Outside Purchase Contracts, Human Capital and Firm Capital Structure

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ABSTRACT

We examine the impact of outside purchase contracts on firm risk and firm capital structure. We find that firms with more outside purchase contracts have less risky cash flows. Despite these less risky cash flows, firms with these contracts also have less financial leverage especially when they operate in high value-added industries. Examining firm financing decisions, we document that firms with more outside contracts are more likely to issue private securities. Our results are consistent with firms with more outside purchase contracts using less leverage to decrease the expected costs of financial distress on their explicit and implicit contracting parties.

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1 Introduction

Purchasing and outsourcing from supplier firms has been growing extensively in the 21st century, yet we know little about how such contracting decisions affect a firm's real and financial decisions. Evidence from the electronics, pharmaceuticals and automotive industries shows that the use of contract manufacturing has been growing significantly. In particular, the electronics industry outsourced $75 billion to contract manufacturers in 2000, representing 10 percent of total production (Plambeck and Taylor (2005)). In addition, firms have been signing extensive contracts with outside firms to run their communication and informational technology operations.

We examine the effect of outside firm contracts on firm risk and capital structure using a unique database of purchase contracts (purchase obligation) data that we collect from firm 10-Ks. In a complete contracting world, using outside contracts would not affect firm capital structure. However, with incomplete contracts between the firm and its real side claimants, using outside contracts may affect financial structure through its effect on the firm's suppliers and own employees. The effect on suppliers and employees can arise due to potential costs that financial distress could impose on them.

We collect data on outside firm purchase contracts using web crawling and text parsing of firm 10-Ks following the SEC's rule that requires firms to report significant outside purchase contracts to investors in their financial statements. These contracts include both traditional supply contracts and service contracts which outsource tasks like customer call centers, handling communication and information technology for the firm, and the production of products. A prominent example of this later type of contracting is Apple Inc. signing contracts for the production of its iPhones.

Our focus is on both domestic and international contracts as our data shows 47.5 percent of contracts are from the U.S., with 25.5 percent of contracting parties from Asia, and the remaining from Europe and other regions.[1] We note that in our data there is still a large fraction of firms in each industry that do not use material outside contracts. They might have suppliers, but do not use explicit contracts as they may purchase on the open market. Thus, the relationship between such firms and their suppliers is likely not to involve investment in firm-specific assets. This fact enables us to effectively examine the characteristics of the firms that use suppliers with material outside contracts and the possible economic link between outside purchase contracts and leverage/financing decisions.

[1]See Nunn and Trefler (2012), and Antras (forthcoming) for recent contributions to the international trade literature based on incomplete contracting and the property-rights theory of firm boundaries. Spencer (2005) and Helpman (2006) provide surveys of the earlier outside purchase contracts and international trade literature. Also, see Handfield (1994), Levy (1995), Monczka and Trent (2003) for management literature on international outsourcing.

On the real side, we find that firms that use outside purchase contracts have less risky cash flows. Despite these less risky cash flows, our results show that firms with more outside purchase contracts have less financial leverage. Given that less risky cash flows should be associated with higher leverage under the traditional trade-off theory of capital structure, we investigate what characteristics of these firms drive this result. Firms that have more external purchase contracts have higher value added per worker and use less debt, especially when they operate in high value-added industries. We recognize that using purchase contracts are endogenous decisions and thus we instrument for purchase contracting decisions using the geographic location of the firm; specifically how close it is to major ports, airports or border crossings, and the transportation costs of the inputs used to produce the products in the firm's industry.

Our results are consistent with firms with more purchase contracts using less leverage to decrease the expected costs of financial distress on implicit and explicit contracting parties and to increase the incentives of contracting parties to invest in relationship-specific assets. Lower leverage decreases the chances of financial distress and bankruptcy and helps maintain the value of implicit and explicit contracts. Thus, conceptually we show that the effects of incomplete contracting go beyond ownership as in Grossman and Hart (1986), extending to how firms with outside firm contracts finance their operations.

Specifically, we consider several possible channels for how using outside purchase contracts may affect a firm's capital structure and financing decisions. The first way purchase contracts may interact with financial structure is through long-term contracts with suppliers. Grossman and Hart (1986) model how the decision to be vertically integrated versus maintain separate ownership can affect the incentives to invest ex ante in relationship-specific assets. They model how control rights should reside in parties for which ex ante investments are more critical. If both parties' investments are important to the final outcome, the firms will be less likely to vertically integrate. In our context, firms in which relationship-specific investments are important will be less likely to be vertically integrated and more likely to use outside purchase contracts.

Firms thus use long-term contracts with suppliers to ensure supply, and suppliers use long-term contracts to guarantee a market for the specified production and to maintain ex ante incentives to invest in the business relationship, as in Grossman and Hart (1986). However, these outside purchase contracts can be directly affected by financial leverage. Given that contracts in bankruptcy can be broken, the expected duration of the contract and the business relationship will be shorter when firms have a higher probability of bankruptcy. If contracting parties are investing in relationship-specific assets or resources, they may be worried about the counter-party firm's financial stability, especially

when there is a possibility of bankruptcy or financial distress resulting in a failure to fulfill the implicit or explicit contractual terms.

One possibility is that suppliers will internalize this possibility and require compensating contractual differentials when dealing with a highly leveraged firm. Alternatively, following the ideas of Williamson (1979), firms may attempt to minimize contracting costs and maximize the incentives to invest in the relationship through the use of lower leverage. Thus, conditional on longer term contracts being desirable for the firm, the firm may use less debt ex ante to decrease the probability of bankruptcy and financial distress in order to obtain more favorable contractual terms.

The second way outside purchase contracts may affect financial structure is through its effect on a firm's human capital and type of employees. The idea is similar to the previous effect on suppliers in that the firm faces a limited commitment problem and is not able to contractually insure its employees through complete contracts in the event of bankruptcy or financial distress. If firms with more external purchase contracts employ more high value-added employees who should optimally invest in firm-specific human capital, the firms will choose a financial structure that increases these incentives. As Jaggia and Thakor (1994) model, higher financial leverage can decrease employees' incentives to invest more in firm-specific assets as the bankruptcy can cause the value of their firm-specific assets to decrease. Thus the firm will optimally take on a lower amount of debt to counteract the effect of potential bankruptcy on an employee's incentive to invest in relationship-specific capital.

The reasoning is that an increase in the probability of bankruptcy that lessens the likelihood that long-term wage commitments will be honored ex post imposes a greater cost on firms and employees when the firm has greater investment specificity. Such a firm, therefore, is predicted to optimally take on a lower amount of debt. Berk, Stanton, and Zechner (2010) analyze the human cost of bankruptcy more generally. Their model shows that even without firm-specific human capital, more human capital intensive firms will have less financial leverage as the optimal contract involves firms providing a more stable fixed compensation contract when employees are risk averse with respect to their human capital. This idea has other empirical support. Bankruptcy and financial distress have been recently shown to affect a firm's ability to hire high quality employees as the number and quality of job applicants decrease with an increase in financial distress, as Brown and Matsa (2013) recently show. Lastly, firms may also use less leverage to help insure workers as in Agrawal and Matsa (forthcoming 2013).

After examining the amount of financial leverage that firms use, we examine firms' financing decisions more closely. We examine whether using outside purchase contracts affect the source of debt and equity that firms use. The idea we investigate is whether firms that have proportionally more

high value added employees and use long-term contracts with suppliers have a more flexible financial structure. Given that private debt with fewer creditors is more flexible and easier to renegotiate than public debt, as Bolton and Scharfstein (1996) model, firms that use debt and wish to have more flexibility in their capital structure are predicted to use more private debt. We find support for this prediction.

Our results show that firms with outside purchase contracts have lower firm cash flow volatility and this lower volatility is particularly evident during the recent financial crisis. During the recent financial crisis, firms with more external purchase contracts were able to better match costs with sales fluctuations. Firms that use long-term purchase contracts incur fewer fixed costs thus reducing their operating leverage. Second, on the financial side, we show that despite the reduction in cash flow volatility, firms with outside purchase contracts use less financial leverage after controlling for the cash flow volatility and the fixed assets firms use. This reduction in leverage is especially found for firms with more outside purchase contracts in high value-added industries or for firms with suppliers that likely invest more in relationship-specific assets. Third, we find that when firms with outside purchase contracts issue securities, they are more likely to issue private securities. When issuing debt, they are more likely to choose private debt over public debt. Thus, firms with outside purchase contracts are more likely to use less debt and change the composition of their debt to include more private debt, as they have proportionally more high value added employees and contracts with external suppliers.

Our results are robust to taking into account that using long-term purchase contracts is itself an endogenous decision. We use the geographic location of the firm; specifically how close it is to major ports, airports or border crossings to instrument for the decision to using outside purchase contracts. We also use the transportation costs of the inputs of the products that the firm's industry produces. The idea is that geographic location and industry input transportation costs can make it easier for some firms to purchase from suppliers but should have limited or no impact on financing decisions of firms other than through the purchase contracting channel after controlling for industry.[2] We also consider alternative instruments that capture how "fearful" or concerned suppliers may be that the firm will stop using them as suppliers. We thus use the amount of competition in the supplier's industry and the distance of the supplier to the firm. The idea is that firms are more likely to sign a contract with the supplier to assuage the supplier's fear that the customer firm will switch suppliers after the supplier has made relationship-specific investments to serve the firm. We confirm that all

[2]Geographic proximity has also been used to study investment in local plants by Giroud (2012). In our case, geographic location directly impacts investment but should not affect financing decisions except through the effect of location on the type of investment.

our instruments used in the instrumental variable regressions pass the standard weak, under- and over-identification tests.

Our results are consistent with outside purchase contracts affecting not only who should own the asset but also the amount and composition of external financing. In our context of separate ownership with long-term contracts, our results are consistent with firms choosing more flexible capital structures through the use of equity and private debt in order to reduce the costs of financial distress on employees and suppliers. The implication of our results is that contracting counter-parties of a firm will be more willing to invest in specialized assets and maintain these assets when the firm uses less debt and less publicly traded debt to finance its operations since then the firm has a greater chance of long-term survival.

Our paper adds to several literatures. We add to the outsourcing literature (see Antras (forthcoming) for recent contributions and Spencer (2005) and Helpman (2006) for extensive surveys) and show that there is a financial dimension to using outside purchase contracts that has not been studied before. Conceptually, we add to the incomplete contracting literature showing that incomplete contracting and relationship-specific assets affect firm financing decisions. Previous literature, including both the theoretical literature beginning with Grossman and Hart (1986) and the empirical literature such as Baker and Hubbard (2004) shows that residual rights of control affect firm ex ante incentives to invest in relationship-specific assets and thus who should own the assets. However, this literature does not deal with how the assets should be financed and whether capital structure is influenced when firms choose not to integrate. Our paper shows that purchase contracts impact the capital structure of the firm and the source of its debt and equity financing.

We also add to the literature that studies labor-finance interactions on how the composition of a firm's labor force and its assets interact with its financial leverage and financing decisions (Jaggia and Thakor (1994), Berk, Stanton, and Zechner (2010) and Brown and Matsa (2013)). Lastly, we add to the literature on customer and supplier relations. Allen and Phillips (2000) show that firms with product market relationships where one party owns equity in another experience better operating performance and more investment. Fee, Hadlock, and Thomas (2006) show that firms are more likely to invest in ownership positions in firms in which they have business relations. Kale and Shahrur (2007) show that competition and the characteristics of customers and suppliers affect firm financial structure.

The remainder of this paper proceeds as follows. Section 2 describes data we use, and in particular, the long-term purchase contracts. Section 3 discusses our identification strategy and empirical

methodology. Section 4 presents our results on the effect of purchase contracts on financial structure and examines the public versus private financing choices of firms with these outside purchase contracts. Section 5 concludes.

2 Data and Summary Statistics

2.1 Purchase Contracts Data

We examine outside purchase contracts for public firms whose 10-K filings we download and process electronically from the SEC's Edgar website. These contracts involve traditional supply contracts and also contracts where the firm outsources tasks like information technology or production to outside firms. Our data begins in 2004, since in January 2003 the SEC issued a final rule on Disclosure about off-balance sheet arrangements and aggregate contractual obligations.[3] This rule requires all public companies other than small business issuers to provide an explanation of their contractual obligations in a separately captioned subsection of the Management's Discussion and Analysis (MD&A) section. U.S. GAAP already requires firms to aggregate and assess all of the following specified categories of contractual obligations: long-term debt obligations, capital lease obligations, and operating lease obligations. The SEC's final rule on disclosure about contractual obligations in January 2003 particularly includes the "purchase obligations" category.

The SEC defines a purchase obligation as an agreement to purchase goods or services that is enforceable and legally binding on the registrant in the future. Therefore, a firm's purchase obligations represent the amount of inputs in production that will be purchased in the future (Lee (2010)). Purchase obligations are different than open-market orders in that a company legally signs purchase contracts with third parties. Thus, purchase obligations capture a firm's contractual outside activities.

These contracts are considered "executory contracts" under American bankruptcy law. An executory contract is a contract in which continuing obligations exist on both sides of the contract at the time of the bankruptcy petition, i.e. one which still requires both the debtor and its counterparty to make further performance. In this context, a trustee or debtor in possession may assume any prepetition executory contract of the debtor, preserving both the debtor's and the counterparty's

[3]This rule is to implement Section 401(a) of the Sarbanes-Oxley Act of 2002. See Final Rule: Disclosure in Management's Discussion and Analysis about Off-Balance Sheet Arrangements and Aggregate Contractual Obligations, Securities Act Rel. No. 33-8182, Exchange Act Rel. 34-47264, Financial Reporting Rel. No. FR-67, International Series Rel. No. 1266, http://www.sec.gov/rules/final/33-8182.htm (Jan. 27, 2003).

obligations through the bankruptcy process, or reject it, thereby *breaching* it as of the date of the petition. In bankruptcy, the supplier would have to keep supplying products to the bankrupt firm to receive payment - without any guarantee of payment as the contract can be breached unless the terms of payment are renegotiated under Chapter 11. Thus, importantly and related to the context of our paper, purchase obligations should not be regarded as liabilities (in other words, as another form of debt or financing), because the counter parties of contracts have not delivered goods or services yet at the time and payment can be made in the future through raising equity, issuing debt or cash. A firm's purchase obligations are the firm's *promises* to purchase from its counter-parties and thus estimated amounts of cash outflows to the counter-parties within the pre-specified period. These contracts are best viewed as forward contracts with escape clauses and also not as leases. In a lease, the firm receives the product in advance and payments are a form of financing. In supply contracts, no money changes hands at the time of signing and future payments occur on delivery of the product. At the future time of delivery of the product, the firm then chooses how to arrange payment, either financing through equity or debt at that point or paying via cash. In a recent study on leases, Damodaran (2009) explicitly excludes purchase obligations in his calculations of firm leases. Damodaran (2009) states (p. 14) that "Purchase obligations are generally less binding than operating leases and have more escape clauses built into them" and notes that if the firm cuts back on production or cancels production the contracts do not apply and the purchase can be canceled, unlike leases where the firm takes delivery of a product or asset upfront. Even though purchase obligations are not regarded as liabilities, as we discuss later, to mitigate any concerns related to these contracts being suppler financing, we additionally test the link between this measure and leverage by including account payables as part of total debt.

For the fiscal years ending on or after December 15, 2003, all public firms (other than small business issuers) started disclosing purchase obligations in their financial statements. Therefore, our primary sample includes all 10-K filers in the manufacturing sector associated with fiscal years ending in 2004 and up to 2010. Firms generally do not sub-categorize purchase obligations in their tabular disclosures. They sometimes provide limited information on the types of purchase obligations in their following footnotes. For manufacturing firms, the most common type of purchase obligation is an inventory purchase commitment. A service agreement, including advertising, marketing and IT, is another common type of purchase obligation.[4] The payment due is classified by specified periods in the tabular disclosure format. Firms commonly disclose total amounts of purchase obligations and then break those amounts into the specified periods (*e.g.* within one year, between one and three

[4]See Lee (2010) for discussion about the across-industry variation in the type of purchase obligations.

years, between three and five years, and beyond five years). Purchase obligations due within the one year category must exist in the disclosure, while firms can arbitrarily choose to report other future periods. In general, the purchase obligations due beyond one year are frequently minimum amounts specified in the contracts that the firm must purchase from the counter parties. Therefore, the purchase obligations beyond one year sharply fall over time, and do not capture the correct amounts of purchase contracts for the specified longer period. Hence, we use the amount of purchase obligations within the closest fiscal year, normalized by cost of goods sold for our measure of purchase contract intensity.

Figure 1 shows an example of Apple Inc.'s purchase obligations disclosure in its 10-Ks. We present purchase obligations data for Apple Inc. for 2005 and 2008. From the data presented, we can see that purchase obligations have increased almost three-fold for Apple Inc.

