The Bonding Hypothesis of Takeover Defenses: Evidence from IPO Firms

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Abstract

We propose and test an efficiency explanation for why firms deploy takeover defenses using IPO firm data. Takeover defenses bond the firm's commitments by reducing the likelihood that an outside takeover will change the firm's operating strategy and impose costs on its trading partners. This bond, in turn, encourages the firm's trading partners to invest in their business relationship with the firm. Consistent with this hypothesis, we find that IPO firms deploy more takeover defenses when they have customers, suppliers, or strategic partners that are vulnerable to changes in the firm's operating strategy. An IPO firm's valuation and subsequent operating performance both are positively related to its use of takeover defenses, particularly when it has dependent customers, suppliers, or strategic partners. Share values at the IPO firm's large customers are affected by the IPO announcement, and the effect is positively related to the IPO firm's use of takeover defenses. We also find that the IPO firm's use of takeover defenses is positively related to the longevity of its business relationships, indicating that defenses do in fact help to bond the IPO firm's commitments to its business partners. These results indicate that takeover defenses are one mechanism by which IPO firms can ameliorate the hold-up problem that arises when firms develop close working relationships with customers, suppliers, and strategic partners.

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I. Introduction

Takeover defenses remain one of the most controversial aspects of corporate governance. Conventional wisdom holds that takeover defenses serve primarily to entrench managers at shareholders' expense.[1] Reflecting this view, shareholder advisory groups frequently advise their clients to vote against the adoption of new defenses and for the repeal of existing defenses.[2] Researchers frequently use the G-Index and E-Index as measures of governance quality, with higher numbers of takeover defenses indicating poorer governance (e.g., see Masulis, Wang, and Xie, 2007; Giroud and Mueller, 2011; Duchin and Sosyura, 2013).

A contrasting view, however, is that takeover defenses convey benefits to shareholders. DeAngelo and Rice (1983) and Stulz (1988) show that defenses can increase managers' ability to extract higher premiums in the event of takeover. Stein (1988) and Chemmanur and Jiao (2012) argue that defenses can protect valuable firm projects that uninformed or myopic investors undervalue in financial markets. These views are espoused by leading practitioners (e.g., see Lipton 2002), and are consistent with some empirical findings (e.g., see Cen, Dasgupta, and Sen 2011; Humphrey-Jenner 2013; Smith 2013).

In this paper we examine a different path by which takeover defenses can create value. Knoeber (1986) and Shleifer and Summers (1988) propose that takeover defenses increase firm value by committing the firm to a business strategy that cannot easily be reversed via outside takeover.[3] This decreases the probability that the firm will act opportunistically towards its large customers and other stakeholders, encouraging them to invest in the business relationship. By

[1] For examples, see Easterbrook and Fischel (1991), Bebchuk, Coates and Subramanian, (2002), and Gompers, Ishii, and Metrick (2003).
[2] See, for examples: "The Shareholder Rights Project 2012 Report," Harvard Law School, February 13, 2013, available at http://srp.law.harvard.edu/releases/SRP-2012-Annual-Report.pdf; "Insitutional Shareholder Services Releases 2013 Proxy Voting Policies," November 16, 2012, available at http://www.issgovernance.com/press/2013policies.
[3] See also Agrawal and Knoeber (1998), Coates (2001), Pontiff, Shleifer, and Weisbach (1990), Cremers, Nair, and Peyer (2008), and Cen, Dasgupta, and Sen (2012).

bonding its contractual performance with counterparties, the firm gains favorable contracting terms that increase firm value. We call this the bonding hypothesis of takeover defenses.

The bonding hypothesis can be illustrated with an example. LMI Aerospace, Inc. produces close tolerance aluminum and specialty alloy components for the aerospace and defense industries. LMI's largest customer, accounting for 10% of sales in the year it went public (1998), is The Boeing Company. Boeing, in turn, relies heavily on LMI for specialty parts. It has invested heavily in its business relationship with LMI, to the point where LMI's engineers have detailed knowledge of Boeing's design and manufacturing processes. Boeing's investment in and reliance upon its partnership with LMI exposes it to what Klein, Crawford, and Alchian (1978) call a hold-up problem: LMI could opportunistically abrogate its contracts with Boeing and demand a higher payment, which in the short run Boeing may very well be willing to pay. That is, Boeing's investment in its business relationship with LMI creates a quasi-rent that potentially is appropriable by LMI.

What keeps LMI from breaking the contract and holding Boeing up for a higher price? One deterrent is that LMI's short-term gain would come at the expense of its long-term sales to Boeing and other customers, or what Karpoff and Lott (1993) call a reputational loss. But as Klein and Leffler (1981) show, under some conditions the reputational loss is insufficient to deter opportunistic behavior. Another deterrent is that LMI's managers have personal connections and reputations that would be sullied if the firm held Boeing up for a short-term gain. But, as Shleifer and Summers (1988) point out, such personal commitments have little value if the managers are removed in a takeover and replaced by different managers who have no commitment to the business relationship. This is how takeover defenses can be valuable. When it went public in 1998, LMI had three takeover defenses. The bonding hypothesis holds that these defenses worked to insulate LMI's managers from the threat of outside takeover, thereby bonding LMI's commitment to its Boeing relationship and encouraging Boeing to continue to invest in the relationship.

This paper tests the bonding hypothesis of takeover defenses using data from firms that went public between 1997 and 2005. In principle, the bonding hypothesis applies to both IPO and seasoned firms and could be tested using data from seasoned firms. One disadvantage to using IPO firm data to examine the hypothesis is that IPO firms may face business risks that are unique and not generalizable to seasoned firms. There are several offsetting advantages, however, to using IPO firm data. The first advantage is that IPO firms' takeover defenses are likely to result from an explicit consideration of their costs and benefits. Seasoned firms' takeover defenses are sticky over time and tend to ratchet only in one direction, toward more defenses (Hannes 2006). This suggests that many seasoned firms' takeover defenses are the legacies of past business conditions and decisions. A second advantage is that IPO firms tend to be small and are more likely to have values that depend heavily upon their relationships with specific business partners. For example, Johnson, Kang, and Yi (2012) report that 65% of IPO firms disclose a large customer, whereas Cen, Dasgupta, and Cen (2011) report that 41% of COMPUSTAT-listed industrial firms rely on such large customers. This implies that the benefits of any bonding from takeover defenses are likely to be larger and more apparent among IPO firms than among seasoned firms. A third advantage is that the IPO event dramatically increases the probability that the (formerly private) company will receive an unsolicited takeover offer. This increases the risk of appropriation for the firm's counterparties, and according to the bonding hypothesis, increases the value of a takeover defense more than for a firm that has been publicly traded for some time. A fourth advantage of using IPO firm data is that we are able to construct reasonable instrumental variables based on the identity of the IPO firm's law firm.

An additional benefit of using IPO firm data is that the bonding hypothesis offers a resolution to an IPO puzzle: Why do so many firms adopt takeover defenses when they go public? Identifying this puzzle, Daines and Klausner (2001) note that, if takeover defenses lower share values as is widely presumed, it would be irrational for pre-IPO shareholders to implement them and suffer the resulting loss when shares are sold to outside investors. The bonding hypothesis

implies that many IPO firms adopt takeover defenses because, contrary to common belief, they increase firm value.

To implement tests of the bonding hypothesis, we construct three measures of the quasi-rents that potentially are appropriable by the IPO firm. The first, *Large customer*, indicates the presence of a large customer on whom the IPO firm relies for a significant portion of its sales – as in the LMI-Boeing example. The second measure, *Dependent supplier*, is an indicator that the IPO firm is a large and dominant customer for one or more of its suppliers. This measure recognizes that a large customer can hold up its supplier . The third measure is an indicator of a *Strategic alliance* between the IPO firm and another firm. For each measure, the presence of a large customer, dependent supplier, or strategic alliance partner indicates that the IPO firm's trading partner has made relationship-specific investments that give rise to appropriable quasi-rents. The bonding hypothesis implies that IPO firms with significant trading partners are more likely to deploy takeover defenses than other IPO firms, and that takeover defenses are more likely to create value when the IPO firms have such trading partners.

We use these three measures of appropriable quasi-rents to conduct five categories of tests of the bonding hypothesis. First, we find that an IPO firm's number of takeover defenses is positively related to all three measures of appropriable quasi-rents. We also examine in more detail a subsample of IPO firms that have a large customer that itself is publicly traded. Among these firms, the number of takeover defenses is positively related to four additional measures that reflect the importance of the large customer's quasi-rents: (i) whether there is a social link between the IPO firm's CEO and the customer firm's CEO, (ii) whether there is a long-term contract between the two firms, (iii) the pre-IPO length of the business relationship, and (iv) whether the IPO firm sells primarily to that one customer. These results support the hypothesis that takeover defenses are deployed to help bond the firm's commitment when it has important trading relationships that create appropriable quasi-rents.

In our second set of tests we examine firm valuation at the IPO using multiples based on earnings and sales. Firm valuation is positively related to the number of takeover defenses, primarily when the IPO firm has a large customer, dependent supplier, or strategic partner. These results support the view that takeover defenses are valuable to the IPO firm when its counterparties have quasi-rents that are at risk of appropriation by the IPO firm.

Firm value and the deployment of takeover defenses are most likely endogenous, so the positive correlation between firm value and takeover defenses need not be causal. To explore causality, we use instrumental variables that rely on the identity or characteristics of the IPO company's law firm. As discussed by Coates (2001), an IPO firm's law firm can help to explain the number of takeover defenses it deploys. In addition, IPO firms tend to choose their lawyers well before the IPO. This implies that law firm identity and characteristics meet both relevance and exclusion criteria as instruments for the number of takeover defenses. Using these instruments, we continue to find that firm value at the IPO is positively related to the use of takeover defenses, and that the positive relation appears only when important counterparty quasi-rents are at stake. These results support the inference that takeover defenses not only are correlated with higher value, but also are a cause of the higher value.

In our third set of tests we find that takeover defenses are associated with higher operating performance after the IPO. Once again, the positive relation arises only in the presence of appropriable quasi-rents among the IPO firm's counterparties, and persist in tests that use instrumental variables for the firm's use of takeover defenses. These results indicate that the higher valuations observed when IPO firms deploy takeover defenses are consistent with these firms' subsequent performance. They also show how IPO firms benefit from their takeover defenses, as they also earn quasi-rents from the ongoing relationships with their counterparties.

In our fourth set of tests we examine the impact of the IPO firm's takeover defenses on its large customers. When an IPO firm announces it decision to go public, its large customers' abnormal stock return is positively related to the IPO firms' use of takeover defenses. Once again,

the marginal impact of the takeover defenses is positively related to our measures of the value of the trading relationship. The positive share impact of the IPO firm's takeover defenses is observed only at its large customer and not among other firms in the customer's industry, indicating that the impact is specific to the firm's important business partner.

In our fifth set of tests we find that the duration of the business relationship between the IPO firm and its large customer increases with the takeover defenses deployed at the time of the IPO. The duration effect of takeover defenses is particularly strong when there is a social link between the IPO and customer firms' CEOs, and when there is a strategic alliance between the two firms. These results provide further support for the bonding hypothesis of takeover defenses, because they indicate that takeover defenses are in fact related to the longevity of the business relationship.

We also conduct supplementary and robustness tests of the bonding hypothesis. Consistent with the hypothesis, we find evidence of a negative spillover effect on the IPO firm's important counterparties when the IPO firm is acquired, that takeover defenses are associated with a lower incidence of forced CEO turnover, and that defenses are associated with higher long-term sales to the firm's large customers. We consider alternate measures of a firm's takeover defenses and the existence of appropriable quasi-rents, and examine the impact of venture capital and the IPO's public float on our results and inferences. We also test three possible alternative interpretations of our findings. All of these supplementary test results are consistent with the bonding hypothesis of takeover defenses.

Taken together, these results indicate that takeover defenses help to bond the IPO firm's guarantees to its counterparties by decreasing the probability that current management will be replaced, and company policy changed, through an outside takeover. This, in turn, encourages the counterparties – including large customers, dependent suppliers, and strategic partners – to make long-term relationship-specific investments. Some of the benefits of these long-term relationships accrue to the IPO firm in the form of higher IPO valuation and improved long-run operating

performance. This implies that many IPO firms adopt takeover defenses precisely because pre-IPO shareholders benefit from them.

These results help to explain the puzzle of why many IPO firms have defenses. To the extent they resolve one puzzle, however, they create another: If takeover defenses create value for many IPO firms, why are they frequently associated with lower share values at seasoned firms (e.g., see Bebchuk, 2013)? We hypothesize that takeover defenses confer both benefits and costs, as the bonding and entrenchment hypotheses of takeover defenses are not mutually exclusive. Our tests indicate that, among IPO firms whose important business partners have relationship-specific quasi-rents at stake, the bonding benefits exceed the costs of entrenchment, on average. It is possible, however, that among seasoned firms, the bonding benefits of takeover defenses are relatively small and/or the entrenchment costs are relatively high. If this is the case, the entrenchment hypothesis applies more generally to seasoned firms than to IPO firms. This, in turn, implies that the costs and benefits of takeover defenses tend to change as a firm matures. Exactly how and when such changes occur, however, is a topic for further research.[4]

This paper proceeds as follows. In section II we describe the bonding hypothesis and the proxy variables we use to test it in our sample of IPO firms. Section III describes the data. Section IV presents the results of our five main empirical tests of the bonding hypothesis. Section V reports on several extensions and robustness tests of the bonding hypothesis. Section VI applies our findings to the IPO takeover defense puzzle, and section VII concludes.

II. The bonding hypothesis of takeover defenses

II.A. The main idea

[4] Cen, Dasgupta, and Sen (2011) find that the passage of a business combination law is associated with an increase in performance in firms with large customers that are publicly traded corporations, and an increase in the length of the business relationship with the large customer. These results suggest that the bonding benefits that we document for IPO firms can also be important for some seasoned firms, at least for one type of takeover defense.

