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Seasoned Equity Offerings and Customer-Supplier Relationships*

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1. ABSTRACT

We investigate how seasoned equity offerings (SEOs) by issuers with large customers affect both trading partners' market values and the relationship's health. We hypothesize that SEOs reveal adverse information about an issuer's major customers and find that issuers and their large customers experience negative returns on SEO announcements. These results are more pronounced when customers have higher levels of information asymmetry and when customer-supplier relationships are particularly important. Large customers of issuers experience larger declines in post-SEO sales, operating performance, and credit ratings than large customers of non-issuers. Also, SEO issuer sales to large customers and relationship duration significantly decline.

Keywords: Seasoned equity offering, Large customer, Supplier, SEO announcement returns, Trading relationship, Information asymmetry.

JEL Codes: G14, G32, L14, M40.

1. Introduction

Previous studies extensively investigate the causes and consequences of seasoned equity offerings, or SEOs (e.g., Masulis and Korwar, 1986; Carlson, Fisher and Giammarino, 2006; Kim and Weisbach, 2008; Lyandres, Sun, and Zhang, 2008). These studies examine issuers in isolation, thus ignoring the impact of potential product market relationships and the interdependence between issuers and their trading partners with respect to the effects of SEOs. However, given that many individual firms maintain important trading relationships with their large customers (supply chain) and that supply chains are a major fixture in current business practice (Sanders, 2011), we believe that examining SEOs within the broader context of these product market relationships can offer valuable new insights into how investors react to SEOs and the determinants of SEO announcement effects. In this study, we investigate this question by focusing on SEOs by issuers with large customers that account for a substantial fraction of issuer total sales.

The financial interdependence of suppliers and large customers allows us to examine several important questions surrounding SEOs. How does the existence of a large customer affect a supplier's SEO announcement return? Do large customers also experience stock price reactions to supplier SEOs? What information about issuers and their main customers do SEOs reveal? By examining these questions, we hope to enhance our understanding of the interactions between product markets and financial decisions and the economics of major trading relationships.

To interpret our findings, we propose the customer revelation hypothesis. This hypothesis predicts that an SEO announcement signals to the market that an issuer's major customer is likely to be experiencing financial difficulties, which leads to a fall in the stock prices of both the issuer and its main customer. Major customer financial difficulties can represent a serious threat to a supplier, but this threat can be lessened if the supplier can switch to new trading

partners relatively quickly and at low costs. However, in some trading relationships, suppliers and their large customers bear large termination costs.¹ If the financial market correctly accounts for these costs, then both an issuer and its large customer are likely to experience declines in firm value on SEO announcements.

Our results are largely consistent with the customer revelation hypothesis. First, we find that SEO issuers with large customers experience significantly larger stock price declines than SEO issuers without large customers. This result is robust to using a variety of market benchmarks to calculate abnormal returns. Second, we find that the largest customers suffer negative abnormal returns when suppliers announce SEOs. Moreover, the largest customers' credit ratings deteriorate prior to supplier SEOs.² These results are inconsistent with the view that an SEO only releases negative information about the issuer, which should adversely affect all its major customers, but support our hypothesis that an SEO announcement releases negative news about an issuer's largest customer.

Third, we find that the largest customers of SEO issuers experience significantly greater declines in post-SEO sales, operating performance, and credit ratings than matching largest customers of non-SEO issuers. This result again indicates that the negative information revealed by the SEO comes from the issuers' largest customers. Further supporting this view, we find that issuer sales to their second largest customers rise substantially after an SEO, suggesting that the negative market reaction to an SEO is attributable to the largest customer's financial problems, and not to the SEO issuer's financial condition.

Fourth, we find that SEO issuers and their large customers suffer larger negative SEO stock price reactions when customer information asymmetry is higher (measured by stock

¹ For instance, the value of relationship-specific investments can be lost, reflecting a loss of valuable quasi-rents associated with these investments, which are borne by issuers and their large customers.

² We find that SEO issuers have no decline in pre-SEO credit quality, but SEO firm customers have a significant decline in credit quality leading up to the SEO event. We interpret this result as evidence that some SEOs are caused in part by anticipated deterioration of financial health of an issuer's major customers, supporting the customer revelation hypothesis.

volatility and analyst coverage), when their trading relationships are more important, and when their trading relationship involve high product specificity and uniqueness. Our information asymmetry findings suggest that negative information about the major customer conveyed by supplier SEOs have more adverse impacts on the stock values of both issuers and their major customers when investors have greater difficulties in assessing customers' financial conditions.

Finally, we find that following an SEO, the issuer's relationship to its major customer deteriorates, as evidenced by larger declines in dollar sales to its major customer and a reduced duration of the trading relationships compared to a matching non-issuer's major trading relationship. These results are consistent with suppliers undertaking SEOs when they anticipate a decline in their largest customer's future performance.

Given that SEOs generate adverse market reactions, one might expect a firm to avoid SEOs by instead raising capital through bank loans. However, debt financing is unlikely to be a good alternative in our setting for several reasons. First, banks as an informed creditor can often be aware of the major customer's difficulties and thus, be reluctant to extend the supplier further loans (Fama, 1985). Furthermore, the current banking regulation environment discourages banks from extending loans to firms with a deteriorating credit rating (Greenbaum and Thakor, 2007). This reluctance on the part of banks to lend to firms relying on a large customer for a large portion of their sales may force these firms to rely on equity financing to strengthen their financial condition.

Second, SEOs reduce financial leverage and financial distress risk of an issuer and thus, strengthen its trading relationships by reassuring existing customers as well as potential new customers of its reliability, and as a result, help firms more easily and quickly switch to new trading partners (Titman, 1984). Third, Campello and Gao (2017) suggest that a firm with a large customer bears higher loan spreads and is subject to more restrictive loan covenants when its large customers are likely to experience financial difficulties. A firm may want to avoid

such restrictive covenants since they can seriously constrain a manager's flexibility and ability to pursue her main goals such as maximizing shareholder wealth.

To rule out several alternative scenarios suggested to explain our results, we perform a battery of additional tests. First, we consider the argument that SEOs signal lower earnings expectations about the issuers, instead of signaling customer financial difficulties, which could actually raise customers' concerns about the viability of their major trading relationship. The economically large and statistically significant fall in the equity values of major customers on supplier SEO announcements is inconsistent with this alternative hypothesis. Specifically, we find that the effect of the decline in the large customer's equity value is much larger than that experienced by SEO issuers themselves, which is inconsistent with the conventional view that SEOs primarily signal to the market issuer overvaluation. Moreover, we find that the average wealth decline of large customers around supplier SEO announcements is more than four times greater than the average issuer's total annual sales to its large customer and the median equity market value loss for large customers is more than 14 times large than that for the issuers, suggesting that for issuers with large customers, SEO announcements reveal important information about the financial well-being of the large customer itself and the future of this major customer relationship. We also find that the average net income decline for an issuer following an SEO event is an order of magnitude smaller than the average net income decline for their large customers (\$2 million versus \$81 million). Combining this evidence together with declining post-SEO customer sales, operating performance, and credit ratings, helps rule out the alternative view that it is the SEO itself that triggers the decline in the value and performance of an issuer's major customer.

Second, we consider competing hypotheses such as whether supplier SEO announcements reflect negative industry shocks. To investigate this possibility, we examine abnormal returns

of issuer competitors and their large public customers.³ We find no evidence that our SEO announcement returns are on average driven by industry-specific events, suggesting that negative industry shocks are unlikely to drive our results.

Third, we consider the argument that an issuer's decision to have a large customer is endogenous and thus, can affect the SEO issuer announcement return. We employ maximum likelihood estimation of a two-equation system to control for this endogeneity problem following Eisenberg, Sundgren, and Wells (1998), Loderer and Martin (1997), and Becker, Cronquist, and Fahlenbrach (2008). We use the ratio of the number of firms with large customers in the same industry as the SEO firm to the total number of firms in the same industry as the instrument for the presence of large customers. Our main finding that negative announcement effects of issuers with large customers are larger than those of issuers without large customers is robust to this endogeneity control.

We contribute to the equity offering literature by examining how major supplier-customer relationships affect market reactions to SEOs. We are the first study to examine SEO announcement effects from the perspective of an issuer's major customer relationships.

Our study also extends our understanding of the information disclosed by an SEO. We extend the extant SEO literature by showing that SEOs can also convey negative information about the future financial health of an issuer's large customers and the health of the issuers' major trading relationships.

Finally, our study contributes to the literature examining the relation of firm security issuance decisions to the existence of large trading partners. We show that SEO issuance decisions can be influenced by problems with an issuer's large customer relationships and signal information to the market about the continued viability of these supply chain

³ We also examine three-day industry-adjusted announcement returns of SEO issuers, where we use four-digit SIC codes, six-digit GICS codes, and the Hoberg and Phillips (2010) metric to define industries.

relationships.

2. Main hypothesis and testable implications: The customer revelation hypothesis

Firms are frequently tied to their large customers through durable trading relationships, so that financially deteriorating large customers can induce significant product market related costs and a reduction in the value of an issuer's relationship-specific investments. For instance, investments made to facilitate the trading relationship between an issuer and its large customer are largely non-salvageable and lose much of their value when the trading relationship between the issuer and large customer declines.⁴ Furthermore, issuers have to bear significant switching costs to find new trading partners (Williamson, 1985). The banking industry regulatory environment and the nature of leverage, which reduces the value of implicit contracts associated with a customer-supplier relationship, lead suppliers facing financial deterioration of a major customer to issue seasoned equity as opposed to debt. Thus, an SEO signals financial difficulties of an issuer's major customers and SEO announcements have a negative effect on the equity values of an issuer and its largest customer. We call this the customer revelation hypothesis.

The customer revelation hypothesis would not hold if stock prices fully incorporated the fact that the existence of a major customer can impair the welfare of issuer shareholders, long before an SEO announcement.⁵ Previous studies show that there exists information asymmetry

⁴ Previous studies argue that the supply chain depends largely on implicit contracts (Klein, Crawford, and Alchian, 1978; Williamson, 1985; Milgrom and Roberts, 1992) in making relationship-specific investments, which earn quasi-rents, but are exposed to post-investment opportunism by the trading partners. Thus, once a supplier becomes aware of a major customer's financial problems and decides to issue equity to prepare for an expected decline in sales, an SEO announcement reveals that the supplier has serious concerns about its major customer relationship, which can trigger equity value declines for both the issuer and major customer, reflecting the expected loss of quasi-rents.