[INSERT FIGURE 1 HERE]

Appendix A gives three further detailed firm examples in the semiconductor industry to illustrate the relation between external purchase contracts and leverage that we explore both cross-sectionally and in time series. The examples show that companies within the same industry have different external contracting strategies. Marvell Technology Group is a leading fabless semiconductor company, while Fairchild Semiconductor owns continuously operating semiconductor manufacturing facilities. Xilinx has substantially changed its outside purchase contracts over time and provides more variation in its external contracting intensity. All three companies operate in the same geographic region.

The appendix shows large cross-sectional differences between Marvel Technology and Fairchild. Fairchild owns and operates semiconductor facilities and has significantly higher leverage than Marvel Technology which does not own its own semiconductor facilities and outsources the production of its semiconductors. Marvel Technology has almost no financial leverage. The last firm, Xilinx, has experienced variation in external production over time. It thus illustrates the within-firm time-series relation between outside purchase contract intensity and leverage. What is also interesting to point out is that there is a sharp decrease in external purchase contracts that occurs for all three firms during 2008, the year after the financial crisis began. Firms are thus able to change the amount of goods and services they obtain from outside suppliers in subsequent years as demand conditions fluctuate.

2.2 Sample

We gather purchase obligation data using "web crawling" of the SEC Edgar website and processing firm 10-Ks using PERL scripts. We provide the detailed collection procedure in Appendix B. After

downloading the firm 10-Ks, we parse the documents to extract the actual purchase contracts data.[5] We extract these data from either tables or text where search keywords indicate the presence of purchase contracts data. The search keywords we use are the combinations of *"purchase"* and one of the following terms: *"obligation"*, *"commitment"*, *"agreement"*, *"order"* or *"contract"*. From the tables or text including the search terms, we extract the rows that contain the amount of purchase obligations. We link this data to the Compustat database and to the security issuance database that we describe later in this section.

We study public manufacturing firms, given that using outside purchase contracts for production prevails in the manufacturing sector, while purchase contracts in the service sector may exist just to supply finished goods that are then resold. We create the primary sample by merging all of the public manufacturing firms in the 10-K filings database to the CRSP/Compustat database by the central index keys (CIK). We exclude firms whose sales revenue is less than $50 million because they are regarded as small business issuers which are not required to disclose contractual obligations.[6]

This sample construction procedure leaves us with 1,806 firms operating in 20 different two-digit SIC code industries and about 9,000 firm-years during the sample period from 2004 to 2010. We supplement this database with a new security issues data from the Securities Data Corporation (SDC) and DealScan databases, and with a supplier database that we create by obtaining supplier information from Capital IQ database. In the rest of this section, we describe the purchase contracts data and the other data we analyze in detail.

Panel A in Table 1 presents industry descriptive statistics for outside purchase contracts by two-digit SIC code industry in the manufacturing sector. We assume that if the firm does not disclose an amount of purchase obligations in its 10-K, it has no contractual purchase obligations.[7]

[INSERT TABLE 1 HERE]

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[5]Lee (2010) first collects and studies purchase obligations data. The description of his data can be found at http://faculty.haas.berkeley.edu/klee/Kwang Lee Purchase Obligations Data.htm. Also, a contemporaneous paper by Williams (2012) uses similar data to explore supplier-customer relationship.

[6]The SEC defined a small business issuer as a company that had less than $25 million in revenues in its previous fiscal year, and whose outstanding publicly-held stock is worth no more than $25 million. In 2008, the SEC adopted a new terminology of 'smaller reporting companies' and amendments to its disclosure and reporting requirements to expand the number of companies that qualify for smaller reporting companies. In the new amendments, smaller reporting companies are defined as companies that have less than $75 million in public equity float, or less than $50 million in revenues in the previous fiscal year if public equity float is not calculable.

[7]The SEC's final rule adopted the "reasonably likely" disclosure threshold that currently applies to other portions of MD&A disclosure. As stated in the SEC's 1989 MD&A Release, a company has an obligation to disclose prospective information in its MD&A "where a trend, demand, commitment, event or uncertainty is both presently known to management and reasonably likely to have material effects on the company's financial condition or results of operations".

Panel A in Table 1 shows that across all industries more than 65 percent of manufacturing firms use outside purchase contracts, and the mean value of such contracting amounts reaches about 10 percent of the total cost of goods sold. The last two columns show that outside purchase contracts comprise almost 15 percent of the total cost of goods sold within firms with purchase contracts. Inspection of the table also shows that the use of outside purchase contracts is not just in high-technology industries; purchase contract intensity is also high in food and kindred products, paper products, petroleum and coal products, and leather products. Importantly, there are in general 30-50% of manufacturing firms in each industry sector that do not have any material long-term purchase contracts. They might have suppliers but the relationship with these suppliers is not based on explicit contracts. This important difference between firms with and without contracting-based suppliers enables us effectively examine the characteristics of the firms that use purchase contracts and the possible economic link between purchase contracts and leverage/financing decisions.

2.3 Customer and Supplier Relationship Data

We examine the potential reasons for the impact of outside purchase contract intensity on firm financial structure in depth by exploring customer and supplier relationships identified in the Capital IQ business relationship database. Previous studies use either the input-output benchmark table from the Bureau of Economic Analysis or the customer data from the Compustat segment file to identify customer and supplier relationships. However, the input-output benchmark table represents interdependencies between industries, not between firms. Also, the Compustat customer data do not include business relationships with foreign or private supplier firms, as the database only compiles information on major customers of U.S. public firms. On the other hand, the Capital IQ database collects data on foreign or private suppliers and provides information on their revenue, assets, total number of employees, SIC code, and main business location, by compiling more than 20,000 news sources. We note that we cannot identify the extent each supplier supplies the firm with this database as these suppliers are just listed by name and not by the amount of goods that they supply.

We identify approximately 7,000 suppliers (3,715 unique suppliers as some suppliers supply more than one firm) for 884 customer firms by merging our sample and Capital IQ database with the customer firm's CIK, ticker, or name. On average, customer firms in our sample have 7.82 suppliers. Our focus is on both domestic and international purchase contracts as we find that 47.5 percent of purchase contracts are from the U.S., with 25.5 percent of suppliers from Asia, 17.2 percent from Europe, 0.3 percent from Africa, 1.9 percent from the Oceania, and 1.6 percent from countries we are not able to identify. Most of the suppliers are in the manufacturing sector (47.5%). Other

than manufacturing, the suppliers are in the following industry sectors: services (17.2%), retail and wholesale trade (2.5%), transportation and utilities (3.2%), mining (2.0%), others (2.4%) and unknown (25.2%). Panel B in Table 1 shows the descriptive statistics for the characteristics of these suppliers.

2.4 Security Issuance Data

We study the impact of purchase contract intensity on financing decisions by U.S. public manufacturing firms from 2005 to 2011. We classify corporate financing in 6 different types by issuing markets and securities; first by public versus private market and second by debt, convertible versus equity. We include both convertible preferred stock and convertible debt in the convertible security category.

The security issuance data come from the three different databases. We obtain public securities issuance data from the SDC new issues database. The SDC new issues database also provides private securities data, but its coverage of private placement is minimal and incomplete.[8]

Our private debt placement data come from the DealScan database of the Loan Pricing Corporation. A private placement is an unregistered offering of securities by a public firm to a selected group of investors.[9] The DealScan database contains private placement information including term loans and revolving credit lines made to U.S. firms by banks and syndicates of lenders (Gomes and Phillips (2012)). Following Gomes and Phillips (2012), we exclude 364-day facilities and any other loan with less than one year of maturity from our sample.

Our private equity and convertible securities consist of private equity investments in public companies data (frequently called PIPEs for private investment in public equity) and come from the Capital IQ database. The Capital IQ database provides comprehensive and detailed information on transaction features and market participants in the private transactions, especially after 1999.[10]

Table 2 provides the summary statistics of the issuance decisions. We can see that the private

[8]The number of private debt issues in the SDC database is less than one-tenth of the number in the DealScan database. Our private equity and convertibles issue data come from the Capital IQ. The Capital IQ database has three times as many private convertibles securities data as the SDC database. The number of private equity issues (PIPEs) in the SDC database is comparable to that in the Capital IQ database.

[9]For example, according to the SEC's Rule 505 of Regulation D, a company can offer Regulation D (Reg D) securities to an unlimited number of "accredited investors" and up to 35 other persons who do not need to satisfy the sophistication or wealth standards associated with other exemptions. The Reg D securities are "restricted" securities, meaning that the securities cannot be re-sold for six months or longer without potentially needing to register the re-sales. The issuers cannot use general solicitation or advertising to sell the securities.

[10]See Stromberg (2008), Lerner, Sorensen, and Stromberg (2011), and Hsu, Reed, and Rocholl (2012) for further discussions on the Capital IQ database.

markets are significant for public firms. Approximately 60 percent of security issuances are private debt.

[INSERT TABLE 2 HERE]

In addition to the public and private securities, we also include Rule 144A issues in our sample, but we aggregate them with other security types as Rule 144A securities are not a large part of the issuance activity. Rule 144A issues have three security types; Rule 144A debt, convertibles, and equity. Most of the Rule 144A issues by public firms are in the debt form, either debt or convertible debts. Rule 144A debt securities are similar to medium-term notes, but they are unregistered and also offered to only Qualified Institutional Buyers (QIBs). In general, QIBs are large domestic or foreign institutional investors that in aggregate own and invest at least $100 million in securities ($10 million for a broker-dealer).[11] As in Gomes and Phillips (2012), the institutional details indicate that 144A issues and public issues are similar. Thus, in Table 3 and throughout the rest of our analysis, we combine Rule 144A securities with other public securities – either debt, equity, or convertibles.

We merge all the above security databases with our purchase contract database from the previous section and the CRSP/Compustat database.[12] Following Huang and Ritter (2009), firm years in which multiple types of securities are issued are excluded from the sample, but results are robust when we include these issuance observations.

Table 3 shows summary statistics for issuance decisions and the issuing firms' purchase contract intensity captured by their purchase obligations scaled by cost of goods sold. Table 3 shows that both security issuance decisions and purchase contract decisions vary strongly with firm size. Firms that issue public debt are larger with most of the firms in the upper four deciles of the market value of assets. Private debt and equity issuers exist at all deciles of firm size. Equity issuers in particular are skewed to smaller firms, especially so for private equity issuers. With respect to purchase contract intensity, we can see that firms using more purchase contracts tend to be larger firms, especially firms that issue convertibles and private debt securities. By comparing private versus public issues for each security, we also find that firms that use the private market to issue any type of security tend to have greater purchase contract intensity in each firm size category.

[11] In addition to the qualification above, banks and savings and loan associations that have a net worth of at least $25 million are regarded as QIBs.

[12] To match the private debt placement data from the DealScan database to other databases, we use the Dealscan-Compustat link file provided by Chava and Roberts (2008) through the WRDS website. To merge private equity and convertible placement data from the Capital IQ, we use the CIKs along with the exchange-ticker information.

[INSERT TABLE 3 HERE]

3 Empirical Strategy and Variables of Interest

We analyze the effect of using outside purchase contracts on financial leverage and security issuance decisions. However, firms using external purchase contracts are not randomly selected, so we face the identification problem that both external purchase contracts and financing decisions may result from common factors, such as demand conditions or cost shocks. Empirical evidence from the data suggests that using outside purchase contracts is relatively more invariant than other corporate decisions. However, outside purchase contract intensity (how much to purchase from outside of the firm) is associated (as we show later) with the firm's growth and cash flow stability, which, in turn, are highly likely to be related to financing decisions. Therefore, we address this endogeneity problem using instrumental variables. We begin by discussing our instrumental variable regression approach and the instruments we use. Also, in this section we discuss the control variables we use in our analysis.

3.1 Proximity to Sourcing Locations and Input Transportation Costs

A valid instrument for our analysis is a variable that affects the amount of outside purchase contracts, but whose effect on the firm's financing decisions comes through the outside purchase contract channel. It has to thus be relevant and also satisfy the exclusion restriction. The instruments we use are 1) the distance to the closest port of entry including seaports, hub airports with cargo services, and border crossings and 2) the transportation cost of inputs used in the *industry*. Given that a firm's location is relatively permanent and the industry transportation costs of inputs used are at the industry-level, it is likely that both instruments do not affect a firm's capital structure choices over time except through the outside purchase contract channel.

In particular, the distance to the closest seaport (for water transportation) has been used as an exogenous instrument in Fort (2011) and Moon (2012). Fort (2011) shows that plants over 200 miles away from a deep water port are 2.4 percentage points less likely to fragment (outsource) relative to plants within 50 miles of the closest port. Moon (2012) also shows that whether the firm is close to the seaport is associated with a 1.2 percentage point increase in a firm's purchase contract intensity.

We construct our measure of a firm's proximity to potential sourcing locations by calculating the distance between the firm's main business location and its closest port of entry among seaports, airports, and border crossings. The information on the U.S. seaports is provided by the Port Import

Export Reporting Service from the Maritime Administration's website. We identify 48 seaports within the U.S. 50 states that carry imports with a value of 500 TEUs or greater.[13] The information of the U.S. airports is available on the Passenger Boarding and All-Cargo Data for U.S. Airports from the Federal Aviation Administration website. We identify 105 hub airports with cargo services using the information. In addition, we identify 21 Mexican border crossings and 79 Canadian border crossings with truck traffics.

We obtain latitude and longitude for these ports of entry and firms' main business locations, then calculate the great-circle distances between the firm's main business location and its closest port of entry. Figure 2 shows firm main business locations and also the locations of the ports, border crossings and hub airports. From these maps we can see that many firms are some distance from external sourcing locations in the West and the Midwest regions and especially so in the East region such as Connecticut.

[INSERT FIGURE 2 HERE]

The distance to the closest port of entry captures a firm's feasibility to purchase products or services from suppliers in other countries or other states far from the firm's location. It is likely to be an exogenous instrument that affects a firm's transportation costs from potential sourcing locations. The closest port of entry is likely to affect a large number of U.S. manufacturing firms that hire foreign suppliers, and thus is an important factor in the firm's decision to increase or decrease its level of the procurement through purchase contracts. We also note during the time period of our data that firms do not change their main business locations, while firm financing decisions frequently change.

We use both cross-sectional and time series regressions to predict outside purchase contracting decisions. The economic interpretation is that the cost of external purchase contracts is different between firms and is also changing over time thus allowing variation in the advantages of being closer to a sourcing location. In our regression analysis, we mainly use a discretized version of the distance to the closest port of entry. This variable, *close to port*, equals one if the minimum distance to any entry ports is in the lowest tercile of the sample. This discretization allows for a likely nonlinear relation. For robustness, we have also used different cutoffs including below the median and similar results obtain.

We create the industry-level transportation costs of inputs using the 2002 input-output use tables

[13] A TEU is a nominal unit of measure equivalent to a 20 x 8 x 8 shipping container. The results remain similar, when we use 100, 300 or 500 TEUs for the cutoff.

from the Bureau of Economic Analysis.[14] At the detailed IO-code level, the input-output use tables provide railroad, truck, water, air, pipeline and gas transportation costs, which indicate the costs to deliver inputs from other industries to the given industry. We aggregate the transportation costs across all transportation methods at each input industry level. Then, we capture each industry's average input transportation costs by calculating the purchase value-weighted average of the transportation costs across all input industries. A discretized version of this variable indicating high input transportation cost industries is used in our regression analysis. The variable, *high transp cost*, equals one when it is in the highest tercile of the sample.

We conduct a set of tests to verify that the geographic location and the industry input transportation costs variables are valid instruments. All instrumental variable regressions pass the weak, under- and over-identification tests. In the leverage regressions discussed later for example, the F-test statistic of excluded instruments is 10.85. The regressions are not under-identified with Anderson canon LM statistic of 17.21 and also not over-identified as the Hansen's J-statistic is 3.32.

3.2 Supplier-based Instrumental Variables

Given that no one set of instruments will assuage all concerns about the exclusion restriction requirement for instruments, we also use an alternative set of supplier-based instruments that capture the competition that the supplier faces and also the difficulty of ensuring trust over longer geographic distances. The idea that we are trying to capture with these variables is that suppliers may be worried or fearful that firms will switch to other suppliers or fail to buy from them after they have made investments to serve the firm. In order to assuage these concerns, firms thus have incentives to sign purchase contracts ex ante with their suppliers.[15] Given that these are supplier-specific variables, it is economically unlikely that the existence of these contracts would affect firm leverage except through the contracting channel as less leverage would make the contracts more secure.

As mentioned earlier, these contracts are considered "executory contracts" under American bankruptcy law. Thus while the contract does help with the supplier's concerns, it will not totally mitigate them, especially in bankruptcy. In bankruptcy, a trustee or debtor in possession may assume any prepetition executory contract of the debtor, preserving both the debtor's and the counterparty's obligations through the bankruptcy process, or reject it, thereby *breaching* it as of the date of the

[14]Input output benchmark tables are publicly available from the website of Bureau of Economic Analysis at http://www.bea.gov/industry/io_benchmark.htm.

