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How Information Asymmetry Affects Contract Design: Paying for Private Firms with IOU's

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How Information Asymmetry Affects Contract Design: Paying for Private Firms with IOU's

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Dedicated to my dear wife Carmen, to my children Max and Eliana,

and my parents Manfred and Doris.

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How Information Asymmetry Affects Contract Design: Paying for Private Firms with IOU's

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This dissertation examines a financing mechanism that is common in the acquisition of privately-held firms. Using a novel database of transactions in which the target firm is private, this paper shows that sellers receive a debt claim as a contingent payment for the firm that is being sold. The debt claim, which takes the form of seller financing, is secured by the assets of the target firm. I show that proxies for information asymmetry are correlated with the presence of seller financing as payment in the transaction. I also find that when the firm is more likely to have received a financial audit, the transaction is less likely to include seller financing. Since financial audits improve firm transparency, I interpret this as evidence that a reduction in information asymmetries between the parties of a acquisition affect the deal structure.

A complementary explanation for the use of seller financing is related to capital constraints faced by buyers in the financing of the transaction. I present evidence that contract structures are affected by cross-sectional and time-series changes in the supply of local investment capital for buyouts. I find that seller financing is less common in areas in which locally informed capital is more abundant. I also find that transactions contain a lower percentage of seller financing in city-years in which Small Business Administration provides loan guarantees for the acquisition and expansion of firm's loan guarantees are higher. The evidence suggests that seller financing is solving a contracting problem because it is unaffected by controls for local banking activity.

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Chapter 1

Introduction

Private firm acquisitions are an important component of capital markets. The aggregate value of private firm acquisitions is approximately $200 billion in a typical year. This study utilizes a novel database of acquisitions that involve private target firms to examine how these transactions are financed. The financing of these transactions differs based on whether the buyer is private or the buyer is public. This results in different contract terms because of the more severe information asymmetries and capital constraints that result when the buyer is private. While the financing of transactions that involve only private firms is interesting and important in its own right, the mergers and acquisitions (M&A) market for such firms also provides a novel setting that helps us understand more generally how contract structures help address buyer concerns about information asymmetries.

In a typical M&A setting, buyers face information asymmetries regarding the future prospects of a target firm. Buyers can mitigate the effects of these asymmetries by modifying the payment consideration. For example, public buyers modify deal structures by using stock as a form of contingent payment. Doing this can help mitigate the problem, because the value of the

stock offer is partially contingent on the value of the target (Hansen, 1987; Fishman, 1989; Eckbo et al., 1990). However, in the case of public buyers, several theories predict the use of cash and stock as payment in an acquisition. This makes it difficult to identify empirically the causality associated with adverse selection on the buyer's payment.

In contrast, a private buyer cannot use stock as easily as the public buyer because sellers face post-transaction liquidity constraints and valuation difficulties. Also, private firms lack the same level of transparency, quality of financial statements, and requirements for disclosure that we observe with public firms. The combination of these factors provides an ideal setting for studying contracts under asymmetric information. Further, when the buyer is private, financing a transaction is more costly because outside debt financing subjects lenders to higher monitoring costs. These frictions help create a setting in which we can study how capital constraints affect the choice of payment.

I develop a theory of how sellers of private firms can mitigate the adverse selection problem faced by private buyers by accepting as payment, a debt claim secured by the assets of the firm being sold. In the theory, sellers face a choice between accepting all-cash as payment at the time of purchase, or accepting the debt claim (i.e. seller financing). While sellers know the expected cash flow of their firm, buyers only know the range of expected outcomes for the target firms. Sellers of firms with poor prospects know that the cash flows from their firms are unlikely to satisfy the debt repayment schedule associated

with a higher price, so they choose an all-cash transaction at a lower price. In contrast, sellers of firms with good prospects expect that their firms' cash flows will satisfy the interest and principal obligations from debt financing. As a result, they accept a higher total consideration which includes seller financing as a signal of firm quality. Since sellers prefer cash over retaining an investment in the firm, retention of debt is a costly and credible signal.

The theory yields a range of testable implications concerning how seller financing relates to information asymmetry. The key prediction is that seller financing is likely to be included in deal structures when the adverse selection problem is important. The disclosure mechanism embedded in the contingent payment allows sellers to avoid giving up part of the valuation discount associated with private firm sales that is attributable to the limited transparency (De Franco et al., 2011).

Since information asymmetry cannot be observed directly, I use several proxies – (i.e. firm asset tangibility, growth prospects and financial disclosures) – in the empirical analysis (Kohers and Ang, 2000). A key finding is that when information asymmetry is more severe, sellers of private firms are more likely to be paid in part with seller financing than entirely with cash. I estimate that when the proxies for information asymmetries are one standard deviation higher, seller financing is 16% more likely to be included in the transaction. The results indicate that seller financing is an important source of financing in the market for private firms. Approximately 50% of transactions rely on this financing, presenting an upper bound of $100 billion per

year in transactions that are affected by seller financing. This preponderance of seller financing illustrates how contract terms that mitigate information asymmetries and capital constraints vary between private and public buyers.

I address several challenges to the identification of the relation between asymmetric information and seller financing. First, interpretation of the evidence is difficult if the results could be explained by unobserved differences in the financial capacity of the buyer. If firms with larger growth prospects attract buyers with greater outside financing needs, this might affect the need for seller financing if a bank is less willing to finance the firm. Second, seller financing and price may be jointly determined if seller financing is used to mitigate the adverse selection problem. As a result, some of the proxies for information asymmetry may suffer from simultaneity bias.

To address the possibility of such endogeneity, I use an instrument based on regulatory differences across U.S. states, and these differences exogenously affect the use of auditing services by private firms. Relative to other forms of assurance, an audit improves the firm's transparency which would reduce potential information asymmetries between the parties of an M&A transaction. Minnis (2011) constructs a state-level index to measure the propensity of a private firm to have a financial audit. A firm's propensity to have a financial audit is in part determined by Certified Public Accountant (CPA) licensure requirements, education requirements, as well as nonprofit and for-profit firm audit requirements that are regulated at the state level. I use this measure as an exogenous instrument to investigate the effects of

information asymmetry on seller financing, and I find that when firms are more likely to have externally validated financial statements, the transaction is less likely to include seller financing. Since state regulations exogenously affect a firm's likelihood to have received an audit, we would expect the effect of audit propensity on seller financing to occur only through the information asymmetry channel via an increase in attestation quality.

A complementary explanation for the existence of seller financing is related to the capital constraints faced by buyers in the financing of the transaction. Even if the buyer and seller have similar information about the firm's prospects, frictions may yet arise in the buyers' ability to secure financing for the transaction. If exogenous changes in the supply or cost of outside capital affect seller financing – something that we would not expect if the information asymmetry problem were limited to the buyer and seller – we would not be able to rule out capital constraints as an explanation for the use of seller financing.

Since it is difficult to identify empirically the parties affected by any unobserved information asymmetry, I investigate how capital constraints affect seller financing by connecting the transaction data to the macroeconomic environment in which the transactions take place. First, I show that when credit spreads are higher, seller financing is more common. Higher credit spreads presumably affect the availability of financing for private equity transactions because higher credit spreads may reflect macroeconomic environments that result in greater risk aversion among investors.