⁵ Klein (1996) argues that as long as the hold-up gain is smaller than the discounted value of the quasi-rents realized from the relationship-specific investment, then the hold-up does not emerge as a Nash equilibrium. Only "unanticipated" events which significantly alter the hold-up gain or the discounted value of the quasi-rents is likely to disrupt the supplier-customer relationship and trigger a loss of quasi-rents.

between supply chain members and financial markets. For example, Baiman and Rajan (2002), Kulp, Lee, and Ofek (2004), and Gong and Luo (2014) show that supply chain members acquire proprietary information about their partners' financial health through repeat transactions and coordinated investments within a supply chain. However, it is difficult for financial market participants to access this proprietary information and evaluate the financial condition of supply chain member firms.⁶

The arguments above suggest that several factors can affect announcement returns of issuers and their major customers, namely, information asymmetry, the importance of the past trading relationships, and relationship-specific characteristics.

First, the customer revelation hypothesis suggests that information asymmetry of customers has significant effects on announcement returns for both issuers and their major customers. Previous studies show that close operational and investment ties among supply chain members reduce their transparency to investors (Cooper et al., 1997; Baiman and Rajan, 2002; Kulp, Lee, and Ofek, 2004). The greater opacity of large customers of SEO firms, the larger is the expected stock price reactions to SEO announcements of issuers and their large customers, since the SEO issue decision reveals previously-unknown negative information about the health of the large customer and the trading relationship. We measure information asymmetry by large customers' stock return volatility and analyst coverage.

Second, the customer revelation hypothesis suggests that both the issuer and its large customer suffer larger value drops when the expected size of losses to trading partners due to relationship termination is higher. The losses associated with a breakup of a major trading relationship should rise with an issuer's dependence on its customer. We measure expected

⁶ Our empirical finding that the interaction between information asymmetry of major customers and the large customer indicator is significantly positively associated with customer value losses around SEO announcements by their suppliers supports this argument. To the extent that financial markets have difficulty valuing a firm's important product market relationships, this should amplify the information asymmetry of a large customer. Therefore, the SEO announcement is likely to create greater adverse selection and thus, greater losses in both an issuer's and its major customer's market values.

relationship breakup costs by the ratio of issuer sales to the large customer to its total sales and by the ratio of the large customer's purchases from the issuer to its total cost of goods sold (*Percent cost of goods sold*).

Third, the customer revelation hypothesis suggests that both the issuer and its large customer suffer larger value drops, particularly when participation in the supply chain involves extensive relationship-specific investments since these investments have little value outside of the existing supply chain relationship. Titman (1984), Cornell and Shapiro (1987), and Cremers, Nair, and Peyer (2008) argue that customers in durable goods and technology intensive industries make relatively large relationship-specific investments, so we expect more negative announcement returns for issuers and their large customers when an issuer's customers also operate in these industries.

Major supplier-customer relationships sometimes involve high levels of asset specificity, which makes it costly for suppliers and customers to switch trading partners (Williamson, 1985, 1991). Thus, as product specificity rises, we expect more negative SEO announcement returns for issuers and their large customers. We measure product specificity by R&D intensity, defined as R&D expenses scaled by total sales (Acs and Isberg, 1991; Santarelli, 1991). We also measure relationship uniqueness by industry trademark intensity, defined as the total number of trademarks filed with the US Patent and Trademark Office in the 1997-2005 period by firms in the supplier's industry (Gorecki, 1975).

Finally, the customer revelation hypothesis predicts a decline in major trading relationships following the SEOs. Specifically, in the immediate post-offer period, we expect large customers of issuers to experience a weakening in operating performance and credit ratings. We also expect issuers to experience a post-SEO decline in sales and a shorter life of its major trading relationships. These results are likely to be more pronounced when issuers have more negative offer announcement CARs, which measures the market's revision of an

issuer's value.

3. Data and summary statistics

We begin with the sample of completed seasoned common stock issues by US firms listed on the NYSE, Amex, or NASDAQ under a firm commitment flotation method, that are reported in the Thomson-Reuters SDC new issues database during the 1986–2005 period. We delete issuers in regulated industries including banking and utility industries, simultaneous offers of equity and debt, unit offers, and pure secondary offers as well as issues with confounding events (e.g., announcements of earnings reports, quarterly and annual reports, CEO turnover, and analyst recommendation changes). Following Healy and Palepu (1990), we eliminate offers by issuers that sold equity publicly within the past five years to reduce concerns that a small number of frequent issuers drive our results. For each issue, we take the filing date recorded by SDC and then track the first date prior to the filing when the stock offer is mentioned in LexisNexis as our initial announcement date. These sample criteria yield a final sample of 1,946 SEOs.

For each observation, we use the COMPUSTAT Segment Level database to identify whether an SEO firm discloses a large customer in its financial statements for the offer year. We only include as a large customer, firms that account for more than 10% of an SEO issuer's sales in the year prior to the offering.⁷ A large customer is defined, not in terms of its own size, but in terms of its importance to the supplier (Fee and Thomas, 2004). To determine if a large customer is publicly traded or private, we manually match customer names to the universe of COMPUSTAT firms. Of the 1,946 SEOs in our sample, 348 have a large public customer

⁷ Our large customer definition is slightly different from Fee, Hadlock, and Thomas (2006), who include all disclosed customers as “large customers” regardless of whether they account for 10% or more of sales or include the voluntary disclosure of smaller customers, which are endogenous choice. Our qualitative results are invariant to including all disclosed large customers sales. If we include only large customers accounting for 15% or more of firm sales, we find similar results. We do not consider government large customers in our paper.

and 429 have a large private customer.⁸ Of these SEO firms, 15% have more than one large public customer. When an SEO firm has multiple large public customers, we only use the largest customer in terms of annual sales in the analysis, following Fee and Thomas (2004). Financial and stock price data for both issuers and their large customers come from the COMPUSTAT and CRSP databases, respectively, and are supplemented with data from SEC filings (predominantly 10-Ks, along with 10-Qs and offer prospectuses).

Table 1 reports the distribution of the 1,946 sample observations by year and industry. The table shows a significant rise in offer frequency in the early 1990s and a fall in the early 2000s. With the exception of retail firms, issuers with a large customer are reasonably well distributed across various industries including the business services ($N = 43$), pharmaceutical products ($N = 39$), and electronic equipment ($N = 56$) industries.

In Table 2.A, we report issue and issuer characteristics of SEO firms with versus without large public customers. We find that the offer size and the percent of secondary shares sold are not significantly different between the two groups. However, SEO firms with large public customers are less likely to be listed on the NYSE and more likely to sell shares through a shelf registration. The table also shows that firms with a large public customer exhibit a higher stock volatility, R&D intensity, and stock price run-up, and likelihood of being in industries where large public customers are more common.

In Table 2.B, we report the characteristics of the largest public customers of SEO firms and their matching firms. We match each SEO firm customer with another firm in the same Fama and French (1997) 48 industry that has a significant supplier that does not undergo an SEO. Using these matching firms allows us to control for any confounding industry-specific events and also ensures that our results are likely driven by SEOs. As expected, we find that firm size as measured by market capitalization is nearly identical between large public

⁸ We limit our attention to major customers known as of the SEO announcement.

customers of SEO firms and matching customers. We also find that the mean leverage is similar between SEO issuer customers and their matching firms, but mean stock volatility is higher for the matching firms. Finally, we find that the mean percent of customer firms in the same industry as the supplier is higher for SEO issuer customers than for their matching firms (26% compared to 21%).

4. Empirical results

4.1. Announcement returns of SEO issuers and their large public customers

To examine the valuation effect of equity issuance announcements, we use a standard one-factor market model estimated with daily returns over event days -301 to -46 using the CRSP equally weighted NYSE/Amex/Nasdaq index as the market portfolio. Market model residuals are compounded daily to calculate cumulative abnormal returns (CARs) from trading day -1 prior to the offer announcement to trading day +1 afterward. Market-adjusted CARs are computed using the equally-weighted CRSP returns. For industry-adjusted CARs, we use Fama and French (1997) 48-industry classification to compute the industry mean portfolio return and subtract it from the firm's raw return. For industry-size adjusted CARs, we first sort firms by industry and then sort them again into five industry-size portfolios per Fama and French (1997). We then adjust each SEO's announcement return by the corresponding industry-size portfolio mean return.

Table 3.A reports CARs (-1, 1) for issuers with and without a large public customer using four different benchmark approaches. Using the market model, we find that the average CARs (-1, 1) of issuers with and without a large public customer are -4.19% and -2.90%, respectively, both of which are significant at the 1% level. The 1.29% difference in CARs is also significant at the 1% level. Median CARs show a similar pattern. We find that the fraction of the sample with negative CARs (-1, 1) is 77.6% for SEO firms with a large public customer and 71.0% for

SEO firms without a large public customer (not reported).⁹ We also examine SEO firms with a large private customer and compare their CARs (-1, 1) to firms without a large private customer and find similar results. The abnormal returns using other benchmark approaches echo those using the market-model. These results support the customer revelation hypothesis and are discussed in more detail in the Internet Appendix.

In Table 3.B, we report shareholder wealth changes (measured as \$ million) for our sample of SEO issuers. We find that for issuers with a large public customer, the median wealth change on the SEO announcement is -\$4.81 million. In comparison, issuers without a large public customer experience a median wealth decline of -\$3.12 million. This difference in wealth loss is statistically significant at the 5% level using a Mann-Whitney test. Overall, our findings suggest that SEOs are bad news for issuers, but worse news if the firms have large customers, supporting the customer revelation hypothesis.

Since we are particularly interested in the impact of SEOs on the market value of large customers, we next examine the announcement returns for large customers of SEO firms and their matching firms used earlier in Table 2. Analyzing the announcement returns of matching public customers helps rule out industry-specific effects influencing major customers of SEO issuers at the time of the SEO. Table 4.A shows announcement effects of large public customers of SEO issuers and their matching firms. Mean and median CARs (-1, 1) for the large public customers of SEO issuers using the same one-factor market-model are -1.15% and -1.12%, respectively, both of which are significant at the 1% level. In comparison, the matching large public customers of non-SEO issuing firms have mean and median CARs (-1, 1) of -0.33% and -0.46%, neither of which is significant. The differences in CARs (-1, 1) between SEO issuer customers and the matching customers are significant using both a *t*-test and a Mann-Whitney test. These negative announcement returns for SEO issuer customers strongly support the

⁹ We find similar results using a longer event windows of (-3, +3) and (-5, +5).

customer revelation hypothesis.¹⁰ The results using other benchmark approaches lead to nearly identical conclusions.