[15]We thank Santiago Bazdresch for this suggestion.

bankruptcy petition. This ability to breach the contract in bankruptcy thus would increase suppliers' concerns about the contract's stability if the purchasing firm has too much leverage.

Specifically, we use *supp compete (TNIC)* and *log(supp distance)* as instruments for PC/COGS. *supp compete (TNIC)* is average supplier competition based on the TNIC Herfindahl index byHoberg and Phillips (2010a). We obtain the supplier data from the Capital IQ database which tracks each supplier firm's SIC code even for foreign or U.S. private supplier firms. Thus, the median TNIC competition index of U.S. public firms within the same 3-digit SIC code group as the supplier is used to approximate each supplier's competition. *log(supp distance)* is the average distance from the customer firm in U.S. to domestic or foreign suppliers, computed using the latitude and longitude information of the supplier country's capital city. We use both industry-level medians for these variables and firm-specific supplier values for a subsample of customer firms whose suppliers are identified with the Capital IQ business relationship database.

3.3 Industry and Firm-specific Variables

In our analysis of firms' financial decisions, we include the firm-specific variables that have been shown to influence security issuance decisions by Gomes and Phillips (2012). These variables include downstream demand shocks, a firm's default probability, the proportion of tangible assets, cash flow volatility, stock return volatility, abnormal stock returns, the percentage foreign tax a firm pays out of total taxes and a firm's marginal tax rate from Graham (1996). We include the percent foreign tax to control for the fact that firms with outside purchase contracts may use less leverage as their foreign operations may be subject to less taxation, thus reducing the need for leverage as a tax shield. Details on the control variables other than the variables below that require more processing are available in Appendix C.

To examine how firms with external purchase contracts respond to demand shocks, we create a measure of downstream demand changes and compare the factor loadings for this variable between firms with external purchase contracts and firms that do not have such contracts. We capture each industry's demand condition using the chain-type quantity indexes for gross output by industry from the U.S. Department of Commerce's Bureau of Economic Analysis (BEA). The BEA provides publicly available series on gross output by industry at the detailed IO-code and NAICS level. For consumer and government demand, we use personal consumption indexes and government spending and investment

indexes, which we also obtain from the Bureau of Economic Analysis.[16] We then link these data to each supplier industry by a downstream matrix using the input-output benchmark table from the Bureau of Economic Analysis. A downstream industry is defined as an industry that uses the industry's output in the input-output use table.[17]

Following Maksimovic and Phillips (2001), a demand shock is the detrended annual percentage change in the downstream industry demand. To detrend, we regress the raw downstream industry demand on industry and year fixed effects indicator variables and then take the residuals from the regression. To capture the response to industry downturns, we use a discretized version of this variable indicating negative demand shocks in our regression analysis. This variable, negative demand shock, equals one when the demand shock is negative and zero otherwise.

To control for industry- and year-specific factors, we include the 25-Fixed Industry Classifications (FIC) dummies made available by Hoberg and Phillips (2010a) and year dummies.[18] For robustness, we also include the economy-wide variables (Aaa bond yield and a credit spread between Baa and Aaa bond yield) instead of using year-fixed effect estimations, to capture aggregate market conditions. Also, we control for industry competition from Hoberg and Phillips (2010a)'s Text-based Network Industry Classifications (TNIC) industries and a high-tech industry indicator variable, to capture industry-wide effects.

3.4 Summary Statistics

In this section we present summary statistics for our key variables (purchase contract intensity and leverage) along with other control variables we include in our regressions. These variables are firm size as captured by the market value of assets, firm market to book, profitability, sales growth, patenting activity, abnormal stock returns, cash flow and stock market volatility, competition from the Hoberg and Phillips (2010a) TNIC industries, and a high-tech industry indicator variable.

[INSERT TABLE 4 HERE]

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[16]These data are available at http://www.bea.gov/industry/gdpbyind_data.htm, for the period of 1998-2011. For the chain-type quantity indexes for gross output by industry, we specifically use the data at http://www.bea.gov/industry/xls/GDPbyInd_GO_NAICS_1998-2011.xls.

[17]Input output benchmark tables are publicly available from the website of Bureau of Economic Analysis at http://www.bea.gov/industry/io_benchmark.htm. We use the 2002 standard use tables at the detailed IO-code level, and match this data into NAICS codes by correspondence tables between IO and NAICS codes.

[18]In unreported results, we use three-digit SIC or four-digit NAICS codes instead. Results are robust to these industry classifications.

Panel A in Table 4 presents summary statistics for firms with and without outside long-term purchase contracts separately and test for significant differences across these groups of firms. The table shows that nearly all control variables are significantly different across firms with and without external purchase contracts. Inspection of the table also reveals that operating margins and the return on assets are higher for firms with external purchase contracts. Firms with external purchase contracts are larger, older, with less debt and higher market to book than firms without such contracts. We also note that firms that use outside purchase contracts have higher value-added per employee.

Panel A also shows that firms with external purchase contracts are less risky than firms that do not have such contracts. The default probability and the standard deviation of the operating margin and return on assets are significantly lower for firms with external purchase contracts than those without such contracts. Also, firms with outside purchase contracts are in more competitive, high-technology industries. Lastly, we note that firms with external purchase contracts are more likely to be located closely to any types of entry ports, and that the industry medians of supplier competition and distance of such firms are more likely to be greater. We later use these measures as one of the instruments in our instrumental variable regressions. The picture that emerges from these results is firms with external long-term purchase contracts are larger, less risky, more profitable firms that have significantly lower leverage than firms that don't have such contracts.

Panel B in Table 4 presents our univariate analysis that examines the variations in outside purchase contract intensity and leverage. We compare both the variances of market leverage and book leverage across highest, medium, lowest terciles of the variance in purchase contract intensity. We capture the variance of leverage and purchase contract intensity by computing their annual percentage growth. We find that book leverage and market leverage vary with the growth of outside purchase contracts. We reinforce this point by examining how leverage ratios will vary during the sample period if firms change the amounts of their purchase contracts substantially, based on standard deviations of both leverage and purchase contract intensity. We find that the firm-level variation in purchase contract intensity during our sample period is associated with the firm-level variation in leverage as well.

4 Results

The basic questions we address are the following: First, is the use of outside purchase contracts associated with a decline in firm risk? Second, what are the characteristics of firms that use purchase contracts? Third, do firms that sign outside purchase contracts use more or less leverage and are these firms more or less likely to use private or public markets as their source of capital?

We first examine the cash flow risk of firms that use outside purchase contracts. We do so in order to better understand the effect of outside purchase contracting on firm business risk and to aid in our analysis of which firms use such contracts. This analysis of which firms use more outside purchase contracts is used in later regressions to explicitly control for the endogeneity of such contracting decisions in order to establish a channel from contracting to financial structure.

We examine these questions with a combination of propensity score matching models and regressions that instrument for the outside contracting decision to take into account the endogeneity of such decisions. We are testing the proposition that firms for which external contracts are more important will choose less risky financial contracts since the firms cannot sign complete contracts to cover every contingency, especially in financial distress and bankruptcy.

4.1 Outside Purchase Contracts and Firm Risk

In this section, we examine the risk of firms that use outside purchase contracts by examining their cash flow volatility using propensity score based matching methods. We consider the standard deviation of operating income before depreciation from the 12 previous quarters scaled by sales instead of using returns on assets (ROA), thus it does not include the effect of fewer fixed assets in outside contracting firms.[19] To examine risk in a nonparametric way, we use a matching estimator and compare firms with outside purchase contracts to firms that have not signed these contracts. We match based on multiple variables which include size as captured by the market value of assets, market to book (M/B), market leverage, mean quarterly sales, competition from Hoberg and Phillips (2010a) TNIC industries, and a high-tech industry indicator variable.

The outside purchase contract variable we consider in Table 5 is an indicator for whether a firm has long-term purchase contracts (PC exists). It equals one if the firm has disclosed a non-zero amount of purchase obligations for the given fiscal year. The control observations are the 10 nearest neighbors across the matching variables with the same FIC-25 code from Hoberg and Phillips (2010a). In robustness tests, we also use as control observations from the same three-digit SIC or four-digit NAICS codes.

[INSERT TABLE 5 HERE]

Table 5 shows that cash flow volatility for firms with outside purchase contracts is lower in every

[19] Our results are robust to using return on assets.

quarter than that of firms without outside purchase contracts. In particular, cash flow volatility is significantly lower in 12 out of 16 quarters from 2007 to 2010. This indicates that firms with outside purchase contracts were able to reduce their volatility when faced with the financial crisis.

In Table 6, we further investigate the source of this lower cash flow volatility by regressing firm cost of goods sold and SG&A on an indicator variable that equals one when the firm experiences a negative demand shock. Our indication of a negative demand shock is when the downstream demand industry experiences a decline in sales. We scale cost of goods sold and SG&A by the average sales of the firm to avoid an effect from changing sales over the period. The idea is to investigate whether firms with outside purchase contracts can scale their costs down when faced with a negative demand shock. We include firm fixed effects to focus on the firm-specific difference relative to their time series average in both their cost of goods sold and SG&A.

[INSERT TABLE 6 HERE]

The analysis presented in Table 6 shows that the outside purchase contracting firms' cost of goods sold combined with their SG&A drops more than two times the amount for firms with no outside contracting when there is a negative demand shock. These results show that firms with outside purchase contracts are able to significantly reduce their cost of goods sold and SG&A expenses and thus their cash flow volatility when faced with negative demand shocks.

4.2 The Outside Purchase Contract Propensity

In this section, we report the results of our regressions for the prediction of outside purchase contracting. As discussed earlier, there is a potential endogeneity problem given that a firm's use of outside purchase contracts and its financing decisions may respond to the same changes in common external factors. As the actual intensity of the firm's outside purchase contracting is endogenous, we thus first instrument this variable with the geographic location and industry input transportation cost variables for all firms in the manufacturing sector sample. We report these results in this section. Then, we use this predicted firm-year level purchase contract intensity measure to examine the impact on financing decisions.

We first estimate between-regressions at the firm level, where each variable is collapsed into its time-series average. These specifications thus examine the cross-sectional heterogeneity in the outside purchase contracting decisions. We report these results in columns one and two. We then estimate panel regressions at the firm-year level for outside purchase contracting propensity. We estimate

standard errors that allow for heteroskedasticity and industry clustering for the firm-level regressions and industry-year clustering for the firm-year panel regressions. Depending on the column, we include industry and year fixed effects. We do not include firm fixed effects as the firms in our sample, over the time period we examine, do not change the geographic location of their main business.

We report several different specifications in Table 7. In the first two specifications – columns one and two of Table 7 – we estimate a tobit model with a dependent variable that equals the amount of purchase contracts due within one year scaled by cost of goods sold. We use a between-regression model that regresses the firm time-series averages of purchase contract intensity (PC/COGS) on the time-series averages of the right hand side variables.

[INSERT TABLE 7 HERE]

Inspection of the results in Table 7 reveals that, on average, being close to a port of entry results in a 1.5 percentage point increase in firm outside purchase contract intensity. The results also show that outside purchase contract intensity is related to firm profitability and sales growth, as we motivate our inclusion of those measures as control variables in our regressions from Lee (2010) who finds that the growth in purchase obligations is associated with higher future sales and earnings. In addition, our results show that industry factors are important in explaining a firm's outside contract intensity. A firm is more likely to increase its use of outside purchase contracts in more competitive industries, as the coefficient for compete (TNIC) from Hoberg and Phillips (2010a) is strongly significant and positive. A firm is more likely to have higher use of outside purchase contracts as well when its industry peers also highly use outside purchase contracts, as the coefficient for high ind PC/COGS is significantly positive.

In the next four specifications, we report the estimated results of the firm-year panel regressions with a tobit and a linear probability model. Columns three and four, and columns five and six of Table 7 report the tobit and linear probability model estimation results, respectively. In later regressions where we instrument for purchase contract intensity for each firm in each year, we use the linear probability regression model from either column five or six of this table based on the fixed effects included.

Each of these specifications shows that the increase in a firm's purchase contracting activity can be explained by whether the firm is closely located to a port of entry and how high its industry input transportation costs are. Both being close to a port of entry and being in an industry with high input transportation costs result in a one to two percentage point effect in firm outside purchase contract

intensity.

The results also show that the percentage foreign tax paid by firms is significantly positively related to purchase contract intensity, as firms with higher foreign sales are more likely to use outside (foreign) purchase contracts. Similar to the between-regression results in columns one and two, firm growth measured by market to book value of equity and sales growth are significantly related to firm purchase contract intensity.

4.3 Outside Purchase Contracts and Leverage

We now examine the relation between the use of outside purchase contracts and leverage. One might expect that given the decreased cash flow risk and increased flexibility on costs, firms with outside purchase contracts would have higher leverage and use more debt. We find the opposite result – leverage is lower for firms with outside purchase contracts. We show this finding is robust to using multiple different matching and regression based methods.

First, in Table 8 we estimate a propensity score based matching model where we match firms that have high outside contract intensity to firms that do not use outside purchase contracts. Second, in subsequent tables we use panel regressions to examine the relation of leverage to the use of outside purchase contracts. In these tables we use the geographic location and industry input transportation costs variables from the previous table, Table 7, where we examine the propensity to use outside purchase contracts, in order to control for the endogeneity of the contracting decision.

In Table 8, we report the results of our propensity score matching model estimations. Firms with high outside contract intensity are based on whether the firm's disclosed PC/COGS is in the highest tercile of our sample at the given fiscal year. The control observations are the 10 nearest neighbors across the matching variables within the same Hoberg and Phillips (2010a) FIC-25 industry group. The matching variables include log(mv assets), log(quarterly sales), M/B, operating margin, cash flow volatility, PPE/assets, compete (TNIC), and whether the firm operates in a high-tech industry.

[INSERT TABLE 8 HERE]

Table 8 shows that the leverage is lower for firms with high outside contract intensity in every quarter. If we collapse over all quarters, leverage is significantly lower for firms with high outside contract intensity at the 3.5 percentage level. This initial evidence shows that despite the lower cash flow volatility, firms with more outside purchase contracts use less debt. In the years after the financial

crisis, the results show that the flexibility associated with such contracts is greater, as high outside contracting firms significantly reduce leverage and thus their risk of financial distress.

We now turn to examining the impact of the use of outside purchase contracts on leverage using multivariate panel regressions. We consider using both the actual amount of outside purchase contracts and the instrumented outside purchase contract intensity. We instrument outside purchase contract intensity using the two instruments, *close to port* and *high transp cost* as described earlier. Both instruments should be valid as they are important to the outside purchase contracting decision and economically likely to satisfy the exclusion restriction since they should affect leverage only through the contracting channel. We do confirm statistically that our instruments do pass the standard weak, under- and over-identification tests as described earlier. We do recognize that the exclusion restriction is impossible to satisfy using correlation data, and thus in a subsequent table we explore the robustness of our results to alternative instruments that are based on the supplier and not the firm itself.

Table 9 presents the effect of outside purchase contract intensity on leverage in a regression framework. Our outside purchase contract intensity variable is the lagged amount of the purchase obligations divided by cost of goods sold (PC/COGS). In the table, we report results using the instrumental variable approach with *close to port* and *high transp cost* as instruments for the lagged PC/COGS to conserve space.[20] All the control variables from the purchase contract intensity prediction regressions (column five and six in Table 7) are also included.

In particular, we control for firm risk (cash flow volatility and stock return volatility) and the extent of the firm's collateralizable assets through its property, plant and equipment (PPE/assets). These control variables are important to rule out the possibility that our results arise from the effect of outside contracting firms' greater risk; such as exchange-rates risk due to their possibly more extensive foreign trades, or the effect of reduced collateralizable assets. We also control for the percentage foreign tax paid by firms, as well as a firm's sales growth, operating margins and the market to book.

For the dependent variable, we begin with *market leverage* and move to a more conservative measure, *market leverage (with AP)*. *market leverage* is the ratio of total debt to the market value of assets. Market value of total assets is market value of common equity plus book value of preferred stock plus debt (long-term debt + debt in current liabilities) plus book value of minority interest. For *market leverage (with AP)* in columns four to six, we additionally include account payables as part of total

[20]The uninstrumented OLS results are available from the authors. Results are qualitatively similar (stronger) in all cases.

debt to mitigate a concern that outside purchase contracting firms are likely to have greater account payables which can be viewed as a substitute for debt.[21] Other variable definitions are available in the Appendix C.

In columns one, two, four, and five, we estimate the regression with industry and year fixed effects. We do not include firm fixed effects as the firms in our sample, over the limited time period we examine, do not change the geographic location of their main business and thus our first stage regression has a strong firm-specific component. In columns three and six, we do not include industry and year fixed effects as we include variables that are constant in a given industry (the competition variable and high-tech industry dummy) and constant in a given year (the Aaa bond rate and the credit spread).