Second, I investigate whether seller financing is affected by cross-sectional changes in the supply of local investment capital for buyouts. The results indicate that there is less seller financing when capital commitments to buyout funds are higher in state-years. This result provides some evidence that seller financing may be replacing other forms of locally informed capital (Lerner, 1995; Coval and Moskowitz, 1999).

Third, I use data from the Small Business Administration (SBA) to show that seller financing is less common when SBA 7(a) loan guarantees for the acquisition or expansion of a business are higher in city-years. The evidence suggests that seller financing may be solving a contracting problem because seller financing is unaffected by controls for state banking regulations and local bank loan originations.

I also find that the relation between the proxies for information asymmetry to seller financing is generally unaffected by the introduction of capital constraints. This provides additional support for the adverse selection hypothesis.

Another contract feature that can help mitigate information asymmetry is the earnout, a form of contingent payment that is based on the performance of the target relative to standards specified in the purchase agreement. My results are consistent with Kohers and Ang (2000) who find that a combination of cash at closing and contingent earnout payment helps to reduce risk related to misvaluation in high information asymmetry situations. My results also show that earnouts are used less frequently (3.7% of transactions) than seller

financing (50%). I conjecture that the challenge in verifying firm cash flows in private firms may make earnouts more difficult to contract. However, the absence of earnouts from most contracts remains an open empirical question.

My focus on the acquisition of private firms helps improve our overall understanding of information asymmetries in M&A. The novel private transaction database allows me to test the empirical predictions of an adverse selection model using exogenous variation in the disclosures of private firms. Sellers, whose firms have a higher likelihood of having received externally validated financial information, are less likely to accept transactions that include seller financing.

The study provides evidence that seller financing may help to complete the capital markets for M&A transactions in private firms. New empirical support for the hypothesis that deal structure helps to alleviate capital constraints is provided by the finding that seller financing is more common when the effect of macroeconomic shocks increases the costs of debt financing for acquisition targets. This study also indicates that seller financing may be a substitute for informed capital from local investors. Finally, this study sheds new light on the sale of private firms – an important part of the U.S. economy generally not well understood by the finance literature.

Chapter 2

Literature Review

This paper presents the first study of how acquisitions are financed by private buyers; however, there is a substantial literature on the financing of acquisitions by public buyers. This chapter will review this literature and its relationship to my study. Section 2.1 of this chapter explores the choice of payment for public buyers. Section 2.2 describes the literature on the effect of information asymmetries on payment consideration in real estate. In Section 2.3, I discuss the literature on trade credit and how it relates to this study. I conclude this chapter by discussing how information asymmetries between entrepreneurs and venture capitalists affect contract structures in early-stage investments.

Several papers provide a more general overview of the literature that relates to this paper, including its intersection with the literature on entrepreneurial finance(Denis, 2004), private equity(Cumming et al., 2007), and leveraged buyouts(Kaplan and Stromberg, 2009).

2.1 How Information Asymmetry Relates to Payment Consideration for Public Buyers

Given the limited data on acquisitions by privately held buyers, previous research on the relation between information asymmetry and contract structure in acquisitions has focused on a public buyer's choice of cash or stock. Betton et al. (2008) find that 26% of takeover contests and initial control bids for public firms are all cash, 37% are for stock, and the remainder are mixed offers of cash and stock.

A number of issues regarding the relation between asymmetric information and contract structure in acquisitions is discussed in the theoretical literature. For example, we know that in the presence of information asymmetry, stock offers dominate cash offers because of the ex-post stock price adjustment (Hansen, 1987). A "low" stock offer may be accepted by the seller because the stock will rise in value ex post. A "high" stock offer will be less costly to the bidder, since the seller is being paid with the same inflated stock price.

However, using stock to finance the purchase of a firm only partially mitigates the information asymmetry problem, as sellers receive only a share of the surviving firm. When the target is substantially smaller than the acquirer, the difference between the acquisition price and the actual value of the stock received as consideration has little impact on the payoff to the seller (Hansen, 1987). Eckbo et al. (1990) extend this work by exploring a mixed offer of cash and stock to partially address the two-sided information asymmetry between

buyer and seller. In a model of takeovers under asymmetry information, they show that abnormal stock returns from bidder announcements are increasing and convex in the cash component of the deal. This prediction suggests that, in a public setting, it may be difficult to empirically disentangle the adverse selection problem faced by the buyer.

In a setting in which the buyer is a publicly traded firm, several other confounding factors relate to the choice of stock or cash as consideration for payment. For instance, buyers make a trade-off between solving the adverse selection problem with the buyer (i.e., suggesting a stock purchase) and the undervaluation of buyer shares by the target firm (i.e., suggesting an all-cash purchase)(Myers and Majluf, 1984). The choice of stock as payment may reveal information about what the CEO of the buyer firm knows about the buyer firm. For example, Shleifer and Vishny (2003) present a model in which public buyers can use temporarily overpriced stock to purchase target firms whose shares are not overpriced. The market reaction of this choice may dominate the market reaction of the information story that relates to the hidden prospects of the seller.

In a related paper, Martos-Vila et al. (2013) develop a model for bidders that are more likely to succeed in the acquisition of the target firm because bidders overestimate synergies during periods in which market valuation multiples are higher than average. Further, Demarzo and Duffie (1999) investigate the problem faced by firms that raise capital with asset-backed securities. Firms make a trade-off between raising capital and illiquidity costs. Similar to my

setting, in which seller financing arises as the solution, their model predicts that the standard debt contract is optimal.

A number of papers provide empirical evidence for these theories. For example, we know that investors who are concerned with adverse selection react negatively to the news of public firms being acquired through the use of stock (Travlos, 1987; Asquith et al., 1987). In contrast, Eckbo et al. (1990) find that the evidence of abnormal abnormal returns during the announcement period is significantly positive for mixed offers than for all-cash or all-stock offers. More recently, Schlingemann (2004) finds that abnormal returns during the announcement period related to the bidder using equity financing. while debt financing by the bidder in the year before the acquisition announcement had no significant impact on bidder announcement returns.

Several other theories predict the use of cash or stock as payment, and this further complicates the interpretation of choices made during public acquisitions. For example, there is evidence of unobservable stock transaction costs related to the actions taken by the CEOs of public firms to protect the private benefits of control (Harris and Raviv, 1988; Stulz, 1988) and to avoid ownership dilution (Yook, 2003; Amihud et al., 1990).

Tax considerations also affect the choice of stock as payment in acquisitions, which further complicates the interpretation of the relation between adverse selection and the choice of payment. Target shareholders are immediately liable for capital gains taxes in an all-cash purchase. In contrast, a merger qualifies for a tax-free reorganization if the method of payment is all

stock (Internal Revenue Code, Section 368). This allows target shareholders to defer capital gains taxes until the year in which the shares are sold(Gilson et al., 1988). For offers to acquire private firms, announcement returns for bidders are non-negative when the consideration is only stock (Houston and Ryngaert, 1997; Chang, 1998; Fuller et al., 2002; Brown and Ryngaert, 1991).

Another payment consideration discussed in the literature on acquisitions by public buyers is the earnout. Consistent with moral hazard theory, Cain et al. (2011) find that deal structures that include earnouts are designed to mitigate problems related to valuation uncertainty. Kohers and Ang (2000) find that target firms that have higher levels of private information are more likely to continue to operate as a separate subsidiary of a public buyer. This ring-fencing of the target helps to effectuate the contingency of the earnout payment, since it allows the buyer to more easily monitor the firms performance.