The main idea of the bonding hypothesis is that takeover defenses can guarantee the firm's commitment not to act opportunistically to appropriate its counterparties' quasi-rents. Quasi-rents arise when a counterparty makes a relationship-specific investment that would lose value if the firm changes its operating strategy. Quasi-rents are important for understanding a wide range of economic phenomena, including CEOs' employment contracts (Gillan, Hartzell, and Parrino 2009), contract enforcement (Klein and Leffler 1981), and rent-seeking (Posner 1975). The archetypal example described by Klein, Crawford, and Alchian (1978) involves Fisher Body and General Motors (GM). GM allegedly entered into a long-term contract to buy exterior shells for its closed body automobiles from Fisher Body at a price set on a cost-plus basis. The contract and GM's specific investments in the trading relationship made GM vulnerable to appropriation by Fisher Body. Once GM was locked into the contract, Fisher Body refused to locate its plants close to GM and increased its price, claiming higher costs.[5]

Williamson (1979) argues that one solution to such hold-up problems is vertical integration, and Klein et al. (1978) claim this is why GM eventually acquired Fisher Body. Vertical integration, however, is itself costly and not likely to be an optimal solution to all hold-up problems. For example, Grossman and Hart (1986) and Hart and Moore (1990) show that vertical integration can distort incentives in ways that destroy value. As a result, some otherwise efficient contracts between firms and their customers will not be made, as the risk of a hold-up undermines the customer's willingness to invest in the trading relationship.

Shleifer and Summers (1988), Coates (2001), and Stout (2002) suggest that an alternative solution is for managers to contract implicitly to not act opportunistically. For example, Fisher Body's managers could promise not to raise prices to appropriate GM's quasi-rents. By their nature, implicit contracts are enforced informally through personal connections and reputation (e.g., see Klein and Leffler 1981). The firm's managers tie their reputations to a business strategy

[5] Although this anecdote is widely cited in the economics literature, it seems not to be supported by the facts of the matter (see Coase 2000). We nonetheless cite it as the standard example of the hold-up problem.

that encourages their business partners to make relation-specific investments. Shleifer and Summers (1988, p. 40) argue that managers are *selected* for their personal commitment to the firm's counterparties: "It is probably most likely that prospective managers are trained or brought up to be committed to stakeholders … they find stakeholder welfare has now entered their preferences, thus making them credible upholders of implicit contracts."

The problem with such implicit commitments – even when managers make good-faith efforts to abide by them – is that the managers can be replaced in a hostile takeover. New owners would not have any personal or reputational commitment to the firm's former business strategy, allowing them to breach the former managers' commitments and appropriate the counterparty's quasi-rent. This is where takeover defenses become important. By decreasing the likelihood of outside takeover, takeover defenses bond the firm's guarantees to abide by its implicit agreements with its counterparties. This induces the counterparties to make relation-specific investments that benefit the firm. In the LMI-Boeing example discussed in the introduction, LMI had three takeover defenses when it went public, including a classified board and a restriction on shareholders' right to act by written consent. The bonding hypothesis holds that these defenses helped to encourage Boeing to continue to invest in and rely upon its relationship with LMI as a supplier for important specialty aerospace products.

Another illustrative example is discussed by Cremers, Nair, and Peyer (2006) and Arlen (2006). PeopleSoft, Inc. produced a complex software product that required a large up-front investment by customers, who in turn relied on PeopleSoft's ongoing vendor support. When in 2003 Oracle made a hostile takeover bid for PeopleSoft, PeopleSoft's customers objected strongly, concerned that their products would no longer be supported by the merged company.[6] That is, PeopleSoft's customers had quasi-rents that would be lost if Oracle did not continue the same level of customer support for PeopleSoft's products.

[6] "PeopleSoft Director Explains Rejection of Bid," *The New York Times*, October 14, 2004.

II.B. Measuring the existence of appropriable quasi-rents

The key insight of the bonding hypothesis is that takeover defenses can be valuable when the IPO firm's counterparties earn quasi-rents that can be appropriated if the IPO firm breaches its implicit contracts. To test the bonding hypothesis, we require measures of the existence of a counterparty's appropriable quasi-rents. Our main tests emphasize three such measures, while the Internet Appendix reports results using four additional measures. The results using all of these measures are similar, indicating that the existence, value, and performance effects of an IPO firm's takeover defenses are positively related to the existence of counterparty quasi-rents.

Our first measure, *Large customer*, is an indicator variable set equal to one if the IPO firm has at least one large customer that accounts for 10% or more of its sales.[7] Our rationale is that relationship-specific quasi-rents are more likely to arise when the IPO firm has an obviously dominant trading relationship with a single customer. Fisher Body's relation with General Motors, as characterized by Klein, Crawford, and Alchian (1978) is an example, as is the LMI Aerospace, Inc. – Boeing example discussed in the introduction. Consistent with these examples, Joskow (1987) and Klein (1988) argue that large customers frequently are exposed to hold-up problems. The potential for a hold-up arises as the customer invests in specialized employee training or builds distribution channels with their suppliers. We hypothesize that the potential for a hold-up problem increases with the size of the trading relationship, and we use *Large customer* to measure the size of the trading relationship.

Not only can the seller (Fisher Body, LMI) potentially hold up its large customer (GM, Boeing). The customer also can hold up the seller. LMI, for example, has invested heavily in

[7] The data come from the COMPUSTAT segment customer database, which contains customer disclosures following U.S. disclosure rules. FAS No.131 requires firms to report of the presence of all customers responsible for over 10% of their annual revenues. This is the database used in Fee and Thomas (2004) and Hertzel, Li, Officer, and Rodgers (2008). Frequently, the data report not only on the existence of a large customer, but also on the fraction of the IPO firm's sales that go to that customer. As reported in the Internet Appendix, our results do not change appreciably when we use this fractional amount instead of the *Large customer* dummy variable, or when we include only customers with >15% of sales, >20% of sales, or >25% of sales.

relationship-specific assets by locating its plant close to Boeing's production facility.[8] This creates a quasi-rent that arises from LMI's lower transportation costs, which Boeing could appropriate by offering to pay a price that covers only LMI's variable costs. If Boeing were going public, the bonding hypothesis implies that it could adopt takeover defenses as a way of bonding its commitments to LMI. That is, the IPO firms in our sample may not only have important relationships with their customers, but also with their suppliers. Our second measure of appropriable quasi-rents therefore is *Dependent supplier*, which is an indicator taking a value of one if the IPO firm is a customer accounting for more than 10% of the sales of another firm.

Our third measure of appropriable quasi-rents is *Strategic alliance*, an indicator variable set equal to one if the firm has entered into a strategic alliance with another firm. Chan, Kensinger, Keown and Martin (1997) argue that strategic alliances encourage partners to make irreversible alliance-specific investments. Williamson (1985) and Joskow (1987) argue that long term contracts, such as occurs in strategic alliances, involve investments in fixed assets that give rise to potentially appropriable quasi-rents. The bonding hypothesis implies that takeover defenses will be particularly valuable when the firm has entered into a strategic alliance.

In some tests below we emphasize the *Large customer* measure of appropriable quasi-rents. This is because we have good data to identify large customers, and *Large customer* = 1 for 60% of the sample IPO firms. In contrast, *Dependent supplier* = 1 for only 4% of the sample IPO firms, and *Strategic alliance* = 1 for 31% of the sample. Because many of the IPO firms have large customers, a substantial number (209) of the large customers are themselves publicly traded corporations. This makes data available with which we can conduct additional tests of the bonding hypothesis. In section IV.A we use data on the characteristics of the large customer firm (e.g., whether the CEOs of the IPO firm and its large customer have a social connection) to gauge

[8] LMI even states that "part of its strategy was to establish facilities near to the Company's principal customers" (LMI prospectus filing, http://www.sec.gov/Archives/edgar/data/1059562/0000950124-98-003679.txt).

the importance of the business relationship. Also, in section IV.D we examine the share price impacts of the IPO firm's takeover defenses on the subsample of publicly traded large customers.

III. Data and summary statistics

Our sample is generated from the Security Data Corporation (SDC) new issues database from 1997-2005. We remove finance and utilities firms, firms making unit offerings, closed end funds, Real Estate Investment Trusts (REITs), American Depository Receipts (ADRs), IPO firms headquartered outside the U.S., and firms with an offer price below $5. Since IPO relative valuation is a key component of our study, we also restrict the sample to include firms with sales (COMPUSTAT data item SALE) and EBITDA (COMPUSTAT data item OIBDP) in the fiscal year before the IPO. This yields a sample of 1,219 firms.

Some of the variables used in our tests are available from the COMPUSTAT dataset. But much of the data were compiled manually from the IPO firms' prospectuses. The hand-collected data include: all takeover defense measures; the exact amounts sold to large customers and purchased from dependent suppliers; indications of strategic alliances, and venture backing; CEO characteristics such as compensation, tenure, and age; firm governance characteristics such as inside ownership, board size and independence; and underwriter characteristics.

Panel A of Table 1 reports summary statistics about the sample firms and CEOs. In the empirical tests we control for a variety of managerial and firm characteristics. The control variables are the union of those examined by Field and Karpoff (2002) and Chemmanur, Paeglis, and Simonyan (2011), plus we add underwriter rank as a control for the quality of the offering. Panel D of Table 1 reports on summary statistics for some of these variables. Most summary measures are similar to those reported by others. For example, on average, the CEO is 47 years old and has been at the firm for 5.9 years, 56% of the CEOs are also chairman of the board, and the mean board size is 6.6. These averages are similar to those reported by Boone et al. (2007) for

their sample of IPOs. One noteworthy difference is that the average CEO compensation is $430,000 in our sample, which is smaller than that reported by Coates and Kraakman (2011).

The mean IPO firm has a book value of assets of $362 million, mean market capitalization at the time of the IPO of $714 million, and mean sales in the year before the IPO of $116 million. Panel B of Table 1 reports summary measures of the three measures of appropriable quasi-rents. A total of 60% of the IPO firms have a large customer, 4% have a dependent supplier, and 31% have entered a strategic alliance.

In our empirical tests we use three measures of a firm's takeover defenses. The first is the FK-index of up to 10 takeover defenses used by Field and Karpoff (2002) in their analysis of IPO firms, which is also used by Chemmanur, Paeglis, and Simonyan (2011). The second is Gompers, Ishii, and Metrick's (2003) G-index, which counts up to 24 takeover defenses. And the third is Bebchuk, Cohen, and Ferrell's (2009) E-index, which counts up to six takeover defenses. Each of these indices has advantages and drawbacks in what it counts as a takeover defense.[9] In our sample, the correlation between the FK-index and the G-index is 0.51. The correlation between the FK-index and the E-index is 0.60, and the correlation between the G-index and the E-index is 0.72. We find similar results using all three indices, although in two specific tests (out of dozens) the results are not significant using the G-index while they are significant using the FK-index and the E-index. We point out these two exceptions below.

As reported in Table 1 Panel C, the mean value of the FK-index is 3.16. This is higher than the mean of 2.56 reported by Field and Karpoff (2002), but closer to that of Chemmanur, Paeglis, and Simonyan (2011) for the same index. This is because our sample period of 1997-2005

[9] For example, the G-index has an advantage of including the largest number of defenses, including coverage by state antitakeover laws. However, it double counts some provisions that largely are redundant (director indemnification, indemnification contracts, and indemnification insurance) and groups together other defenses that most likely are distinct (e.g., counting control share acquisition laws as similar to supermajority vote requirements). The E-index was constructed to count only the defenses that its creators judge to be most important, but possibly misses other important defenses. The FK-index includes several additional provisions that the E-index does not, but it also combines certain provisions (e.g., restrictions on shareholders' right to act by written consent or to call special shareholder meetings) that the G-Index treats as separate, and does not include state antitakeover laws. Details of how each index is constructed are reported in the Appendix.

postdates that of Field and Karpoff (2002), and there is a secular increase in the number takeover defenses at IPO firms over this time period. The mean G-index value of 9.59 is similar to that reported by Gompers, Ishii, and Metrick (2003). Our E-index mean, however, is below the mean reported by Bebchuk, Cohen, and Ferrell (2009). This is because few IPO firms adopt poison pills. Field and Karpoff (2002) report a poison pill adoption rate of 2.3% in IPO firms, compared to a rate of 62.1% among the mature firms in the Bebchuk et al. (2009) sample.

IV. Empirical tests of the bonding hypothesis

IV.A. Takeover defenses at the IPO

IV.A.1. Univariate comparisons

We first measure whether IPO firms use more takeover defenses when their counterparties have potentially appropriable quasi-rents. Table 2 reports on univariate comparisons. Our first measure for the existence of appropriable quasi-rents, *Large customer*, indicates whether the IPO firm has at least one customer who accounts for 10% or more of the firm's total sales at the time of the IPO. Using any of the three indices of takeover defenses, the mean number of defenses at firms with large customers is significantly larger than for IPO firms without large customers. Using the Field and Karpoff (2002) (F-K) index, for example, the mean value is 3.24 for firms with large customers and 3.05 for firms without large customers. This difference is significant at the 5% level. The non-parametric Mann-Whitney test statistic also is significant at the 5% level (untabulated).

We find similar results for our other measures of quasi-rents: *dependent supplier* and *strategic alliance*. For instance, we find that firms with a dependent supplier adopts 3.76 takeover provisions based on the F-K index but only 3.13 takeover provisions if they have no dependent supplier. This difference is significant at the 1% level. Likewise, firms with a strategic alliance adopt 3.40 takeover provisions compared to 3.06 takeover provisions when they have no strategic alliance. In each case, our measures of counterparty quasi-rents are associated with a larger number of takeover defenses at the IPO firm.

In tests reported in the Internet Appendix, we examine whether the results in Table 2 are affected by any particular takeover defenses. We re-tabulate the Table 2 results after alternately omitting miscellaneous defenses, blank check preferred stock, supermajority vote requirements, and classified boards from the takeover defense indices, or by treating classified boards as the only relevant defense. In all cases, the results are qualitatively the same as in Table 2. This indicates that IPO firms with important counterparties use a broad mix of takeover defenses rather than relying on any one type of defense.