[INSERT TABLE 9 HERE]

Table 9 shows that firms with outside purchase contracts have significantly lower leverage in all specifications. Leverage decreases with predicted outside purchase contract intensity. These result hold for both market leverage and book leverage, as well as leverage when we include accounts payables as part of debt. Our results show that there is a strong effect of the use of outside purchase contracts on leverage. Using the uninstrumented regression results, we find that a one standard deviation increase in outside purchase contract intensity leads to a 0.051 standard deviation decrease in firm leverage. This economic effect is relatively greater than the effect of cash flow volatility, where a one standard deviation change in cash flow volatility leads to a 0.022 standard deviation change in firm leverage.

The table also shows that firms use more leverage when they have more fixed assets. A one standard deviation change in property, plant and equipment (PPE/assets) leads to a 0.083 standard deviation change in firm leverage. Thus, the effect of use of outside purchase contracts (a 0.051 decrease) is comparable in magnitude to the effect of fixed assets. More importantly, given we control for fixed assets, our results are not just picking up a reduced collateral effect from the fact that firms with outside purchase contracts use less fixed assets.

[21] We present the analogous test results with alternative measures of book leverage and book leverage with account payables in Table A.1. Results are qualitatively similar in all cases.

4.3.1 Alternative Supplier-based Instruments

We realize that our any potential set of instruments still may affect leverage independent of the external contracting channel and thus may not satisfy the exclusion restriction.[22] We thus explore some alternative instruments that capture suppliers' potential concerns that the contracts they sign with the firm may be potentially broken and thus would cause losses to any human capital or firm specific investment that they make to serve the firm. We consider two different first-stage instruments to capture this effect of "fearful" suppliers. Our first instrument is the competition in the upstream supplier industry, *supp compete (TNIC)*, and our second instrument is the supplier distance from the U.S. customers. The economic idea that these instruments capture is that the suppliers will want to sign contracts to decrease customer firms' incentives to break supply contracts with them and switch to a different supplier. In the second stage, leverage can be affected as firms can break these contracts in bankruptcy as they are executory contracts, and thus may use less leverage to assuage their suppliers' fears by reducing this possibility.

The instruments are constructed as follows: *supp compete (TNIC)* is the average supplier competition based on the TNIC Herfindahl index by Hoberg and Phillips (2010a). *log(supp distance)* is the average distance from the customer firm in U.S. to domestic or foreign suppliers, computed using the latitude and longitude information of the supplier country's capital city. Both instruments are industry level medians in column one for the full sample, and firm-specific in column three for a subsample of customer firms whose suppliers are identified with the Capital IQ business relationship database.

[INSERT TABLE 10 HERE]

Table 10 presents the results. Columns one and three report estimates of the first-stage regressions of PC/COGS. The instrumented PC/COGS from the regression in columns one and three are used in the second-stage of regressions of market leverage in columns two and four, respectively. All instrumental variable regressions pass the weak, under- and over-identification tests. In the first set of regressions for example, the F-test statistic of excluded instruments is 15.68. The regressions are not under-identified with Anderson canon LM statistic of 31.32 and also not over-identified as the Hansen's J-statistic is 3.01.

The results in this table show that firms are more likely to use outside purchase contracts when

[22]We do note that the explanation that "close to port" affects profits directly would imply that profits are higher for these firms and thus they would have incentives to increase leverage. However, we find the opposite. Firm leverage decreases with closeness to a port.

there is greater supplier competition and suppliers are farther from the U.S. customers. Firms are likely to sign these contracts to convince suppliers that they will be more committed to purchasing from them. In the second stage where we examine the effect on financial leverage, we can see that firms use less financial leverage with higher predicted outside purchase contracts consistent with them doing so to mitigate suppliers' potential concerns about the stability of the contracts.

4.3.2 Maturity of Financial Leverage

Another potential concern is that these results may come from substituting away from using short-term leverage toward the increased use of supplier financing. To address this concern, we examine whether the previous effects we document are only present for short-term leverage.

[INSERT TABLE 11 HERE]

The first two columns of Table 11 show that firms with outside purchase contracts do not change their short-term leverage significantly. In contrast, the last two columns confirm that the lower leverage of the firms with more outside purchase contracts is from a decrease in long-term leverage. This result implies that firms that use outside purchase contracts choose particularly lower long-term leverage to possibly decrease the chances of financial distress and bankruptcy. This result also effectively rules out the alternative hypothesis that our results are from a substitution effect between short-term leverage and supplier financing.

Overall, our results are consistent with firms with outside purchase contracts using less debt to decrease the potential costs of financial distress on contracts with suppliers and employees. To consider this explanation more explicitly, we now explore if these effects are stronger for specific types of firms, in particular for firms with higher value-added per employee and for firms with high R&D suppliers, relatively more suppliers in number, or a higher fraction of foreign suppliers who may place higher value on the low leverage of their customers.

4.4 Contracting Parties and Leverage

We now explore in more detail why firms use less financial leverage when they use more outside purchase contracts. The central idea we examine first is whether firms will choose a financial structure that decreases the potential for bankruptcy when they have high value-added employees who are likely to invest in firm-specific human capital. This channel is particularly relevant to our context, as firms with more outside constructs are likely to keep their high value-added employees with them.

As Jaggia and Thakor (1994) model, higher financial leverage can decrease employees' incentives to invest more in firm-specific assets as a bankruptcy can cause the value of employee firm-specific assets to decrease. Thus, the firm will optimally take on a lower amount of debt to counteract the effect of bankruptcy on an employee's incentive to invest in human capital. The reasoning is that an increase in the probability of bankruptcy lessens the likelihood that long-term wage commitments will be honored ex post and imposes a cost on the firm and its employees with greater specificity. Such a firm, therefore, is predicted to optimally take on a lower amount of debt.

The model of Berk, Stanton, and Zechner (2010) shows that even without firm-specific human capital, more human-capital intensive firms will have less financial leverage as the optimal contract involves firms providing a more stable fixed compensation contract when employees are risk averse with respect to their human capital.

We explore these arguments in the first column of Table 12. Specifically, we examine if firms in industries with high value-added per employee have less leverage when they use more outside purchase contracts.

[INSERT TABLE 12 HERE]

The hypothesis is that financial leverage of firms with more outside purchase contracts should be lower in industries with high value-added per employee, since it is in these industries that there are high potential costs of financial distress on employees that may have firm-specific human capital. The first column of Table 12 shows that firms with outside purchase contracts that produce in industries with high value-added per employee use less financial leverage. This result supports the conclusion that firms with outside purchase contracts use less leverage when they operate in industries where employees are more likely to make firm-specific human capital investments.

We further examine whether the identified link between the use of outside purchase contracts and firm leverage applies to the firm's relationship to suppliers with unique characteristics. We ask to what extent supplier characteristics affect how the use of outside purchase contracts impacts leverage. We consider those cases where we are able to identify the exact suppliers with which the firm is doing business.

In columns two to four in Table 12, we focus on three different aspects of suppliers; R&D intensity of suppliers, the total number of suppliers, and the percentage of foreign suppliers. We include supplier labor and capital intensities in our regression analysis along with the percentage of the suppliers in the manufacturing sector. We also include an indicator variable that identifies whether the supplier

is producing in a concentrated industry and the relative size of suppliers versus their customers, to control for the potential that the firm uses less leverage in situations where it needs to increase its bargaining power vis-a-vis its suppliers as in Kale and Shahrur (2007).

In column two, we examine if the firm uses less leverage when it is dealing with suppliers who need to invest in R&D so as to provide more assurance of their safety. As each supplier's SIC code is available from the Capital IQ suppliers data and not the supplier's actual R&D, we use the three-digit SIC code industry median of R&D/sales from Compustat for each supplier's R&D intensity variable. High supp R&D in the table is a firm-level dummy variable that equals one if the average supplier R&D intensity of a given firm is in the highest tercile of the sample. The result in column one shows that firms use less leverage when their suppliers have higher R&D intensity. This result is consistent with firms that have outside purchase contracts using less leverage when they contract with suppliers in R&D industries who may place higher value on the low leverage of their customers.

In column three, we explore the same argument for the firms dealing with relatively more suppliers. The result shows that the number of suppliers is negatively associated with the firm's leverage. If one views the number of suppliers as a measure of firm bargaining power vis-a-vis its suppliers, this result is not consistent with firms using leverage when they have more bargaining power. It is consistent with the firm using less financial leverage to reduce the probability of financial distress and bankruptcy when it signs more contracts externally.

The last column in Table 12 examines whether the firm uses less leverage when it has more foreign suppliers. The result shows that the higher percentage of foreign suppliers is negatively related to the firm's financial leverage. Overall, the results related with supplier characteristics support the conclusion that firms that use more outside purchase contracts choose less financial leverage to to mitigate suppliers' worries about potential financial distress.

4.5 Robustness: Outside Purchase Contracts, R&D, and Leverage

One possibility is that our results are driven by the fact that firms with outside purchase contracts also conduct more R&D and the high R&D by the firms leads to a decrease in leverage. In order to examine this possibility, we separately include both the actual R&D and the instrumented R&D as control variables in our leverage regression. We particularly include the instrumented R&D as R&D itself is clearly an endogenous variable.

In addition to our previous instruments, we add the percentage of residents that received higher education within the same area as the firm because this is likely to affect R&D but not firm capital

structure directly. The variable, *area % higher education* is the percentage of the population which has a graduate school degree in the same three-digit zip code as the firm's main business location. We thus use *close to port*, *high transp cost*, and *area % higher education* as our instrumental variables for both PC/COGS and R&D/sales. Columns one and two report estimates of the first-stage regressions of PC/COGS and R&D/sales, respectively. Column two shows that the instruments are indeed relevant for R&D, and we confirm that our instruments used in the instrumental variable regression pass the standard weak, under- and over-identification tests. Columns three and four present the supplemented results of our previous tests and include both the actual R&D and the instrumented R&D. The instrumented PC/COGS from the regression in column one is used in column three with the lagged R&D/sales. In column four, both the instrumented PC/COGS and R&D/sales are used.

[INSERT TABLE 13 HERE]

The results presented in this table show that our previous results on the negative relation between outside purchase contracting and leverage are robust to the inclusion of either the actual R&D or the instrumented R&D.

4.6 Outside Purchase Contracts and Security Issuance

In this section, we examine security issuance decisions directly. The tests in this section avoid the problem of changes in leverage being potentially driven by stock market movements or accounting changes. The hypothesis is that the use of outside purchase contracts affects not only equity versus debt financing, but also whether the firm raises capital in the public versus the private markets. We examine firm security issuance decisions using both a multinomial and a nested logit framework. We consider six different security types: public and private debt, public and private convertibles, and public and private equity. We begin with the multinomial framework where each alternative is independent of the other alternatives. This assumption is called independence of irrelevant alternatives (IIA) and while strong, it allows us to present initial evidence. We relax this assumption in the subsequent table when we estimate a nested logit model.

Table 14 presents coefficient estimates from the multinomial logistic regression testing the impact of outside purchase contract intensity on public and private security issues. The dependent variable is the relative log-odds of issuing each security type versus the base choice of public debt. PC/COGS (instr.) is outside purchase contract intensity instrumented using the variables, *close to port* and *high transp costs*. Industry and year control variables are included, but not reported.

[INSERT TABLE 14 HERE]

Table 14 shows that outside purchase contract intensity significantly increases the probability of issuing public convertibles over public debt. In addition, we see that the probability of choosing private debt over public debt is significantly greater than zero. The results also show that riskier firms are more likely to choose other securities over public debt and that firms with a higher marginal tax rate are more likely to issue private debt. Overall, the results indicate that firms with outside purchase contracts choose more flexible financial structure, consistent with their financial structure being influenced by firm contracting with their own employees and suppliers in order to reduce the possibility of financial distress.

We now examine security issuance decisions using a nested logit approach. This approach allows correlation in the errors within the public versus private market choice, and also allows correlation in the errors for the type of security – debt, convertibles, and equity – within the public or private market choice. The interpretation of this structure is that firms' choices of security type are correlated within markets (public versus private). Tests indicate that the assumption of IIA within each market is rejected. Thus, unobserved factors affect security choice conditional on the market, causing errors to be correlated across securities within markets.

Table 15 presents the coefficient estimates from the nested logit regression testing the impact of outside purchase contract intensity on public and private security issues. The table presents the choice of market (private versus public) in the first column and the type of securities (equity or convertible verses debt) within markets in columns two through five. PC/COGS (instr.) is the predicted outside purchase contract intensity using *close to port* and *high transp cost* as instruments for PC/COGS. All control variables are the same as the outside purchase contract intensity prediction regression (column six in Table 7). Industry and year control variables are included, but not reported.

[INSERT TABLE 15 HERE]

Examining the results presented in Table 15, we can see that the instrumented outside purchase contract intensity significantly impacts the private versus public market choice. Firm outside purchase contract intensity increases the probability of firms choosing to issue securities in the private market over the public market. Within markets, the choices show that firms that use more outside purchase contracts avoid issuing debt, significantly so for the choice of issuing public convertibles over public debt. The results indicate that firms with outside purchase contracts choose to issue in the private market, consistent with these firms choosing securities that give them more flexibility and lower risk.

Overall, the results are consistent with a desire to reduce the probability that employees and suppliers will suffer from a loss in their human and firm-specific capital.

5 Conclusions

We examine the impact of outside purchase contracting on firm risk and capital structure using a unique database of external purchase contracts. We analyze the hypothesis that incomplete contracting between firms and their suppliers and employees affects how firms finance their operations. We thus extend the extensive incomplete contracting literature that begins with Grossman and Hart (1986) and Hart and Moore (1990) by showing that incomplete contracting affects not just the vertical integration decision but also the financing decisions of firms in contracting relationships with suppliers and employees.

We document that a firm's use of outside purchase contracts is associated with a reduction in the firm's cash flow volatility relative to matched firms that do not use external purchase contracts. In particular, during the recent financial crisis, firms with outside purchase contracts were able to better match costs with sales fluctuations, as firms that use purchase contracts incur fewer fixed costs thus reducing their operating leverage.

Despite the reduction in cash flow volatility, we document that firms with external purchase contracts use less financial leverage. We take into account the fact that the decision to use outside purchase contracts is itself an endogenous decision. We instrument for the external purchase contracting decision using firm, industry or supplier-level instruments that affect the external contracting decision and are not likely to affect leverage economically and directly. We show that firms are more likely to use outside purchase contracts when they are geographically close to potential sourcing locations or deal with suppliers that are in competitive industries and located far away from the firm.

We show that firms with external purchase contracts particularly use less debt. This effect is magnified when firms operate in high value-added per employee industries. Examining actual firm supplier data, we also find that the high R&D intensity of suppliers, the number of suppliers, and the high proportion of foreign suppliers are negatively associated with own firm leverage. If one views the number of suppliers as a measure of firm bargaining power vis-a-vis its suppliers, this result is not consistent with firms using leverage when they have more bargaining power. Thus, our results are consistent with the firm using less financial leverage when it signs more contracts externally, to mitigate the expected financial distress and the potential bankruptcy that might cause losses on contracting

parties.

Examining firm security issuance decisions, we document that firms with outside purchase contracts are more likely to issue equity and more private securities. We find that when firms with outside purchase contracts do issue debt, they choose private debt over public debt. These results show that firms with outside purchase contracts choose more flexible securities that can be more easily renegotiated. In our context of separate ownership with outside purchase contracts, our results indicate that these firms with outside purchase choose more flexible capital structures through the use of more equity-based and private securities.

These findings are consistent with firms with outside purchase contracts choosing a capital structure that increases their flexibility in order to reduce the costs of financial distress on their higher value-added employees and suppliers. Overall, the results are consistent with incomplete contracting between firms and their employees and suppliers affecting not only who should own the assets, but also how firms should finance their assets.