2.2 How Information Asymmetry Relates to Payment Consideration In Real Estate

This research also relates to the literature on information asymmetry between buyers and sellers in real estate transactions. Garmaise and Moskowitz (2004) examine how information asymmetry affects the choice of financing in real estate transactions. An adverse selection problem in real estate transactions may arise because the seller knows more about the leasing intentions of the tenants than the prospective buyer. Using the ownership

of nearby properties as a proxy for information asymmetry, the authors find mixed evidence that the use of seller financing is related to information asymmetries.

In contrast, Garmaise and Moskowitz (2009) find strong evidence that earthquake risk is related to bank loan provisions, while seller financing is not tied to that same risk. This result is interpreted as evidence that real estate sellers make use of their superior information on real estate assets related to investments in safety improvements, and this information affects their choice of payment.

The acquisition of firms differs from the acquisition of real estate as described in Garmaise and Moskowitz (2004), since information asymmetries are more severe in the sale of firms than in the sale of real estate. Building inspections can help reveal the quality of the asset, while lease agreements inform buyers about the future revenues of those assets. In contrast, it is more difficult to evaluate the many tangible and intangible assets of a firm. More importantly, it is more difficult to predict a firms future cash flow. This difference may explain the difference in the prevalence of seller financing in real estate transactions (19%) and the acquisitions of firms (50%)Garmaise and Moskowitz (2009).

A further difference between firm acquisition and real estate acquisition is that the information asymmetry in the acquisition of private firms is two-sided. While buyers are generally concerned with the private information that sellers have, sellers that receive seller financing are also concerned with how

the buyer will manage the firm after a change in control. If the buyer lacks the skills necessary to manage the firm or does not expend the necessary effort to manage the firm successfully, the firm may eventually default to the seller in a condition that is significantly worse than when the firm was sold. Poorly maintained real estate may result in a lower recovery for a seller when the buyer defaults, but the expected cost of poor real estate management would be less than the cost of poor private firm management.

2.3 How Seller Financing is Related to Trade Credit

Seller financing is similar to trade credit. In both situations, the seller of an asset provides financing for the asset that is being sold. Some theories for the use of trade credit align with the use of seller financing found in acquisitions. For example, trade credit presents a form of warranty in which the buyer can return the product rather than pay for it. Lee and Stowe (1993) propose a model in which sellers of low-quality products provide larger cash discounts. In equilibrium, these discounts convey information about the quality of the products being sold. This prediction is consistent with the use of trade credit to mitigate adverse selection. The authors find support for this prediction in variations in the size of cash discounts between industries.

Smith (1987) finds empirical evidence that trade credit terms are used as a screening device in situations of high asymmetric information. Sellers are able to respond to defaults more quickly than banks. Ng et al. (1999) show evidence that trade credit terms are used to mitigate a two-sided information

problem: sellers assess buyer creditworthiness, while buyers receive assurances of product quality.

Trade credit also helps mitigate the effect that asymmetric information between lenders and firms has on project finance. Trade credit improves the information set for banks by incorporating into the lending relationship the private information held by suppliers about their customers.

Empirically, we know from the existing literature that firms that are credit rationed are more likely to use trade credit. Petersen and Rajan (1995) show evidence that firms that face credit constraints use more trade credit, and sellers with access to credit are more likely to provide trade credit. Petersen and Rajan (1997) show that firms extend trade credit because of an information advantage (relative to banks) and because of their ability to liquidate the assets efficiently.

Sellers could also realize greater salvage value from the assets if other buyers purchase those assets(Petersen and Rajan, 1994). Similarly, sellers of private firms could realize a greater liquidation value for their firm in the case of default on seller financing.

We also know that sellers of consumer goods use financing offers to price-discriminate between buyers that have different levels of wealth (Sen, 1998). It may be feasible to deploy this strategy in the sale of firms. We know that small firms that have limited access to capital markets use more trade credit when credit from financial institutions is unavailable. Biais and

Gollier (1997) find empirical evidence that small firms use more trade credit during tighter credit markets. Similarly, seller financing is more prevalent in transactions of firms with less than $10 million in revenue.

However, some theories on the use of trade credit are inconsistent with the use of seller financing. For example, sellers who offer trade credit may also have tying relationship with the buyer(Petersen and Rajan, 1994). Trade credit arises as a screening mechanism against buyer default when the seller makes a non-tangential investment in the buyer. Sellers who provide trade credit are also thought to have a financing advantage if we assume that sellers are better at assessing credit risk for buyers that have capital constraints. These sellers may have an information advantage over banks because of the sellers frequent interactions with customers.

2.4 How Information Asymmetry Relates to Contracting in Venture Capital

Venture capital firms concentrate on early-stage investments and high-tech companies, and in these contexts, information asymmetries are more likely, and the value of monitoring is higher. In the venture capital context, a firm receives funding from outside investors in exchange for a form of equity. However, in my setting, the entire firm is purchased.

Related to my proxies of information asymmetry, Gompers (1995) shows that increases in asset tangibility increases financing duration and reduces monitoring intensity in venture capital. When venture capitalists learn nega-

tive information about future returns, the project is cut off from new financing.

A related literature on venture capital also informs us about how contract structures arise in response to information. For example, Bergemann and Hege (1998) model how the supply of venture capital responds to the arrival of information. They show that the optimal contract is one in which the investor and the entrepreneur share the risks of the venture. The entrepreneur receives a real option, the value of which is determined by the venture capital firms' control of the funds. Their model predicts that higher firm liquidation values result in the use of convertible securities, which are also observed in firm acquisitions in which the buyer is a public firm.

Other studies relate the exit decisions to the contract design in venture capital finance. Bascha and Walz (2001) show that convertible securities are widely used in venture capital finance because they help align the divergent interests of the investor and entrepreneur with respect to the exit timing. Black and Gilson (1998) also shed light on the contractual arrangements between entrepreneurs and venture capital providers. The authors show that firm operators have an implicit option to retake control from investors if they successfully guide the firm to an initial public offering (IPO). The IPO allows the venture capitalist to realize an exit from the firm.

The literature on venture capital investment also informs us about monitoring and board activity. Representation of venture capitalists on firm boards increases when VC firms invest. A venture capitalist is more than twice as likely to serve as a director of a company that is in the same geographic area

as a venture capitalist who requires a flight to reach the firm (Lerner, 1995).

Chapter 3

Empirical Predictions

In this chapter, I explore the mechanisms that can lead to seller financing. I present a framework in which an entrepreneur receives a form of contingent payment, nonrecourse debt collateralized by the assets of the firm being sold, to help mitigate the information asymmetry problem. This framework is useful in understanding the intuition for the empirical predictions tested herein. Further details of the model are provided in Appendix A.

3.1 How Information Asymmetry Impacts Seller Financing

Information asymmetries are likely to affect the sale of the firm in several ways. Relative to prospective buyers, sellers will be better informed about the human capital of the firm and the local market conditions as it pertains to the firm. Further, sellers may have private information about the quality of any firm technology and any intangible brand and reputation effects. In this situation, a lemons problem arises if sellers cannot credibly communicate the firm's prospects (Akerlof, 1970).