IV.A.2. Multivariate tests

Table 3, Panel A reports the results from nine specifications of a Poisson maximum likelihood regression in which the dependent variable is the Field-Karpoff index (Models 1-3), G-index (Models 4-6), or E-index (Models 7-9), measured at the IPO. In addition, we report logit regressions with the dependent variable as an indicator taking a value of one if the firm has a classified board and zero otherwise (Models 10-12). Each regression includes all of the control variables examined by Field and Karpoff (2002) and Chemmanur, Paeglis, and Simonyan (2011) in their tests for takeover defenses at IPO firms, plus the underwriter's rank and the number of pre-IPO takeovers in the IPO industry. There is evidence of industry clustering, as an analysis of variance on industry effects yields a value of F = 1.47 (p-value = 0.03), so we include industry controls as well. As reported in the Internet Appendix, the results are similar when we use an OLS model as an alternative to the Poisson model, or if we limit the control variables to those used by Field and Karpoff (2002) or Chemmanur, Paeglis, and Simonyan (2011).

In Model 1 the coefficient for *Large customer* is 0.095 and is statistically significant at the 1% level. In Model 2 the coefficient for *Dependent supplier* is 0.155, and in Model 3 the coefficient for *Strategic alliance* is 0.073 (both significant at the 1% level). Similar results obtain in Models 4 – 6 using the G-index as the dependent variable, and in Models 7 – 9 using the E-index. Likewise, in the results examining the presence of a classified board, the results are

significant for all firms with a large customer or a strategic alliance. (the supplier indicator is not significant, but this may be caused by the small number of firms having both a classified board and dependent supplier). These results indicate that the univariate comparisons reported in Table 2 maintain even controlling for other possible determinants of a firm's use of takeover defenses.

As a sensitivity test, we estimated logistic models in which the dependent variable equals 1 if the firm has more than the median number of takeover defenses, using each of the three indices. This measure is similar to that used by Chemmanur, Paeglis, and Simonyan (2011). The results are similar to those reported here.[10]

For 209 of the 1,219 IPO firms in our sample, *Large customer* = 1 and the large customer is itself a publicly traded firm. (When a particular IPO firm has multiple large customers, we identify the customer that purchases the largest amount as our sample customer.) This allows us to collect data on four additional measures of the importance of the IPO firm's takeover defenses in protecting the large customer's quasi-rents. *Social links* is set equal to one when there is a social link between the IPO firm's CEO and the large customer's CEO, as defined by Hwang and Kim (2009). A social link between CEOs is likely to reinforce the IPO firm's CEO's commitment to the trading relationship, increasing the bonding value of a takeover defense. *Long term contract* indicates the existence of a long-term contract between the two trading partners. *Pre-IPO relationship length* measures the number of years that the two trading partners have done business. *Percent of IPO firm sales* is the dollar sales of the IPO firm to its large public customer divided by the total IPO firm sales. The Internet Appendix reports on summary statistics for each of these variables.

Panel B of Table 3 reports the results of tests using these four additional measures of the importance of the trading relationship. These results use the FK-index of takeover defenses,

[10] Chemmanur, Paeglis, and Simonyan (2011) also suggest that the use of takeover defenses is related to managerial quality. When we control for the variables used by Chemmanur, Paeglis, and Simonyan (2011) to proxy for managerial characteristics, our results are qualitatively unchanged. These test results are tabulated in the Internet Appendix.

although the results are similar using the G-index or E-index. Each regression includes all of the control variables reported in Panel A, although the control variable results are not reported in the table. Using any of the four additional measures, the number of takeover defenses is positively related to the importance of the trading relationship with the IPO firm's large customer. In Model 5 we include all four variables. These four measures are positively correlated, so including them all at once can induce an attenuation bias (Wooldridge, 2002). Despite such an effect, the coefficients for *Social links*, *Long-term contract*, and *Percent of IPO firms sales* remain statistically significant. These results further support the bonding hypothesis, which holds that IPO firms are more likely to adopt takeover defenses when they have important trading relationships that give rise to appropriable quasi-rents.

IV.B.1 The impact of takeover defenses on the length of the post-IPO relationship

The bonding hypothesis implies that takeover defenses help to guarantee the IPO firm's contractual performance with its counterparties, i.e., that the IPO firm will not act opportunistically to abrogate the relationship. This implies that the use of defenses should correspond to business relationships that do, in fact, persist over time. A direct implication of this is that a more important relationship should be associated with the adoption of more takeover provisions and the relationship should last a greater amount of time. To examine this implication, we examine the association between the deployment of takeover defenses and the longevity of the business relationship. We use data from the 209 instances in which the IPO firm has a large customer that is itself a publicly traded firm.

Table 4 reports on the univariate comparisons of relationship lengths by the number of antitakeover provisions adopted by a firm. On average, the business relationship survives 2.73 years after that IPO. Among the 64 cases in which the IPO firm has fewer than three defenses, the relationship lasts an average of 2.17 years. Among the 68 cases in which the IPO firm has more than three defenses, the relationship lasts an average of 3.32 years. The difference is significant at

the 1% level. This is consistent with the notion that takeover defenses are associated with longer business relationships.

While the univariate results support our assertion that firms with more important relationships will adopt more antitakeover provisions, we now test this using a multivariate regression setting to ensure that our results are not driven by another important covariate. We utilize a non-parametric Cox Hazard model following Fee, Hadlock, and Thomas (2006) to model the relationship length after the IPO. Table 5 reports the results where the dependent variable is the hazard rate for the post-IPO length of the relationship, measured in years. Coefficients above one indicate a higher hazard rate and shorter relationship, whereas coefficients below one indicate a lower hazard rate and longer relationship. As control variables, we use the same variables used by Fee, Hadlock, and Thomas (2006) and Johnson, Kang, Masulis, and Yi (2011), including: R&D/assets, IPO firm percent of sales to the large customer, the square of the IPO firm's percent of sales to the large customer, log (IPO firm assets), and an indicator for negative free cash flows.

In all models estimated, the length of the business relationship is positively related to the number of takeover defenses. For example, in Model 1 the coefficient on the number of takeover defenses is 0.797 and is significantly different from one at the 1% level. Models 2 – 6 include interaction terms that reflect the importance of a takeover defense in protecting appropriable quasi-rents. In Model 2, the longevity of the relationship is positively related to the number of takeover defenses, the presence of a social link between the IPO firm and large customer's CEOs, and also to the interaction of the two terms. This implies that the marginal effect of a takeover defense is larger when there is a social link between the CEOs. The results in Model 6 indicate that the business relationship lasts longer when the firm also has a strategic alliance, particularly when the IPO firm has more takeover defenses. The coefficients for interaction terms in Models 3 through 5 are insignificant, but even in these models the relationship length is positively related to use of takeover defenses.

For the multivariate regressions in Table 5 we utilize the number of antitakeover provisions as measured by Field and Karpoff (2002). However, our results are qualitatively similar if we utilize as our measure the g-index first proposed by Gompers, Ishii, and Metrick (2003) or the E-index as proposed by Bebchuck, Cohen, and Ferrell (2009). Likewise, if we utilize as our measure of antitakeover provisions an indicator variable taking a value of one if the firm has a classified board and zero otherwise, we obtain similar results.[11]

IV.B.2. Endogeneity

The results in Tables 4 and 5 indicate that takeover defenses are positively associated with a longer relationship length with the firm's large customers. However, based on the results presented thus far, we cannot make a strong argument that the relation is causal. It is possible that relationship length, counterparty quasi-rents, and the use of defenses all reflect the firm's underlying economic environment. For example, suppose that firms with important counterparties tend to have good performance, and that good performance grants self-serving CEOs latitude to adopt takeover defenses. The defenses would be associated with longer relationships with customers, but the relationship would not be causal. Likewise, there could be an omitted variable that is correlated with both the higher adoption of antitakeover provisions and the longer relationship length.

To examine the possibility that our results reflect endogeneity in the determination of takeover defenses and relationship strength, we conduct instrumental variable tests using three different instruments for takeover defenses. Coates (2001) demonstrates that law firms have different tendencies to recommend takeover defenses to their client firms, and that takeover defenses are heavily influenced by the IPO firm's law firm. It is also important to note that IPO firms typically choose their attorneys long before their decision to go public and for reasons that

[11] In addition, we run OLS regressions with the dependent variable being the length of the relationship after the IPO event and find qualitatively similar results. We do not tabulate these results since survival models tend to be misspecified using linear models.

appear to be unrelated to the use of takeover defenses at a future IPO. Our first instrument uses this regularity by using dummy variables for the firms' law firms in a first stage regression.

Coates (2001) identifies another regularity that motivates our second instrument. Some law firms encourage their IPO clients to adopt corporate charter provisions that work at odds with one another. For example, a firm can adopt a staggered board takeover defense and simultaneously include a charter provision that allows shareholders to remove directors by written consent – thus partially offsetting the effect of the staggered board. Coates (2001) argues that the number of takeover defenses tends to be higher in firms that have such offsetting provisions. We therefore include as an instrument an indicator variable, *Law firm gaffe*, that equals one if the firm has at least one pair of takeover defenses or charter provisions that offset or contradict each other.

Our third instrument, *Law firm acquisition experience*, equals the number of takeovers the IPO firm's law firm advised in the two years before the IPO. Our rationale is that the law firm's acquisition-related experience can affect its knowledge and recommended use of takeover defenses. So it is likely to meet the relevance criterion. But this experience is unlikely to be directly related to the IPO firm's relationships. Even if there were a general relation between the law firm's identity and the IPO firm's valuation (i.e., our first instrument does not meet the exclusion criterion), it is unlikely that such a relation would arise from the law firm's recent experience in the acquisitions market. This is particularly likely because we measure acquisition experience over the previous two years, whereas many IPO firms choose their law firms more than two years before their IPOs.

Another complication of our use of the instrumental variables approach is that a non-linear model such as a hazard model does not lend itself to use of an instrumental variables approach. As such, we follow Fee, Hadlock, and Thomas (2006) by converting our results into a linear probability model using as the dependent variable taking a value of one if the relationship terminates and a zero if the relationship continues. For each supplier-customer relationship, there

are as many observations as the length of the relationship, increasing our number of observations to N=577.

The first stage regression results, reported as Model 7 in Table 5, show that all three law firm-related instruments meet the relevance criterion for a good instrument. *Law firm gaffe* is positively related to the number of takeover defenses, *Law firm acquisition experience* is negatively related to the number of defenses, and many of the individual law firm dummy variables also are significant in the first stage regression. (The F-statistic on the joint significance of the law firm indicator variables is 2.2×10^5.) Again, a firm's lawyers typically are chosen long before the firm goes public, so it is unlikely that the IPO valuation is directly related to these instruments.[12] This implies that the instruments also meet the exclusion restriction.

Model 8 in Table 5 reports the results of the second stage regression for relationship termination with the law firm-specific variables used to construct the instrument. The coefficient on the instrumented number of takeover defenses is -0.032 and is significant at the 5% level. The coefficient implies that an increase in the number of antitakeover provisions by one decreases the likelihood of relationship termination by 3.2%. This result implies that takeover defenses are not just correlated with relationship length, but are also a cause of a decrease in the likelihood of relationship termination. The Internet Appendix reports the results of several additional tests in which we use only one or two of the three law firm-related instruments. The findings are similar to those in Table 5, and indicate that all three of these instruments yield similar results.

These results indicate that takeover defenses are associated with longevity of the business relationship with the IPO firm's large customer. This is consistent with the implication of the bonding hypothesis that takeover defenses do, in fact, credibly commit the IPO firm to maintaining its important business relationships. In addition, takeover defenses are particularly

[12] To ensure that we have good instrumental variables, we also conduct an additional test. We eliminate all IPOs that go public within 4 years of founding, the median time. By eliminating IPO firms that go public right after founding, we are most likely to eliminate IPOs who strategically select their law firms with the IPO in mind. When we then repeat our results on this subset of firms, we find similar coefficient size and significance.

useful in bonding and preserving the business relationship when the IPO firm's CEO has a social connection to the large customer's CEO or when the two firms have entered a strategic alliance.

IV.C.1. Antitakeover provisions and Customer impact

If takeover defenses help to bond the IPO firm's commitments to its trading partners and protect their quasi-rents, the defenses should have value consequences for the trading partners of the IPO firms. In this section we examine the spillover effect on the IPO firm's large customers, using data on the 209 large customers which themselves are publicly traded.

Table 6 reports the cumulative abnormal return over several time periods centered on the IPO firm's prospectus filing date for the IPO firms' large customers. The prospectus filing date is when the IPO firm's use of takeover defenses is revealed to the investing public. CAR(-3, 3) is calculated using parameters estimated from the market model over days -255 to -46 relative to the filing date with the equally weighted CRSP index as the market proxy.[13] Measured over all 209 firms, the mean CAR(-3, 3) is 1.17%. This is similar to the finding by Johnson, Kang, and Yi (2010).

Table 6 Panel B reports the mean CAR(-3,3) when the sample is partitioned into groups based on the number of defenses at the IPO firm. When the IPO firm has fewer than three defenses, the mean return for large customers is –0.75%. When the IPO firm has more than three defenses the mean return for large customers is 4.66%. The difference is statistically significant, implying that the positive spillover effect on large customers' values is positively related to the IPO firm's adoption of takeover defenses.

One aspect of the univariate comparisons is potentially puzzling. Large customers' mean return is positive even though the IPO increases the likelihood that the IPO firm eventually could be acquired. The bonding hypothesis implies that customers' returns should be positively related

[13] We use a CAR(-3, 3) abnormal return because Johnson, Kang, and Yi (2010) report that there is substantial pre- and post-prospectus filing stock price drift. Our results are qualitatively similar using CAR(-1, 1). We also repeated our analysis using industry adjusted returns from Ken French's web site (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html) The results are similar to those reported here.

to the IPO firm's use of takeover defenses, but does not imply that the return should be positive. It is possible that some other effect of the IPO is at work. For example, the IPO firms' new access to equity financing can alleviate capital constraints at the IPO firms, thus benefitting their large customers. In contrast, IPO firms who become new targets for takeover (since they are much more likely to be acquired once they are public) are much more likely to be acquired, resulting in a negative for IPO firms with few takeover protections.

IV.C.2. Multivariate comparisons

Table 7 reports the results of multivariate tests of the relation between the spillover effect and the IPO firm's takeover defenses. All regressions include the following control variables: customer market capitalization; customer leverage; an indicator for the customer having a credit rating as reported in COMPUSTAT; the underwriter rank of the IPO offering; the size of the IPO firm; and IPO firm leverage. The control variable results are not tabulated in the table. Model 1 shows that CAR(-3,3) for the IPO firm's large customer is positively related to the number of takeover defenses at the IPO firm.