Appendix A Semiconductor Firms and Outside Purchase Strategies

This appendix presents three examples of firms operating in the semiconductor industry with different outside firm contract strategies. It shows their purchase contract obligations and their financial leverage over time. Fairchild Semiconductor owns continuously operating semiconductor manufacturing facilities, while Marvell Technology Group is a leading fabless semiconductor company. Xilinx has substantially changed its outside purchase contract intensity over time. PC is the total amount of outside purchase contracts due within the next fiscal year. PC/COGS is the total amount of purchase contracts scaled by cost of goods sold. Book (market) leverage is the book value of debt scaled by the book (market) value of total assets.

year	sales ($million)	PC ($million)	PC/COGS	CAPX/sales	book leverage	market leverage
			FAIRCHILD SEMICONDUCTOR INTERNATIONAL INC			
2004-2010	1529.8	84.2	0.087	0.092	0.284	0.236
2004	1601.0	77.9	0.077	0.138	0.357	0.274
2005	1425.1	125.9	0.128	0.062	0.335	0.219
2006	1651.1	123.8	0.117	0.080	0.290	0.199
2007	1670.2	79.9	0.074	0.086	0.276	0.218
2008	1574.2	28.5	0.028	0.104	0.289	0.383
2009	1187.5	52.2	0.070	0.039	0.268	0.239
2010	1599.7	100.9	0.112	0.133	0.173	0.122
			MARVELL TECHNOLOGY GROUP LTD			
2004-2010	2485.3	230.3	0.217	0.052	0.029	0.013
2004	1224.6	104.0	0.193	0.056	0.009	0.003
2005	1670.3	224.5	0.312	0.080	0.012	0.002
2006	2237.6	457.0	0.403	0.108	0.096	0.036
2007	2894.7	279.0	0.180	0.051	0.088	0.049
2008	2950.6	62.6	0.046	0.025	0.001	0.001
2009	2807.7	213.3	0.187	0.013	0.000	0.000
2010	3611.9	271.5	0.198	0.032	0.000	0.000
			XILINX INC			
2004-2010	1858.8	89.2	0.141	0.035	0.172	0.067
2004	1573.2	97.2	0.185	0.044	0.000	0.000
2005	1726.3	76.8	0.127	0.043	0.000	0.000
2006	1842.7	59.1	0.089	0.064	0.314	0.111
2007	1841.4	74.3	0.117	0.025	0.319	0.123
2008	1825.2	46.5	0.076	0.021	0.244	0.108
2009	1833.6	129.5	0.208	0.015	0.111	0.044
2010	2369.4	141.3	0.184	0.035	0.215	0.086

Appendix B Collection of Outside Purchase Contracts (Purchase Obligations) Data

This appendix describes how we collect the outside purchase contracts data. We first electronically gather all "10-K"s and "10-K405"s by PERL web crawling[23] of the SEC Edgar database, searching for the filings from 2004 to 2010. We do not include "10KSB"s and "10KSB40"s, because small business issuers (or smaller reporting companies) are not required to disclose purchase obligations by the SEC's final rules. Then, using PERL programming we specifically extract purchase obligations data in the MD&A section and other identifying information including the CIK number in each 10-K.

There are two types of reporting practices. First, firms use HTML documents. In this case, purchase obligations are disclosed in tabular formats. Second, firms use TEXT documents. In this case, it is highly likely that the firms disclose purchase obligations also in textual formats. For the HTML groups, we extract all tables first and then sort out the certain tables including search keywords. The search keywords are the combinations of *"purchase"* and one of the following terms: *"obligation"* *"commitment"*, *"agreement"*, *"order"* or *"contract"*. From the tables including the search terms, we extract the proper rows that contain the amount of purchase obligations. For the TEXT document group, we use page breaks instead of tables. From the pages including the above search terms, we extract the proper sentences that contain information on the amount of purchase obligations.

In the event that the extraction process cannot sort out a table or a page containing search terms, we reexamine the whole document and search for another terms including either *"contract obligation"* or *"contract commitment"*. When the extracted information does not contain *"purchase"* or there still exists no match for the search terms, we conclude that the firm has no purchase obligations.

The reporting units vary with reporting firms. Therefore, we normalize the units of disclosed purchase obligations in million dollars, by matching other information in the extracted tables or pages with the corresponding Compustat data item.

[23] We acknowledge that Andy Leone's Perl resource page at http://sbaleone.bus.miami.edu/PERLCOURSE/Perl_Resources.html provides a useful help to get started Edgar web crawling algorithms using PERL.

Appendix C Variable Definitions

- *PC exists* is the firm-level variable that equals one, if a given firm has disclosed a non-zero amount of purchase obligations in the given year.
- *PC/COGS* is the total amount of purchase obligations due within the next fiscal year, scaled by cost of goods sold.
- *close to port* is one if the minimum distance to any entry ports including sea ports, airports, and border crossings is in the lowest tercile of the sample.
- *high transp cost* is one when each industry's average input transportation costs by calculating the purchase value-weighted average of the transportation costs across all input industries is in the highest tercile of the sample.
- *supp compete (TNIC)* is the average supplier competition based on the TNIC Herfindahl index byHoberg and Phillips (2010a). The CapitalIQ database tracks each supplier firm's SIC code even for foreign or private supplier firms. Thus, the median TNIC competition index of U.S. public firms within the same 3-digit SIC code group as the supplier is used to approximate each supplier's competition.
- *Log(supp distance)* is the log of one plus the average distance from the customer firm in U.S. to domestic or foreign suppliers, computed using the latitude and longitude information of the supplier country's capital city.
- *area % higher education* is the percentage of the population which has a graduate school degree in the same three-digit zip code as the firm's main business location.
- *log(mv assets)* is the log of market value of the firm's assets. Market value of assets is market value of common equity plus book value of preferred stock plus debt (long-term debt + debt in current liabilities) plus book value of minority interest.
- *log(1+age)* is the log of one plus firm age, defined as a given year minus the year when the firm first appeared in Compustat.
- *M/B* is market value of assets divided by book value of assets.
- *Return on Assets* is net operating income divided by total assets in the prior year. *operating margin* is operating income before depreciation, scaled by sales.
- *R&D/sales* is R&D expenditures divided by sales in the prior year.
- *market leverage* is the ratio of total debt to the market value of assets.
- *market leverage (with AP)* additionally includes account payables as part of total debt.
- *book leverage* is the ratio of total debt to the book value of assets.
- *book leverage (with AP)* additionally includes account payables as part of total debt.
- *PPE/assets* is gross property, plant and equipment divided by total assets in the prior year.
- *sales growth* is the percentage growth in sales in a given year.
- *#patent/assets* is the total patent count granted to the firm during the 20 year period from 1985 to 2004, scaled by the average total assets during the period. Under the current U.S. patent laws, the term of a patent is 20 years from the filing date of the earliest application.
- *cash flow volatility* or *sd(operating margin)* is the standard deviation of *operating margin* from the previous 12 quarters.
- *cash flow volatility (ROA)* is the standard deviation of *Return on Assets*.
- *abnormal stock return* is the estimated stock alpha from a regression of the firm's daily excess stock returns (raw returns minus the risk-free rate) in the prior 252 trading days (over the one fiscal year period from June to May in the next year) using the market model. Results do not change by using the Fama French 3 or 4 factor models.
- *stock return volatility* is the log of standard deviation of the firm's daily logarithmic returns over the 252 trading days starting from June to May in the next year, multiplied by the square root of the time period, 252.
- *default probability* is Merton's naive default probability (distant to default) based on the approach in Bharath and Shumway (2008). Refer to our Empirical Strategy and Variables of Interest section and Bharath and Shumway (2008) for the detailed explanation on how to construct this measure.

- *demand shock* is the detrended annual percentage change in the downstream industry demands using the 2002 input-output benchmark table from the Bureau of Economic Analysis, following Maksimovic and Phillips (2001). To detrend this variable, we regress it on industry and year fixed effects indicator variables and then take the residual from this regression. The downstream industry demands data come from the chain-type quantity indexes for gross output by industry from the U.S. Department of Commerce's Bureau of Economic Analysis. For the consumer and government demands, we use personal consumption indexes and government spendings and investment indexes.
- *negative demand shock* is a discretized version of *demand shock*, which equals one when *demand shock* is negative and zero otherwise.
- *Aaa bond rate* is the Aaa corporate bond yield.
- *credit spread: Baa-Aaa* is the spread between the Baa and Aaa corporate bond yields.
- *compete (TNIC)* is one minus the TNIC Herfindahl index. The TNIC Herfindahl index is a measure of product market competitiveness based on the Text-Based Network Industries by Hoberg and Phillips (2010a).
- *high-tech industry* is a dummy variable indicating the 31 four-digit SIC code industries defined as high technology manufacturing industries by TechAmerica organization. By high-technology, we refer to micro-electronics rather than other technologies. We do not include bio-technology firms in the high-tech industries, as biotechnology is not established yet with its own set of SIC codes and rather widely spreads over the drug sectors. Our high-tech industry classification is compatible with Loughran and Ritter (2004) classification.
- *value added/employee (VAE)* is operating income before depreciation divided by the number of employees in the prior year. This equals zero when operating income before depreciation is negative.
- *high ind VAE* is an industry-level dummy variable that equals one if the given industry's value added per employee (VAE) is greater than the sample median.
- *high ind PC/COGS* is an industry-year level dummy variable that equals one if a given industry's mean PC/COGS level is greater than the median of all industries in the sample at the given year.
- *high supp R&D* is a firm-level dummy variable that equals one if the average R&D intensity (R&D/sales) of the firm's suppliers is in the highest tercile of the sample. The CapitalIQ database tracks each supplier firm's SIC code even for foreign or private supplier firms, but does not report their R&D expenditures. Thus, the median R&D intensity of U.S. public firms within the same 3-digit SIC code group as the supplier is used to approximate each supplier's R&D intensity.
- *high supp labor* is a firm-level dummy variable that equals one if the average labor intensity (number of employees divided by sales) of the firm's suppliers is in the highest tercile of the sample.
- *high supp #* is a firm-level dummy variable that equals one if the firm's total number of suppliers is in the highest tercile of the sample
- *high % foreign supp* is a firm-level dummy variable that equals one if the percentage of the foreign suppliers out of all suppliers is in the highest tercile of the sample
- *relative supp size small* is a firm-level dummy variable that equals one if the average sales of a given firm's suppliers relative to the firm's own sales is in the lowest tercile of the sample.
- *high supp HHI* is a dummy variable that equals one if the average HHI of the firm's suppliers (based on the TNIC Herfindahl index by Hoberg and Phillips (2010a)) is in the highest tercile.
- *% foreign supplier* is the percentage of the foreign suppliers out of all suppliers identified for the firm in the Capital IQ database.
- *% manufacturing supplier* is the percentage of the suppliers in the manufacturing sector.
- *% foreign tax* is the percentage foreign income tax paid out of total income tax paid in each fiscal year.
- *marginal tax rate* is a firm's marginal tax rate kindly provided to us by John Graham. The marginal tax rate after deductions for depreciation, interest and leasing expenses is used.

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	Total	Payments Due in Less Than 1 year	Payments Due in 1-3 years	Payments Due in 4-5 years	Payments Due in More Than 5 years
Operating Leases	$ 865	$ 108	$ 211	$ 192	$ 354
Purchase Obligations	1,994	1,994	—	—	—
Asset Retirement Obligations	14	—	2	2	10
Other Obligations	4	4	—	—	—
Total	$ 2,877	$ 2,106	$ 213	$ 194	$ 364

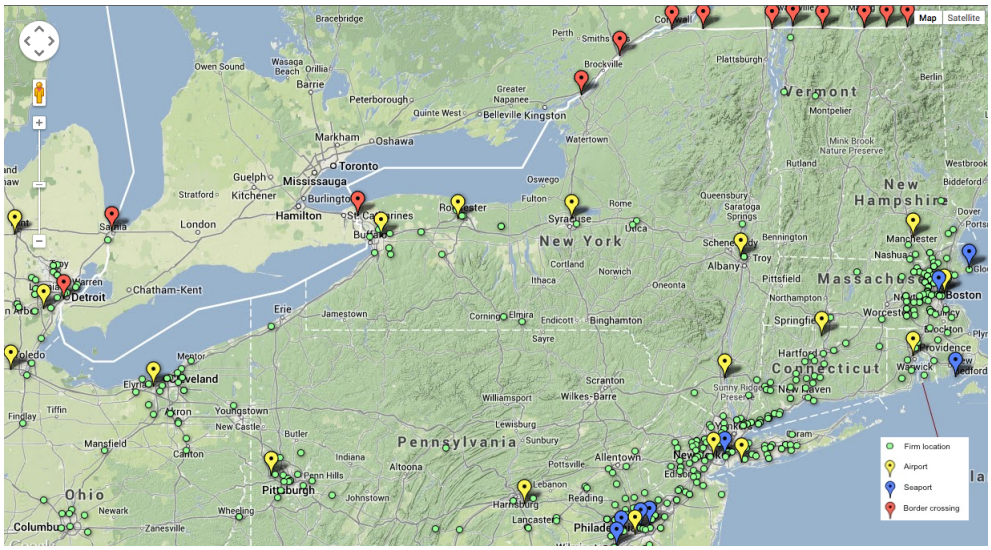
(a) Source: Apple Inc.'s 10-K for the fiscal year 2005

	Total	Payments Due in Less Than 1 Year	Payments Due in 1-3 Years	Payments Due in 4-5 Years	Payments Due in More Than 5 Years
Operating leases	$ 1,760	$ 195	$ 409	$ 368	$ 788
Purchase obligations	5,378	5,378	—	—	—
Asset retirement obligations	28	—	8	7	13
Other obligations	471	242	124	105	—
Total	$ 7,637	$ 5,815	$ 541	$ 480	$ 801

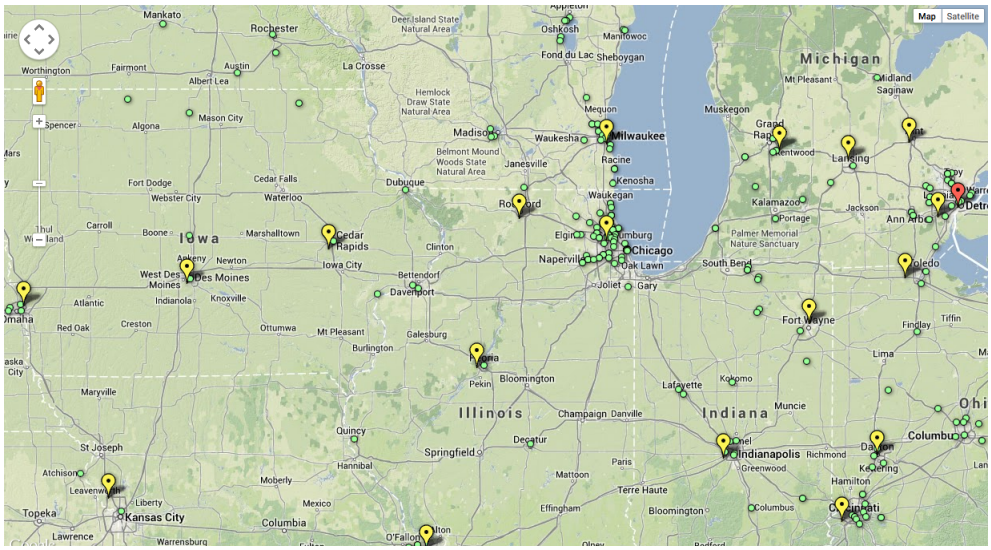
(b) Source: Apple Inc.'s 10-K for the fiscal year 2008

Figure 1: Examples of Purchase Obligations Disclosures

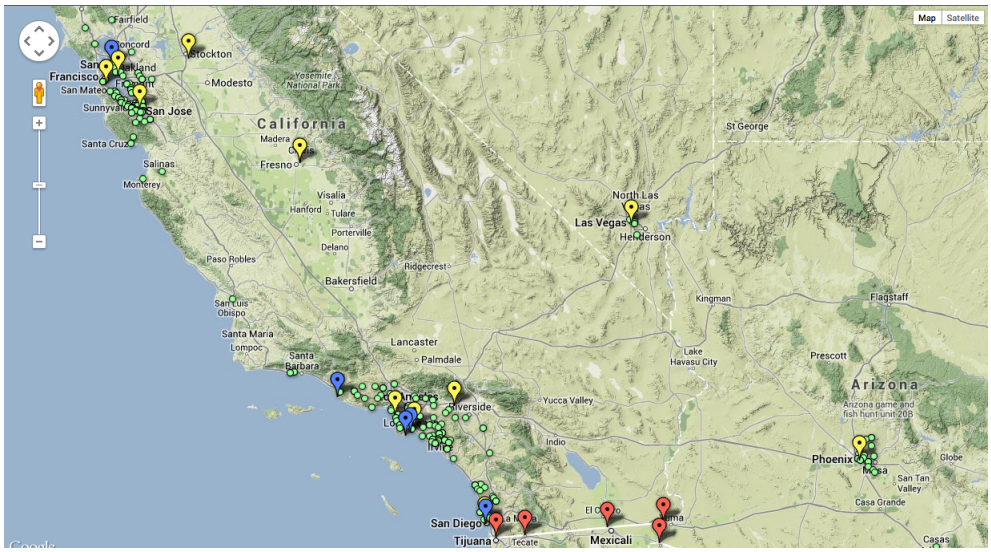
Description of purchase obligations excerpted from the footnotes of Apple Inc.'s 2008 10-K: "The Company utilizes several contract manufacturers to manufacture sub-assemblies for the Company's products and to perform final assembly and test of finished products. These contract manufacturers acquire components and build product based on demand information supplied by the Company, which typically covers periods ranging from 30 to 150 days. The Company also obtains individual components for its products from a wide variety of individual suppliers. Consistent with industry practice, the Company acquires components through a combination of purchase orders, supplier contracts, and open orders based on projected demand information. Such purchase commitments typically cover the Company's forecasted component and manufacturing requirements for periods ranging from 30 to 150 days. In addition, the Company has an off-balance sheet warranty obligation for products accounted for under subscription accounting pursuant to SOP No. 97-2 whereby the Company recognizes warranty expense as incurred. As of September 27, 2008, the Company had outstanding off-balance sheet third-party manufacturing commitments, component purchase commitments, and estimated warranty commitments of $5.4 billion. During 2006, the Company entered into long-term supply agreements with Hynix Semiconductor, Inc., Intel Corporation, Micron Technology, Inc., Samsung Electronics Co., Ltd., and Toshiba Corporation to secure supply of NAND flash memory through calendar year 2010. As part of these agreements, the Company prepaid $1.25 billion for flash memory components during 2006, which will be applied to certain inventory purchases made over the life of each respective agreement. The Company utilized $567 million of the prepayment as of September 27, 2008."