In my setting, sellers face a choice between accepting all-cash as pay-

ment at the time of purchase and accepting a partial payment in the form of a note secured by the assets of the selling firm. As illustrated in Figure 1, the note is issued to the seller by the selling firm, and it is secured only by the assets of the firm being sold (i.e. by nonrecourse debt).[1]

Sellers of firms with poor prospects know that their firms are not able to satisfy the debt repayment schedule associated with a higher price, so they choose an all-cash transaction. Sellers of firms with good prospects expect that their firms' cash flows will satisfy the interest and principal obligations from debt financing, so they choose to offer seller financing as a signal of firm quality.[2] Because the seller prefers cash over retaining an investment in the firm, retention of debt is a costly and credible signal (Leland and Pyle, 1977). This intuition suggests several testable implications related to how information asymmetry relates to seller financing.

Prediction 1. *In the presence of information asymmetries, deal structures are more likely to include contingent payment in the form of seller financing.*

Suppose that firms generate two types of cash flow – one part that is verifiable by outsiders and one that is not. The portion of the firm which is

[1]While other outside financing is common in transactions, we know that seller financing is typically junior to any bank financing, consistent with the adverse selection framework.

[2]If the seller accepts a transaction structure with a contingent payment, the value of the contingent payment is dependent on the true values of both the firm and the effort of the buyer. The solution to this moral hazard problem is also a debt contract (Ross, 1977). The two-sided nature of the information asymmetry problem (and more severe information asymmetries) in M&A contrasts with transactions in the real estate industry in which seller financing is less commonly used to mitigate information asymmetry (Garmaise and Moskowitz, 2004).

verifiable could be purchased in cash or with bank financing. That portion of the company in which the cash flows (and assets) are non-verifiable creates an adverse selection problem for the buyer as described above. That remaining portion would require seller financing.

Prediction 2. *When information asymmetries are more severe, the payment consideration will include a greater percentage of seller financing.*

3.2 How Financing Constraints Impact Seller Financing

Buyer wealth and/or liquidity constraints lead to external financing requirements. However, frictions related to information or agency may prevent buyers from securing sufficient financing from a diversified bank or investor to fund the transaction.

It is challenging to disentangle the adverse selection problem between (a) the buyer and seller, and (b) the frictions that the buyer faces in securing financing for the transaction. In either case, we might expect similar empirical predictions that associate seller financing to the firm's information environment. However, if exogenous changes in the supply or cost of outside capital affect seller financing – something that we would not necessarily expect if the information asymmetry problem were limited to the buyer and seller – we cannot rule out capital constraints as an explanation for the use of seller financing. In contrast, if the buyer can overcome the adverse selection problem but has insufficient wealth to finance the transaction and faces frictions in

securing capital for the transaction, we would expect seller financing to play a significant role in supplementing or replacing outside sources of funding.

Prediction 3. *In the presence of information asymmetries, seller financing is more common when risky capital is more costly.*

Prediction 4. *In the presence of information asymmetry, seller financing is less common when other forms of informed capital are more abundant.*

Capital constraints for the buyer may also arise because of collateral value limitations of the firm assets. In case of default, a bank would likely sell the assets of the firm and realize their liquidation value. Tangible assets in the target firm may be expected to be associated with less private information than intangible firm assets. If the target firm has tangible assets, this collateral could be used to support bank financing as senior debt in the capital structure, which may obviate the need for additional seller financing.

Prediction 5. *Firms with more tangible assets will have transactions which include a smaller percentage of seller financing.*

3.3 Risk-Sharing as an Explanation for the Use of Seller Financing

Another explanation for the use of seller financing is that its presence in contracts may simply be a risk-sharing agreement between two risk-averse parties. If this is the case, we would expect to observe seller financing more frequently in transactions in which we expect risk-averse parties to be more

common. If smaller firms are representative of sellers which are more risk-averse, we have the final prediction:

Prediction 6. *Seller financing is more common with smaller target firms.*

Chapter 4

Data Description and Institutional Details

Research on private firms is becoming more important because private firms are an increasingly important component of the overall U.S. economy. They constitute over 99% of all employer firms and 50% of private sector employment. Jensen (1989) has suggested that publicly held firms have outlived their useful life in many sectors of the U.S. economy. New private organizations are more efficient at resolving conflicts between managers and owners. The frequency of leveraged buyouts is increasing, and they resolve the corporate governance problems of debt, management ownership, and compensation. The number of listed U.S. firms has been decreasing over the last 20 years – now half the approximately 8,000 U.S. firms listed in 1996.

4.1 BVR Transaction Data

The transaction database used in this study contains 22,304 private company sales from 1990 to 2014, of which 20,351 transactions include U.S. targets, which are used in the analysis. Business Valuation Resources, LLC (BVR) collected the private-to-private transactions data from members of the International Business Brokers Association (IBBA) and private-to-public

transactions from the Securities and Exchange Commission (SEC) filings for private company acquisitions by public firms. Transaction intermediaries, such as investment bankers and business brokers, pay a subscription fee to access the data to identify comparable transactions and track market-pricing trends. To be included in the database, the acquired firm must be private, and 100% of the firm must be acquired. Transactions are reported via an online form that is screened by staff members for inclusion criteria. Staff members hand-collect other data through direct contact with business intermediaries and investment bankers. Variable definitions are described in Appendix B.

The BVR data provides information on a large number of small transactions. In comparison, between 1980 and 2005, SDC provides data on 18,776 transactions in which the method of payment is disclosed among a sample of 35,727 initial control bids (Betton et al., 2008). Private bidders are involved in 28% of successful transactions in SDC, while 75% of buyers are private in the BVR data. Significantly, 100% of the BVR data involves private targets, while 65% of targets in SDC are private. While the breadth of data between SDC and BVR is comparable, the target-level disclosures are the key difference: 100% of the data in BVR include financial statements on the private targets, while the financials of the target are available in less than 5% of SDC transactions in which the target is private.

The median firm in the BVR data is 12 years old, has $696,000 in revenue, and has a price-to-revenue multiple of 0.53. More than 80% of the firms in the sample are profitable. Revenue represents annual gross revenue, net of

returns, and discounts allowed from the most recent financial statement before closing in the BVR data. The firm price is the total dollar value of consideration paid for the business that was sold. The selling price includes the value of any interest-bearing liabilities assumed and any value afforded the noncompete agreement. However, the price specifically excludes any value afforded to real estate, the earnout, and the employment agreement or consulting agreement.

Hurst and Pugsley (2011) describe the types of firms that are generally found in the BVR data. Small companies in the U.S., like the firms found in the data, serve an existing market with an existing good or service and are owned by individuals that have little desire to grow or innovate. The owners of these firms, motivated by nonpecuniary benefits, generally do not start these firms because of a lack of employment opportunity. Instead, Hurst and Pugsley (2011) find a positive relation between personal wealth and the likelihood of starting a business, because individuals can buy the nonpecuniary benefits of owning a business.

The average firm size of $9.1 million reflects the larger transactions completed by 25% of the sample when the buyer is a public company. The median revenue for firms that were acquired by private buyers is $0.46 million, while the median revenue of firms acquired by public buyers is $11.8 million.