Models 2 – 6 include interactions with five measures of the potential value of a takeover defense in bonding the IPO firm's commitment to its large customer. In Model 2, for instance, the marginal effect of a social connection on the customer's stock return is negative (coefficient = –8.454 with t=3.5). When a social connection exists, however, the marginal impact of an additional takeover defense at the IPO firm is 2.561 + 1.633 = 4.194. These point estimates imply that social connections are associated with lower customer returns when the IPO firm uses two or fewer defenses, presumably because a valuable trading relationship is at risk. Takeover defenses at the IPO firm partially or fully offset this bad news. The net effect on the customer firm is positive when the IPO firm uses three or more defenses.

Similar results obtain in Models 3 – 6, when we use *Long-term contract*, *Long pre-IPO relationship length*, *High % of IPO firm sales*, and *Strategic alliance with large customer* as our measures of the potential importance of the IPO firm's takeover defenses. (The results are similar

using *Percent of IPO firm sales* in place of the dummy variable, *High % of IPO firm sales*.) Together, these results indicate that the customers of the IPO firms benefit from the IPO antitakeover provision adoption; high antitakeover provision adoption is correlated with both longer relationships and greater customer value impact.By making explicit and implicit contracts more secure, thus protecting the IPO firms' large customers' quasi-rents, the defenses have positive spillover effects on the large customers.

IV.C.3. Multivariate comparisons controlling for endogeneity

One problem of the regressions documented in Table 7 is that they are subject to the assumptions made in generating OLS estimates. Specifically, if there are unobservable variables in our regressions or other sources of endogeneity in our sample, then our coefficients are biased. To control for this possibility, we again utilize the Law Firm instrumental variables used when we studied the relationship length in Table 5. Specifically, we use Law Firm indicators, an indicator for a gaffe in the law firm antitakeover provisions adopted, and the number of acquisitions advised by the Law firm.

In the first stage regression we find many of the Law Firm indicators are significant along with the number of acquisitions. However, our reduced sample size results in an insignificant coefficient for the Law Firm gaffe indicator due to the reduced sample size (N=209). Our second stage regression (Model 8) finds that even after controlling for the endogeneity that may exist, the coefficient is nearly of the same size and significance for the instrumented number of takeover provisions. This result suggests that endogeneity and omitted variables bias is not driving our overall results, but that there is in fact a causal relationship between IPO firms adopting more antitakeover provisions and the customer firm wealth effect.

IV.D. Takeover defenses and IPO firm valuation

IV.D.1. Univariate comparisons of IPO firm valuation

The bonding hypothesis implies that takeover defenses are adopted because they increase firm value, at least among firms that seek to provide guarantees that they will not act opportunistically to appropriate their counterparties' quasi-rents. In this section we examine this implication of the bonding hypothesis using a difference-in-difference test, multiple regression, and instrumental variable tests. To measure IPO firm value, we report several different measures used in prior research: (i) the ratio of share price to EBITDA per share (P/EBITDA) (see Kim and Ritter 1999; Purnanadam and Swaminathan 2004; Smart et al. 2008; Chemmanur and Loutskina 2009); (ii) price divided by sales per share (P/Sales) (Kim and Ritter 1999; Purnanadam and Swaminathan 2004); and (iii) earnings divided by price (Smart et al. 2008). We use several different measures because, as Chemmanur and Loutskina (2006) point out, each measure is subject to unique criticism about whether it accurately reflects fundamental firm value. In addition, in the Internet Appendix we report results using price divided by cash flow (Ohlson 1990; Chemmanur and Loutskina 2006).

For the relative price measures, we follow Purnanadam and Swamanathan 2004 and compare the IPO firm's value to that of a control firm matched by industry, sales, and EBITDA/sales. For each IPO firm, all firms in its Fama-French industry are grouped into a 3x3 matrix by sorting by sales and EBITDA/sales. Within its matching 3x3 cell, the firm with sales closest to that of the IPO firm is selected as its control firm. The tests reported here use the offer price to measure the share price. We also replicated these tests using the raw valuation measures, i.e., not relative to control firms. The results are similar to those reported here and are tabulated in the Internet Appendix.

Using the FK-index, the median number of takeover defenses among our IPO firms is three, so we sort the sample into firms with fewer than three defenses (N=384), exactly three defenses (N=371), and more than three defenses (N=464).[14] Table 8 Panel A reports on the median ratios

[14] The results are qualitatively similar using different sorts, for example, splitting the IPO firms into quintiles.

of P/EBITDA for the IPO firm to P/EBITDA for its matched control firm.[15] If the IPO firm and its matched control firm have identical pricing relative to their EBITDA, this ratio will equal one. The conventional agency view of takeover defenses implies that defenses decrease firm value, implying that the ratio should be negatively related to the firm's use of takeover defenses. The bonding hypothesis, in contrast, implies that takeover defenses increase firm value when the firm has counterparties with appropriable quasi-rents, implying that the ratio should be positively related to the use of takeover defenses for this subset of firms.

In the general sample of firms (not tabulated), the median ratio of P/EBITDA for firms with fewer than three defenses is 1.71. The median ratio for firms with exactly three defenses is 2.87, and the median ratio for firms with more than three defenses is 2.59 . The difference between firms with fewer than three defenses and more than three defenses is statistically significant using the Mann-Whitney nonparametric test.

The association between takeover defenses and firm value, however, is not apparent in all IPO firms. Rather, it appears only among firms for which *Large customer* = 1. Among such firms that have fewer than three defenses, the median valuation ratio is 1.78 (mean = 6.25). Among firms with large customers that have more than three defenses, the median ratio is 2.98 (mean = 23.60). This difference is significant at the 5% level using a paired t-test, and at the 0.1% level using the Mann-Whitney test. Among firms without a large customer, in contrast, there is no significant difference in the valuation ratios among firms with few or many takeover defenses. As reported in Table 8, we find similar results when we use *Dependent supplier* or *Strategic alliance* to indicate the existence of appropriable quasi-rents. Firms with a strategic alliance have a

[15] While we have examined the means, the variables are highly skewed making results unreliable. Our overall results are significantly stronger when we examine the univariate differences using sample means rather than medians.

significantly higher value when they adopt more than three takeover defenses compared to firms with fewer than three takeover defenses.[16]

Panel B reports the results of similar comparisons using price divided by sales per share (P/Sales) as the measure of valuation. Panel C uses earnings divided by price. The results are similar to those in Panel A. Firms with more than three takeover defenses have relatively high valuations, but this effect appears chiefly among the subsample of IPO firms with appropriable quasi-rents, as proxied by firms with large customers, dependent suppliers, and strategic alliances.

In Panels A through C, the valuation measures for IPO firms with exactly three takeover defenses are slightly larger than those for firms with more than three defenses. This difference, however, is not statistically significant. In terms of their valuation effects, firms with exactly three defenses appear similar to firms with more than three defenses. In fact, if we partition the IPO firms into two groups – those with 0-2 defenses vs. those with 3 or more defenses – the empirical results are even stronger than those reported in Table 8. More importantly, the multivariate tests reported below do not suggest evidence of a structural break at three defenses. We infer that the relatively high valuation ratios for firms with exactly three defenses are due to other firm characteristics that are controlled for in the multivariate tests.

IV.D.2. Multivariate tests for firm valuation

Table 9 reports the results of multivariate tests that examine the effect of takeover defenses on IPO firm valuation. To control for skewness, the dependent variable is the log of the relative valuation ratio reported in Panel A of Table 8. Each test includes the same control variables reported in Table 3, with the addition of *log(IPO proceeds)*, the percent of the shares that are primary shares, and *IPO firm R&D/assets*. For brevity, we do not report the control variable results in the table. The regressions also include year and industry indicators. Models 1 shows

[16] The results are qualitatively similar, but are not statistically significant for firms with dependent suppliers. We attribute this insignificance to the limited sample size of N=54 firms.

that, including the control variables, IPO valuation remains positively related to the IPO firm's use of takeover defenses. We find that our results are qualitatively similar if we utilize the g-index or the E-index as our measures of takeover defenses.

Models 2-4 report results in which we interact our three measures of appropriable quasi-rents with the FK-index of takeover defenses (again, the results are similar using the other indices). In Model 2, the coefficient for the FK-index is insignificant, as is the coefficient for *Large customer*. But the coefficient on the interaction of the two variables is positive and significant at the 5% level. Similarly, in Models 3 and 4, the interaction of the FK-index with *Dependent supplier* or *Strategic alliance* is positively and significantly related to the IPO firm's valuation. These results indicate that IPO valuation is not mechanically or universally related to the use of takeover defenses. Rather, takeover defenses are associated with an increase in value only when the IPO firm's counterparties have large appropriable quasi-rents.

IV.D.3. Multivariate comparisons controlling for endogeneity

As we have seen in our prior analyses, there may be an endogeneity problem in our OLS regressions. To control for this possibility, we repeat our tests using an instrumental variables approach where we first instrument for the number of takeover defenses adopted by the firm and then can generate an unbiased estimate of the relationship between takeover defense adoption and firm valuation. We report these analyses in Table 9 Models (5) and (6). Specifically, as in our previous analyses, we use Law Firm indicators, an indicator for a gaffe in the law firm antitakeover provisions adopted, and the number of acquisitions advised by the Law firm as our instruments in the first stage regression.

Our first stage regression shows that many of the Law Firm indicators, the law firm gaffe indicator, and the law firm acquisition experience are all statistically significant at normal levels. Our second stage regression (Model 6) finds that even after controlling for the endogeneity that may exist, we still find a positive and significant relationship between firm value and the number of takeover defenses adopted by the firm. This result suggests that endogeneity is not driving our

findings, but there is in fact a causal relationship between IPO firms adopting more antitakeover provisions and the customer firm wealth effect.

IV.D.4. Alternative valuation measures

Bhojraj and Lee (2002) discuss problems with firm valuation measures, including skewness and measurement error. Such problems may affect our results, too. As one indication, the point estimates in Table 8 imply larger economic effects than one might expect. In Model 1 of Table 8, the point estimate of 0.075 implies that deploying one additional defense increases the log relative valuation ratio from 1.02 to 1.09, or the ratio of IPO firm to matching firm from 2.77 to 2.97, an increase of 7%. Holding the matching firm size constant, this translates into an increase in market capitalization of $21 million for the median IPO firm.

To investigate whether our results are affected by our choice of valuation measure, we repeated our tests using the three other valuation measures reported in Table 9. In all tests we find that firm valuation is positively related to the use of takeover defenses. In most tests, the positive relation is concentrated among firms with large customers. Details are reported in the Internet Appendix.

IV.E. IPO firm operating performance

IV.E.1. Univariate comparisons

If the conventional agency cost view of takeover defenses is correct, then IPO firms that adopt takeover defenses should experience poorer operating performance after they go public. This is because the defenses presumably entrench managers who run the firm inefficiently or consume large private benefits. Field and Karpoff (2002) examined this issue and found that, contrary to expectations, IPO firms with takeover defenses subsequently had better long term operating performance than IPO firms without defenses. They acknowledged that this result is inconsistent with the conventional view of takeover defenses, but otherwise left the result unexplained.

The bonding hypothesis provides an explanation for this result because it implies that takeover defenses improve firm value by bonding the firm's commitments to its counterparties. The higher valuations documented in Tables 8 – 9 plausibly should manifest as superior operating performance after the IPO. As the LMI-Boeing example cited earlier illustrates, both Boeing (the customer) and LMI (the IPO firm) earn quasi-rents from the trading relationship. Higher quasi-rents at the IPO firm typically will appear as a higher level of measured operating performance because the value of the quasi-rent is not reflected in the book value of assets. Thus, the bonding hypothesis implies that IPO firms that have significant trading relationships and deploy takeover defenses will earn higher (measured) operating profits than other IPO firms.

Table 10 reports on univariate difference-in-difference tests of the bonding hypothesis. Following Kaplan (1989), Jain and Kini (1994), Field and Karpoff (2002), and others, we measure the change in each IPO firm's ROA from the year of the IPO to the following year, adjusted for the contemporaneous change in ROA for the IPO firm's control firm. (Our results are qualitatively similar using ROA changes of up to four years after the IPO.) As before, we partition the sample into three groups: firms with fewer than 3 takeover defenses (N=384), those with exactly 3 takeover defenses (N=371), and those with more than 3 takeover defenses (N=464). Again, we use the FK-index in the results reported in the tables, but the results are similar using the G-index and E-index .

We find in the overall sample that IPO firms tend to have a negative change in performance relative to their matched sample. This results is generally consistent with the prior literature (Jain and Kini (1994)). However, we find that IPO firms with more takeover provisions tend to have a smaller performance decline relative to firms which adopt fewer antitakeover provisions. In addition, this effect seems to be largest among firms with large customers, firms that have dependent suppliers, and firms that have strategic alliances. For instance, we find that IPO firms with more than 3 takeover provisions that have a large customer have a change in adjusted ROA of 0.01. In contrast, IPO firms with fewer than three takeover provisions have a decline of -0.05.

The difference between these two values is significant at the 5% level, suggesting that the firms are performing better in the future if they adopt more takeover provisions. The only statistically significant differences reported in Table 10 are for firms with large customers, dependent suppliers, and strategic alliances. This implies that our overall operating performance results are concentrated among the firms that are more dependent upon counterparties making relationship specific investments, consistent with our hypotheses.

IV.E.2. Multivariate tests

To ensure that our results are not driven by some other general characteristics of the firms we are examining, in Table 11 we report multivariate tests of the relation between operating performance and the use of takeover defenses. The tests include the same control variables as in Table 5, but the control variable coefficients are not reported in the table. The adjusted change in ROA is positively related to the FK-index as reported in Model 1. Models 2 – 4 report results when we include interactions with measures of the counterparties' appropriable quasi-rents. In each regression the interaction term is positive and statistically significant. This indicates that takeover defenses are associated with operating performance improvements when the IPO firm has a counterparty that plausibly has a large appropriable quasi-rent. Note that the presence of appropriable quasi-rents by itself is negatively associated with changes in ROA: the coefficient on *Large customer* in Model 2, for example, is –0.044 and is significant at the 5% level. Combined with the point estimate of 0.010 for the interaction term, this implies that the adjusted change in ROA among firms with large customers is negative, on average, when the firm has four or fewer takeover defenses, and is positive for firms with five or more defenses. These results indicate that the IPO firms' change in ROA does not increase with the presence of a large customer, dependent supplier, or strategic partner *per se*. Rather, ROA is higher when the trading relationship with the important counterparty is protected by takeover defenses.