(a) East Coast Region



(b) Midwest Region



(c) West Coast Region

Figure 2: Firm Main Business Locations and U.S. Major Ports of Entry

Table 1: Descriptive Statistics of Outside Purchase Contracting Activities

Panel A shows the outside purchase contracting activity by two-digit SIC code industry in the manufacturing sector. The sample period is 2004-2010. The firm-level purchase contracts data are from purchase obligations information from 10-K filings. Purchase Contract Intensity is PC/COGS, which is the total amount of outside purchase contracts due within the next fiscal year scaled by cost of goods sold. PC/COGS is winsorized at the top and bottom 1% of the distribution.

PANEL A: Industry Description	SIC Code	Total Firms(#)	Firms with Purchase Contracts(#)	Firms with Purchase Contracts(%)	Purchase Contract Intensity	Purchase Contract Intensity (within firms with Purchase Contracts)
Food and kindred products	20	83	59	0.711	0.091	0.128
Tobacco manufactures	21	6	6	1	0.169	0.169
Textile mill products	22	12	8	0.667	0.022	0.033
Apparel and other textile products	23	39	23	0.59	0.121	0.204
Lumber and wood products	24	16	6	0.375	0.008	0.022
Furniture and fixtures	25	24	13	0.542	0.032	0.059
Paper and allied products	26	39	30	0.769	0.053	0.068
Printing and publishing	27	46	26	0.565	0.02	0.036
Chemicals and allied products	28	343	239	0.697	0.126	0.181
Petroleum and coal products	29	22	19	0.864	0.114	0.132
Rubber and miscellaneous plastics products	30	37	19	0.514	0.044	0.084
Leather and leather products	31	16	13	0.813	0.151	0.186
Stone, clay, glass, and concrete products	32	15	12	0.8	0.071	0.089
Primary metal industries	33	59	41	0.695	0.089	0.128
Fabricated metal products	34	53	34	0.642	0.077	0.12
Industrial machinery and equipment	35	242	169	0.698	0.09	0.128
Electrical and electronic equipment	36	359	250	0.696	0.111	0.159
Transportation equipment	37	90	49	0.544	0.074	0.134
Instruments and related products	38	274	177	0.646	0.099	0.153
Miscellaneous manufacturing industries	39	32	17	0.531	0.051	0.095
Total		1807	1210	0.67	0.097	0.144

PANEL B presents the summary statistics of suppliers identified from the Capital IQ's business relationship database. The sample consists of 6,917 suppliers of 884 customer firms in the primary sample. Information on suppliers' revenue, assets, numbers of employees, SIC codes, and countries of incorporation are available from the Capital IQ database. The statistics are based on the firm-level average of each variable from all available firm-year observations from 2005 to 2011. We use the industry median R&D from all US public firms at the same four-digit SIC code to proxy foreign or US private supplier R&D.

PANEL B:	Supplier Characteristics						
	mean	min	p25	p50	p75	max	obs.
Supplier Revenue ($million)	4595.580	0.000	50.386	244.643	1730.357	2384814.250	5281
Supplier Assets ($million)	7794.225	0.000	63.025	305.264	2344.114	2421008.500	5282
Supplier Capital Intensity (sales/assets)	0.944	0.061	0.577	0.845	1.189	3.008	5277
Supplier Labor Intensity (employees/revenue)	8.059	0.094	2.992	4.972	8.754	58.148	4903
Supplier R&D Intensity (R&D/sales)	0.102	0.000	0.004	0.087	0.125	0.763	5107
Supplier TNIC Competition	0.812	0.038	0.739	0.845	0.924	0.978	5107
Supplier SIC Competition	0.814	0.000	0.778	0.880	0.931	1.000	5110
Supplier in Manufacturing	0.475	0.000	0.000	0.000	1.000	1.000	6917
Domestic Supplier	0.481	0.000	0.000	0.000	1.000	1.000	6917
Domestic Public Supplier	0.321	0.000	0.000	0.000	1.000	1.000	6917
Region: America	0.536	0.000	0.000	1.000	1.000	1.000	6917
Region: Asia	0.255	0.000	0.000	0.000	1.000	1.000	6917
Region: Europe	0.172	0.000	0.000	0.000	0.000	1.000	6917
Region: Africa	0.003	0.000	0.000	0.000	0.000	1.000	6917
Region: Oceania	0.019	0.000	0.000	0.000	0.000	1.000	6917
Region: Unknown	0.016	0.000	0.000	0.000	0.000	1.000	6917

Table 2: New Security Issuance

The table presents security issuance decisions by public firms in private and public markets over our sample period. It presents the number of issues, the total gross proceeds raised in millions of dollars, the mean value of the proceeds of each issue as a fraction of the market value of the issuer's asset, and the mean value of the maturity for debt security issues. The sample consists of all security issues by 1,806 manufacturing firms during the fiscal year period of 2004-2011. Panel B shows the number of security issues by year and security type.

PANEL A:

Detailed Issue Type	*# issues*	*proceeds($million)*	*proceeds/market assets*	*maturity of debt*
Public Debt	469	1212.17	0.05	10.79
Public Conv. Debt	80	365.79	0.12	7.19
Public Conv. Preferred	15	541.01	0.13	
Public Equity	639	185.02	0.16	
144A Debt	90	361.47	0.15	8.06
144A Conv. Debt	176	413.55	0.14	8.95
144A Conv. Preferred	5	72.22	0.13	
144A Equity	5	17.76	0.09	
Private Debt	1,930	701.36	0.19	4.44
Private Conv. Debt	66	48.72	0.14	
Private Conv. Preferred	49	196	0.14	
Private Equity	205	35.75	0.11	
Total	3,729	590.95	0.16	6.02

PANEL B:

	Data Year - Fiscal								
Detailed Issue Type	2004	2005	2006	2007	2008	2009	2010	2011	Total
Public Debt	31	29	47	55	57	93	83	74	469
Public Conv. Debt	2	4	12	14	11	20	9	8	80
Public Conv. Preferred		2		1		2	4	6	15
Public Equity	104	69	83	76	26	129	96	56	639
144A Debt	25	28	6	19	4	8			90
144A Conv. Debt	47	26	35	27	7	10	9	15	176
144A Conv. Preferred	2					1	2		5
144A Equity						1	4		5
Private Debt	12	377	356	315	193	145	204	328	1,930
Private Conv. Debt		13	11	9	12	9	10	2	66
Private Conv. Preferred		11	4	7	8	9	5	5	49
Private Equity	3	34	39	39	25	25	28	12	205
Total	226	593	593	562	343	452	454	506	3,729

Table 3: New Security Issuance and Outside Purchase Contracting Intensity by Firm Size

The table reports the number of issues and the mean value of the issuing firm's outside purchase contracting intensity for each security type by firm size. Size categories are 10 quantiles based on the prior year's market value of the assets. The outside purchase contracting intensity, PC/COGS is the total amount of outside purchase contracts due within the next fiscal year scaled by cost of goods sold. We combine Rule 144A securities with other public securities in the table.

		10 Quantiles of the prior year's Market Value of Assets									
Security Type		1	2	3	4	5	6	7	8	9	10
Public Debt	# Issues		1	1	1	7	6	23	46	133	279
	PC/COGS		0	0	0	0.03	0.081	0.085	0.049	0.099	0.149
Private Debt	# Issues	35	64	84	135	166	202	257	294	324	356
	PC/COGS	0.045	0.11	0.102	0.084	0.06	0.075	0.108	0.083	0.1	0.156
Public Convertible	# Issues	2		6	11	21	43	35	40	35	27
	PC/COGS	0.032		0.155	0.019	0.175	0.17	0.22	0.138	0.097	0.264
Private Convertible	# Issues	37	14	18	11	10	5	6	3	4	4
	PC/COGS	0.016	0.111	0.113	0.09	0.054	0.042	0.213	0.344	0.035	0.144
Public Equity	# Issues	25	36	73	75	76	66	52	46	46	19
	PC/COGS	0.103	0.084	0.107	0.138	0.115	0.154	0.096	0.12	0.065	0.103
Private Equity	# Issues	42	42	39	33	19	8	7	8	1	3
	PC/COGS	0.089	0.101	0.165	0.108	0.177	0.095	0.25	0.117	0	0.132

Table 4: Summary Statistics

Panel A of the table presents summary statistics for firms with and without outside purchase contracts. All variable definitions are in Appendix C. The sample consists of 1,807 manufacturing firms during the fiscal year 2004-2010. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively. Panel B of the table presents summary statistics of the growth and variance of leverage for the subsamples of the highest, middle, and lowest tercile groups of the variance in outside contracting intensity. The terciles for PC/COGS growth or sd(PC/COGS growth) are the annual percentage growth of PC/COGS and its standard deviation at the firm level, respectively.

PANEL A:	Firm with vs. without outside firm contracts				
	Firms with purchase contracts		Firms without purchase contracts		
	Mean	Median	Mean	Median	Mean Difference
PC/COGS	0.142	0.094	0.000	0.000	0.142***
market leverage	0.124	0.089	0.138	0.096	-0.013*
market leverage (with AP)	0.177	0.143	0.201	0.156	-0.024***
book leverage	0.187	0.148	0.191	0.136	-0.004
book leverage (with AP)	0.265	0.233	0.277	0.222	-0.013
log(mv assets)	6.894	6.722	5.659	5.491	1.235***
log(1+age)	2.574	2.667	2.470	2.667	0.105**
M/B	2.141	1.764	2.032	1.556	0.109*
sales growth	0.153	0.089	0.146	0.086	0.007
operating margin	-0.193	0.105	-0.249	0.082	0.056
return on assets	-0.001	0.036	-0.024	0.019	0.023**
PPE/assets	0.429	0.346	0.427	0.352	0.002
R&D/sales	0.294	0.042	0.278	0.020	0.016
#patents/assets	0.113	0.019	0.110	0.009	0.003
value-added per emp	0.061	0.033	0.039	0.020	0.021***
abnormal stock return	-0.001	0.013	-0.037	-0.010	0.036***
stock return volatility	0.420	0.421	0.464	0.465	-0.043***
cash flow volatility	0.278	0.038	0.429	0.038	-0.150**
cash flow volatility (ROA)	0.091	0.066	0.104	0.071	-0.013***
default probability	0.016	0.000	0.033	0.000	-0.017***
marginal tax rate	0.144	0.085	0.155	0.117	-0.011
% foreign tax	0.298	0.130	0.213	0.003	0.085***
high ind PC/COGS	0.460	0.500	0.373	0.167	0.087***
compete (TNIC)	0.761	0.847	0.686	0.762	0.075***
high-tech industry	0.305	0.000	0.261	0.000	0.044*
close to port	0.351	0.000	0.252	0.000	0.099***
high transp cost	0.327	0.000	0.326	0.000	0.001
% gradschool grad	13.884	12.200	13.226	11.400	0.658
supp compete(TNIC)	0.822	0.830	0.815	0.814	0.006***
log(supp distance)	7.484	7.821	7.355	7.741	0.129*
Observations	1168		559		

PANEL B:	Outside Purchase Contracting Intensity and Leverage		
Terciles PC/COGS growth	PC/COGS growth	market leverage growth	book leverage growth
Low	-0.472	0.071	-0.017
Medium	-0.004	0.090	-0.001
High	0.883	0.100	0.002
Observations	4767		
Terciles sd(PC/COGS growth)	sd(PC/COGS growth)	sd(market leverage growth)	sd(book leverage growth)
Low	0.217	0.464	0.306
Medium	0.508	0.518	0.357
High	1.148	0.557	0.381
Observations	974		

Table 5: Outside Purchase Contracts and Cash Flow Volatility: Propensity Score Based Differences

The table presents the differences in firm cash flow volatility between firms with outside purchase contracts and matched firms with no outside purchase contracts. We estimate a matching model using log(mv assets), M/B, market leverage, mean quarterly sales, compete (TNIC), and high-tech industry as matching variables. For each quarter, a firm with outside purchase contracts is the firm in the sample that has disclosed a non-zero amount of purchase obligations for the given fiscal year. The control observations for a firm with outside purchase contracts are the 10 nearest neighbors across the matching variables within the same FIC-25 code group by Hoberg and Phillips (2010a). The variable of interest is Standard Deviation of (ROS), which is the standard deviation of operating income before depreciation scaled by sales from the 12 previous quarters. Other variable definitions are available in the Appendix. Results are robust to using different matching variables or different numbers of control observations. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

Quarter	[Outside Purchase Contracting - Matched Firms]	Std. Err.	z	P>z	N
	Standard Deviation of ROS (Operating Margin)				
all quarters	−0.022*	0.012	-1.793	0.073	1685
2004q1	−0.025	0.016	-1.511	0.131	1243
2004q2	−0.027*	0.016	-1.65	0.099	1258
2004q3	−0.029*	0.016	-1.852	0.064	1258
2004q4	−0.031**	0.015	-2.092	0.036	1259
2005q1	−0.025*	0.014	-1.757	0.079	1416
2005q2	−0.024*	0.014	-1.659	0.097	1427
2005q3	−0.019	0.014	-1.402	0.161	1428
2005q4	−0.021	0.013	-1.559	0.119	1426
2006q1	−0.032**	0.015	-2.219	0.026	1381
2006q2	−0.030**	0.015	-2.056	0.04	1391
2006q3	−0.027*	0.015	-1.821	0.069	1388
2006q4	−0.02	0.014	-1.427	0.154	1388
2007q1	−0.024*	0.015	-1.683	0.092	1338
2007q2	−0.026*	0.015	-1.782	0.075	1346
2007q3	−0.025*	0.015	-1.728	0.084	1349
2007q4	−0.027*	0.015	-1.82	0.069	1351
2008q1	−0.021	0.016	-1.28	0.201	1288
2008q2	−0.019	0.016	-1.206	0.228	1295
2008q3	−0.023	0.016	-1.397	0.162	1297
2008q4	−0.024	0.016	-1.477	0.14	1293
2009q1	−0.051***	0.018	-2.796	0.005	1067
2009q2	−0.052***	0.018	-2.899	0.004	1069
2009q3	−0.048***	0.018	-2.752	0.006	1069
2009q4	−0.046***	0.016	-2.778	0.005	1069
2010q1	−0.034**	0.016	-2.131	0.033	1010
2010q2	−0.037**	0.016	-2.321	0.02	1011
2010q3	−0.037**	0.016	-2.295	0.022	1011
2010q4	−0.041**	0.016	-2.527	0.012	1011

Table 6: Cost Fluctuations in Firms with versus Firms without Outside Purchase Contracts

The table shows the cost fluctuations based on downstream demand shocks for firms with and without outside purchase contracts. Each column presents coefficient estimates from an OLS regression with firm-fixed effects. COGS and SG&A represent Cost of Goods Sold and Selling, General & Administrative Expense, respectively. The dependent variables are scaled by the average sales of the firm during the sample period. A demand shock is the detrended annual percentage change in the downstream industry demands using the chain-type quantity indexes for gross output by industry and the 2002 input-output benchmark table from the Bureau of Economic Analysis, following Maksimovic and Phillips (2001). To detrend this variable, we regress it on industry and year fixed effects indicators and then take the residual from the regression. The variable, negative demand shock, is a discretized version of the demand shock, which equals one when the demand shock is negative and zero otherwise. The panel A sample includes firms that disclose a non-zero amount of purchase obligations at least once during the sample period, and otherwise firms are included in the panel B sample. All specifications have firm fixed effects. *t-statistics* (in parenthesis) are robust and adjusted for clustering at the firm level. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

PANEL A: Firms with Outside Purchase Contracts	(COGS+SG&A)/avrg sales	COGS/avrg sales	SG&A/avrg sales
negative demand shock	-0.0447***	-0.0268***	-0.0161***
	(-6.00)	(-4.18)	(-4.00)
Observations	6826	6826	6826
Adjusted R^2	0.598	0.671	0.739