There are other significant differences between the target firms acquired by public buyers and those acquired by private buyers. The median firm acquired by private buyers is older (12.0 years vs. 8.0 years), has higher operating margins (10.1% vs. 4.1%), and has lower asset intensity (0.165

TA/S ratio vs. 0.421). The median private target firm trades at a lower multiple of sales (0.463 vs. 1.17) and EBITDA (3.06 vs, 6.23). For the median private target, Tobin's Q (defined as the ratio of the enterprise value to the book value of the assets) is 1.00, while the public targets have a Tobin's Q of 2.20. While private targets had significantly fewer employees (5 vs. 120 in the median target), the revenue per employee was more similar ($101,000 vs. $139,000 respectively in the median target). Table 1, Panel A shows the summary statistics for the data.

Table 1, Panel B splits the data into two subsamples by transactions that include seller financing. In this private firm subset, 86% of the firms in the sample are profitable. Only 12% of the firms were levered before the transaction. Among these private transactions, 1.4% used an earnout as part of the payment consideration. Of the firms that used seller financing as consideration, seller financing comprised 52.7% of the total consideration on average. Panel B also describes the difference in means test and the difference in median test for transactions that include seller financing versus transactions that did not. The median firm purchased by a private buyer that uses seller financing as consideration is 16 years old, has $1.7 million in revenue, and sells for $1.0 million. Firms that are sold without seller financing as consideration are significantly younger, have less revenue, are more profitable, and sell for a lower price/revenue multiple.

The correlation matrix of the variables is shown in the as Table 4. Most of the correlations of the variables used in this paper are with +/0.15. A few

notable exception is the relation of tangible assets to sales ratios and prices (0.23).

Several other contract terms are observed in the database. Employment agreements were included in the contract terms in 35.7% of the transactions and were relatively more common in transactions in which the buyer was private. Asset purchase agreements were used in over 95% of transactions in which the buyer was private, while public buyers used stock purchase agreements 65%of the time.

The target firms in the sample fall into 79 Standard Industrial Classification (SIC-2) codes and 96 North American Industry Classification System (NAICS-3) codes. The most common industry classifications are business services (13.6%), eating and drinking establishments (12.6%), miscellaneous retailers (6.1%), personal services (5.5%), health services (4.3%), and wholesalers (3.9%). The other industry sectors each constitute less than 3.3% of the total sample of firms.

Approximately 50% of firms in the transaction sample used at least some seller financing as consideration in the transaction, while less than 4% of transactions used an earnout. Figure 3 shows the prevalence and the amount of seller financing in comparison to the use of the earnout.

While it is difficult to determine the comprehensiveness of the sample, interviews with transaction intermediaries suggest it is representative. There is no obvious source of selection bias in the data. Transaction intermediaries

have no obvious reason to avoid the inclusion of some deals over others. For example, including deals with high price-to-sales multiples and omitting deals with low price-to-sales multiples could be used to induce more sellers to list their company for sale. However, it might not helpful to the intermediaries because in equilibrium, buyers would not accept the asking prices of the sellers that are induced to enter the market based on the biased reporting of higher multiples.

I compare the data to PeerComps, another private firm transaction database, which contains only deals that include Small Business Administration (SBA) loan guarantees. I find that the target firms (a) have similar financial characteristics, (b) come from a similar distribution of states, and (c) are similarly distributed across the time series. One noticeable difference is that the firms in the PeerComps database have a slightly different industry distribution, which may be related to the types of firms that are eligible for SBA-funding. The comparison is shown in Table 2.

I provide the following back-of-the-envelope calculation to assess the coverage of private transactions by the BVR database. I start with the Census Bureau figure of 2.35 million U.S. employer firms with sales over $500,000 and the fact that 70% of private firms fail within 10 years (according to the Small Business Development Center). If 25% of the surviving firms are sold and the balance of viable firms are transferred to family, liquidated, or sold to employees, then we have approximately 175,000 salable firms. If the average firm is sold every 10 years, we would expect 17,500 transactions per year,

which suggests that the sample represents approximately 5% of the total.

The database also contains transactions which occured outside the United States. While these transactions are not included in my sample, the 258 Canadian target firms that were acquired by private buyers also provide an interesting comparison to their U.S. counterparts. The Canadian targets were the same age (12), had the same number of employees, (5) were of comparable size (CDN$642,000 vs. US$457,000) and had similar operating margins (9.3% vs. 10.3%). The industry dispersion of the smaller Canadian sample was also comparable to the U.S. sample. The Canadian firms sold for comparable multiples of sales (0.49 vs. 0.46) and EBITDA (4.23 vs. 3.52). Notably, the likelihood that seller financing was used in the transaction was also comparable (46% vs. 48%). The amount of seller financing in a transaction conditional on the use of seller financing was significantly higher in the U.S. sample (43.4% vs. 59.3%).

4.2 Macroeconomic Data

I also connect a variety of macroeconomic data to the transaction data to investigate the impact of the capital constraints on seller financing, including the BofA Merrill Lynch US High Yield Spread, private equity commitments for buyout funds, and Small Business Administration (SBA) loan guarantees.

I obtain state-level private equity commitments for buyout funds and mezzanine debt from the 2015 National Venture Capital Association Yearbook. I calculate state-level private equity commitments for buyout funds and

mezzanine debt as the difference between the reported annual state-level total capital commitments to private equity funds and the venture capital fund commitments from 1990 to 2014. This variable is scaled by the number of households in the state.

I also investigate the impact of local household wealth that could be deployed in local private equity investments using a measure based on household income (Lerner, 1995; Becker, 2007). As a measure of local wealth, I use the percentage of households with incomes greater than $200,000 in a CBSA. Households that are among the top 5% of earners would presumably have greater levels of savings to allocate to risky private equity investments.

USAspending.gov reports on loans and loan guarantees provided by the SBA, via banks, to assist in the acquisition or expansion of an existing business that has revenues in the range of $0.75 million to $38.5 million and fewer than 1,000 employees. This SBA program offers loan guarantees for the purchase of private companies of up to $5.0 million at a typical cost of 350 basis points for the guarantee fee. In my sample, I scale the amount of CBSA-year level financing provided by the SBA as part of the 7(a) loan guarantee program by the number of households in the CBSA.

I also assess the impact of the amount of CBSA-level bank loan originations on seller financing. Bank origination represents the volume of bank originations from banks and thrifts, which are required to report their loans, subject to size requirements (greater than $1B after 2005 and greater than $250M before 2005). Small business loans of up to $1M capture that portion

of the local lending that may affect transactions of the size that dominates the database.

Another measure that could provide insight into the availability of local capital for private equity transactions is the amount of equity that could be used from a home. I calculate the available homestead equity that could be used as collateral for use by prospective buyers in a transaction. I use the difference between median single-family home values within Federal Information Processing Standards (FIPS) areas and state homestead exemption limits as a measure for local capital that could be deployed in private equity investments. The FIPS are then mapped to the CBSA's.

Another control that I use for banking activity is a discrete measure that informs us about the interstate banking restrictions. Using the methodology of Rice and Strahan (2010), states with limitations score one point, while states that are the most open to out-of-state entry score zero points. Points are added to a state's banking regulation score based on the following criteria: (a) imposition of a minimum age of three or more years on the bank target of interstate acquirers, (b) failure to permit de novo interstate branching, (c) failure to permit the acquisition of individual branches by an out-of-state bank, and (d) imposition of a deposit cap of less than 30%.