In Table 4.B, we examine mean and median wealth losses of the largest customers of SEO issuers and the matching large customers of the non-SEO issuers. We find that a mean (median) wealth decline for largest customers for the three day announcement period is \$447 million (\$68 million). This average wealth decline sustained by the issuers' large customers is more than four times greater than the average total annual sales of an issuer to these largest customers. Thus, SEO announcements appear to reveal important information about the financial well-being of issuers' major customers. In comparison, the mean (median) wealth change for the non-SEO issuers' matching large customers is an insignificant \$1 million (-\$2 million), suggesting SEOs exhibit only minor industry effects.

4.2. Major customer performance around SEOs

An important implication of the customer revelation hypothesis is that the SEO event itself signals a decline in the future performance of SEO firm customers. If the market correctly assesses value implications of SEO announcements by issuers with a large customer and a large decline in the market value of issuers' large customers around the SEO indeed reflects poor future customer business prospects, we expect significant declines in their sales, operating performance, and credit ratings in the post-SEO period. This analysis supports the conclusion that SEOs are motivated by developments at the issuers' major customers and that the negative information revealed by an SEO reflects major customer difficulties.

The results are reported in Table 5. We report median sales and operating performance throughout Table 5 since mean values can be skewed by outliers (Loughran and Ritter, 1997). In Panel A, we examine SEO issuer sales to their large customers and sales to non-SEO issuers'

¹⁰ We also study supplier valuation effects around SEO announcements by our sample issuers by searching supplier firms that report a SEO firm in our sample as a large public customer. Of 1,946 SEO firms, 88 are large suppliers. Large suppliers have a mean CAR (-1, 1) of -0.91 (t -statistic = 0.91).

matching large customers around SEO announcement years. The first two columns show the sales of SEO and non-SEO issuers to large customers, respectively. The median sales in the SEO year are \$16 million for both samples of firms. However, the sales of SEO issuers to large customers show subsequent declines after SEOs to \$14 million by year +4. In contrast, the sales of non-SEO firms to large customers matched by size and industry show an increase to \$17 million by year +4. The tests of differences in median sales between the two groups using a Wilcoxon rank-sum test show that while sales to large customers are not significantly different between the two groups prior to the SEO announcement, SEO issuer sales to their large customers are significantly smaller than non-SEO issuer sales to matching customers starting in year +2 and continuing through year +4. The next two columns of Table 5.A (columns C and D) examine the sales of SEO and non-SEO issuers to all their other customers, excluding their largest (i.e., total supplier sales – supplier sales to the largest customers). Supplier sales to all other customers are similar between the two groups of customers in year -3 and year -2. However, from year -1 to year +4, the sales of SEO issuers to all other customers increases substantially relative to the sales of non-SEO issuers to all other customers. These results suggest that while purchases by an SEO issuer's largest customer fall significantly after the SEO, other customers actually increase their purchases after the SEO.

Panel B show the changes in ROA and profit margin for largest customers of SEO firms and matching largest customers of non-SEO firms around SEO years. We find that ROA declines after year 0 for the largest customers of SEO firms, while it slightly increases for matching largest customers of non-SEO firms. Specifically, the ROA of SEO issuers' major customers decline on average by 0.92% from year 0 to year +1. In contrast, the ROA of the matching largest customers of non-SEO firms increases on average by 0.26% during the same period. This difference is statistically significant at the 5% level. Profit margins show a similar pattern. Tests of differences show that SEO firm customers insignificantly outperform

matching large customers of non-SEO firms prior to the SEO, but significantly underperform matching customers after the SEO, supporting the customer revelation hypothesis.

In Table 5.C, we examine the changes in the credit ratings of SEO firm customers and non-SEO firm matching customers. We find that the credit rating of SEO firm customers decline from a BB before the SEO to a BB– from the SEO year to year +3. In contrast, matching customers have a modest decline from four years before the SEO event from BBB to BB in year -2 with subsequent improvement in credit rating after year +2. To test for differences in credit ratings, we use the COMPUSTAT credit coding for splticrm (formerly data item 280) as reported in Appendix B. The difference in credit ratings of SEO issuers' largest customers and non-SEO issuers' matching largest customers are statistically significant starting in year 0. Overall, these results suggest that SEO firm customers experience a significant decline in their operating performance and credit quality in the year subsequent to the SEOs by their suppliers.

In tests reported in the Internet Appendix, we also examine changes in credit ratings for SEO firms and their large customers in the months leading up to the SEO event. We find that while SEO firms experience no significant decline in credit ratings before the SEO event, monthly data shows that SEO customers experience a significant decline in their credit ratings in this same period. In addition, we find that major customer credit ratings continue to decline in the months after the SEO. We interpret this result as implying that the SEO event signals to the market not only new information about the SEO firm, but provides new credit quality information about the largest customers as well. In addition, we examine the relation between the post-SEO credit rating declines of the largest customers and their announcement returns. We find a statistically significant relation, suggesting that information about future customer credit rating declines are imputed into the customer stock price at the time of its supplier's SEO.

In Table 5.D, we report operating performance and credit ratings of SEO firms around

SEO completion dates. The prior literature shows that the operating performance of SEO firms declines significantly after an equity offering (Loughran and Ritter, 1997). Consistent with this literature, we find a significant decline in ROA and profit margins for SEO issuers after the SEO issuance announcement year. For instance, the ROA of a typical SEO issuer declines from 5.23% in the SEO year to 2.82% in the subsequent year. This change is statistically significant and it results in a decline in net income of \$1.94 million. In comparison, the corresponding ROA decline for the SEO firm's largest customers is smaller in percent terms, from 5.27% to 4.35%. However, this change results in a decline in net income of \$81 million for the SEO issuer customers, due to their larger scale of operations. Despite the decline in operating performance of the SEO issuers, we find no change in the credit rating of the SEO issuers, possibly due to the infusion of new equity capital as a result of the SEOs.

If a supplier's SEO hurts its largest customer due to the release of negative information about the issuer's performance, then we should also expect to observe a negative valuation effect for the SEO issuer's second largest customers and declines in its own performance and sales in the post-SEO period. On the other hand, if SEOs signal negative information about an issuer's largest customer, then other customers should be largely unaffected by a supplier SEO. We test this proposition by examining SEO announcement returns for issuers' second largest customers ($N = 103$) and their post-SEO changes in sales and operating performance. In untabulated tests, we find that their mean announcement CAR $(-1, 1)$ is an insignificant 0.25% (t -statistic = 0.98) and their median announcement CAR $(-1, 1)$ is an insignificant 0.36% (t -statistic = 1.04). Further, unlike the results for an SEO issuer's largest customer, the changes in operating performance (profit margins and ROA) after the SEOs are small and statistically insignificant for the second largest customers. We conclude that these findings are inconsistent with SEOs primarily releasing negative information about the issuers' financial condition.

4.3. Multivariate analysis of SEO issuer announcement returns

To further examine the validity of the customer revelation hypothesis, we estimate ordinary least square (OLS) regressions of issuer 3-day CARs (-1, 1) on issue-, issuer-, and relationship-specific characteristics. Our key explanatory variable of interest is an indicator for issuers with large customers at the start of the offer year (*Large customer*). Following prior research (Jung et al., 1996), we include the following issue and issuer characteristics as controls: log (market capitalization), prior stock performance, stock return volatility, R&D intensity, log (1 + firm age), offer proceeds scaled by equity market capitalization, fraction of secondary shares in the SEO, an NYSE listing indicator, and a Rule 415 shelf offer indicator (all measured at pre-offer year-end).¹¹ We include a strategic alliance indicator and year and industry fixed effects to control for time trends and common industry effects, respectively. We cluster standard errors by industry. Appendix A gives the definitions of all the variables.

Table 6 reports regression estimates using the full sample of 1,946 equity offers. In model (1), the coefficient estimate for *large customer* is -1.05, which is significant at the 1% level. This estimate indicates a 1.05% more negative mean announcement effect for issuers with large customers than for issuers without large customers, showing that SEO firms with large public customers have a larger wealth decline on average, consistent with our prior univariate results.

In models (2) and (3), we include customer stock volatility and customer analyst coverage as the measures of information asymmetry. Since we cannot observe customer information asymmetry for firms without a large customer, instead of using an interaction term between *large customer* and a measure of customer information asymmetry, we define two indicator variables for firms in this context. The first indicator in model 2 (3) takes a value of one if the SEO firm has a large customer whose stock volatility is above the median value (large customer with no analyst coverage). The second indicator variable in model 2 (3) takes a value of one if

¹¹ We find that controlling for accelerated offers, firms with dual-class stock, or firms with block holders do not affect our results. We thank Jay Ritter and Andrew Metrick for data on these types of offers.

the SEO firm has a large customer whose stock volatility is below the median value (large customer that has analyst coverage). We expect SEO firms with higher customer information asymmetry to experience a more negative SEO announcement returns since it is more difficult ex ante for investors to discern information about these less transparent customers. Consistent with our expectation, in both regressions, we find that only the coefficients on the indicator for large customers with high information asymmetry (model 2) and the indicator for large customers without analyst coverage (model 3) are negative and significant. These results indicate that SEO firms experience more negative announcement returns when their large customers have greater information asymmetry.

In model (4), we replace the measure of customer information asymmetry with a measure of expected relationship breakup costs. We classify an SEO firm where its large customer accounts for more than 17.9% of its sales in the prior year (median sales ratio) as an SEO firm with a strong prior trading relationship and an SEO firm where its largest customer accounts for less than 17.9% of its total sales in the prior year as an SEO firm with a weak trading relationship with its largest customer. We expect to find that higher supplier dependence on a customer leads to larger expected losses for its trading partners if the relationship is terminated. Thus, SEO firms should experience more negative returns as their sales dependence on their largest customers rises. Consistent with this prediction, we find SEO firms with above-median percent sales to their largest customer exhibit significantly more negative SEO announcement period returns than those without a large customer.

In Table 6 models (5) and (6), we examine the impact of relationship specificity on SEO announcement returns. Given the importance of relationship specificity in durable trading relationships, the customer revelation hypothesis predicts that the SEO announcement returns for issuers with high relationship specificity are more negative than those for issuers with low relationship specificity. Consistent with this prediction, we find that the coefficients on the

interaction term between *large customer* and the indicator for durable goods industry and the interaction term between *large customer* and the indicator for technology intensive industry are both negative and significant.

In models (7) and (8), we examine the impact of relationship uniqueness on SEO announcement returns of issuers. If large customers operate in industries with more specialized products, as measured by high R&D industries and high trademark intensity industries, then the SEO announcement returns are expected to be more negative. Consistent with this expectation, we find that the interaction terms of *large customer* and high R&D intensity and *large customer* and high trademark intensity are both negative and significant. Thus, issuers with high relationship uniqueness experience a particularly large negative impact from the disclosure of new information through SEO announcements.