PANEL B: Firms without Outside Purchase Contracts	(COGS+SG&A)/avrg sales	COGS/avrg sales	SG&A/avrg sales
negative demand shock	-0.0224*	-0.0152	-0.00410
	(-1.82)	(-1.57)	(-0.65)
Observations	2998	2998	2998
Adjusted R^2	0.574	0.676	0.764

Table 7: Outside Purchase Contracting Propensity

The table presents outside purchase contracting propensity estimates from Tobit and Linear Probability regressions. The dependent variable, PC/COGS is the total amount of outside purchase contracts due within the next fiscal year scaled by cost of goods sold. The first two results are from the firm-level between estimations, and others are from the firm-year level panel estimations. We estimate both tobit and linear probability models for panel regressions. We use two instrumental variables, *close to port* and *high transp cost*. *close to port* equals 1 if the minimum distance to any entry ports including seaports, airports, and border crossings is in the lowest tercile of the sample. *high transp cost* equals 1 if the average (purchase value weighted) industry transportation cost of inputs from other industries is in the highest tercile. Detailed variable definitions are available in the Appendix C. *t-statistics* (in parenthesis) are robust and adjusted for industry-year clustering. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

Estimation Method	Firm Level Between Regression		Firm-Year Level Tobit		Firm-Year Level OLS	
	PC/COGS					
close to port	0.0151**	0.0169***	0.0153***	0.0223***	0.00637*	0.0103***
	(2.52)	(2.74)	(2.83)	(4.04)	(1.74)	(2.79)
high transp cost	-0.0180	-0.00834	-0.0177**	-0.00979	-0.0211***	-0.0151***
	(-1.46)	(-0.76)	(-2.50)	(-1.34)	(-4.25)	(-2.92)
log(mv assets)	0.0271***	0.0227***	0.0372***	0.0343***	0.0164***	0.0143***
	(7.00)	(6.75)	(17.05)	(15.80)	(11.77)	(10.41)
log(1+age)	-0.00503	-0.00680	-0.00555	-0.00551	0.00197	0.00234
	(-0.78)	(-1.17)	(-1.03)	(-0.97)	(0.52)	(0.59)
PPE/assets	-0.0311	-0.0294	-0.0317**	-0.0307***	-0.0319***	-0.0356***
	(-1.41)	(-1.64)	(-2.32)	(-2.67)	(-4.07)	(-5.19)
operating margin	0.00530***	0.00536***	0.000812	0.00144	0.000908	0.00117
	(2.64)	(2.84)	(0.41)	(0.74)	(0.75)	(1.00)
cash flow volatility	-0.00595	0.00261	0.00209	0.00677	0.00831	0.0121
	(-0.25)	(0.11)	(0.15)	(0.47)	(0.89)	(1.25)
M/B	0.00119	0.00196	0.00165	0.00248	0.00458**	0.00584***
	(0.31)	(0.49)	(0.51)	(0.70)	(2.29)	(2.68)
sales growth	0.0667**	0.0678**	0.0265**	0.0201	0.0181*	0.0145
	(2.23)	(2.41)	(2.01)	(1.45)	(1.91)	(1.52)
#patents/assets	0.0595**	0.0544**	0.0489***	0.0479**	0.0278*	0.0242
	(2.37)	(2.23)	(2.91)	(2.21)	(1.97)	(1.40)
abnormal stock return	0.115***	0.112***	0.0348**	0.0426**	0.0194*	0.0224**
	(2.69)	(2.88)	(1.98)	(2.32)	(1.90)	(2.10)
stock return volatility	0.0252	-0.0200	0.0772**	0.0546	0.0484**	0.0358
	(0.24)	(-0.20)	(2.09)	(1.40)	(2.12)	(1.49)
% foreign tax	-0.00101	0.000785	-0.00732*	-0.00381	-0.00827***	-0.00703**
	(-0.08)	(0.06)	(-1.67)	(-0.77)	(-2.77)	(-2.12)
high ind PC/COGS	0.0363	0.0369***	0.0249***	0.0447***	0.0187***	0.0310***
	(1.40)	(2.74)	(2.93)	(5.94)	(3.22)	(6.33)
compete(TNIC)		0.0779***		0.0739***		0.0444***
		(3.72)		(4.80)		(5.52)
high-tech industry		0.0286**		0.0266***		0.0112**
		(2.08)		(3.61)		(2.40)
Aaa bond rate				-0.0229		-0.0201**
				(-1.48)		(-1.99)
credit spread: Baa-Aaa				0.00193		-0.00126
				(0.20)		(-0.22)
Observations	1454	1460	7675	7366	7675	7345
Pseudo or Adjusted R^2	0.843	0.766	0.228	0.182	0.089	0.078
F	.	116.1	43.68	49.88	71.00	50.66
Fixed Effects	Ind	None	Ind, Year	None	Ind, Year	None

Table 8: Leverage: Propensity Score Based Differences

The table presents the differences in leverage between firms with high outside contracting intensity and matched firms without outside purchase contracts. We estimate a matching model using log(mv assets), log(quarterly sales), M/B, operating margin, cash flow volatility, PPE/assets, compete (TNIC), and high-tech industry as matching variables. For each quarter, a firm with high outside contracting intensity is the firm in the sample with PC/COGS in the highest tercile. The control observations for a firm with high outside contracting intensity are the 10 nearest neighbors across the matching variables within the same FIC-25 code group by Hoberg and Phillips (2010a). The variable of interest is market leverage, which is the ratio of total debt to the market value of total assets. Market value of total assets is market value of common equity plus book value of preferred stock plus debt (long-term debt + debt in current liabilities) plus book value of minority interest. Other variable definitions are available in the Appendix C. Results are robust to using different matching variables and different numbers of control observations. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

Quarter	[High Outside Contracting - Matched Firms]	Std. Err.	z	P>z	N
	market leverage				
all quarters	−0.035 * **	0.009	-4.076	0.000	1687
2004q1	−0.012	0.011	-1.086	0.278	1156
2004q2	−0.007	0.011	-0.65	0.515	1164
2004q3	−0.012	0.011	-1.107	0.268	1163
2004q4	−0.019*	0.01	-1.851	0.064	1170
2005q1	−0.012	0.01	-1.232	0.218	1311
2005q2	−0.015	0.01	-1.571	0.116	1334
2005q3	−0.014	0.01	-1.463	0.143	1331
2005q4	−0.018*	0.01	-1.898	0.058	1340
2006q1	−0.016*	0.009	-1.712	0.087	1288
2006q2	−0.014	0.009	-1.466	0.143	1300
2006q3	−0.016	0.01	-1.618	0.106	1287
2006q4	−0.015	0.009	-1.628	0.103	1294
2007q1	−0.022 * *	0.01	-2.314	0.021	1253
2007q2	−0.022 * *	0.01	-2.236	0.025	1262
2007q3	−0.032 * **	0.01	-3.135	0.002	1264
2007q4	−0.035 * **	0.011	-3.161	0.002	1270
2008q1	−0.030 * **	0.012	-2.582	0.010	1208
2008q2	−0.026 * *	0.012	-2.122	0.034	1222
2008q3	−0.039 * **	0.013	-2.944	0.003	1222
2008q4	−0.056 * **	0.016	-3.544	0.000	1226
2009q1	−0.025	0.017	-1.451	0.147	1015
2009q2	−0.022	0.015	-1.441	0.150	1024
2009q3	−0.025*	0.013	-1.845	0.065	1020
2009q4	−0.026 * *	0.013	-1.981	0.048	1026
2010q1	−0.036 * **	0.013	-2.83	0.005	965
2010q2	−0.034 * **	0.013	-2.65	0.008	966
2010q3	−0.035 * **	0.013	-2.744	0.006	962
2010q4	−0.027 * *	0.012	-2.254	0.024	973

Table 9: Outside Purchase Contracts and Leverage

The table analyzes the impact of outside purchase contracts on leverage. It reports estimates from leverage regressions using an instrumental variable approach with *close to port* and *high transp cost* as instrumental variables for PC/COGS. The dependent variable, market leverage is the ratio of total debt to the market value of total assets. Market value of total assets is market value of common equity plus book value of preferred stock plus debt (long-term debt + debt in current liabilities) plus book value of minority interest. In columns four to six, market leverage (with AP) is computed by additionally including account payables as part of total debt. Other variable definitions are available in the Appendix C. The sample consists of all firm-years in the manufacturing sector during the period of 2005-2011. All the lagged control variables from the outside contracting intensity prediction regression (column five and six in Table 7) are included. Industry fixed effects are at the FIC-25 code group level following Hoberg and Phillips (2010a). *t-statistics* (in parenthesis) are robust and adjusted for industry-year clustering. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

Estimation Method	Instrumental Variable Approach					
	market leverage			*market leverage (with AP)*		
PC/COGS (instr.)	-1.089***	-0.817***	-1.321***	-1.273***	-0.776***	-1.306***
	(-6.11)	(-4.91)	(-6.97)	(-6.42)	(-4.54)	(-6.05)
log(mv assets)		0.0354***	0.0417***		0.0320***	0.0393***
		(11.61)	(13.03)		(9.95)	(11.26)
log(1+age)		-0.0126**	-0.00774		-0.00958*	-0.00350
		(-2.57)	(-1.63)		(-1.97)	(-0.72)
PPE/assets		0.00715	-0.0101		0.0238**	0.00462
		(0.68)	(-0.94)		(2.11)	(0.39)
operating margin		-0.00123*	-0.000933		-0.00111*	-0.000572
		(-1.94)	(-1.59)		(-1.80)	(-0.92)
cash flow volatility		-0.00168	0.00665		-0.0125	-0.0116
		(-0.23)	(0.81)		(-1.42)	(-1.15)
M/B		-0.0271***	-0.0220***		-0.0373***	-0.0331***
		(-9.49)	(-7.82)		(-9.14)	(-8.55)
sales growth		0.0236***	0.0300***		0.0261***	0.0339***
		(4.49)	(5.28)		(4.70)	(5.54)
#patents/assets		0.0227***	0.0196**		0.0160	0.0113
		(2.64)	(2.37)		(1.63)	(1.10)
abnormal stock return		-0.0803***	-0.0766***		-0.105***	-0.0995***
		(-6.45)	(-6.13)		(-7.58)	(-7.40)
stock return volatility		0.308***	0.285***		0.388***	0.378***
		(13.34)	(11.78)		(14.77)	(13.83)
% foreign tax		-0.00403	-0.0121***		0.000193	-0.00737**
		(-1.45)	(-3.94)		(0.07)	(-2.18)
high ind PC/COGS		0.00879*	0.0352***		0.00764	0.0222*
		(1.92)	(3.70)		(1.55)	(1.81)
compete(TNIC)			0.00277			-0.00295
			(0.26)			(-0.22)
high-tech industry			-0.0212***			-0.0199***
			(-4.47)			(-3.46)
Aaa bond rate			0.00647			0.0100
			(0.46)			(0.65)
credit spread: Baa-Aaa			-0.0430***			-0.0614***
			(-5.82)			(-6.33)
Observations	8953	7801	7470	8953	7801	7470
Adjusted R^2	0.129	0.258	0.217	0.149	0.303	0.267
Fixed Effects	Ind, Year	Ind, Year	None	Ind, Year	Ind, Year	None

Table 10: Outside Purchase Contracts, Leverage and Concerned Suppliers

The table examines the impact of outside purchase contracts on financial leverage through the channel of supplier competition and supplier distance to capture suppliers' potential concerns about the firm switching suppliers. We use an instrumental variable approach with *supp compete (TNIC)* and *log(supp distance)* as instruments for PC/COGS. Columns one and three report estimates of the first-stage regressions of PC/COGS. The instrumented PC/COGS from the regression in columns one and three are used in the second-stage of regressions of market leverage in columns two and four, respectively. *supp compete (TNIC)* is average supplier competition based on the TNIC Herfindahl index by Hoberg and Phillips (2010a). *log(supp distance)* is the log of one plus the average distance from the customer firm in U.S. to domestic or foreign suppliers, computed using the latitude and longitude information of the supplier country's capital city. Both instruments are industry level medians in column one for the full sample, and firm-specific in column three for a subsample of customer firms whose suppliers are identified with the Capital IQ business relationship database. Other variable definitions are available in the Appendix C. All the control variables are lagged. *t-statistics* (in parenthesis) are robust and adjusted for industry-year clustering. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

Estimation Method	Instrumental Variable Approach			
	PC/COGS	*market leverage*	*PC/COGS*	*market leverage*
supp compete (TNIC)	0.261***		0.0430**	
	(5.73)		(2.43)	
log(supp distance)	0.00314***		0.00355***	
	(3.91)		(4.80)	
PC/COGS (instr.)		-0.869***		-0.563***
		(-4.11)		(-3.41)
log(mv assets) (lagged)	0.0149***	0.0349***	0.0164***	0.0310***
	(10.47)	(10.43)	(8.69)	(7.96)
log(1+age)	0.00338	-0.0100**	0.00330	-0.0120**
	(0.83)	(-2.05)	(0.72)	(-2.17)
PPE/assets (lagged)	-0.0382***	0.0104	-0.0401***	0.0311***
	(-5.34)	(1.04)	(-3.74)	(2.85)
operating margin (lagged)	0.000869	-0.00128**	-0.00198	-0.00320**
	(0.72)	(-2.31)	(-0.89)	(-2.37)
cash flow volatility (lagged)	0.0105	0.00103	0.0413***	0.0150
	(1.16)	(0.13)	(3.69)	(1.27)
M/B (lagged)	0.00560***	-0.0252***	0.00547*	-0.0279***
	(2.66)	(-7.92)	(1.78)	(-11.01)
sales growth (lagged)	0.0163*	0.0219***	0.0107	0.0122**
	(1.66)	(3.84)	(0.74)	(2.07)
#patents/assets	0.0235	0.00810	0.0126	0.00346
	(1.39)	(0.90)	(0.73)	(0.40)
abnormal stock return (lagged)	0.0222**	-0.0843***	0.0366**	-0.0617***
	(2.09)	(-6.57)	(2.09)	(-4.58)
stock return volatility (lagged)	0.0408*	0.270***	0.114***	0.271***
	(1.75)	(10.71)	(3.22)	(7.30)
% foreign tax (lagged)	-0.00749**	-0.00935***	-0.0139***	-0.0125***
	(-2.27)	(-3.12)	(-3.09)	(-3.14)
high ind SC/COGS	0.0231***	0.0217**	0.0408***	0.0173**
	(4.89)	(2.60)	(6.16)	(2.12)
compete(TNIC) (lagged)	0.0333***	-0.0181	0.0610***	-0.0199
	(3.91)	(-1.62)	(4.79)	(-1.25)
high-tech industry	0.00619	-0.0294***	0.00926*	-0.0325***
	(1.43)	(-5.57)	(1.95)	(-8.91)
Observations	7319	7444	3808	3875
Adjusted R^2	0.081	0.228	0.097	0.247
Fixed Effects	Year	Ind, Year	Ind, Year	Ind, Year

Table 11: Outside Purchase Contracts and Short-term vs Long-term Leverage

The table analyzes the impact of outside purchase contracts on short-term leverage vs. long-term leverage. It reports estimates from leverage regressions using an instrumental variable approach with *close to port* and *high transp cost* as instrumental variables for PC/COGS. The dependent variable, short-term leverage (long-term leverage) is the ratio of debt in current liabilities (long-term debt) to the market value of total assets. Market value of total assets is market value of common equity plus book value of preferred stock plus debt (long-term debt + debt in current liabilities) plus book value of minority interest. Other variable definitions are available in the Appendix C. The sample consists of all firm-years in the manufacturing sector during the period of 2005-2011. All the lagged control variables from the outside contracting intensity prediction regression (column five and six in Table 7) are included. Industry fixed effects are at the FIC-25 code group level following Hoberg and Phillips (2010a). *t-statistics* (in parenthesis) are robust and adjusted for industry-year clustering. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