4.3 Proxies for Information Asymmetry

Since I cannot observe information asymmetries between the parties of an M&A transaction, I use proxies that are motivated by Kohers and Ang

(2000), who provide evidence of a relation between information asymmetries and earnouts. The authors identify large information asymmetries in firms that have high-growth opportunities versus asset in place, firms with low tangible assets, and companies with little or no previously disclosed information.

Buyers that conduct due diligence on a target will generally be able to assess the value of the tangible assets such as accounts receivable, inventory, and vehicles. Thus when a greater portion of the firm value is derived from tangible assets, it may be easier for an outsider to assess the value of the firm than if the firm is comprised of intangible assets. As my first proxy for information asymmetry, I scale tangible assets by revenue to gauge the relative importance of the tangible assets relative to the size of the firm.

Buyers that conduct due diligence on a target firm may have a challenging task in accurately assessing the value of the growth prospects of the firm without the benefit of being an insider in the firm. Fazzari et al. (1987) show that financing constraints are more severe in firms with high Tobins Q in the presence of information asymmetries.

While Tobin's Q assesses the growth prospects relative to the firm's assets, the ratio of present value of the growth opportunities to the enterprise value (PVGO/Price) informs us about the growth prospects of the firm relative to the firm's cash flow. I also calculate the present value of growth opportunities relative to the price of the target firms in the sample. The present value of the growth options-to–price ratio represents the ratio of the difference between (a) the enterprise value (Price) of the firm and the present value of

the expected free cash flow (EBITDA) of the firm and (b) the enterprise value of the firm, based on a discount rate calculated using the unlevered industry betas with an adjustment for size premium and a private company discount rate.[1] The summary statistics inform us that firms with public buyers have a similar PVGO/Price as firms with private buyers.

As an indicator of disclosure level by firms, I use a measure of accounting certification developed by Francis and Gunn (2015) as a proxy for information asymmetry within industries using the American Institute of Certified Public Accountants' (AICPA) Audit and Accounting Practice Guides and the Financial Accounting Standards Board's (FASB) Topic 900. Using the methodology of Francis and Gunn (2015), I define Industry Accounting Complexity as equal to 1 if both the AICPA audit and accounting practice guides as well as the FASB Topic 900 identify the industry of the firm as one with high levels of accounting complexity.[2]

In industries that are high in accounting complexity, using experienced auditors to produce financial statements results in smaller accruals, fewer restatements, and smaller analyst earnings forecast errors. Their measure, which classifies 18 of the 48 Fama-French industries as *complex* if they are included

[1] I use the most recent year's reported EBITDA for the expected free cash flow of the firm. This is discounted using the unlevered industry betas from Damodaran matched for each firm. I use a market risk premium of 8% and the monthly risk free rate from Ken French's website. The discount rate is then adjusted on a firm size discount (Hertzel and Smith, 1993; Berk, 1995). For private buyers, the price of the firm is also adjusted by the private company liquidity discount of 30% (Koeplin et al., 2000).

[2] The following FamaFrench 48 industry categories are identified as such: 1, 7, 11, 11, 18, 26, 27, 29, 30, 31, 32, 34, 35, 40 ,44, 45, 46, 47, and 48.

in the AICPA and/or FASB guide, and it identifies industries with higher within-industry earnings variation and less persistent earnings over time.

Another proxy that may be related to information asymmetries between the buyer and seller relates to the degree of assurance that is provided by the financial statements from the selling firm. The financial accounting literature informs us that corporate disclosures may help reduce information asymmetry through audit services which can increase firm value (Verrecchia, 2001).

Firms that have their financial statements prepared by an independent accountant can choose among three levels of assurance. When a firm receives a compilation, the accountant does not provide any assurance that there are no material modifications that should be made to the financial statements. With a review the accountant provides limited assurance that there are no material modifications that should be made to the financial statements. A financial audit is the highest level of assurance that the financial statements are free of material misstatement that an independent accountant can provide.

Among a comparable sample of private firms, 23% received an audit, 45% received a review, and 32% had compiled financials (Minnis, 2011). Relative to other forms of assurance, an audit improves transparency of the firm which would reduce potential information asymmetries between the parties of an M&A transaction.

This paper uses audit propensity as a proxy for the information asymmetry between buyer and seller. The propensity of a firm to have received a

financial audit as their attestation choice is based on the location of the firm as described in Minnis (2011). This variable measures the likelihood that a private firm has had a financial audit. This measure is affected by regulatory differences across U.S. states, which exogenously affect the use of auditing services by private firms. Factors such as CPA licensure requirements, education requirements, nonprofit audit requirements, and audit requirements regulated at the state level affect the level of the audit propensity index Minnis (2011).

Chapter 5

Empirical Methodology and Results

I present the results in four subsections. I first analyze how proxies related to information asymmetry affect seller financing. Then, I investigate the impact of factors that relate to capital constraints on seller financing. Robustness tests follow in Section 5.3. Finally, I discuss how information frictions may affect the use of the earnout contracts.

5.1 The Impact of Information Asymmetry on Deal Structure

5.1.1 Univariate Tests

I test the adverse selection hypothesis, proposed in the theoretical framework, through a series of univariate and multivariate regressions. Table 3 reports the prevalence of seller financing sorted on the aforementioned proxies for information asymmetry in univariate tests. Firms which have low levels (i.e., below the median) of tangible assets/revenue, have a greater likelihood of seller financing and a greater percentage of seller financing as a percentage of the total consideration. Firms which are above the median in Tobin's Q and PVGO/Price have significantly higher levels of seller financing. Firms that are in industries with high levels of accounting complexity are also more likely

to provide seller financing. These results are consistent with the hypothesis that seller financing helps mitigate adverse selection problems. Due to the similarity in the empirical predictions, I cannot rule out the possibility that the results in Table 3 may be driven by capital constraints for the buyer in acquiring capital to complete the transaction. This concern will be addressed later in this section.

Another way to think about the difficulty in identifying information asymmetries is to consider the environment in which firms are competing. Table 3 reports results on industries that exhibit these characteristics. Firms in industries with higher growth expectations are 4.7% more likely to have seller financing included in the payment consideration, while transaction for firms in industries with lower asset intensity are 4.3% more likely to include seller financing.

5.1.2 Multivariate Tests

Next I test the adverse selection hypothesis by estimating a multivariate logit model of contingent payment choice with controls for a number of determinants of contingent payment. My primary specification is

$$Logit\,(Seller\ Financing_{i,j,\tau}) = \lambda_j + \lambda_\tau + \beta_1 IA_i + \beta_2 X_i + \varepsilon_{i,j,\tau},$$

where i represents the firm, j the firm's industry, and τ the year of the transaction, and IA_i represents the proxies for information asymmetries. The inclusion of controls for revenue (ln) as an independent variable captures the

nonlinearity of firm size. I include operating profit/revenue to control for the profitability of the firm which would be expected to affect the firm's ability to receive external financing. The age of the firm may be an important indicator of the firm life cycle, as more established firms with more stable cash flows are able to sustain greater levels of financing. The indicator variable for public buyer allows us to the distinguish transactions in which the buyer is a public firm.