Overall, these results support the customer revelation hypothesis which predicts that major customers in financial difficulties impose significant costs on issuers. This is particularly true when issuers' major customers are informationally opaque, when the expected relationship breakup costs are high, and when relationship specificity and relationship uniqueness are relatively more important.¹²

4.4. Multivariate analysis of customer announcement returns

We next examine customer announcement CARs (-1, 1) in a multivariate setting. The sample consists of 348 large public customers of SEO issuers and 348 matching large public customers of non-SEO issuers that are matched by industry and size. Our control variables include log (major customer's equity capitalization), log (issuer equity capitalization), issuer R&D intensity, issuer age, previous relationship length measured in years, an indicator for

¹² Given the passage of FAS 131 in 1998 that may result in the material change in the disclosure requirements concerning large customers, we repeat our analysis in Table 6, after deleting all SEOs occurring in the post-FAS 131 period (N = 1,354). We also re-estimate the regression models in Table 6 after eliminating the large number of technology firms in our sample. Finally, we cluster standard errors by year-month when estimating these regressions. In each case, we find qualitatively similar results.

strategic alliance, an indicator taking a value of one if the issuer has negative free cash flows, and an indicator for whether or not the supplier and its largest customer operate in the same industry.

Table 7 reports the results. Consistent with the customer revelation hypothesis, model (1) shows that customers of SEO issuers have a more negative -1.24% stock announcement returns than customers of non-SEO issuers, which is statistically significant. To the extent that high information asymmetry makes it difficult for the market to assess customer value, the negative valuation effects documented in model (1) are expected to be greater when the customers of SEO firms have higher information asymmetry. In model (2), we include customer stock volatility and its interaction with an indicator for SEO issuer customers and in model (3), we include an indicator for customers without analyst coverage and its interaction with an indicator for SEO issuer customers. We find that the coefficients on both interaction terms are negative and significant, suggesting that customers with more information asymmetry have significantly more negative announcement returns than other customers.

In model (4), we examine how the importance of the relationship strength between an SEO firm and its large customer affects customer SEO announcement returns. We measure the relationship's importance using *Percent cost of goods sold*. We utilize this measure since the issuer's percent of sales used in Table 6 is unlikely to be relevant for customers. We find a negative and statistically significant relation between customer SEO announcement returns and the interaction term between *Percent cost of goods sold* and the indicator for an SEO issuer's largest customer. This result strongly supports the customer revelation hypothesis.

In models (5) and (6), we examine how relationship specificity affects customer returns. Since the adverse impact of relationship specificity on customer value is expected be particularly severe when past relationships are stronger, we use the triple interaction term of the indicator for an SEO issuer's largest customer, *percent cost of goods sold*, and a relationship

specificity measure (i.e., an indicator for durable goods industries or an indicator for technology intensive industries). Consistent with the customer revelation hypothesis, we find that the coefficients on both the triple interaction terms are negative and significant.¹³

Finally, in models (7) and (8), we use the triple interaction terms involving the indicator for an SEO issuer customer, *percent cost of goods sold*, and our relationship uniqueness measures (i.e., an indicator for high R&D intensity or an indicator for high trademark intensity). We again find that the coefficients on both triple interaction terms are negative and significant.

Overall, our results suggest that the large customers of SEO firms suffer more around SEO announcement dates when they are perceived to be more opaque and when they face higher expected relationship breakup costs. The negative impacts of expected relationship breakup costs on customer returns are particularly evident when their trading relationships involve higher relationship specificity and uniqueness.

5. Post-SEO supply chain relationships with large customers

In this section, we examine post-SEO relationships between customers and SEO firms.

5.1. Post-SEO changes in supplier dependence on its large customer

Next, we examine the change in sales to SEO firms using a multivariate framework in Table 8. The dependent variable in columns (1) and (2) is the post-SEO changes in a supplier's percent of sales to its large public customer (sales to the customer divided by total sales) from year -1 to year +1. We follow the previous literature in our choice of control variables (Bushee, 1998; Sundaram et al., 1996). As in earlier regressions, each model includes year and industry fixed effects.

¹³ Although our regressions do not include the double interaction terms in the tabulated results, we include the double interaction terms between the indicator for an SEO firm's large customer and *percent cost of goods sold*, between an SEO firm's large customer and a relationship specificity measure, and between *percent cost of goods sold* and a relationship specificity measure in the regressions in a robustness check. Our results remain qualitatively similar but we choose not to report these coefficients for the sake of brevity.

In model (1), the significant negative coefficient of an SEO issuer indicates that the percent of sales declines by an additional 4.6% for SEO issuers compared to non-SEO issuers with large customers. This is a large added decline in sales given that the median percent sales to the large customer is 16% for the full sample. This result is consistent with our major findings that after the SEO, there is a substantial decline in the supplier's relationship with its largest customers. In model (2) we divide SEO firms into two groups: SEO firms with high CAR (-1, 1) and those with low CAR (-1, 1). We find that when a supplier has a large negative SEO announcement return, the decline in the percentage sales to its large public customers is especially severe, which is consistent with the market correctly anticipating the average post-SEO decline in its major trading relationship.

In models (3) and (4), we examine the ex post trading relationship duration after the SEO using a non-parametric Cox proportional hazard model.¹⁴ The dependent variable is the hazard rate for the relationship terminating in one of the five years after the SEO, as measured in years by the post-SEO duration of the trading relationship. Consistent with the results in Fee, Hadlock, and Thomas (2006), we find that supplier size and age are negatively related to the likelihood of relationship termination (i.e., the relationship lasts longer), whereas R&D intensity is positively related to the likelihood of relationship termination (i.e., relationship duration declines). More importantly, model (3) shows that SEO issuers are more likely to lose their major trading relationships than are non-issuers. In model (4), we find that large negative SEO announcement returns are associated with a shorter remaining life for the major trading relationship, suggesting that the market correctly forecasts weakening of the major trading relationships given news of a supplier's SEO.

In untabulated tests, we repeat the hazard model estimation in models (3) and (4) using a

¹⁴ A coefficient above one is analogous to a negative coefficient in an OLS regression of the relationship's post-offer duration.

Weibull distribution as further evidence that our results are not due to model misspecification, and find qualitatively similar results. We also estimate a logit model to predict the relationship breakup probability in each year of a 5-year window after the SEO. The dependent variable equals one for the post-SEO year when the relationship terminates and is zero for all the prior years. Once again, we find qualitatively similar results using this specification. These results provide further support for the customer revelation hypothesis.

In further tests, we examine changes in the profitability of SEO issuers with large customers around SEOs using multivariate regressions. If adverse information about major customers is disclosed by the SEO, then we expect a larger decline in the profitability of SEO issuers with large customers compared to other issuers. We find that the profit margins of these issuers decline significantly more than do other SEO issuers without large customers.

5.2. Endogeneity of major customer relationships

Thus far, we have treated an issuer's decision to have a major customer relationship as exogenous to the offer announcement return. However, a relation could exist between the SEO announcement return and having a major trading relationship and this could lead to an endogeneity problem as the presence of a major customer and the SEO decision could both be determined by an omitted variable. It is also possible that an SEO is more attractive if a large customer exists. To address these issues, we follow Eisenberg, Sundgren, and Wells (1998), Loderer and Martin (1997), and Becker, Cronqvist, and Fahlenbrach (2008), who argue that an efficient method for handling this type of endogeneity problem is two equation system estimated by maximum likelihood estimation (MLE).

The results of our MLE are reported in Table 9. Our selection equation for having a large customer uses as its instrument the number of firms with large customers in the same industry as the SEO issuer divided by the total number of firms in the same industry. We label this in the table as the percent of firms in the same industry with a large customer. As expected, we

find that the coefficient of this instrumental variable is positive and significant in the first column. In the second column, we find that the coefficient on the predicted indicator for an issuer with a large customer is negative and significant at the 1% level, suggesting that the major customer relationship worsens the issuer's SEO announcement returns. Thus, our key finding that issuers with large customers suffer larger negative announcement effects relative to issuers without large customers is robust to this control for endogeneity.

6. Robustness tests

To check the robustness of our key results and rule out alternative explanations for our findings, we conduct a battery of additional tests. As alternative explanations, we consider the possibility that our major results are caused by negative industry shocks or by other endogeneity biases. We then examine whether firms with and without large public customers exhibit differences in the life cycle timing of their SEOs.

6.1. Negative industry shock

A potential alternative explanation for the negative customer returns observed in Table 4 is that they reflect negative industry shocks around SEO announcements. To investigate this alternative explanation, we examine the abnormal returns for competitors of issuers and the large public customers of these competitors. We create two portfolios of public competitors in the same industry as SEO issuers and their large customers and examine mean CAR (-1, 1) for these two competitor portfolios under the four alternative industry classifications methods: COMPUSTAT SIC codes, CRSP SIC codes, historical GICS code classifications, and a text based industry classification from Hoberg and Phillips (2010). In each case, we find that the industry competitors of the SEO issuers and their large customers have insignificant average CARs (-1, 1). These results are inconsistent with a negative industry shock explaining our findings.

6.2. *Other unobservable endogeneity biases*

Although the instrumental variables approach in Subsection 5.2 can address the endogeneity of the presence of major customers, our results may still suffer from other endogeneity biases. For example, the occurrence of SEOs may be related to the formation of the customer-supplier relationship and thus, the SEO event itself and the establishment of a new trading relationship are not independent of each other. It is also possible that an unobservable event that is correlated with SEOs and at the same time affects customer performance drives our major results. To mitigate these concerns, we conduct several additional tests.

First, to address the concern that SEO firms may form new relationships with their large customers and then sell equity to help further develop such relationships, we consider only customer-supplier relationships that occur at least two (four) years before the SEO event. As reported in the Internet Appendix, we find that our results remain significant for this sample. Second, we split our sample in half, i.e., 1986-1995 and 1996-2005, and then repeat all our major tests separately in these two subsamples. If our major results are driven by a specific event (e.g., dot-com boom and bust) that simultaneously influences firms to issue more equity and affects their major customer performance, then our results would only be present in that specific sample period. However, we find that our results hold for both subperiods, suggesting that our major results are not driven by an event specific to particular subperiod. Third, to further control for unobservable time-invariant omitted variable biases, we add industry-year fixed effects. We continue to find a strong negative relation between the presence of large customers and SEO issuer CARs (-1, 1).

Finally, we consider industry-specific characteristics to determine if our results are driven by certain industries. We investigate the differences between highly competitive industries and less competitive industries, but find significant results in both industry subsamples. We also

consider whether our results for durable industries, industries where relation-specific investment is particularly important (Titman, 1984), are different from those for non-durable industries. We find stronger results in the durable industries, although we find that our major results also hold in non-durable industries.