As with our valuation tests, we estimated instrumental variable models to examine whether the results in Models 1 – 4 are affected by endogeneity issues. Model 5 in Table 11 reports on the first stage regression using the three law firm-related instruments first examined in Table 5, and Model 6 in Table 11 reports the second stage results. The coefficient on the instrumented number of takeover defenses is positive and significant at the 10% level. This result is consistent with the view that takeover defenses contribute to operating performance improvements. In general, however, the instrumental variable tests for operating performance are not as robust as the other results we report in this paper. In particular, the coefficient on the instrumented number of takeover defenses becomes insignificant when we include year fixed effects. Others have noted similar effects of year fixed effects in instrumental variables tests, and suggest that annual dummy variables introduce severe multicollinearity issues in two-stage tests that limit the test's power (e.g., see Cliff and Denis 2004).

V. Additional tests of the bonding hypothesis

V.A. Supplementary tests and evidence

V.A.1. Spillovers upon IPO firm acquisition

If the bonding hypothesis is correct, we should observe a spillover effect on the IPO firm's counterparties if the IPO firm opportunistically takes action to abrogate the business relationship. Furthermore, the spillover effect should be larger when the IPO firm previously bonded its commitment to the business relationship by adopting takeover defenses. We do not have direct indications of opportunism by the IPO firms, but an indirect indicator is whether an IPO firm subsequently is acquired. It is plausible that, at least in some acquisitions, the commitments to the firm's counterparties were abrogated.

In our sample, there are 43 IPO firms with large public customers that were acquired within three years of the IPO. Ten of these firms had fewer than three takeover defenses. The

mean CAR (-1, 1) is –0.37% for the large customers of these IPO firms. Fifteen of these firms had more than three takeover defenses, and the mean CAR (-1, 1) is –1.41% for the large customers of these firms. The difference between these two abnormal returns is statistically significant at the 10% level (t-statistic = –1.88). These results are consistent with the bonding hypothesis of takeover defenses, because they indicate that the negative spillover effects are largest where the IPO firm previously had made a significant commitment (via the use of takeover defenses) not to change the business relationship with its large customer.

We also investigate whether the business relationship is affected when the IPO firm is acquired. For the 43 IPO firms with large customers that were acquired within three years of the IPO, the business relationship with their large customers lasts 2.6 years. For the 176 IPO firms that were not acquired, the average duration of the business relationship is 3.2 years. The t-statistic for the difference in means is 1.81. This finding is consistent with the proposition that takeovers are, in fact, associated with a shortening of the IPO firm's business relationships.

V.A.2. Takeover defenses and forced CEO turnover

Both the bonding hypothesis and the agency cost view of takeover defenses imply that takeover defenses deter unsolicited takeover bids and help managers to keep their jobs. Using the Parrino, Sias, and Starks (2003) method to classify forced CEO turnover, we identify 32 instances of forced CEO turnover within three years of the IPO among the 1,219 IPO firms in our sample. Firms with forced CEO turnover have fewer takeover defenses than firms without forced turnover (2.66 versus 3.17), a difference that is statistically significant at the 5% level (t-statistic = 2.06). We also find that the rate of forced turnover rate declines with the use of takeover defenses. Among firms with fewer than three defenses (using the F-K index), 3.65% have a forced CEO turnover. For firms with three defenses, the rate of forced turnover is 2.43%, and for firms with more than three defenses, the rate of forced turnover is 1.94%. These results are consistent with the notion that takeover defenses do in fact help top managers keep their jobs.

V.A.3. Changes in percent of sales and R&D investment

The bonding hypothesis implies that firms adopting more takeover defenses will have stronger relationships with their large customers in the future. One measure of the relationship's durability is how the percent of sales made to the large customer changes over time. In the year after the IPO, IPO firms with fewer than three defenses have a decline in the percent of sales to their large customer of 8.3%. IPO firms with more than three defenses have a much smaller decline in the percent of sales to their large customer of 1.5%. This difference, however, is not statistically significant (*t*-statistic = 1.32).

The bonding hypothesis also implies that IPO firms adopting takeover defenses will themselves invest more highly in relationship-specific assets. To measure relationship-specific investment, we use the IPO firm's investment in R&D/assets. Firms with fewer than three defenses have a decline in R&D/assets of 12.3% in the year after the IPO. Firms with more than three takeover defenses, in contrast, have a smaller decline in R&D/assets of 4.2%. The difference is statistically significant at the 1% level. This provides additional support for the hypothesis that takeover defenses encourage long-term investment in important business relationships.

V.B. Alternate specifications and robustness tests

V.B.1. Classified boards

Daines and Klausner (2001) and Bebchuk, Coates, and Subramanian (2002) argue that staggered boards and dual-class shares are much more important than other types of takeover defenses. An extreme view is that these are the only defenses that matter, in which case the Field-Karpoff index, G-index, and E-index of takeover defenses are extremely noisy measures of a firm's takeover defenses. To examine this issue we repeat many of our tests replacing the index of takeover defenses with a dummy variable that indicates the presence or absence of a classified

board. (Dual class shares are uncommon in our sample, and the results are not affected if we include them.)

The results, which are tabulated in the Internet Appendix, are similar to those reported in our main tests, although some p-values are larger. For example, 65.6% of IPO firms with large customers adopt classified boards, compared to 60.6% of IPO firms without a large customer (the difference is significant at the 10% level); 68.9% of IPO firms with strategic alliances adopt classified boards, compared to 61.4% of IPO firms without large customers (the difference is significant at the 5% level). IPO firms with classified boards have an average relative valuation of 23.25 where IPO firms without classified boards have a valuation of 10.39, a difference that is significant at the 5% level. In multivariate tests measuring IPO valuation, the coefficient on the classified board indicator is positive and significant at the 1% level. These results indicate support for the bonding hypothesis even if we measure a firm's takeover defenses only by the presence of a classified board.

V.B.2. Additional quasi-rent measures

Large customers, dependent suppliers, and strategic partners are not the only counterparties with potentially appropriable quasi-rents that can be protected by takeover defenses. In the Internet Appendix we report the results of tests that use four alternate measures of the existence of appropriable quasi-rents: (i) overfunded pension assets, (ii) low employee turnover, (iii) high selling, general, and administrative expenses, and (iv) high trademark intensity. The first of these is prompted by Pontiff, Shleifer, and Weisbach's (1990) observation that acquirers of firms with overfunded pensions have incentive to distribute the excess assets to themselves. The second and third measures are suggested by Titman and Wessels (1988). They argue that employees in industries with low employee turnover tend to have greater job-specific skills, creating quasi-rents that can be appropriated. They also argue that firms with high selling, general, and administrative expenses have unique and differentiated products. As such, these

products would be difficult to replace with a new supplier, potentially imposing costs on the firm's customers. Firms in industries with many trademarks provide differentiated products. Employees and suppliers of firms selling unique products are likely to have job-specific skills and capital, and their customers may find it difficult to find alternative servicing for their differentiated products. Thus, the degree of product differentiation as measured by high trademark industry can reflect the size of appropriable quasi-rents.

A priori, we would expect these alternative measures to be quite noisy. For example, a high SGA expense could reflect administrative inefficiencies and not the uniqueness of the firm's product. Nonetheless, and as reported in the Internet Appendix, most of the results using these alternative measures are similar to the results reported in the main body of the paper.

Finally, we constructed "multiple quasi-rent" measures. These are indicators for the simultaneous presence of at least two among our three primary indicators of the existence of quasi-rents: large customers, dependent suppliers, and strategic alliances at the IPO firm. In general, the results for firms with multiple quasi-rents are even stronger than those reported in our main tests. This is consistent with the notion that the value of a takeover defense increases with the size of the quasi-rents that are at stake.

V.B.3. Venture capital and public float

Many of our findings are stronger in the subset of IPO firms that are backed by venture capital investors. For example, the empirical measures of the relation between firm value and the use of takeover defenses that are reported in Table 9 are generally more significant in venture-backed firms than in non-venture backed firms. One interpretation of this result is that venture-backed firms are more likely to deploy takeover defenses optimally, presumably because they can take advantage of the expertise of their venture capital investors. These additional tests are tabulated in the Internet Appendix.

For many firms, the public float of shares remains small after the IPO (e.g., see Field and Hanka (2001)). For such firms the risk of outside takeover, and the benefits of a takeover defense, may be relatively small. Including the public float as an additional control variable, however, or focusing only on firms with a large float at the time of the IPO, has no qualitative effect on our results. (These tests are summarized in the Internet Appendix.) We infer that takeover defenses help to bond the IPO firm's relationships with important business partners even when the public float is relatively small. It is possible that the IPO is merely a first step in the public float of shares, and that the future risk of takeover increases substantially even when the public float initially is relatively small.

V.C. Alternate explanations

V.C.1. Takeovers and toeholds by the IPO firm's large customer

The IPO firm may adopt takeover defenses not to bond its commitments with important counterparties, but rather, because IPO managers seek protection against an unsolicited bid from the firm's large customer. This conjecture is consistent with our finding that IPO firms tend to adopt more defenses when they have large customers. One problem with this conjecture, however, is that it does not explain our other findings, including the positive relation between the use of takeover defenses and firm value and operations when there is an important counterparty. Furthermore, we find no evidence that an IPO firm's large customer is, in fact, a likely acquirer. Of the 43 IPO firms in our sample that were acquired within three years of the IPO, none were acquired by its large customer.

Alternatively, the IPO firm's large customer may own an equity stake in the firm, thus mitigating the threat of takeover by unrelated firms and decreasing the benefit of any takeover defenses. In our sample, large customers own equity shares of 2% or larger in 49 of our sample firms. To examine whether such toeholds affect our results, we replicated our tests after

eliminating these 49 firms. The results are qualitatively the same as the tests reported in the paper, and are tabulated in the Internet Appendix.

V.C.2. Anticipation and supply chain spillovers

Another possibility is that takeover defenses signal that the IPO firm is likely to be acquired with a takeover premium. This could explain our finding that IPO firm value is positively related to the use of takeover defenses. This conjecture also could explain our finding that IPO firms' large customers have positive share price reactions when the IPO firm has a large number of defenses. As Ahern and Harford (2012) report, an increased likelihood of takeover could signal increases in the acquisition likelihoods at the IPO firm's suppliers and customers.

While this anticipation hypothesis is consistent with these two findings, it does not explain the full complement of our empirical results. For example, it does not explain why takeover defenses are particularly common when the IPO firm has counterparties with large quasi-rents at stake. It also does not explain our results regarding operating performance or the duration of the IPO firm's business relationships with important customers.

We nonetheless test one variation of the anticipation story, which is that the IPO firm's use of takeover defenses reveals that the firm is in an industry in which acquisitions are likely. This implies that the IPO firm's use defenses reveals that acquisition likelihoods for all firms in the same industry are higher than previously believed. We examine this conjecture by measuring the effect of the IPO announcement on the values of other firms in the same industry. The results, which are reported in the Internet Appendix, show that the mean three-day announcement period abnormal return for other firms in the industry is not significantly different from zero. Nor is it significantly related to the number of takeover defenses deployed by the IPO firm. These results are inconsistent with the conjecture that takeover defenses at the IPO firm signal that the firm is in an acquisitive industry.

V.C.3. Bargaining power

Another conjecture is that our results reflect the view that takeover defenses increase managers' bargaining power in the event of a takeover bid, as proposed by DeAngelo and Rice (1983). Kadyrzhanova and Rhodes-Kropf (2011) argue that bargaining enhancements, such as takeover defenses, are particularly valuable when more value is at stake, and they use industry concentration to proxy for the importance of bargaining power. It is possible that the presence of a large customer, supplier, or strategic partner indicates that the IPO firm has a high value that makes increased bargaining power more important. This conjecture could explain our findings that takeover defenses are more common when the IPO firm has an important counterparty, and that defenses are positively related to the IPO firm's valuation.[17]

There are three drawbacks to the bargaining power hypothesis. First, it does not explain the full range of our findings, including the evidence regarding IPO firm operating performance, spillover effects on the IPO firm's important counterparty, or the duration of the trading relationship. Second, Cremers, Nair, and Peyer (2008) find that takeover defenses are more common in competitive than concentrated industries, a result that is inconsistent with the argument that they will be used for increased bargaining in concentrated industries. And third, Field and Karpoff (2002) find no relation between takeover premiums and the use of takeover defenses in their sample of IPO firms, a result that is inconsistent with the bargaining power hypothesis for IPO firms in general.

Nonetheless, we investigate the bargaining power hypothesis with two tests. First, we include a measure of industry concentration, the Herfindahl index, as an additional control variable in all of our primary tests. In some specifications the use of takeover defenses is more common in competitive industries, similar to the findings by Cremers et al. (2008). In none of the

[17] Although, as with the other alternate explanations we have considered, it is difficult to explain the full complement of our results with the bargaining power hypothesis. In particular, the bargaining power conjecture does not explain our findings regarding IPO firm operating performance, spillover effects on the IPO firm's important counterparty, or the duration of the trading relationship.

tests, however, does the inclusion of the Herfindahl index have a noticeable impact on our main findings. These results are tabulated in the Internet Appendix.

In a second test, we examine whether there is any direct evidence that takeover defenses at IPO firms are associated with higher takeover premiums for the 43 IPO firms with large customers that were acquired within three years of their IPOs. We consistently find that takeover premiums are not significantly related to an IPO firm's use of takeover defenses. In the majority of specifications the point estimates of the relation are negative. These results are inconsistent with a bargaining power interpretation of our results.

V.C.4. IPO effect vs. industry-wide shock

An alternate interpretation of the results in Tables 6 and 7 (customer wealth effect results) is that the apparent spillover effect is spurious. For example, suppose the IPO is timed to exploit a simultaneous increase in demand for the large customer's products and that, for some unobserved reason, the number of takeover defenses increases with the size of the demand shock. This could account for the finding that the spillover effect on the IPO firms' large customers increases with the number of takeover defenses at the IPO firm. To test this possibility we examine spillover effects on other firms with the same CRSP 4-digit SIC code as the IPO firm's large customer. The bonding hypothesis implies that the spillover effects should be specific to the large customer, whereas the industry-wide shock story implies that spillover effects also will be observed among other firms in the same industry.