Table 5 shows evidence consistent with the hypothesis that firms that have higher levels of information asymmetry are more likely to use seller financing. Recall that firms with higher levels of tangible assets/revenue are less likely to use seller financing. At the mean, a one standard deviation increase in tangible assets/revenue results in a 5.1% decrease in the likelihood that seller financing is used. Column 2 in Table 5 shows that a similar increase in firm's levels of Tobin's Q (ln) make it 4.8% more likely to use seller financing as consideration in the sale of the firm. Similarly, a one standard deviation increase in PVGO/Price results in a 13.9% increase in the likelihood that seller financing is used. Firms in industries with higher accounting complexity are 23.3% more likely to provide seller financing.

To provide further economic insights, I also investigate how the amount of seller financing varies with the information asymmetry measures. I find that a one standard deviation change in my measures for information asymmetry increases seller financing by 0.6% for PVGO/Price to 3.1% for Industry Accounting Complexity.

To reduce the likelihood that these proxies are connected to idiosyncratic risks of the firm, I control for a range of factors. Large publicly-traded firms may face comparatively smaller information asymmetry issues in acquisitions. Table 5 shows that public buyers are 33% less likely to use seller financing as a form of payment in the acquisition of a private firm after controlling for the effects of size, age, profitability, and the effects related to information asymmetry. This result is consistent with Graham and Harvey (2001), who show that information considerations typically do not affect the choice of financing in a survey of chief financial officers of public firms.

We observe seller financing in public transactions. For example, in SunCoke Energy Partners' 2015 acquisition of Convent Marine Terminal, $115 million of seller financing was used in the $412 million transaction. However, the less common use of seller financing when the buyer is public may relate to a number of other factors. Seller financing lacks contingency as public firms are able to repay the note irrespective of the performance of the (typically smaller) target firm. Alternatively, public buyers would need to ring-fence the target firm which may limit the synergies between the target and the acquirer. Another reason that seller financing may be less common with public acquirers is that seller financing may interfere with covenants of other debt financing instruments that results from the introduction of seller financing to the buyers' balance sheet. Finally, the firms that are more typically targeted by public firms may have venture capital backing or angel investors as equity holders rather than the concentrated ownership of smaller family-owned firms.

Providing contingent payment to non-active limited partners in the target would not mitigate information asymmetries.

The results in Table 5, Panel A related to the size and age of the firm suggest that there may be other necessary conditions for seller financing to be used as consideration for payment. The results indicate that larger firms, and firms that are in later stages of development, are more likely to use seller financing as consideration. Smaller firms and early-stage companies may lack the cash flows needed to service debt payments, and this suggests that a necessary condition for nonrecourse debt as a contingent payment is that a firm has sufficient operating cash flows to service the debt. While it could be postulated that size and age are proxies for information asymmetry, revenue may be easily verified by an outsider suggesting that the size of the firm may not be a significant factor in the asymmetry of information (Cain et al., 2011). The outcomes of young firms may be similarly opaque to buyers and sellers. Another explanation for why smaller transactions are less likely to use transactions that include contingent payment is that the due diligence cost is high relative to the size of the firm. In a competitive bid situation, all-cash purchases are more common when the costs of conducting due diligence on a target is high (Fishman, 1989).

The specification also includes (a) industry fixed effects to control for any variation among industries in how deals are structured and (b) year fixed effects to isolate cross-sectional variation. Since the FF-48 industry clusters are not completely homogeneous within a grouping, the industry effect may not

be the same for all firms. To account for any correlation of residuals within an industry grouping, I use standard errors that are heteroscedasticity-consistent and clustered at the industry level.

Table 5, Panel B informs us that industries with above-average growth prospects, as measured by Tobin's Q, are more likely to receive seller financing. The table also informs us that transactions for firms that operate in more asset-intensive industries are less likely to receive seller financing. These results provide further support for the adverse selection model.

5.1.3 Instrumental Variable Tests

While the proxies for information asymmetry may provide insight into the level of firm transparency, I cannot observe the actual amount of private information that is hidden from the buyer. The proxies I use for information asymmetry also relate to other characteristics of the firm that may affect the use of seller financing in a transaction. For example, tangible assets/revenue could also be proxy for the ability of the firm to receive outside financing because of the collateral value of the assets. If that is the case, seller financing could simply be a substitute for other forms of financing.

I address several challenges to the identification of the relation between unobserved asymmetric information and seller financing. First, interpretation of the evidence is difficult if the results could be explained by unobserved differences in the financial capacity of the borrower. If firms with larger growth prospects attracted buyers with greater unobserved financing needs, this might

increase the need for seller financing if an investor or bank is unwilling to finance the transaction.

Second, seller financing and price may be jointly determined if seller financing is used to mitigate the adverse selection problem. As a result, the growth proxies for information asymmetry may suffer from simultaneity bias. If seller financing helps mitigate the adverse selection problem, then we might expect the sale price of the firm to be positively related to seller financing when information asymmetries are more severe. If the sale price and the form of financing are determined simultaneously, as they would be in order to create the separating equilibrium, then Tobin's Q and PVGO/Price would be endogenous in the firm-level specifications.

To address the endogeneity concern, I use an instrumental variable constructed by Minnis (2011) based on the attestation choice of private firms. The choice of attestation, which is not available in the BVR data, may be endogenously determined by the seller's desire to reduce information asymmetry in the anticipated sale of the company. In contrast, the instrumental variable relies on regulatory differences, which exogenously affect the supply and demand of auditing services, but this variable is not related to seller financing or to the cost of debt for the firm.[1] Factors such as the Certified Public Accountant (CPA) licensure requirements, education requirements, and firm audit

[1]Firms with intangible assets may be more likely to mitigate the information asymmetry issue because they have stronger incentives to receive a financial audit (Lisowsky and Minnis, 2013). The authors find that ownership change is a strong predictor of receiving audits as sellers attempt to mitigate information asymmetries in equity transactions.

requirements regulated at the state level affect the propensity of a private firm to elect an audit over other forms of attestation. These factors exogenously shift the supply curve of auditing services and by extension the likelihood that a firm will receive a financial audit. Figure 5 shows the state level variation in audit propensity.

Two concerns must be addressed in the use of my instrument. First, my instrument should be sufficiently correlated with the endogenous variable – my proxy for information asymmetry of the firm. The propensity of a firm to have an audit would be expected to be correlated with information asymmetry as firms which have audits are more transparent to third parties. Minnis (2011) finds that forecasted net incomes of firms with audited financial statements are more predictable than those without audits, effectively reducing the information asymmetry between firm insiders and outsiders. Firms in industries with higher accounting complexity face higher audit costs which may be mitigated by an exogenous shock to the cost of audits (Francis and Gunn, 2015).

Second, the instrument must be exogenous. Since the state regulations which affect the audit propensity are exogenously determined we would expect the state audit variable to be uncorrelated with the error term. However, the instrument could be endogenous if the variable is correlated with a state's economic environment in a way that affects the entrepreneurs' decision to sell the firm. For instance, I cannot completely exclude the possibility that the variable is also correlated with state banking regulations that influence the availability of capital for private firm M&A and address this concern in later

tests. Nevertheless Minnis (2011) also provides some evidence to show that the state audit measure is not correlated with a state's banking or overall economic environment.

A further limitation of the audit measure arises in situations in which auditing would not resolve an information asymmetry issue. For example, a high-tech firm with an unproven technology or a bio-tech firm with a blockbuster compound before FDA approval will have significant private information. In neither of these situations would an audit shed much light on the key value driver of the firm.