6.3. Firm maturity and SEOs

An alternative explanation for our results is that an SEO occurs because a firm has matured to the point that it needs to change its operating behavior (Carlson, Fisher, and Giamarino, 2010). These changes involve cutting R&D, raising advertising expenses, and finding new customers for its developed products. To rule out this maturing firm hypothesis, we match our SEO issuers with large public customers to non-SEO issuers with large public customers that publicly listed in the same year. We then examine the changes in relationships between the SEO firms and their large customers compared to the non-SEO matching firms and their large customers.

We first investigate the future duration of the relationship between SEO issuers and their large customers compared to non-SEO issuers and their large customers. We find that the average remaining life of an SEO issuer's major trading relationship is 2.94 years, whereas for non-SEO firms matched based on firm maturity, it is 3.57 years. This difference is statistically significant at the 10% level (t -statistic = 1.87). Since SEO issuer relationships decline, but similar firms that are matched on size and industry show no comparable future decline in their large relationships, this evidence suggests that the decline is not driven by industry-specific characteristics such as firm maturity.

Second, we examine changes in R&D, selling, general, administrative, and advertising expenditures in the years around an SEO. We find that SEO issuers cut their investment in these areas after an SEO. These findings are inconsistent with a lifecycle explanation for SEOs since similar matching firms do not show these declines, but the observed reductions in these

investments are consistent with SEO decisions revealing negative news about the current status of the issuer-large customer relationship.

7. Summary and conclusions

In this study, we investigate how seasoned equity offerings (SEOs) by issuers with a large customer affect the value of both trading partners and their trading relationship's post-offering strength. We argue that an SEO announcement can signal financial difficulties for an issuer's major customer as well as an expected deterioration in the value of the issuer's main supply chain relationship. Overall, we uncover a large body of evidence supporting the customer revelation hypothesis.

One important implication of our study is that unlike most prior research that examines SEO decisions from the lens of an issuer in isolation, we show that examining how SEOs are related to the financial health of issuers, their major customers, and the viability of these trading relationships is important to understanding the causes of negative SEO announcement returns documented in prior studies. Our results also suggest that in assessing SEO issue decisions and market reactions, researchers should consider important product market factors such as the size of major trading relationship-specific investments as a potential cost of losing these large customers. Thus, our study sheds new light on the valuation effects associated with SEOs and documents the importance of major trading relationships in understanding the nature of such effects.

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Table 1
Frequency distribution of seasoned equity offerings by year and industry

The sample consists of 1,946 seasoned equity offerings (SEOs), 348 of which have a large public corporate customer, reported in Thomson Financial's SDC New Issues database in the 1986–2005 period. We use the COMPUSTAT Segment Customer database field, *customer name*, to identify whether SEO issuers have large corporate customers. An issuer is defined as having a large customer when a customer represents 10% or more of an issuer's total sales. When an issuer has multiple large customers, the customer purchasing the largest amount is identified as the large customer. To determine whether a customer is publicly traded or privately held, we match the names in the COMPUSTAT Segment Customer database with those in the COMPUSTAT database. Industry classifications are based on the 10 industry sector classification on Kenneth French's website. The numbers in parentheses are those of SEO firms with a large public corporate customer.

Year	Business services	Pharmaceutical products	Electronic equipment	Retail	Other industries	Total
1986	9 (1)	4 (1)	8 (3)	6 (1)	55 (6)	82 (12)
1987	5 (0)	4 (1)	2 (0)	3 (0)	53 (6)	67 (7)
1988	3 (1)	1 (0)	2 (0)	3 (0)	21 (3)	30 (4)
1989	4 (1)	2 (1)	3 (0)	5 (0)	36 (5)	50 (7)
1990	5 (1)	1 (1)	2 (1)	4 (0)	27 (4)	39 (7)
1991	7 (2)	13 (4)	9 (1)	8 (0)	74 (8)	111 (15)
1992	9 (0)	20 (2)	4 (1)	9 (0)	75 (19)	116 (22)
1993	7 (0)	12 (2)	20 (5)	21 (0)	106 (22)	166 (29)
1994	10 (1)	3 (0)	12 (3)	7 (0)	88 (15)	120 (19)
1995	23 (3)	11 (0)	19 (9)	12 (0)	96 (17)	161 (29)
1996	23 (7)	20 (7)	8 (3)	7 (0)	103 (19)	161 (36)
1997	24 (3)	12 (4)	9 (7)	15 (0)	89 (17)	149 (31)
1998	23 (3)	6 (1)	5 (2)	7 (0)	62 (8)	103 (14)
1999	18 (3)	7 (1)	16 (7)	8 (0)	47 (3)	96 (14)
2000	37 (4)	18 (3)	25 (9)	0 (0)	34 (11)	114 (27)
2001	7 (1)	7 (1)	7 (1)	5 (0)	41 (6)	67 (9)
2002	5 (0)	2 (1)	3 (1)	9 (0)	51 (9)	70 (11)
2003	12 (5)	10 (2)	2 (1)	4 (0)	47 (10)	75 (18)
2004	10 (3)	9 (3)	7 (2)	5 (0)	59 (11)	90 (19)
2005	12 (4)	11 (4)	2 (0)	2 (0)	52 (10)	79 (18)
Total	253 (43)	173 (39)	165 (56)	140 (1)	1,216 (209)	1,946 (348)

Table 2
Issue, issuer, and major customer characteristics

The sample consists of 1,946 seasoned equity offerings (SEOs), 348 of which have a large public corporate customer, reported in Thomson Financial's SDC New Issues database in the 1986–2005 period. We use the COMPUSTAT Segment Customer database field, *customer name*, to identify whether SEO issuers have large corporate customers. An issuer is defined as having a large customer when a customer represents 10% or more of an issuer's total sales. When an issuer has multiple large customers, the customer purchasing the largest amount is identified as the large customer. To determine whether a customer is publicly traded or privately held, we match the names in the COMPUSTAT Segment Customer database with those in the COMPUSTAT database. In Panel B, matching large customers of non-SEO firms are selected from firms in the same Fama and French (1997) 48 industry as the SEO firm customer and having the closest market capitalization to the SEO firm's largest customer. Appendix A summarizes the definitions of the variables used in a table. The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. *P*-values are in parentheses.

Panel A. Issue characteristics and characteristics for SEO firms with and without large public customers						
	SEO firms with large public customers (N = 348): A		SEO firms without large public customers (N = 1,598): B		Test of difference (A - B)	
	Mean	Median	Mean	Median	<i>t</i> -test	Wilcoxon z-test
Issue characteristics:						
Proceeds (\$ millions)	92.48	46.20	84.40	46.00	0.82 (0.41)	0.35 (0.73)
Percent of secondary shares	0.30	0.16	0.31	0.136	0.39 (0.69)	0.27 (0.79)
NYSE listed	0.20	0.00	0.30	0.00	3.49*** (0.00)	3.48*** (0.00)
Shelf registration offering	0.13	0.00	0.08	0.00	2.13** (0.03)	2.13** (0.03)
SEO firm characteristics:						
Market capitalization (\$ millions)	750.84	158.90	956.57	169.28	0.41 (0.69)	0.06 (0.95)
Leverage	0.17	0.10	0.18	0.13	1.51 (0.13)	0.88 (0.38)
Stock return volatility	4.03	3.65	3.69	3.33	3.17*** (0.00)	3.89*** (0.00)
R&D / assets	0.11	0.04	0.04	0.00	0.96 (0.34)	2.43** (0.02)
Stock price run-up	0.54	0.40	0.45	0.30	2.66*** (0.01)	2.85*** (0.00)
Firm age (years)	9.16	5.00	9.81	5.00	1.01 (0.31)	0.42 (0.68)
Percent of firms in the same industry with a large customer	0.26	0.26	0.21	0.20	11.97*** (0.00)	11.36*** (0.00)
Panel B. Characteristics of large customers of SEO firms and matching large customers of non-SEO firms						
	Large public customers of SEO firms (N = 348): A		Matching large customers of non-SEO firms (N = 348): B		Test of difference (A - B)	
	Mean	Median	Mean	Median	<i>t</i> -test	Wilcoxon z-test
Customer market capitalization (\$ billions)	41.11	18.32	39.05	18.88	0.40 (0.69)	0.35 (0.73)
Customer leverage	0.16	0.15	0.18	0.15	1.05 (0.29)	2.26** (0.02)
Customer stock return volatility	2.35	2.00	3.63	2.96	8.63*** (0.00)	8.23*** (0.00)

Table 3

Cumulative abnormal returns and wealth changes of issuers around seasoned equity offering announcement dates by the presence of large customers

The sample consists of 1,946 seasoned equity offerings (SEOs), 348 of which have a large public corporate customer, reported in Thomson Financial's SDC New Issues database in the 1986–2005 period. We use the COMPUSTAT Segment Customer database field, *customer name*, to identify whether SEO issuers have large corporate customers. An issuer is defined as having a large customer when a customer represents 10% or more of an issuer's total sales. When an issuer has multiple large customers, the customer purchasing the largest amount is identified as the large customer. To determine whether a customer is publicly traded or privately held, we match the names in the COMPUSTAT Segment Customer database with those in the COMPUSTAT database. The abnormal returns are calculated using four different benchmark approaches. The abnormal returns using the market model are estimated with returns from days -301 to -46 relative to the SEO announcement date (AD). The equal-weighted CRSP index return is used as the proxy for the market portfolio. The daily abnormal returns are accumulated to obtain the cumulative abnormal return (CAR) from day -1 before the announcement date to day +1 after the announcement date. Market-adjusted CAR (-1, 1) is calculated by subtracting the three day equally-weighted CRSP index return from a firm's three day raw return. Industry-adjusted CAR (-1, 1) is calculated by subtracting the three day mean return for the Fama and French (1997) 48 industry portfolio from a firm's three day raw return. Size-Industry adjusted CAR (-1, 1) is calculated by subtracting the equally-weighted portfolio return of stocks in the same size quintile and the same Fama and French (1997) 48 industry classification from a firm's three day raw return. The symbols ***, **, and * denote that values are significantly different from zero at the 1%, 5%, and 10% levels, respectively. +, ‡, and ‡‡ denote that the two values are significantly different from each other at the 10%, 5% and 1% levels, respectively. *P*-values are in parentheses.

