after the IPO times the first available closing price of the IPO firm.
Total assets	COMPUSTAT data item 6.
Total sales	COMPUSTAT data item 12.

EBITDA/sales	COMPUSTAT data item 13 / data item 12.
Negative earnings (dummy)	A dummy variable taking a value of one if data item 13<0 and zero otherwise.
Research and development (R&D) expenditures / assets	COMPUSTAT data item 46 / data item 6.
High (low) R&D / assets IPO (dummy)	A dummy variable taking a value of one for an IPO firm with a large public corporate customer if its R&D expenditures/total assets is above (below) the sample median.
Property, Plant, and equipment (PPE) / assets	COMPUSTAT data item 30 / data item 6.
Change in IPO firm PPE / assets	The percent change in PPE / assets of an IPO firm with a large public corporate customer from the year of the IPO to the year after the IPO.
High (low) PPE / assets IPO (dummy)	A dummy variable taking a value of one for an IPO firm with a large public corporate customer if its PPE / total assets is above (below) the sample median.
IPO firm age	Number of years from firm founding to the IPO year.
IPO firm leverage	COMPUSTAT (data item 34 + data item 9) / (data item 6).
High (low) leverage IPO (dummy)	A dummy variable taking a value of one for an IPO firm with a large public corporate customer if its debt / total assets is above (below) the sample median.
Delisting of IPO firms within 3 years of IPO (dummy)	A dummy variable taking a value of one if the IPO firm with a large public corporate customer is delisted from a public exchange within three years of the IPO date for reasons other than a merger or acquisition.
Large public corporate customer characteristics	
Customer leverage	COMPUSTAT (data item 34 + data item 9) / (data item 6).
Customer assets / IPO assets	COMPUSTAT data item 6 for the customer / data item 6 for the IPO firm.
High (low)customer assets / IPO assets (dummy)	A dummy variable taking a value of one if customer assets / IPO assets is above (below) the sample median.
Customer total cost of goods sold	COMPUSTAT data item 41.
Purchase from IPO firm	Dollar value of IPO firm's sales to the large public corporate customer as obtained from COMPUSTAT.
Purchases from IPO firm / Customer total cost of goods sold	Dollar value of IPO firm's sales to the large public corporate customer divided by COMPUSTAT data item 41.
Purchases from IPO firm / IPO firm sales	Dollar value of IPO firm's sales to the large public corporate customer divided by COMPUSTAT data item 12.
Customer with investment credit rating (dummy)	A dummy variable derived from COMPUSTAT data item 280 with investment credit ratings above BBB taking a value of one and below taking a value of zero.
High (low) Herfindahl index customer (dummy)	A dummy variable taking a value of one if the large public corporate customer has a Herfindahl index above (below) the sample median.
Durable relationship and interfirm arrangements	

Long(short) term relationship (dummy)	A dummy variable taking a value of one if the IPO firm maintains relationships with the large public corporate customer above (below) the sample median number of years.
Large customer(dummy)	A dummy variable taking a value of one if the IPO firm discloses a large customer in its COMPUSTAT filings.
Large private customer (dummy)	A dummy variable that takes a value of one if an IPO firm has a large corporate customer that is not publicly traded.
Large public customer (dummy)	A dummy variable that takes a value of one if an IPO firm has a large corporate customer that is publicly traded.
Equity ownership in IPO firm by customer (dummy)	A dummy variable taking a value of one if the large public corporate customer holds equity in the IPO firm.
Loan from customer (dummy)	A dummy variable taking a value of one if the large public corporate customer made a loan to the IPO firm.
Long term purchasing agreement (dummy)	A dummy variable taking a value of one if the IPO firm has a supplier contract with a large public corporate customer lasting more than 18 months (the median length of time) and zero otherwise.
Strategic alliance (dummy)	A dummy variable taking a value of one if the IPO firm has a licensing agreement, a development agreement, or a marketing agreement with its large public corporate customer.
Performance variables	
IPO firm offer value / matching firm value based on price/EBITDA ratio	IPO firm offer value / matching firm value is the ratio of shares outstanding times the offer price to EBITDA for the IPO firm divided by the ratio of market capitalization to EBITDA for a matching firm. The matching firms are selected based on sorting the Fama and French (1997) industry into three portfolios based on sales in the year before the IPO. These portfolios are then sorted into three additional portfolios based on EBITDA/sales, ultimately producing a matrix of 3x3 portfolios for each industry. Then within each portfolio, the firm with sales closest to the IPO firm is considered as the matching firm.
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Customer CAR around the IPO supplier's S-1 filing (issuance) date	Cumulative abnormal return (CAR) for the customer using the market model. The market model estimates are obtained by using 255 trading days of returns data, beginning 302 days before and ending 46 days before the IPO supplier's S-1 filing (issuance) date. The equally weighted index return is used as the market return. The daily abnormal returns are cumulated to obtain the CAR from day t_1 before the IPO supplier's S-1 filing (issuance) date to day t_2 after the IPO supplier's S-1 filing (issuance) date.
High (low) customer S-1 CARs (-3, 3) (dummy)	A dummy variable taking a value of one if the large public corporate customer has above (below) the median CARs (-3, 3) around the S-1 date.
Operating performance	COMPUSTAT data item 13 / data item 12.
Industry-adjusted operating performance	The industry adjustment is achieved by subtracting the Fama and French (1997) industry median operating performance for the IPO firm.