We calculate the market model abnormal returns of portfolios of competitors of each IPO customer. There are N=192 IPO customer competitor portfolios with sufficient data to calculate abnormal returns using a market model. The customer competitor CAR(-1, 1) is 0.01% and CAR(-3, 3) is 0.78%, both of which are statistically insignificant. More importantly, the relation between the industry portfolio return and the number of takeover defenses at the IPO firm is statistically insignificant. These results indicate that the takeover defenses at the IPO firm

positively impact the firms that have a direct trading relationship with the IPO firm, but not firms in the same industry with no trading relationship. That is, we are not observing a general industry spillover, but rather, the impact of the IPO firm's takeover defenses on firms with an actual trading relationship with the IPO firm.

VI. The IPO takeover defense puzzle

The fact that IPO firms have takeover defenses runs counter to our profession's views of IPO firms, takeover defenses, or both. We typically view IPO firms as adopting the value-maximizing mix of governance and operating characteristics because the pre-IPO firm principals internalize most of this value. And we typically view takeover defenses as value-reducing entrenchment devices. Easterbrook and Fischel (1991, pp. 204-5) reflect conventional wisdom when they argue – erroneously – that "Firms go public in easy to acquire form: no poison pill securities, no supermajority rules or staggered boards. Defensive measures are added later, a sequence that reveals much." To the contrary, 98.5% of the IPO firms in our sample from 1997-2005 have at least one takeover defense when they go public, and the average firm has three such defenses.

The bonding hypothesis offers a resolution to this puzzle: Takeover defenses are deployed at the IPO stage because, contrary to common assumption, they increase firm value. The increase in firm value does not arise from an increase in bargaining power as modeled by DeAngelo and Rice (1983) and Stulz (1988), or because of market myopia as in Stein (1988) and Chemmanur, Paeglis, and Simonyan (2011). Rather, defenses increase firm value because they help to protect the IPO firm's important business partners from opportunistic hold-up problems, thus facilitating the formation of profitable business relationships.

Our findings are at odds with Field and Karpoff (2002)'s conclusions about takeover defenses at IPO firms. They find that the likelihood that a firm has at least one takeover defense is positively related to the CEO's compensation, *Board size*, and *Dual CEO/chair*, and negatively

related to *CEO age*, *Inside ownership,* and *Board independence*. These results imply that takeover defenses are more likely to be deployed at the IPO stage when senior managers derive large private benefits and are subject to relatively weak internal controls. This, in turn, implies that agency problems are important even at the pre-IPO stage.

We do not dispute the notion that even IPO firms may face severe agency problems, and that the agency hypothesis of takeover defenses may be at work in many firms. As reported in the Internet Appendix, we replicate the Field and Karpoff (2002) results when we include only their variables. However, when we include our measures of appropriable quasi-rents measures (and, in some tests, industry fixed effects), the agency-related variables based on board and CEO characteristics generally become statistically insignificant, while the variables that reflect the importance of counterparty quasi-rents – *Large customer*, *Dependent supplier*, or *Strategic partner* – are statistically significant (e.g., see Table 3). Thus, the use of takeover defenses appears to be driven more by a desire to bond commitments to firm counterparties than by managerial agency problems, at least among firms that have important counterparties.

VII. Conclusions

In this paper we propose and test an efficiency explanation for takeover defenses using data from IPO firms. Borrowing from Knoeber (1986), Shleifer and Summers (1988), Coates (2001), and Pontiff, Shleifer, and Weisbach (1990), we argue that takeover defenses can help to bond the IPO firm's explicit and implicit commitments to its stakeholders, including customers, suppliers, and strategic partners. By insulating current managers from the threat of ouster, takeover defenses increase the value of managers' commitments to maintain their promised operating strategy and not to opportunistically exploit their counterparties' investments in the IPO firm. This bond, in turn, encourages the firm's counterparties to invest in the business relationship, yielding benefits for the IPO firm. We call this the bonding hypothesis of takeover defenses.

We test five implications of the bonding hypothesis using data on IPO firms. The tests rely on three measures of the importance of the quasi-rents earned by the IPO firm's counterparties. Such quasi-rents arise from the counterparties' investments in the business relationship, and would be at risk if the IPO firm abrogates its commitments. Our measures include indicators for the presence of a large customer, dependent supplier, or strategic alliance. In summary, our results indicate that:

(1) IPO firms deploy more takeover defenses when they have large customers, dependent suppliers, or strategic partners;

(2) The IPO firm's value is positively related to its use of takeover defenses, particularly when it has large customers, dependent suppliers, and/or strategic partners;

(3) The IPO firm's subsequent operating performance is positively related to its use of takeover defenses, particularly when it has large customers, dependent suppliers, and/or strategic partners;

(4) When the IPO firm announces its intention to go public, its large customers experience a change in share values that is positively related to the IPO firm's use of takeover defenses; and

(5) After the IPO, the longevity of the IPO firm's business relationship with its large customer is positively related to its use of takeover defenses.

We conduct several additional tests that complement these results. In total, these tests indicate that IPO firms are more likely to deploy takeover defenses particularly when their bonding value is high. The results are not sensitive to how takeover defenses are counted, as we examine three different indices of takeover defenses and consider various subsets of these indices (e.g, including only staggered boards). The results persist when we use alternate measures of the IPO firm's counterparties' appropriable quasi-rents. Several supplementary tests also are consistent with the bonding hypothesis and are inconsistent with alternate explanations for our findings, as reported in Section V.

At first glance, these results are surprising because they run counter to our profession's view – and our own prior view – of takeover defenses. Upon reflection, however, the bonding hypothesis and its empirical support are consistent with a broader view of the contracting problem discussed by Akerlof (1970), Klein, Crawford, and Alchian (1978), Williamson (1979), Grossman and Hart (1986), and others. Explicit contracts are costly to specify and enforce, creating the potential for opportunism by both buyers and sellers in most trading relationships. Coase (1960) argues that market transactions and contracts tend to arise when the costs of executing such contracts is less than the gain from trade. Viewed this way, takeover defenses help to economize on the cost of building and maintaining value-increasing trading relationships between the IPO firm and its counterparties. It is important to emphasize how the bonding hypothesis differs from previous theories about how takeover defenses can improve firm values, which depend on transfers (i.e., increased bargaining power as in DeAngelo and Rice, 1983) or market inefficiencies (as in Stein, 1988). Rather, the bonding hypothesis implies that takeover defenses increase value because they economize on contracting costs .

It also is important to recognize that our results do not address whether takeover defenses entrench managers and decrease firm values at seasoned firms, where agency problems are more severe. It is plausible that, due to firm life-cycle effects, the benefits of relationship bonding decrease and the cost of entrenchment increase as a firm matures. This would explain findings that seasoned firm values are negatively related to the insulating effect of takeover defenses, as summarized by Bebchuk (2013). However, at IPO firms whose values depend heavily on their relationships with customers, suppliers, and strategic partners, takeover defenses appear to increase value by bonding the IPO firm's commitment to these relationships.

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Appendix: Takeover defense indices

We use three indices of takeover defenses, or antitakeover provisions. Each index is a count of the number of specified defenses the firm has at the time of its IPO. See the original sources for definitions of each defense listed.

The FK-index from Field and Karpoff (2002) includes the following ten defenses:

Table A.1. Takeover defenses in the FK-index

1. Antigreenmail provision
2. Blank check preferred stock
3. Classified board
4. Fair price provision
5. Poison pill
6. Stakeholder clause
7. Shareholder meeting restrictions
Meetings called only by directors or executives
Advance notice requirement
Restrictions on action by written consent
8. Supermajority voter requirements
Supermajority required to approve mergers
Supermajority required to replace directors
9. Unequal voting rights
10. Miscellaneous antitakeover provisions
Board can be removed only for cause
Merger must be approved by an inside director
Restrictions on transfer of common stock
Merger must be approved by separate class of stock
Restrictions on how many IPO shares may be purchased
Restrictions on votes each shareholder may cast

The G-index from Gompers, Ishii, and Metrick (2003) includes the following 24 defenses:

Table A.2. Takeover defenses in the G-index

1. Blank check preferred stock
2. Classified board
3. Restrictions on calling a special meeting
4. Restrictions on written consent
5. Compensation plans with change in control provisions
6. Director indemnification contracts
7. CEO golden parachute
8. Director indemnification in the charter or bylaws
9. Charter amendments limiting director liability
10. Severance packages for management
11. Bylaw amendment restrictions
12. Charter amendment restrictions
13. Does not have cumulative voting
14. Does not have secret ballots
15. Supermajority to approve mergers
Control-share acquisition laws (state)
16. Unequal voting rights
17. Antigreenmail
Antigreenmail law (state)

18. Directors duties to other stakeholders
Directors duties law (state)
19.Fair price provision
Fair price law (state)
20. Pension parachutes
21. Poison pill
22. Silver parachutes
23. Business combination law (state)
24. Cash-out law (state)

The E-index from Bebchuk, Cohen, and Ferrell (2009) contains the following six defenses:

Table A.3. Takeover defenses in the E-index

1. Classified board
2. Bylaw amendment restrictions
3. Charter amendment restrictions
4. Supermajority to approve mergers
5. Golden parachutes(requires change in control)
Severance package (no change in control)
6. Poison pill

Variable Definitions

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

Variable Name	Definition
Takeover defense indices	
F-K index	An index adding up the total number of ten takeover defenses as in Field and Karpoff (2002) based on their presence in the firm charter and bylaws as disclosed in the IPO firm prospectus.
G-index	An index adding up the total number of 24 takeover defenses present as in Gompers, Ishii, and Metrick (2003) based on their presence in the firm charter and bylaws as disclosed in the IPO firm prospectus.
E-index	An index adding up the total number of 6 takeover defenses present as in Bebchuck, Cohen, and Ferrell (2009) based on their presence in the firm charter and bylaws as disclosed in the IPO firm prospectus.
Appropriable quasi-rent measures	
Large customer (indicator)	An indicator taking a value of one if the IPO firm has a large customer based on the COMPUSTAT segment level database. All observations are hand-checked using the IPO firm prospectuses.
Dependent supplier (indicator)	An indicator taking a value of one if the IPO firm is disclosed by another firm as a large customer based on the COMPUSTAT segment level database. All observations are hand-checked using firm annual reports.
Strategic alliance (indicator)	An indicator taking a value of one if the IPO firm has a strategic alliance with another firm as disclosed in the IPO firm prospectus.
Managerial characteristics	
CEO salary ($ thousands)	The dollar value of total cash compensation as disclosure in the IPO firm prospectus.
CEO tenure (years)	The number of years the CEO has been with the firm as disclosed in the IPO firm prospectus.
CEO age (years)	The age of the CEO as disclosed in the IPO firm prospectus.
Other IPO firm characteristics	
Inside ownership	The percent of shares held by inside managers of the firm as collected from the IPO prospectus.
Venture capital backed (indicator)	An indicator variable taking a value of one if the IPO firm has a venture capital investor as a pre-IPO shareholder.
Development firm (indicator)	An indicator variable taking a value of one if the IPO firm has zero sales at the time of the IPO based on COMPUSTAT data.
Board independence	The percent of the board that is made up of outsiders as collected from the IPO firm prospectus.
Board size	The total size of the IPO firm board as collected from the IPO prospectus.
Dual CEO/chair	An indicator variable taking a value of one if the CEO is also the chairman of the board and zero otherwise.
Total assets	COMPUSTAT data item AT.
Leverage	COMPUSTAT data item (DLTT+DLC)/AT
Market capitalization	Number of shares outstanding after the IPO times (CRSP shrout) the first available closing price of the IPO firm (CRPS prc).
Sales	COMPUSTAT data item SALE.
State antitakeover provisions	An indicator variable taking a value of one if the state of IPO firm incorporate has a state level antitakeover provision.
Delaware incorporation	An indicator taking a value of one if the IPO firm is incorporated in Delaware
Number of acquisitions	The number of acquisitions in the IPO firm Fama and French (1997) industry in the three years leading up to the IPO year measured in hundreds.
Underwriter rank	The rank of the lead underwriter of the offering as provided by Jay Ritter (http://bear.warrington.ufl.edu/ritter/ipodata.htm)
IPO firm-customer relationship characteristics	
CEO with social links to customer (indicator)	An indicator variable taking a value of one if the CEO has social links to the large customer CEO as defined by Hwang and Kim (2009).
Percent of IPO firm sales	The dollar value of sales to the large customer in the IPO year divided by COMPUSTAT data item SALE.
Long term contract	An indicator variable taking a value of one if the IPO firm discloses a long term contract with the large public customer and zero otherwise.
Pre-IPO relationship length	The number of years the relationship has existed as disclosed in the IPO firm prospectus.

Table 1. IPO firm characteristics

The sample consists of 1,219 IPOs reported in the Securities Data Corporation (SDC) New Issues database from 1997-2005. All REITs, unit offerings, closed end funds, ADRs, firms not covered by CRSP, firms that belong to either the financial services or utilities industries, and IPOs with an offer price below $5 are excluded from the sample. We use the COMPUSTAT Customer Segment database to identify whether the IPO firms have large customers. A large public corporate customer is defined as a customer whose sales account for more than 10% of the IPO firm's total sales. When there are multiple large corporate customers for each IPO firm, the customer that purchases the largest amount is identified as the sample customer. To determine whether a corporate customer is publicly traded or privately held, we match the names of large corporate customers in the COMPUSTAT Segment Customer database with those of firms in COMPUSTAT.