Panel A: Cumulative abnormal returns (-1, 1) for SEO firms with and without a large public customer over the three day SEO announcement period

	SEO firms with large public customers (N = 348): A				SEO firms without large public customers (N = 1,598): B				Test of difference (B-A)	
	Mean	<i>t</i> -test	Median	Signed-rank statistics	Mean	<i>t</i> -test	Median	Signed-rank statistics	<i>t</i> -test	Mann-Whitney z-test
Market-model CAR (-1, 1)	-4.19%	7.39*** (0.00)	-3.83%	10.12*** (0.00)	-2.90%	17.82*** (0.00)	-2.71%	18.23*** (0.00)	2.94‡‡ (0.00)	3.06‡‡ (0.00)
Market-adjusted CAR (-1, 1)	-2.86%	7.93*** (0.00)	-2.90%	8.70*** (0.00)	-2.16%	13.54*** (0.00)	-2.13%	14.93*** (0.00)	1.83+ (0.07)	2.38‡ (0.02)
Industry-adjusted CAR (-1, 1)	-3.10%	8.56*** (0.00)	-2.90%	9.18*** (0.00)	-2.40%	14.85*** (0.00)	-2.27%	15.77*** (0.00)	1.82+ (0.07)	2.29‡ (0.04)
Size-industry adjusted CAR (-1, 1)	-2.43%	6.35*** (0.00)	-2.52%	7.22*** (0.00)	-1.80%	10.83*** (0.00)	-1.77%	12.21*** (0.00)	1.59 (0.11)	2.08‡ (0.04)

Panel B: Wealth changes for SEO firms with and without a large public customer over the three day SEO announcement period

	SEO firms with large public customers (N = 348): A				SEO firms without large public customers (N = 1,598): B				Test of difference (B-A)	
	Mean	<i>t</i> -test	Median	Signed-rank statistics	Mean	<i>t</i> -test	Median	Signed-rank statistics	<i>t</i> -test	Mann-Whitney z-test
Wealth change (\$ millions)	-33.87	2.86***	-4.81	9.84***	-22.79	2.85***	-3.12	16.75***	0.61	2.61‡

Table 4

Cumulative abnormal returns and wealth changes of large public customers of SEO firms around seasoned equity offering announcement dates

The sample consists of 348 large public customers of SEO firms and 348 control large public customers of non-SEO firms, matched by industry and size, reported in Thomson Financial's SDC New Issues database in the 1986–2005 period. We use the COMPUSTAT Segment Customer database field, *customer name*, to identify whether SEO issuers have large corporate customers. An issuer is defined as having a large customer when a customer represents 10% or more of an issuer's total sales. When an issuer has multiple large customers, the customer purchasing the largest amount is identified as the large customer. To determine whether a customer is publicly traded or privately held, we match the names in the COMPUSTAT Segment Customer database with those in the COMPUSTAT database. The abnormal returns are calculated using four different benchmark approaches. The abnormal returns using the market model are estimated with returns from days -301 to -46 relative to the SEO announcement date (AD). The equal-weighted CRSP index return is used as the proxy for the market portfolio. The daily abnormal returns are accumulated to obtain the cumulative abnormal return (CAR) from day -1 before the announcement date to day +1 after the announcement date. Market-adjusted CAR (-1, 1) is calculated by subtracting the three day equally-weighted CRSP index return from a firm's three day raw return. Industry-adjusted CAR (-1, 1) is calculated by subtracting the three day mean return for the Fama and French (1997) 48 industry portfolio from a firm's three day raw return. Size-Industry adjusted CAR (-1, 1) is calculated by subtracting the equally-weighted portfolio return of stocks in the same size quintile and the same Fama and French (1997) 48 industry classification from a firm's three day raw return. Matching large customers of non-SEO firms are selected from firms in the same Fama and French (1997) 48 industry as the SEO firm customer and having the closest market capitalization to the SEO firm's largest customer. The symbols ***, **, and * denote that values are significantly different from zero at the 1%, 5%, and 10% levels, respectively. +, ‡, and †† denote that the two values are significantly different from each other at the 10%, 5% and 1% levels, respectively. *P*-values are in parentheses.

Panel A: Cumulative abnormal returns (-1, 1) for large public customers of SEO firms (N = 348) and matching large public customers of non-SEO firms (N = 348)

	Large public customers of SEO firms (N = 348): A				Matching large public customers of non-SEO firms (N = 348): B				Test of difference (B-A)	
	Mean	<i>t</i> -test	Median	Signed-rank statistics	Mean	<i>t</i> -test	Median	Signed-rank statistics	<i>t</i> -test	Mann-Whitney <i>z</i> -test
Market-model CAR (-1, 1)	-1.15%	5.46*** (0.00)	-1.12%	6.07*** (0.00)	-0.33%	0.88 (0.38)	-0.46%	1.45 (0.15)	1.88+ (0.06)	2.63‡ (0.01)
Market-adjusted CAR (-1,1)	-0.92%	4.49*** (0.00)	-0.94%	5.33*** (0.00)	-0.28%	1.36 (0.00)	-0.55%	2.38‡ (0.02)	2.65‡ (0.01)	1.77+ (0.08)
Industry-adjusted CAR (-1, 1)	-1.11%	5.65*** (0.00)	-1.29%	6.77*** (0.00)	-0.52%	1.36 (0.18)	-0.53%	2.38‡ (0.02)	1.45 (0.15)	1.76+ (0.08)
Size-industry adjusted CAR (-1, 1)	-0.95%	4.62*** (0.00)	-0.95%	5.39*** (0.00)	-0.36%	0.97 (0.33)	-0.30%	1.75+ (0.08)	1.45 (0.15)	1.76+ (0.08)

Panel B: Wealth changes for large public customers of SEO firms and matching large public customers of non-SEO firms over the three day SEO announcement period

	Large public customers of SEO firms (N = 348): A				Matching public customers of non-SEO firms (N = 348): B				Test of difference (B-A)	
	Mean	<i>t</i> -test	Median	Signed-rank statistics	Mean	<i>t</i> -test	Median	Signed-rank statistics	<i>t</i> -test	Mann-Whitney <i>z</i> -test
Wealth change (\$ millions)	-\$446.80	3.03***	-68.38	5.54***	\$1.23	0.28	-2.38	0.61	2.75‡ (0.00)	4.24†† (0.00)

Table 5
Changes in performance of large public customers of SEO firms, matching customers of non-SEO firms, and SEO firms

In Panels A, B, and C, the sample consists of 348 large public customers of SEO issuers and 348 matching large public customers of non-SEO issuers, reported in Thomson Financial's SDC New Issues database in the 1986–2005 period. In Panel D, the sample consists of 348 SEO firms with a large public customer during the same period. We use the COMPUSTAT Segment Customer database field, *customer name*, to identify whether SEO issuers have large corporate customers. An issuer is defined as having a large customer when a customer represents 10% or more of an issuer's total sales. When an issuer has multiple large customers, the customer purchasing the largest amount is identified as the large customer. To determine whether a customer is publicly traded or privately held, we match the names in the COMPUSTAT Segment Customer database with those in the COMPUSTAT database. Matching large customers of non-SEO firms are selected from firms in the same Fama and French (1997) 48 industry as the SEO firm customer and having the closest market capitalization to the SEO firm's largest customer. Sale to all other customers are measured as total sales of the supplier to the customer minus supplier sales to the largest customer. The numbers reported are the median values. ROA is measured by COMPUSTAT data item ni/assets. Profit margin is measured by COMPUSTAT data item ni/sale. Credit ratings are generated from the COMPUSTAT data item splticrm and adjusted to the historical numerical values reported in Appendix B for the Wilcoxon Rank-sum tests.

Panel A. Sales of an SEO firm to its largest customer and to all its other customers and sales of a non-SEO firm to its matching largest customer and to all its other customers

Year relative to offering	Sales of SEO firms to large customers (N=348): A	Sales of non-SEO firms to matching large customers (N=348): B	Wilcoxon rank-sum test B - A	Sales of SEO firms to all other customers (N=348): C	Sales of non-SEO firms to all other customers (N=348): D	Wilcoxon rank-sum test D - C
Year -4	15.62	14.55	0.51	89.11	50.70	1.92*
Year -3	17.53	13.31	0.21	73.14	39.46	1.55
Year -2	13.81	12.39	0.14	56.86	44.60	1.23
Year -1	17.88	15.43	0.09	59.71	39.62	2.37**
Year 0	15.97	16.00	-0.95	86.53	35.70	5.04***
Year 1	13.86	16.63	-1.25	102.86	44.64	4.75***
Year 2	13.50	16.58	-2.02**	117.24	47.34	4.46***
Year 3	13.08	16.31	-2.47**	142.88	48.29	4.71***
Year 4	13.94	16.78	-2.65***	158.83	56.46	4.68***

Panel B. Operating performance of the largest customers of SEO firms and the matching largest customers of the non-SEO firms

Year relative to offering	ROA of large customers of SEO firms (N=348): A	ROA of matching large customers of non-SEO firms (N=348): B	Wilcoxon rank-sum test B - A	Profit margin of large customers of SEO firms (N=348): C	Profit margin of matching large customers of non-SEO firms (N=348): D	Wilcoxon rank-sum test D - C
Year -4	5.50%	4.87%	0.55	4.13%	4.05%	0.26
Year -3	5.36%	5.41%	0.70	4.15%	4.17%	1.31
Year -2	5.10%	4.81%	0.26	4.14%	4.08%	0.25
Year -1	6.10%	4.72%	1.44	4.72%	4.29%	1.23
Year 0	5.27%	4.53%	0.05	4.75%	4.11%	1.59
Year 1	4.35%	4.79%	-1.36	3.58%	4.13%	-1.35
Year 2	4.28%	4.85%	-1.98**	3.59%	4.13%	-2.05**
Year 3	4.24%	5.00%	-1.95*	3.60%	4.07%	-1.88*
Year 4	4.49%	4.94%	-1.38	3.47%	4.34%	-1.13

Panel C. Credit rating of largest customers of SEO firms and the matching largest customers of the non-SEO firms

Year relative to offering	Credit rating of large customers of SEO firms (N=348): A	Credit rating of matching large customers of non-SEO firms (N=348): B	Wilcoxon rank-sum test B - A
Year -4	BB	BBB	-1.03
Year -3	BB	BB+	-1.54
Year -2	BB	BB	-1.56
Year -1	BB	BB	-1.49
Year 0	BB-	BB	-1.77*
Year 1	BB-	BB	-1.96**
Year 2	BB-	BBB-	-2.32**
Year 3	BB-	BBB-	-2.05**
Year 4	BB	BBB+	-1.75*