Estimation Method	Instrumental Variable Approach			
	short-term market leverage		*long-term market leverage*	
PC/COGS (instr.)	0.133	0.0797	-0.915***	-1.391***
	(1.22)	(0.60)	(-6.16)	(-8.56)
log(mv assets)	-0.00515***	-0.00348*	0.0372***	0.0428***
	(-2.75)	(-1.76)	(13.89)	(15.05)
log(1+age)	0.00559***	0.00765***	-0.0149***	-0.0109***
	(3.52)	(4.24)	(-3.69)	(-2.85)
PPE/assets	0.0200***	0.0160**	0.00359	-0.0117
	(3.78)	(2.50)	(0.39)	(-1.26)
operating margin	0.000851**	0.00106**	-0.00197***	-0.00164***
	(2.23)	(2.54)	(-3.04)	(-2.69)
cash flow volatility	-0.0167***	-0.0245***	0.00384	0.0128*
	(-3.04)	(-3.86)	(0.56)	(1.76)
M/B	-0.0153***	-0.0157***	-0.0220***	-0.0173***
	(-7.28)	(-7.60)	(-9.65)	(-7.69)
sales growth	0.00194	0.00396	0.0241***	0.0298***
	(0.68)	(1.21)	(5.44)	(6.34)
#patents/assets	-0.0133***	-0.0172***	0.0297***	0.0288***
	(-3.11)	(-3.65)	(4.15)	(4.06)
abnormal stock return	-0.0594***	-0.0592***	-0.0452***	-0.0394***
	(-7.56)	(-7.06)	(-4.32)	(-3.75)
stock return volatility	0.152***	0.164***	0.235***	0.212***
	(10.39)	(10.46)	(12.63)	(10.70)
% foreign tax	0.00830***	0.00810***	-0.00793***	-0.0153***
	(3.85)	(3.16)	(-3.10)	(-5.41)
high ind PC/COGS	-0.00591*	-0.0176***	0.0134***	0.0401***
	(-1.78)	(-2.62)	(3.15)	(4.94)
compete(TNIC)		-0.0249***		0.0223**
		(-2.88)		(2.38)
high-tech industry		-0.00750*		-0.0120***
		(-1.87)		(-2.98)
Aaa bond rate		0.0107		-0.000819
		(1.18)		(-0.07)
credit spread: Baa-Aaa		-0.0298***		-0.0315***
		(-5.69)		(-5.40)
Observations	7828	7496	7801	7470
Adjusted R^2	0.236	0.201	0.242	0.201
Fixed Effects	Ind, Year	None	Ind, Year	None

Table 12: Outside Purchase Contracts, Leverage, and Contracting Counter-Parties

The table examines the impact of outside purchase contracts and contracting counter-party characteristics on financial leverage. We use an instrumental variable approach with *close to port* and *high transp cost* as instrumental variables for PC/COGS. High ind VAE is an industry-level dummy variable that equals one, if a given industry's value added per employee is in the highest tercile. High supp R&D is a firm-level dummy variable that equals one, if the firm's average value of suppliers' R&D intensity is in the highest tercile. High supp # is a firm-level dummy variable that equals one, if the firm's total number of suppliers is in the highest tercile. High % foreign supp is a firm-level dummy variable that equals one if the firm's foreign supplier percentage is in the highest tercile. The sample in columns two to four is a subsample of customer firms whose suppliers are identified with the Capital IQ's business relationship database. All the lagged control variables from the outside contracting intensity prediction regression (column five in Table 7) are included but not reported to conserve space. *t-statistics* (in parenthesis) are robust and adjusted for industry-year clustering. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

Estimation Method	Instrumental Variable Approach			
	market leverage			
PC/COGS (instr.)	-0.426*	-0.471*	-0.195	-0.581**
	(-1.81)	(-1.87)	(-0.55)	(-2.51)
high ind VAE * PC/COGS (instr.)	-1.713***			
	(-2.68)			
high supp R&D * PC/COGS (instr.)		-0.870*		
		(-1.70)		
high supp # * PC/COGS (instr.)			-0.697*	
			(-1.70)	
high % foreign supp * PC/COGS (instr.)				-1.587*
				(-1.70)
high ind VAE	-0.00296			
	(-0.71)			
high supp R&D		0.0954	-0.00603	-0.00512
		(1.56)	(-1.32)	(-1.08)
high supp #		-0.0144***	0.0623	-0.0103*
		(-3.42)	(1.33)	(-1.86)
high % foreign supp		-0.00316	-0.00760*	0.162
		(-0.65)	(-1.84)	(1.62)
high supp capital		-0.0101**	-0.00764*	-0.00191
		(-2.51)	(-1.79)	(-0.30)
high supp labor		0.0108***	0.000554	0.00832***
		(3.07)	(0.11)	(2.79)
% manufacturing supp		0.0130**	0.000553	0.0203*
		(1.99)	(0.14)	(1.94)
supp size small		0.00193	0.00428	0.0164**
		(0.34)	(0.81)	(2.00)
high supp HHI		-0.0115*	-0.0185***	-0.0181***
		(-1.68)	(-2.77)	(-2.74)
Observations	7801	4669	4669	4669
Adjusted R^2	0.258	0.284	0.284	0.284
Fixed Effects	Ind, Year	Ind, Year	Ind, Year	Ind, Year

Table 13: Outside Purchase Contracts, Leverage and R&D Investment

The table examines the impact of outside purchase contracts and R&D investment on financial leverage. We use an instrumental variable approach with *close to port*, *high transp cost*, and *area % higher education* as instrumental variables for both PC/COGS and R&D/sales. Column one and two report estimates of the first-stage regressions of PC/COGS and R&D/sales, respectively. The instrumented PC/COGS from the regression in column one is used in column three with the lagged R&D/sales. In column four, both the instrumented PC/COGS and R&D/sales are used. *area % higher education* is the percentage population of graduate school graduates for the same three-digit zip code with the firm's main business location. Other variable definitions are available in the Appendix C. All the control variables are lagged. *t-statistics* (in parenthesis) are robust and adjusted for industry-year clustering. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

Estimation Method	Instrumental Variable Approach			
	PC/COGS	*R&D/sales*	*market leverage*	
close to port	0.00608*	0.0537***		
	(1.76)	(2.87)		
high transp cost	-0.0218***	-0.0727***		
	(-4.51)	(-3.85)		
area % higher education	-0.00131	0.430***		
	(-0.05)	(3.03)		
PC/COGS (instr.)			-0.795***	-0.728***
			(-4.91)	(-3.33)
R&D/sales			0.00167	
			(0.62)	
R&D/sales (instr.)				-0.0143
				(-0.39)
log(mv assets)	0.0156***	0.00496	0.0344***	0.0335***
	(11.46)	(1.33)	(12.06)	(9.63)
log(1+age)	0.00438	0.00431	-0.0107**	-0.0109**
	(1.33)	(0.29)	(-2.20)	(-2.22)
PPE/assets	-0.0303***	0.101***	0.00903	0.0126
	(-3.92)	(3.05)	(0.86)	(0.92)
operating margin	0.000933	-0.396***	-0.000559	-0.00697
	(0.78)	(-10.96)	(-0.50)	(-0.47)
cash flow volatility	0.0118	0.408***	0.0000958	0.00609
	(1.21)	(4.58)	(0.01)	(0.39)
M/B	0.00602***	-0.0101	-0.0260***	-0.0266***
	(2.81)	(-0.71)	(-9.17)	(-8.88)
sales growth	0.0171*	0.892***	0.0209***	0.0340
	(1.84)	(5.91)	(3.38)	(1.11)
abnormal stock return	0.0166*	-0.111***	-0.0827***	-0.0857***
	(1.68)	(-2.73)	(-6.54)	(-5.79)
stock return volatility	0.0511**	-0.242**	0.309***	0.302***
	(2.22)	(-2.42)	(13.41)	(9.87)
% foreign tax	-0.00819***	-0.0162	-0.00378	-0.00341
	(-2.76)	(-1.43)	(-1.38)	(-1.21)
high ind PC/COGS	0.0186***	-0.00646	0.00823*	0.00689
	(3.21)	(-0.17)	(1.84)	(1.26)
Observations	7675	7828	7801	7801
Adjusted R^2	0.086	0.657	0.258	0.258
Fixed Effects	Ind, Year	Ind, Year	Ind, Year	Ind, Year

Table 14: Multinomial Logit Regression (Base: Public Debt Issue)

The table presents coefficient estimates from a multinomial logistic regression testing the impact of outside contracting intensity on public and private security issues. The dependent variable is the relative log-odds of issuing each security type versus public debt. PC/COGS (instr.) is the predicted outside contracting intensity using an instrumental variable approach with *close to port* and *high transp cost* as instrumental variables. All the lagged control variables from the outside contracting intensity prediction regression (column six in Table 7) are included. Other variable definitions are available in the Appendix C. Industry and year control variables are included but not reported to conserve space. *t-statistics* (in parenthesis) are robust. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

Base: Public Debt	*Private Debt*	*Convertible*	*Private Convertible*	*Equity*	*Private Equity*
PC/COGS (instr.)	23.85**	42.24**	26.23	16.21	11.90
	(2.03)	(2.01)	(1.00)	(0.94)	(0.53)
log(mv assets)	-1.063***	-1.027***	-1.913***	-1.301***	-1.671***
	(-5.28)	(-2.95)	(-4.34)	(-4.41)	(-4.53)
log(1+age)	-0.653***	-0.852***	-0.527	-1.419***	-1.538***
	(-3.22)	(-3.19)	(-1.34)	(-5.65)	(-4.99)
PPE/assets	0.491	0.144	-0.693	-0.697	-0.118
	(0.86)	(0.14)	(-0.61)	(-0.90)	(-0.11)
operating margin	-0.338	-1.684	-1.081	-1.582	-1.621
	(-0.25)	(-1.18)	(-0.73)	(-1.11)	(-1.14)
cash flow volatility	3.701	4.275	5.618	5.567	4.706
	(1.00)	(1.12)	(1.47)	(1.48)	(1.25)
M/B	-0.170	-0.151	0.148	0.132	0.328
	(-1.15)	(-0.70)	(0.53)	(0.68)	(1.43)
sales growth	1.766**	1.628*	2.096**	1.884**	2.185**
	(2.38)	(1.93)	(2.18)	(2.28)	(2.44)
#patents/assets	-1.056	-1.552	-1.007	-0.643	-0.163
	(-1.27)	(-1.41)	(-0.85)	(-0.64)	(-0.15)
abnormal stock return	0.0146	-0.358	-2.063	1.586	-0.677
	(0.02)	(-0.30)	(-1.56)	(1.47)	(-0.57)
stock return volatility	4.176***	8.603***	8.963***	9.335***	13.08***
	(2.89)	(3.96)	(2.83)	(5.14)	(5.50)
% foreign tax	0.357*	0.489	-0.480	0.711**	0.780**
	(1.78)	(1.35)	(-0.81)	(2.49)	(1.97)
marginal tax rate	2.558***	2.582*	2.396	1.142	1.387
	(2.91)	(1.95)	(1.08)	(0.88)	(0.79)
default probability	4.214*	2.332	0.440	2.255	0.721
	(1.72)	(0.74)	(0.12)	(0.87)	(0.19)
Observations	1792				
Pseudo R-squared	0.375				
Ind, Year control	Yes				

Table 15: Nested Logit Regression (First Stage: Market Decision)

The table presents coefficient estimates from a nested logistics regression testing the impact of outside contracting intensity on public and private security issues. The first stage is the choice of market (public vs. private) with coefficients representing the impact of the variables on the propensity to issue securities in the private market versus the public market. The second stage is the choice of security type with coefficients representing the impact of the variables on the propensity to issue convertible and equity relative to debt issues. PC/COGS (instr.) is the predicted outside contracting intensity using an instrumental variable approach with *close to port* and *high transp cost* as instrumental variables. All the lagged control variables from the outside contracting intensity prediction regression (column six in Table 7) are included. Other variable definitions are available in the Appendix C. Industry and year control variables are included but not reported to conserve space. *t-statistics* (in parenthesis) are robust. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

	First Stage: Market Decision	Second Stage: Security Decision			
	Private Market (vs. Public Market)	*Public Convertible* (vs. Public Debt)	*Public Equity* (vs. Public Debt)	*Private Convertible* (vs. Private Debt)	*Private Equity* (vs. Private Debt)
PC/COGS (instr.)	24.63***	20.22*	15.06	-0.329	-13.20
	(2.62)	(1.75)	(1.37)	(-0.01)	(-0.66)
log(mv assets)	-0.841***	-0.520**	-0.793***	-0.834*	-0.555
	(-4.99)	(-2.48)	(-3.17)	(-1.73)	(-1.48)
log(1+age)	-0.368***	-0.576***	-0.907***	0.135	-0.848**
	(-2.73)	(-3.94)	(-5.02)	(0.39)	(-2.03)
PPE/assets	0.941**	0.0970	-0.0227	-1.337	-0.584
	(2.07)	(0.19)	(-0.05)	(-1.18)	(-0.64)
operating margin	1.260**	-0.148**	-0.119*	-0.892	-1.420***
	(2.42)	(-2.06)	(-1.86)	(-1.37)	(-2.67)
cash flow volatility	3.742	5.228*	5.574*	1.879*	0.931
	(1.22)	(1.77)	(1.86)	(1.69)	(1.12)
M/B	-0.287**	-0.0634	0.0156	0.350	0.517**
	(-2.56)	(-0.52)	(0.13)	(1.33)	(2.36)
sales growth	1.061*	1.050*	1.098*	0.356	0.374
	(1.81)	(1.74)	(1.78)	(0.53)	(0.62)
# patents/assets	-1.076*	-0.581	-0.349	0.304	1.128
	(-1.70)	(-0.82)	(-0.51)	(0.34)	(1.30)
abnormal stock return	-0.438	-0.216	0.762	-2.066**	-0.811
	(-0.68)	(-0.35)	(1.15)	(-2.16)	(-1.16)
stock return volatility	2.600**	5.691***	6.683***	4.301	8.531**
	(2.00)	(3.31)	(3.66)	(1.34)	(2.50)
% foreign tax	0.296*	0.251	0.421*	-0.967	0.342
	(1.78)	(1.13)	(1.84)	(-1.42)	(1.00)
marginal tax rate	1.935***	1.275*	0.695	-0.206	-1.158
	(2.71)	(1.69)	(0.83)	(-0.10)	(-0.62)
default probability	3.345*	0.532	0.854	-4.104	-3.562
	(1.84)	(0.27)	(0.49)	(-1.24)	(-1.11)

Table A.1: Outside Purchase Contracts and Book Leverage

The table analyzes the impact of outside purchase contracts on book leverage. It reports estimates from leverage regressions using an instrumental variable approach with *close to port* and *high transp cost* as instrumental variables for PC/COGS. The dependent variable, book leverage is the ratio of total debt to the book value of total assets. In columns four to six, book leverage (with AP) is computed by additionally including account payables as part of total debt. Other variable definitions are available in the Appendix C. The sample consists of all firm-years in the manufacturing sector during the period of 2005-2011. All the lagged control variables from the outside contracting intensity prediction regression (column five and six in Table 7) are included. Industry fixed effects are at the FIC-25 code group level following Hoberg and Phillips (2010a). *t-statistics* (in parenthesis) are robust and adjusted for industry-year clustering. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

Estimation Method	Instrumental Variable Approach					
	book leverage			*book leverage (with AP)*		
PC/COGS (instr.)	-0.981***	-1.085***	-1.855***	-1.070***	-1.027***	-1.805***
	(-3.79)	(-4.62)	(-7.44)	(-4.08)	(-4.46)	(-6.59)
log(mv assets)		0.0553***	0.0636***		0.0535***	0.0623***
		(13.49)	(15.67)		(13.26)	(14.83)
log(1+age)		-0.0157***	-0.0118**		-0.0120**	-0.00780
		(-2.67)	(-2.09)		(-2.17)	(-1.42)
PPE/assets		-0.0000176	-0.0277**		0.0196	-0.00667
		(-0.00)	(-1.99)		(1.31)	(-0.45)
operating margin		-0.00468***	-0.00450***		-0.00490***	-0.00444***
		(-3.35)	(-3.12)		(-3.48)	(-3.00)
cash flow volatility		0.0303*	0.0475***		0.0154	0.0222
		(1.79)	(2.73)		(0.89)	(1.18)
M/B		-0.0146***	-0.00599**		-0.0170***	-0.00972***
		(-5.85)	(-2.33)		(-5.76)	(-3.31)
sales growth		0.0180**	0.0281***		0.0184**	0.0297***
		(2.58)	(3.69)		(2.55)	(3.80)
#patents/assets		0.0727***	0.0667***		0.0692***	0.0622***
		(4.73)	(4.34)		(4.38)	(3.68)
abnormal stock return		-0.0801***	-0.0690***		-0.0953***	-0.0797***
		(-5.58)	(-4.61)		(-6.04)	(-5.06)
stock return volatility		0.358***	0.292***		0.466***	0.400***
		(12.25)	(10.40)		(15.62)	(13.94)
% foreign tax		-0.00655*	-0.0168***		-0.00143	-0.0111**
		(-1.76)	(-4.02)		(-0.38)	(-2.58)
high ind PC/COGS		0.0139**	0.0592***		0.0135**	0.0427***
		(2.20)	(5.07)		(2.05)	(3.07)
compete(TNIC)			0.0120			0.00671
			(0.86)			(0.41)
high-tech industry			-0.0325***			-0.0344***
			(-5.56)			(-5.55)
Aaa bond rate			-0.00216			0.000164
			(-0.13)			(0.01)
credit spread: Baa-Aaa			-0.0452***			-0.0697***
			(-6.16)			(-8.17)
Observations	8953	7801	7470	8953	7801	7470
Adjusted R^2	0.088	0.200	0.154	0.089	0.198	0.159
Fixed Effects	Ind, Year	Ind, Year	None	Ind, Year	Ind, Year	None