Panel A. IPO firm characteristics				
	N	Mean	Median	Standard deviation
IPO firm CEO characteristics				
CEO compensation ($ thousands)	1,219	429.60	252.00	1,133.47
CEO tenure (years)	1,219	5.88	4.00	6.23
CEO age (years)	1,219	47.38	47.00	8.58
IPO firm characteristics				
Inside ownership	1,219	0.58	0.60	0.29
Venture capital backed (indicator)	1,219	0.52	1.00	0.50
Development firm (indicator)	1,219	0.03	0.00	0.18
Board independence	1,219	0.28	0.25	0.17
Board size	1,219	6.60	7.00	2.02
Dual CEO/chair (indicator)	1,219	0.56	1.00	0.49
Total assets ($ millions)	1,219	362.29	99.45	1,874.31
Leverage	1,219	0.37	0.25	0.36
Market capitalization ($ millions)	1,219	714.32	292.53	1,685.43
Sales ($ millions)	1,219	116.18	80.84	97.84
State antitakeover provisions (indicator)	1,219	0.95	1.00	0.22
Delaware incorporation (indicator)	1,219	0.78	1.00	0.41
Number of acquisitions	1,219	255	201	200
Underwriter rank	1,219	7.87	9.00	1.71
Panel B. Appropriable quasi-rents				
Large customer (indicator)	1,219	0.6005	1.0000	0.4899
Dependent supplier (indicator)	1,219	0.0443	0.0000	0.2058
Strategic alliance (indicator)	1,219	0.3068	0.0000	0.4614
Panel C. Takeover defenses of IPO firms				
Field and Karpoff (2002) index of takeover defenses	1,219	3.16	3.00	1.40
G-index	1,219	9.59	10.00	2.50
E-index	1,219	1.50	1.00	1.19

Table 2. IPO firm takeover defenses and appropriable quasi-rents

The sample consists of 1,219 IPOs reported in the Securities Data Corporation (SDC) New Issues database from 1997-2005. All REITs, unit offerings, closed end funds, ADRs, firms not covered by CRSP, firms that belong to either the financial services or utilities industries, and IPOs with an offer price below $5 are excluded from the sample. We use the COMPUSTAT Customer Segment database to identify whether the IPO firms have large customers or are dependent suppliers. We hand collect data on strategic alliances from the IPO firm prospectus. Panel A examines firms with CEO characteristics strongly promoting bonding versus CEO characteristics that do not strongly promote bonding. Panel B examines firms with high versus low relationship quasi-rents.

Appropriable quasi-rents and takeover provision adoption

	Firms with high quasi-rents (N) Antitakeover provisions adopted	Firms with low quasi-rents (N) Antitakeover provisions adopted	Test of difference t-statistic (p-value)
Antitakeover provision adoption	**Firms with large customer** (732)	**Firms with large no customer** (487)	
F-K Index	3.24	3.05	2.33**
G-Index	9.81	9.27	3.71***
E-Index	1.56	1.42	2.10**
Classified board (indicator)	0.66	0.61	1.78*
	Firms with dependent supplier (54)	**Firms with no dependent supplier** (1,165)	
F-K Index	3.76	3.13	3.22***
G-Index	10.19	9.57	1.78*
E-Index	1.81	1.49	1.96**
Classified board (indicator)	0.69	0.63	0.77
	Firms with a strategic alliance (354)	**Firms with no strategic alliance** (865)	
F-K Index	3.40	3.06	3.86***
G-Index	9.99	9.43	3.61***
E-Index	1.70	1.42	3.65***
Classified board (indicator)	0.69	0.61	2.49**

Table 3. Determinants of IPO firms' takeover defenses

Columns 1-9 report the results of a Poisson maximum-likelihood model in which the dependent variable is the number of takeover defenses as measured by one of three measures: the Field-Karpoff (2002) index, the G-Index (Gompers, Ishii, and Metrick 2003), or the E-Index (Bebchuk et al. 2007). Column 10-12 reports logit regressions where the dependent variable takes a value of one if the firm has a classified board and zero otherwise. The regressors are defined in the Appendix. The sample consists of 1,219 IPOs reported in the Securities Data Corporation (SDC) New Issues database between 1997 and 2005. Panel A reports results from nine regressions using the full sample, and Panel B reports results using a sub-sample in which the IPO firm has a large (10% of sales or greater) customer and the large customer is a publicly traded firm. The regressions include dummy variables for each year and Fama and French (1997) industry. Standard errors clustered by industry are reported below the regression coefficients. ***, **, and * denote two-tailed significance levels of the parameter estimates at the 0.01, 0.05, and 0.10 levels.

Panel A. Determinants of IPO firm takeover defenses, total sample (N=1,219)

	F-K index as dependent variable			G-index as dependent variable			E-index as dependent variable			Classified board as dependent variable		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Measures of appropriable quasi-rents:												
Large customer (indicator)	0.095***			0.075***			0.156***			0.283**		
	(0.026)			(0.016)			(0.045)			(0.115)		
Dependent supplier (indicator)		0.155***			0.060**			0.197**			0.230	
		(0.060)			(0.030)			(0.092)			(0.381)	
Strategic alliance (indicator)			0.073***			0.036***			0.122**			0.233**
			(0.027)			(0.012)			(0.051)			(0.102)
Control Variables:												
Log(1+CEOsalary)	0.008*	0.010*	0.009*	0.003	0.003	0.003	0.012*	0.015**	0.014**	0.061**	0.063***	0.063***
	(0.005)	(0.005)	(0.005)	(0.002)	(0.002)	(0.002)	(0.007)	(0.007)	(0.007)	(0.018)	(0.018)	(0.018)
CEO tenure (years)	0.001	0.001	0.001	-0.001	-0.001	-0.001	-0.006*	-0.006*	-0.006*	-0.020	-0.020	-0.020
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.004)	(0.004)	(0.004)	(0.014)	(0.014)	(0.014)
CEO age (years)	0.000	0.000	0.000	0.000	0.000	0.000	-0.001	-0.001	-0.001	-0.003	-0.003	-0.003
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.006)	(0.006)	(0.006)
Inside ownership	-0.048	-0.045	-0.046	-0.018	-0.019	-0.019	-0.086	-0.088	-0.085	-0.234	-0.239	-0.227
	(0.031)	(0.029)	(0.030)	(0.023)	(0.024)	(0.024)	(0.067)	(0.067)	(0.068)	(0.151)	(0.149)	(0.148)
Venture capital backed (indicator)	0.070***	0.063**	0.069**	0.046**	0.043**	0.045**	0.113***	0.103**	0.109**	0.807***	0.798***	0.815***
	(0.027)	(0.027)	(0.027)	(0.018)	(0.018)	(0.018)	(0.043)	(0.042)	(0.044)	(0.148)	(0.150)	(0.154)
Development firm (indicator)	-0.072	-0.048	-0.079	0.011	0.032	0.016	-0.068	-0.025	-0.078	-0.385	-0.308	-0.419*
	(0.067)	(0.069)	(0.068)	(0.041)	(0.043)	(0.043)	(0.072)	(0.074)	(0.078)	(0.250)	(0.258)	(0.249)
Board independence	0.124	0.114	0.112	0.129***	0.124***	0.123***	0.378**	0.360**	0.352**	0.070	0.057	0.014
	(0.114)	(0.108)	(0.110)	(0.047)	(0.044)	(0.044)	(0.178)	(0.173)	(0.178)	(0.638)	(0.624)	(0.623)
Board size	0.018**	0.018**	0.015**	0.011***	0.010***	0.009**	0.035***	0.034***	0.029***	0.014	0.013	0.011
	(0.007)	(0.007)	(0.007)	(0.004)	(0.003)	(0.004)	(0.007)	(0.007)	(0.006)	(0.014)	(0.014)	(0.014)
Dual CEO/chair	0.026	0.035	0.032	0.002	0.007	0.006	0.054	0.066	0.064	0.064	0.081	0.083
	(0.030)	(0.029)	(0.030)	(0.019)	(0.019)	(0.019)	(0.081)	(0.080)	(0.080)	(0.142)	(0.143)	(0.144)
Log (total assets)	0.029***	0.023**	0.028***	-0.004	-0.007	-0.005	0.021	0.013	0.019	0.117**	0.108**	0.114***
	(0.011)	(0.012)	(0.011)	(0.005)	(0.006)	(0.006)	(0.016)	(0.016)	(0.017)	(0.049)	(0.051)	(0.052)
Leverage	-0.036	-0.030	-0.017	-0.076***	-0.071***	-0.066***	-0.148***	-0.137**	-0.117**	-0.275*	-0.259*	-0.230
	(0.040)	(0.040)	(0.040)	(0.017)	(0.017)	(0.016)	(0.056)	(0.055)	(0.052)	(0.160)	(0.158)	(0.160)

State antitakeover law (indicator)	0.096	0.094	0.100	0.316***	0.316***	0.318***	0.314***	0.313***	0.319***	0.951**	0.944**	0.947***
	(0.085)	(0.081)	(0.085)	(0.033)	(0.033)	(0.032)	(0.089)	(0.087)	(0.091)	(0.347)	(0.337)	(0.355)
Delaware incorporation (indicator)	-0.059*	-0.059*	-0.060*	-0.101***	-0.103***	-0.103***	-0.045	-0.049	-0.049	-0.279*	-0.283**	-0.279*
	(0.033)	(0.032)	(0.034)	(0.014)	(0.013)	(0.014)	(0.055)	(0.054)	(0.051)	(0.146)	(0.144)	(0.149)
Number of acquisitions	0.010	0.017	0.014	0.018*	0.022**	0.021**	0.033	0.042	0.039	0.001*	0.001*	0.001*
	(0.013)	(0.014)	(0.013)	(0.010)	(0.010)	(0.010)	(0.038)	(0.038)	(0.038)	(0.000)	(0.000)	(0.000)
Underwriter Rank	0.034***	0.037***	0.036***	0.016***	0.018***	0.018***	0.038*	0.042*	0.040*	0.079	0.083	0.083
	(0.009)	(0.009)	(0.009)	(0.006)	(0.006)	(0.006)	(0.022)	(0.022)	(0.023)	(0.054)	(0.054)	(0.055)
Year indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample size	1,219	1,219	1,219	1,219	1,219	1,219	1,219	1,219	1,219	1,219	1,219	1,219
Log pseudolikelihood	-2145.261	-2146.632	-2146.807	-2813.569	-2819.132	-2818.641	-1777.680	-1780.422	-1779.464	-711.359	-713.062	-712.189

Panel B. Effects of the importance of the trading relationship with a large customer(N=209)

	FK-index as dependent variable				
	(1)	(2)	(3)	(4)	(5)
Social Links between IPO CEO and customer CEO (indicator)	0.215***				0.231***
	(0.054)				(0.052)
Long term contract (indicator)		0.197***			0.179***
		(0.073)			(0.065)
Pre-IPO relationship length (years)			0.015*		0.014
			(0.009)		(0.009)
Percent of IPO firm sales				0.322***	0.287**
				(0.114)	(0.123)
Control Variables	Yes	Yes	Yes	Yes	Yes
Year indicators	Yes	Yes	Yes	Yes	Yes
Industry indicators	Yes	Yes	Yes	Yes	Yes
Sample size	209	209	209	209	209
Log pseudolikelihood	-337.164	-336.785	-337.832	-337.745	-334.093

Table 4. Takeover defenses and relationship duration, univariate comparisons

This table reports the mean and median length, in years, of the post-IPO business relationship between the IPO firm and its large publicly traded customer. Panel A reports on the total subsample of 209 IPOs reported in the Securities Data Corporation (SDC) New Issues database between 1997 and 2005 that had large public customers at the time of their IPO. Panel B reports on the subsample partitioned by the IPO firm's number of takeover defenses at the time of the IPO, using the Field-Karpoff (2002) index as described in the Appendix. ***, **, and * denote the significance of the parameter estimates at the 0.01, 0.05, and 0.10 levels, respectively.

Panel A. Post-IPO relationship length for IPO firms with large public customers

	Post-IPO relationship length (years)		
	N	Mean	Median
	209	2.73	2.00

Panel B. Post-IPO relationship length by the number of takeover defenses

Number of IPO firm takeover defenses	Post-IPO relationship length (years)		
	N	Mean	Median
<3 takeover defenses (a:)	64	2.17	2.00
3 takeover defenses	77	2.68	2.00
>3 takeover defenses (b:)	68	3.32	3.00
Test of difference (b – a) using *t*-test / Mann-Whitney (p-value)		3.59*** (0.00)	3.27*** (0.00)

Table 5. Takeover defenses and relationship duration, multivariate tests

Models 1-6 report on non-parametric (Cox) survival analysis tests in which the dependent variable is the post-IPO length of the business relationship between the IPO firm and its large publicly traded customer. Models 7-8 report the results of a 2SLS instrumental variable tests that seek to control for the endogeneity of the firm's takeover defenses. The second stage regression dependent variable is an indicator for the year the relationship terminates where there is the same number of year observations for each firm as the length of the relationship. The sample consists of 209 IPOs reported in the Securities Data Corporation (SDC) New Issues database between 1997 and 2005 that have large public customers at the time of their IPO. All REITs, unit offerings, closed-end funds, ADRs, firms not covered by CRSP, firms that belong to either the financial services or utilities industries, IPOs with an offer price below $5, and IPOs without earning or sales data in the year before the IPO are excluded from the sample. We use the COMPUSTAT Segment Customer database to identify whether the IPO firms have large corporate customers. A large corporate customer is defined as a customer whose sales account for more than 10% of the IPO firm's total sales. When there are multiple large corporate customers for each IPO firm, the customer that purchases the largest amount is identified as the sample customer. To determine whether a corporate customer is publicly traded or privately held, we match the names of large corporate customers in the COMPUSTAT Segment Customer database with those of all firms in COMPUSTAT. The Field and Karpoff (2002) index is described in the Appendix. ***, **, and * denote the significance of the parameter estimates at the 0.01, 0.05, and 0.10 levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dependent variable = Post-IPO length of business relationship						1st stage: Dep var = number of takeover defenses	2nd stage: Dep var = Relationship termination
F-K index a:	0.797***	0.829***	0.780***	0.813***	0.797***	0.858**		
	(0.044)	(0.045)	(0.046)	(0.043)	(0.041)	(0.057)		
Interfirm characteristics								
Social Links between IPO CEO and customer CEO (indicator) b:		3.526***						
		(1.668)						
a x b		0.690***						
		(0.084)						
Long term contract (indicator) c:			0.767					
			(0.372)					
a x c			1.100					
			(0.139)					
Long pre-IPO relationship length (indicator) d:				1.017				
				(0.319)				
a x d				0.975				
				(0.108)				
High percent of IPO firm sales (indicator) e:					0.689			
					(0.362)			
a x e					1.069			
					(0.180)			
Strategic alliance with customer (indicator) f:						1.619*		
						(0.439)		
a xf						0.864*		
						(0.067)		
Instrumental variables:								
Law firm indicator variables							Included	
Law firm gaffe (indicator)							0.697***	
							(0.128)	
Law firm acquisition experience							-0.021***	
							(0.003)	
Instrumented number of takeover defenses								-0.032**
								(0.016)
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry indicators	209	209	209	209	209	209	577	577
Sample size	-907.749	-906.129	-907.612	-907.704	-907.283	-907.161	0.80	0.19
Log pseudolikelihood								

Table 6. Cumulative abnormal returns (CARs) for large public corporate customers around the IPO preliminary filing date

Mean and median values of the impacts on the IPO firms' large customers' share values when the IPO firms' preliminary prospectus is filed. The sample consists of 209 IPOs reported in the Securities Data Corporation (SDC) New Issues database from 1997-2005 that have a large customer disclosed in the firm SEC filings that itself is a publicly traded corporation. We use the COMPUSTAT Customer Segment database to identify whether the IPO firms have large public corporate customers. A large public corporate customer is defined as a customer whose sales account for more than 10% of the IPO firm's total sales. To determine whether a corporate customer is publicly traded or privately held, we match the names of large corporate customers in the COMPUSTAT Segment Customer database with those of firms in COMPUSTAT. Cumulative abnormal returns are calculated using a market model regression with parameters estimated from day -255 to day -46. ***, **, and * denote significance of the parameter estimates at the 0.01, 0.05, and 0.10 levels.