Panel D. Operating performance of SEO firms

Year relative to offering	ROA of SEO firms	Profit margin of SEO firms	Credit rating of SEO firms
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	(N=348)	(N=348)	(N=348)
Year -4	3.69%	2.98%	BB-
Year -3	2.44%	1.91%	BB-
Year -2	3.37%	2.51%	BB-
Year -1	4.16%	3.80%	BB-
Year 0	5.23%	5.15%	BB-
Year 1	2.82%	2.70%	BB-
Year 2	2.39%	2.18%	BB-
Year 3	1.57%	1.42%	BB-
Year 4	1.20%	1.36%	BB-

Table 6

Ordinary least square regressions of cumulative abnormal returns of issuers around seasoned equity offering announcement dates

The sample consists of 1,946 seasoned equity offerings (SEOs), 348 of which have a large public corporate customer, reported in Thomson Financial's SDC New Issues database in the 1986–2005 period. We use the COMPUSTAT Segment Customer database field, *customer name*, to identify whether SEO issuers have large corporate customers. An issuer is defined as having a large customer when a customer represents 10% or more of an issuer's total sales. When an issuer has multiple large customers, the customer purchasing the largest amount is identified as the large customer. To determine whether a customer is publicly traded or privately held, we match the names in the COMPUSTAT Segment Customer database with those in the COMPUSTAT database. The dependent variable is the cumulative abnormal return (CAR) for SEO firms from day -1 before the announcement date to day +1 afterwards. The abnormal returns are calculated using the market model. The market model is estimated using returns from days -301 to -46 relative to the SEO announcement date. The equally weighted CRSP index return is used as the proxy for the market portfolio. The daily abnormal returns are accumulated to obtain the CAR. All regressions include indicator variables for each of Fama and French's (1997) 10 industries and year. Standard errors that are heteroscedastic robust and clustered by industry are reported in parentheses. Appendix A summarizes the definitions of the variables used in a table. The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Large customer	-1.053*** (0.369)				-1.411*** (0.319)	-1.283*** (0.302)	-0.951** (0.411)	-1.158*** (0.274)
Information Asymmetry								
High volatility customer		-1.003* (0.529)						
Low volatility customer		-1.106 (0.759)						
Customer without analyst coverage			-1.401* (0.739)					
Customer with analyst coverage			-0.348 (0.961)					
Relationship importance								
Above median percent sales				-0.831** (0.421)				
Below median percent sales				-0.800 (0.794)				
Relationship specificity								
Durable goods industry					2.335*** (0.403)			
Durable goods industry x large customer					-3.254*** (0.764)			
Technology intensive						-0.090 (0.690)		
Technology intensive x large customer						-2.294* (1.351)		
Relationship uniqueness								
High R&D intensity							1.243*** (0.451)	
High R&D intensity x large customer							-1.671*** (0.592)	
High trademark intensity								0.044 (0.469)
High trademark intensity x large customer								-1.062* (0.590)
Issue characteristics								
Proceeds / market capitalization	-0.020*** (0.005)	-0.020*** (0.005)	-0.020*** (0.005)	-0.020*** (0.005)	-0.019*** (0.004)	-0.019*** (0.004)	-0.020*** (0.004)	-0.019*** (0.004)
Percent secondary shares	-0.578 (0.492)	-0.581 (0.478)	-0.561 (0.502)	-0.579 (0.487)	-0.704 (0.424)	-0.646 (0.432)	-0.627 (0.410)	-0.657 (0.419)
NYSE listed	0.533** (0.259)	0.533** (0.262)	0.545** (0.266)	0.543** (0.266)	0.526* (0.291)	0.508* (0.299)	0.574* (0.310)	0.509 (0.309)
Shelf registration offering	2.564*** (0.561)	2.565*** (0.564)	2.585*** (0.565)	2.543*** (0.550)	2.643*** (0.571)	2.473*** (0.562)	2.577*** (0.590)	2.547*** (0.581)
Other control variables								
Log (market capitalization)	-0.264 (0.241)	-0.264 (0.243)	-0.275 (0.250)	-0.263 (0.241)	-0.301 (0.218)	-0.268 (0.199)	-0.315 (0.217)	-0.296 (0.223)

Stock price run-up	-0.617** (0.298)	-0.618** (0.298)	-0.622** (0.298)	-0.620** (0.297)	-0.676** (0.291)	-0.642** (0.300)	-0.659** (0.295)	-0.657** (0.292)
Return volatility	-42.037* (22.592)	-41.926* (22.593)	-41.914* (22.761)	-42.123* (22.698)	-43.868** (20.337)	-41.966** (19.819)	-44.404** (21.243)	-41.749** (20.567)
R&D / assets	1.990** (0.968)	1.982** (0.926)	2.013** (0.984)	2.004** (0.972)	1.797** (0.898)	1.643* (0.866)	1.255 (1.255)	1.781* (0.996)
Strategic alliance	4.266* (2.252)	4.280* (2.283)	4.472* (2.292)	4.044* (2.246)	4.137* (2.222)	5.323** (2.585)	4.798** (2.319)	4.252* (2.261)
Log (1+firm age)	0.230 (0.228)	0.231 (0.232)	0.232 (0.231)	0.233 (0.233)	0.226 (0.229)	0.229 (0.242)	0.203 (0.244)	0.231 (0.231)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1,946	1,946	1,946	1,946	1,946	1,946	1,946	1,946
R ²	6.35	6.35	6.42	6.25	6.34	6.52	6.58	6.38

Table 7

Ordinary least square regressions of cumulative abnormal returns of large public customers of issuers around seasoned equity offering announcement dates

The sample consists of 348 large public customers of seasoned equity offering (SEO) firms and 348 matching large public customers of firms that do not engage in an SEO, reported in Thomson Financial's SDC New Issues database in the 1986–2005 period. We use the COMPUSTAT Segment Customer database field, *customer name*, to identify whether SEO issuers have large corporate customers. Matching customers are the large customers of non-SEO firms and are selected from firms in the same Fama and French (1997) 48 industry as the SEO firm customer and having the closest market capitalization to the SEO firm's largest customer. An issuer is defined as having a large customer when a customer represents 10% or more of an issuer's total sales. When an issuer has multiple large customers, the customer purchasing the largest amount is identified as the large customer. To determine whether a customer is publicly traded or privately held, we match the names in the COMPUSTAT Segment Customer database with those in the COMPUSTAT database. The dependent variable is the cumulative abnormal return CAR (-1, 1) for large public customers of issuers from day -1 before the announcement date to day +1 afterwards. The abnormal returns are calculated using the market model. The market model is estimated using returns from days -301 to -46 relative to the SEO announcement date. The equally weighted CRSP index return is used as the proxy for the market portfolio. The daily abnormal returns are accumulated to obtain the CAR. All regressions include indicator variables for each of Fama and French's (1997) 10 issuer industries and year except where noted. Standard errors that are heteroscedastic robust and clustered by industry are reported in parentheses. Appendix A summarizes the definitions of the variables used in a table. The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SEO firm customer: a	-1.243*	-0.027	-0.429	-1.129*	-1.169*	-1.256*	-1.220*	-1.219*
	(0.705)	(0.700)	(0.858)	(0.658)	(0.648)	(0.670)	(0.669)	(0.655)
Information Asymmetry								
Customer stock volatility: b		-9.303						
		(21.745)						
a x b		-67.494**						
		(28.082)						
Customer without analyst coverage: c			0.800					
			(0.840)					
a x c			-1.683*					
			(0.926)					
Relationship importance								
Percent cost of goods sold: d				1.905	-0.045	0.360	1.199	0.800
				(2.406)	(0.507)	(1.862)	(1.903)	(1.984)
a x d				-5.233**				
				(2.408)				
Relationship specificity								
Durable goods industry: e					-0.012			
					(2.049)			
a x d x e					-13.064***			
					(3.303)			
Technology intensive: f						1.480		
						(1.079)		
a x d x f						-7.157***		
						(2.480)		
Relationship uniqueness								
High R&D intensity: g							-0.242	
							(0.522)	
a x d x g							-8.365**	
							(3.308)	
High trademark intensity: h								0.396
								(0.644)
a x d x h								-5.020*
								(2.591)
Control variables								
Log (issuer market capitalization)	0.252	0.258	0.251	0.275	0.246	0.224	0.289	0.279
	(0.185)	(0.178)	(0.183)	(0.180)	(0.178)	(0.183)	(0.186)	(0.180)
R&D / assets	-0.100	-0.292	-0.154	-0.069	-0.445	0.538	0.900	0.061
	(2.478)	(2.501)	(2.421)	(2.467)	(2.541)	(2.396)	(1.591)	(2.456)
Strategic alliance	-4.874**	-4.735**	-4.772**	-4.878**	-4.645**	-5.156**	-4.901**	-4.746**
	(2.116)	(1.984)	(2.145)	(2.148)	(2.170)	(2.129)	(2.149)	(2.172)
Log (1+issuer age)	0.326*	0.303	0.320*	0.343*	0.287	0.359*	0.297	0.357*
	(0.185)	(0.192)	(0.184)	(0.189)	(0.201)	(0.189)	(0.184)	(0.199)

Pre-SEO relationship length (years)	0.023 (0.099)	0.016 (0.098)	0.028 (0.098)	0.025 (0.100)	0.020 (0.100)	0.015 (0.098)	0.011 (0.097)	0.027 (0.100)
Negative free cash flow	1.225* (0.670)	1.264* (0.699)	1.176* (0.685)	1.228* (0.665)	1.264* (0.659)	1.243* (0.661)	1.289 (0.677)	1.261* (0.746)
Log (customer market capitalization)	-0.053 (0.133)	-0.149 (0.144)	-0.061 (0.134)	-0.097 (0.124)	-0.066 (0.125)	-0.071 (0.113)	-0.101 (0.120)	-0.091 (0.119)
Same industry	0.809 (0.617)	0.745 (0.610)	0.795 (0.602)	0.805 (0.615)	0.859 (0.634)	0.767 (0.591)	0.745 (0.604)	0.777 (0.644)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	696	696	696	696	696	696	696	696
R ²	12.97	14.05	13.41	13.49	13.57	13.68	13.92	13.38

Table 8

Post-SEO changes in sales and relationship duration for SEO firms and non-SEO matching firms with their large public customers

The sample consists of 348 seasoned equity offering (SEO) issuers with large public customers and 348 non-SEO issuers with large public customers, reported in Thomson Financial's SDC New Issues database in the 1986–2005 period. We use the COMPUSTAT Segment Customer database field, *customer name*, to identify whether SEO issuers have large corporate customers. Matching customers are the large customers of non-SEO firms and are selected from firms in the same Fama and French (1997) 48 industry as the SEO firm customer and having the closest market capitalization to the SEO firm's largest customer. An issuer is defined as having a large customer when a customer represents 10% or more of an issuer's total sales. When an issuer has multiple large customers, the customer purchasing the largest amount is identified as the large customer. To determine whether a customer is publicly traded or privately held, we match the names in the COMPUSTAT Segment Customer database with those in the COMPUSTAT database. Each non-issuer with a large public corporate customer is matched to an SEO firm with a large public corporate customer by industry (Fama and French's (1997) 10 industry classifications), size (market value of equity), and number of years a supplier maintains a relationship with its large public customer prior to SEO. The dependent variables are the change in sales from year -1 to year +1 relative to the SEO year in models (1) and (2) and the hazard rate for the relationship terminating in the years after the SEO in models (3) and (4). Each firm relationship has one observation. The control variables are measured at the beginning of each year. Note that models (1) and (2) use a smaller number of sample in the analysis since some firms do not have sufficient information to measure the change in firm sales. All regressions include indicator variables for each of Fama and French's (1997) 10 issuer industries and year. Standard errors are heteroscedastic robust and clustered by industry are reported in parentheses. Appendix A summarizes the definitions of the variables used in a table. The symbols *** and ** denote significance at the 1% and 5% levels, respectively.

	Sales		Cox Hazard Model	
	(1)	(2)	(3)	(4)
SEO issuer	-0.046** (0.020)		1.194*** (0.066)	
SEO issuer with high CAR		-0.023 (0.022)		1.060 (0.056)
SEO issuer with low CAR		-0.053*** (0.026)		1.347*** (0.132)
Control variables				
Log (market capitalization)	-0.011 *** (0.002)	-0.011 *** (0.002)	0.932** (0.027)	0.932** (0.027)
R&D / assets	-0.059 (0.051)	-0.056 (0.049)	1.459** (0.248)	1.511** (0.259)
Strategic alliance	-0.019 (0.025)	-0.017 (0.026)	0.970 (0.094)	0.944 (0.094)
Log (1+ issuer age)	0.012 (0.010)	0.011 (0.009)	0.937*** (0.045)	0.938*** (0.044)
Negative free cash flow	-0.030** (0.011)	-0.030** (0.011)	1.243 (0.130)	1.233 (0.128)
Pre-SEO relationship length (years)	-0.006 (0.004)	-0.007 (0.004)	1.002 (0.015)	1.001 (0.015)
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
N	420	420	696	696
R ² / Root MSE	12.10	12.40	-3329.817	-3327.966

Table 9
MLE regression of cumulative abnormal returns (CARs) for seasoned equity offering (SEO) firms around the SEO announcement date on explanatory variables: Controlling for endogeneity

The sample consists of 1,946 seasoned equity offering (SEO) issuers, 348 of which have a large public corporate customer, reported in Thomson Financial's SDC New Issues database in the 1986–2005 period. We use the COMPUSTAT Segment Customer database field, *customer name*, to identify whether SEO issuers have large corporate customers. An issuer is defined as having a large customer when a customer represents 10% or more of an issuer's total sales. When an issuer has multiple large customers, the customer purchasing the largest amount is identified as the large customer. To determine whether a customer is publicly traded or privately held, we match the names in the COMPUSTAT Segment Customer database with those in the COMPUSTAT database. We use a maximum likelihood instrumental variables approach to control for the endogeneity of the presence of a large customer. Our selection equation for having a large customer uses as its instrument the number of firms with large customers in the same industry as the SEO firm divided by the total number of firms in the same industry (*percent of firms in the same industry with a large customer*). We use this instrument in the MLE system to predict the effect of the presence of a large customer on abnormal announcement returns for SEO firm. The abnormal return is calculated using the market model, which is estimated using returns from days -301 to -46 relative to the SEO announcement date. The equally weighted CRSP index return is used as the proxy for the market portfolio. The daily abnormal returns are accumulated to obtain the cumulative abnormal return (CARs) from day -1 before the announcement date to day +1 afterwards. All regressions include indicator variables for each year. Standard errors are heteroscedastic robust and clustered by industry are reported in parentheses. Appendix A summarizes the definitions of the variables used in table. The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Dependent variable = an indicator for issuers having a large public customer	Dependent variable = SEO firm CAR (-1, 1)
Percent of firms in same industry with a large customer (instrument):	2.458*** (0.307)	
Instrumented indicator for issuer having a large public customer:		-1.987*** (0.362)
Issue characteristics		
Proceeds / market capitalization	0.000 (0.001)	-0.018*** (0.004)
Percent of secondary shares	0.080 (0.087)	-0.570 (0.462)
NYSE listed	-0.191 (0.127)	0.453* (0.249)
Shelf registration offering	0.505*** (0.102)	2.654*** (0.513)
Other control variables		
Log (market capitalization)	0.004 (0.024)	-0.224 (0.219)
Stock price run-up	0.065 (0.082)	-0.594** (0.293)
Stock return volatility	0.903 (2.747)	-40.134* (22.083)
R&D / assets	-0.097 (0.281)	2.308** (1.102)
Strategic alliance	7.492*** (0.145)	4.647** (2.181)
Log (1+firm age)	-0.030 (0.067)	0.252 (0.187)
Industry fixed effects		No
Year fixed effects		Yes
N		1,946
Log Pseudo likelihood		-7429.466

Appendix A: Variable definitions

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

Variable name	Definition
<i>Above (below) median percent sales</i>	An indicator variable taking a value of one if the percent of sales to the customer is above (below) the median.
<i>Credit rating</i>	The Standard and Poor's credit rating as provided by COMPUSTAT data item splticrm. Empirical tests use the numeric values for the credit rating as provided in Appendix B.
<i>Customer with (without) analyst coverage</i>	An indicator variable taking a value of one if the customer has (does) not have analyst coverage according to the IBES database.
<i>Customer stock volatility</i>	The daily stock return volatility of the customer for the calendar year before the SEO event.
<i>Firm age</i>	The number of years since the SEO firm first reported data at (book value of assets) in the COMPUSTAT database.
<i>Durable goods industry</i>	An indicator variable taking a value of one for SEO firms in durable industries as defined by the US Census Bureau. The Census Bureau classification of durable industry firms is available at .
<i>High R&D intensity</i>	An indicator variable taking a value of one if the SEO firm has above-the-median R&D/total assets and zero otherwise.
<i>High trademark intensity</i>	An indicator variable taking a value of one if the SEO firm is in an industry with above-the-median number of trademarks and zero otherwise. The number of trademarks in each industry is obtained from the US Patent and Trademark Office at .
<i>High (low) volatility customer</i>	An indicator variable taking a value of one if the large customer has a daily stock volatility above (below) the sample median value.
<i>Large customer</i>	An indicator variable taking a value of one if the firm discloses a customer that accounts for greater than 10% of its sales and zero otherwise.
<i>Leverage</i>	COMPUSTAT (dltt + dlc) / at in the year before the SEO, winsorized at the 95 th percentile.
<i>Market capitalization</i>	COMPUSTAT data csho* prcc_f in the year before the SEO. For firms missing COMPUSTAT observations, CRSP data using the shares outstanding and closing price for the month before the SEO announcement is utilized.
<i>Negative free cash flow</i>	An indicator variable taking a value of one if COMPUSTAT data ib + data dp – data capx in the year before the SEO is less than zero and zero otherwise.
<i>NYSE listed</i>	An indicator variable taking a value of one if the SEO firm trades on the New York Stock Exchange as reported in COMPUSTAT and zero otherwise.
<i>Percent of cost of goods sold</i>	Issuer dollar sales to the large customer divided by the large customer COMPUSTAT data cogs.
<i>Percent of firms in same industry with a large customer</i>	The number of firms with large customers in the same industry (Fama and French (1997) 48 industry) as the SEO firm divided by the total number of firms in the same industry.
<i>Percent of sales to customer</i>	Issuer dollar sales to the large customer divided by issuer COMPUSTAT sale.
<i>Percent of secondary shares</i>	Number of shares sold by firm insiders based on the offering prospectus divided by the total shares sold in the offer.
<i>Pre-SEO relationship length</i>	The number of years from the first time the customer shows up in filings as a large public customer until the SEO year.
<i>Proceeds</i>	Number of shares issued in the offer times the offer price as reported in the SDC Platinum New Issues database.
<i>Profit margin</i>	COMPUSTAT data item ni/sale.

<i>R&D / assets</i>	COMPUSTAT xrd / at in the year before the SEO.
<i>ROA</i>	Return on assets (ROA) measured as ni / at.
<i>Same industry</i>	An indicator variable taking a value of one if the SEO firm and its large public customer are at least in the same 2-digit industry and zero otherwise.
<i>SEO firm</i>	An indicator variable taking a value of one if the firm engages in an SEO and zero otherwise.
<i>SEO issuer with high (low) CAR</i>	An indicator variable taking a value of one if the SEO issuer has an announcement return above (below) the sample median CAR.
<i>Shelf registration offering</i>	An indicator variable taking a value of one if the SEO offer is a shelf offer according to SEC Rule 415.
<i>Stock price run-up</i>	The buy-and-hold return for the SEO firm from day -90 to day -11 before the SEO announcement date. In 83 cases, there were insufficient returns available, so we utilized the returns that were available.
<i>Stock return volatility</i>	Daily stock return standard deviation for the SEO issuer from day -90 to day -11 before the SEO announcement.
<i>Strategic alliance</i>	An indicator variable taking a value of one if the SEO firm and the large public customer have a strategic alliance as described in the SEO firm prospectus of the annual report. Firms with joint venture agreements, marketing agreements, development agreements, and licensing agreements are all classified as having strategic alliances (Chan et al., 1997).
<i>Technology intensive</i>	Following Loughran and Ritter (2004), we define a technology firm as having one of the following 4-digit SIC codes: 3571, 3572, 3575, 3577, 3578, 3661, 3663, 3669, 3671, 3672, 3674, 3675, 3677–3679, 3812, 3823, 3825–3827, 3829, 3841, 3845, 4812, 4813, 4899, 7371–7375, 7378, and 7379.
<i>Wealth change</i>	The three day CAR (-1, 1) multiplied by the firm market capitalization.

Appendix B: Standard and Poor's Credit Rating Coding

This appendix provides a detailed description of the credit rating coding utilized in the test for the statistical significance of the credit rating in Table 5. We utilize the COMPUSTAT data item splterm, replacing the credit rating with the numerical code from the historical COMPUSTAT data 280 for our numerical tests of significance.

S&P credit rating	Numerical code
Investment credit rating	
AAA	2
AA+	4
AA	5
AA-	6
A+	7
A	8
A-	9
BBB+	10
BBB	11
BBB-	12
Speculative credit rating	
BB+	13
BB	14
BB-	15
B+	16
B	17
B-	18
CCC+	19
CCC	20
CCC-	21