Panel A. Abnormal returns in event window around IPO filing date (N=209)

Event window	Mean	Median	t-test	Mann-Whitney z-test
-1	0.17%	-0.13%	0.54	0.53
			(0.59)	(0.60)
0	0.50%	0.15%	2.64**	2.27**
			(0.01)	(0.03)
+1	0.19%	-0.25%	0.91	0.29
			(0.36)	(0.77)
-1 to 1	0.86%	0.09%	2.13**	1.10
			(0.03)	(0.27)
-3 to 3	1.17%	0.30%	2.35**	1.96**
			(0.02)	(0.05)

Panel B. Abnormal returns by the number of takeover defenses

Number of IPO firm takeover defenses	Preliminary prospectus filing date CAR(-3, 3)		
	N	Mean	Median
<3 takeover defenses (a:)	64	-0.75%	-0.11%
3 takeover defenses	77	-0.33%	-0.63%
>3 takeover defenses (b:)	68	4.66%	1.69%
Test of difference (b – a) using *t*-test / Mann-Whitney (p-value)		4.39*** (0.00)	3.61*** (0.00)

Table 7. Multivariate regressions of cumulative abnormal returns (CARs) for large public corporate customers

This table reports results from eight OLS regressions in which the dependent variable is the cumulative abnormal return over days (0,5) relative to the IPO firm's preliminary prospectus filing date for the IPO firms' large public customers. The sample consists of 209 IPOs reported in the Securities Data Corporation (SDC) New Issues database from 1997-2005 that have a large public customer disclosed in the firm SEC filings. We use the COMPUSTAT Customer Segment database to identify whether the IPO firms have large customers. A large customer is defined as a customer whose sales account for more than 10% of the IPO firm's total sales. When there are multiple large customers for each IPO firm, the customer that purchases the largest amount is identified as the sample customer. To determine whether a corporate customer is publicly traded, we match the names of large corporate customers in the COMPUSTAT Segment Customer database with those of firms in COMPUSTAT. Cumulative abnormal returns are calculated using a market model regression with parameters estimated from day -255 to day -46 relative to the IPO firm's preliminary prospectus filing date. ***, **, and * denote significance of the parameter estimates at the 0.01, 0.05, and 0.10 levels.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dependent variable = IPO announcement day return for large customers						1st stage: Dep var = number of takeover defenses	2nd stage: Dep var = Announcement day return
F-K index a:	1.940***	1.633***	1.524***	0.820**	0.859	0.093		
	(0.451)	(0.548)	(0.442)	(0.340)	(0.545)	(0.609)		
Interfirm characteristics								
Social Links between IPO CEO and customer CEO (indicator) b:		-8.454**						
		(3.528)						
a x b		2.561**						
		(1.217)						
Long term contract (indicator) c:			-6.460**					
			(2.699)					
a x c			1.945***					
			(0.664)					
Long pre-IPO relationship length (indicator) d:				-1.845				
				(2.642)				
a x d				1.518*				
				(0.830)				
High percent of IPO firm sales (indicator) e:					-5.759**			
					(2.280)			
a x e					1.861*			
					(0.964)			
Strategic alliance with customer (indicator) f:						-6.918*		
						(3.939)		
a x f						3.030**		
						(1.285)		
Instrumental variables:								
Law firm indicator variables							Included	
Law firm gaffe (indicator)							0.197	
							(0.397)	
Law firm acquisition experience							-0.015*	
							(0.008)	
Instrumented number of takeover defenses								1.734***
								(0.557)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample size	209	209	209	209	209	209	209	209
Adjusted R^2	0.22	0.24	0.24	0.26	0.24	0.28	0.41	0.21

Table 8. IPO firm valuation, univariate comparisons

Mean and median ratios of the IPO firm's relative valuation. In Panel A, relative valuation is calculated as the ratio of shares outstanding times the offer price to EBITDA for the IPO firm divided by the ratio of market capitalization to EBITDA for its matched firm. In Panel B, relative valuation is calculated as the ratio of shares outstanding times the offer price to sales for the IPO firm divided by the ratio of market capitalization to sales for its matched firm. The matched firms are selected by sorting the Fama and French (1997) industry into three portfolios based on sales in the year before the IPO. Each of these portfolios is then sorted into three additional portfolios based on EBITDA/sales, producing a matrix of 3x3 portfolios for each industry. Then, within each portfolio, the firm with sales closest to the IPO firm is selected as the matched firm. A large customer is defined as a customer whose sales account for more than 10% of the IPO firm's total sales. ***, **, and * indicate significance at the 1%, 5%, and 10% levels.

Panel A: IPO firm offer value/matching firm value (using EBITDA) partitioned by the number of takeover defenses

	N	<3 takeover defenses (a) (median)	3 takeover defenses (median)	>3 takeover defenses (b) (median)	Difference (b-a) Mann-Whitney (p-value)
IPO firms with large customers	732	1.78	3.02	2.98	3.00*** (0.00)
IPO firms without large customers	487	1.66	2.72	1.96	0.23 (0.82)
IPO firms that are dependent suppliers	54	1.70	4.03	4.85	1.45 (0.15)
IPO firms that are not dependent suppliers	1,165	1.71	2.86	2.40	2.16** (0.03)
IPO firms with a strategic alliance	354	2.28	3.19	3.47	1.97** (0.05)
IPO firms without a strategic alliance	865	1.59	2.71	2.06	1.31 (0.19)

Panel B: IPO firm offer value/matching firm value (using sales) partitioned by the number of takeover defenses

	N	<3 takeover defenses (a) (median)	3 takeover defenses (median)	>3 takeover defenses (b) (median)	Difference (b-a) Mann-Whitney (p-value)
IPO firms with large customers	732	2.03	3.54	3.00	2.38** (0.02)
IPO firms without large customers	487	1.59	2.91	2.61	1.34 (0.18)
IPO firms that are dependent suppliers	54	1.36	8.21	6.72	1.19 (0.23)
IPO firms that are not dependent suppliers	1,165	1.93	3.26	2.91	2.48** (0.01)
IPO firms with a strategic alliance	354	3.64	3.79	3.73	0.92 (0.36)
IPO firms without a strategic alliance	865	1.59	3.04	2.53	1.97** (0.05)

Panel C. IPO firm earnings per share to price (E/P) ratio by number of ATPs

	N	<3 takeover defenses (a) (median)	3 takeover defenses (median)	>3 takeover defenses (b) (median)	Difference (b-a) Mann-Whitney (p-value)
IPO firms with large customers	327	0.0400	0.0338	0.0314	1.75* (0.08)
IPO firms without large customers	209	0.0439	0.0302	0.0388	0.55 (0.58)
IPO firms that are dependent suppliers	22	0.0732	0.0333	0.0189	1.71* (0.09)
IPO firms that are not dependent suppliers	514	0.0428	0.0332	0.0347	1.49 (0.13)
IPO firms with a strategic alliance	134	0.0303	0.0543	0.0297	1.07 (0.28)
IPO firms without a strategic alliance	402	0.0430	0.0319	0./0341	1.98** (0.05)

Table 9. IPO firm valuation, multivariate tests

Ordinary least squares estimates in which the dependent variable is log(relative valuation). Relative valuation is calculated as the ratio of shares outstanding times the offer price to EBITDA for the IPO firm divided by the ratio of market capitalization to EBITDA for its matched firm. The matched firms are selected by sorting the Fama and French (1997) industry into three portfolios based on sales in the year before the IPO. Each of these portfolios is then sorted into three additional portfolios based on EBITDA/sales, producing a matrix of 3x3 portfolios for each industry. Then, within each portfolio, the firm with sales closest to the IPO firm is selected as the matched firm. *Large customer*, *Dependent supplier*, and *Strategic alliance* are indicator variables that reflect the existence of an important business relationship with the IPO firm. Control variables include IPO firm underwriter rank, log(IPO proceeds), an indicator taking a value of one if the IPO is venture backed, the percent of the shares that are primary shares, IPO firm leverage, and IPO firm R&D/assets. ***, **, and * indicate significance at the 1%, 5%, and 10% levels.

	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent variable = IPO firm valuation				First Stage Dependent variable = number of defenses	Second Stage Dependent variable = IPO firm valuation
Takeover defense measures:						
F-K Index	0.075***	0.010	0.057**	0.034		
	(0.026)	(0.039)	(0.025)	(0.029)		
Measures of appropriable quasi-rents:						
Large customer		-0.057				
		(0.159)				
Large customer x takeover defense index		0.110**				
		(0.051)				
Dependent supplier			-0.597			
			(0.159)			
Dependent supplier x takeover defense index			0.225**			
			(0.098)			
Strategic alliance (indicator):						
				-0.066		
Strategic alliance x takeover defense index				(0.276)		
				0.122*		
Instrumental variables:				(0.072)		
Law firm indicator variables					Included	
Law firm gaffe (indicator)					0.778***	
					(0.003)	
Law firm acquisition experience					-0.007**	
					(0.003)	
Instrumented number of takeover defenses						0.148***
						(0.035)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Year indicators	Yes	Yes	Yes	Yes	Yes	Yes
Industry indicators	Yes	Yes	Yes	Yes	Yes	Yes
Sample size	1,219	1,219	1,219	1,219	1,219	1,219
Adjusted R^2	0.16	0.17	0.17	0.17	0.17	0.21

Table 10. Change in operating performance, univariate results

We report for each IPO firm in our sample the change in ROA for the IPO firm minus the change in ROA for a matched firm. Matched firms are selected based on industry, year, and ROA values within 10% of the IPO firm ROA. A large customer is defined as a customer whose sales account for more than 10% of the IPO firm's total sales. ***, **, and * indicate significance at the 1%, 5%, and 10% levels.

IPO firm change in ROA from year -1 to year +1 adjusted by a matching firm ROA partitioned by the number of takeover defenses					
	N	<3 takeover defenses (a) (mean)	3 takeover defenses (mean)	>3 takeover defenses (b) (mean)	Difference (b-a) t-test (p-value)
IPO firms with large customers	732	-0.05	-0.04	0.01	2.25** (0.02)
IPO firms without large customers	487	-0.01	0.04	0.01	0.57 (0.57)
IPO firms that are dependent suppliers	54	-0.40	0.05	-0.01	3.47*** (0.00)
IPO firms that are not dependent suppliers	1,165	-0.02	-0.02	0.01	1.35 (0.17)
IPO firms with a strategic alliance	354	-0.08	-0.09	-0.01	1.79* (0.07)
IPO firms without a strategic alliance	865	-0.02	0.02	0.02	1.38 (0.17)

Table 11. Change in operating performance, multivariate regressions

Models 1-6 report ordinary least squares estimates in which the dependent variable is the change in IPO firm ROA from the year of the IPO to the year after the IPO minus the corresponding change in ROA at the IPO firm's matched firm. Models 7-8 report the results of instrumental variable tests that seek to control for the endogeneity of the firm's takeover defenses. The second stage regression has as a dependent variable the change in firm ROA as in models 1-6. Matched firms are selected based on industry, year, and ROA values within 10% of the IPO firm ROA. A large customer is defined as a customer whose sales account for more than 10% of the IPO firm's total sales. *Large customer*, *Dependent supplier*, and *Strategic alliance* are indicator variables that reflect the existence of an important business relationship with the IPO firm. Control variables include IPO firm underwriter rank, log(IPO proceeds), an indicator taking a value of one if the IPO is venture backed, the percent of the shares that are primary shares, IPO firm leverage, and IPO firm R&D/assets. ***, **, and * indicate significance at the 1%, 5%, and 10% levels.

	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent variable = Δ Adjusted ROA				1st stage: Dep var = number of takeover defenses	2nd stage: Dep var = ΔAdjusted ROA
Takeover defense measures:						
F-K Index	0.005*	0.000	0.005	0.002		
	(0.003)	(0.003)	(0.003)	(0.003)		
Measures of appropriable quasi-rents:						
Large customer		-0.044**				
		(0.021)				
Large customer x takeover defense index		0.010*				
		(0.006)				
Dependent supplier			-0.285			
			(0.144)			
Dependent supplier x takeover defense index			0.024**			
			(0.012)			
Strategic alliance (indicator):				-0.094**		
				(0.033)		
Strategic alliance x takeover defense index				0.015*		
				(0.008)		
Instrumental variables:						
Law firm indicator variables					Included	
Law firm gaffe (indicator)					0.762***	
					(0.124)	
Law firm acquisition experience					-0.006*	
					(0.003)	
Instrumented no. of takeover defenses						0.016*
						(0.009)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Year indicators	Yes	Yes	Yes	Yes	No	No
Industry indicators	Yes	Yes	Yes	Yes	Yes	Yes
Sample size	1,219	1,219	1,219	1,219	1,219	1,219
Adjusted R^2	0.07	0.07	0.08	0.08	0.36	0.01