Table 6 shows the results from a reduced-form regression of seller financing on audit propensity and a 2-stage least squares regression on industry accounting complexity instrumenting with audit propensity. The instrumental variable regression informs us that the industry accounting complexity is a significant predictor of seller financing when using audit propensity as an instrument. The controls in this specification are similar to the previous specification, except I use robust standard errors clustered on the state to account for any correlation of residuals on the proxy variables which does not vary for firms within a state.

A plausible alternative explanation for the existence of seller financing is that the seller places greater value on the firm collateral. In case of default, a bank would likely sell the assets of the firm and realize their liquidation value. In contrast, a seller may simply take over the business and continue to operate the firm which could allow for a greater recovery than a liquidation

of the firm.[2] While I cannot exclude the possibility that collateral values may be affecting the use of seller financing, I am able to provide evidence that is consistent with the hypothesis that information asymmetries are affecting seller financing. The finding that firms with higher tangible asset-to-revenue ratios use less seller financing is consistent with the either hypothesis: collateral values and information asymmetries may be affecting the use of seller financing. However, a reduction in asymmetric information related to the financial statement disclosures would not be expected to affect collateral values for the firm, because the liquidation premium that a seller may have over a bank is unaffected by a reduction in information asymmetry. Hence, audit propensity, which reduces information asymmetries, would not be expected to affect seller financing through the collateral channel.

5.2 The Impact of Capital Constraints

5.2.1 Time Series Tests

In the previous section I provide some direct evidence of information asymmetries by using firm and industry proxies. In this section, I provide indirect evidence of information asymmetries by examining a channel in which these would be expected to manifest: capital constraints. The buyer may be unable to raise the capital required for a cash transaction because the bank faces the same information asymmetry as the buyer in financing the

[2]This contrasts with the used car market in which auction prices determine the collateral value for all lenders.

transaction.[3] We may expect that external sources of finance for the buyer may be more costly, or even unavailable when the buyer is more informed than an investor in the buyer (Myers and Majluf, 1984). In this section, I investigate whether seller financing helps to mitigate these factors.[4]

The literature informs us that small private firms are particularly susceptible to supply-side factors that affect financing (Holmstrom and Tirole, 1997). Small firms that lack collateral are predicted to experience a shortage of financing during a credit crunch in which there is a flight to quality as banks lack the incentives to monitor very small firms (Martos-Vila et al., 2013). I test this hypothesis by observing changes in the amount of seller financing that is used when there are macroeconomic changes in the supply of capital as evidenced by the credit spread. Table 7 shows that when the credit spread is high, sellers provide greater levels of debt financing in the deal structure. This finding is consistent with the hypothesis that seller financing may help mitigate the effects of capital constraints since we would not expect changes in credit spreads to affect adverse selection between the buyer and seller. This result relates to the finding of Harford (2005) who shows that interest rate spreads drive merger activity.

After conditioning for credit spread, the results for the measures prox-

[3]In contrast, seller financing would not be expected to solve a moral hazard problem between the buyer and the bank since seller financing leaves the buyers level of commitment unaffected

[4]To test the effects of capital constraints on seller financing, one would ideally observe the wealth of the buyer to see if external financing requirements are needed for the transaction. However, data limitations preclude this study from observing this information.

ies for information asymmetry are persistent. This result is consistent with the interpretation that seller financing may be solving an adverse selection problem. However, I cannot rule out the possibility that the friction in the transaction is only related to the borrowing constraints of the buyer which may be related to an adverse selection problem between the buyer who seeks funding from a bank or investor.

The findings suggest that higher credit spread may be inducing sellers to provide more financing. My interpretation comes from an equilibrium between (a) an exogenous supply–side shock that is increasing the cost of available capital for private equity transactions and (b) the higher interest rate that induces informed sellers to help finance the transaction.[5]

5.2.2 Cross-sectional Tests

To help address the concern that the changes in seller financing are related to unobserved macroeconomic factors that affect seller financing in the time series, I investigate the cross-sectional effects of changes in the supply of capital. I evaluate whether the availability of private equity capital commitments to buyout and mezzanine debt funds within state–years affects the use of seller financing.

Private equity capital commitments may be a proxy for greater lev-

[5]An alternative explanation for these results is that times of high credit spread may be times of high information asymmetry in the economy. It is plausible that changes in systematic risk increase the amount of private information in firms.

els of locally informed capital that may obviate the need for seller financing. Assuming that local capital providers have information advantages relative to more distant investors, I would expect those factors to reduce the use of seller financing in the transaction (Becker, 2007). Banks may be more willing to providing financing to the transaction if either seller financing or subordinated mezzanine financing is available. Figure 6 illustrates the total private equity capital commitments per household for all states in the 14-year sample period across U.S. states.

Table 8 Panel A reports the results from an ordinary least squares regression on the percentage of seller debt financing. The table informs us that seller financing decreases with increases in private equity capital commitments in state-years and shows that the proxies for information asymmetry are generally unaffected by the introduction of this measure. A 100% increase in the capital commitments per household, results in a 0.2% decrease in the amount of seller financing is in the transaction.

When buyers are party to the asymmetric information related to the target firms' prospects, which may be the case when local capital is informed and abundant, we might expect less seller financing. The finding that private equity capital commitments are related to seller financing provides further support for the hypothesis that seller financing may help relieve capital constraints.

As a further test of this hypothesis, I test whether the concentration of local wealth affects seller financing in Columns 6 and 7. If prospective buyers

are have ample support from local investors, there may be less of a need for seller financing. Local investors would be expected to have lower monitoring costs and decreased sources of information asymmetry related to geography (Lerner, 1995; Coval and Moskowitz, 1999). I use the percentage of households with incomes greater than $200,000 as a proxy for the availability of local investor capital. The controls for firm financials helps exclude alternative explanations that local wealth effects or regional economic demand may be affecting firm demand and profitability. Column 6 shows that a one standard deviation increase in the share of wealthy households results in a 2.5% decrease in seller financing. This evidence provides some support for the hypothesis that capital from private equity firms and local acquisition-minded entrepreneurs may be binding in the transaction market for private firms (Lerner, 1995; Coval and Moskowitz, 1999).

The results from Panel A could be affected by unobservable factors that affect differences in state-level funding. In Panel B, I investigate whether the likelihood and size of seller financing is affected by the existence of SBA 7(a) loan guarantees for the acquisition or expansion of a business. The absence of these loan guarantees may affect the ability of private transactions to be funded.[6] Figure 7 illustrates the household level of SBA loan guarantees by US county from 2007 to 2014. While the data do not allow me to match specific transactions that used SBA financing, I am able to compare SBA funding for

[6]SBA loans are secured by the assets of the firm and by the personal assets of the borrower. Personal guarantees, which include a lien over all personal assets of the principals in the transaction, are also required from the borrower.

the CBSA-year in which the firm transaction occurred, and this allows me to control for state fixed effects. The results in Panel B show that SBA 7(a) loan guarantees appear to partially offset the use of seller financing in private transactions. This finding may be interpreted as further evidence that seller financing may be helping to relax capital constraints in private transactions. A 100% increase in SBA loan guarantees per household, results in a 1.7% decrease in the percentage of total consideration that is seller financing.

The results show that high growth firms continue to rely on seller financing in the presence of SBA loan guarantees. However, tangible assets to revenue is no longer a significant predictor of seller financing when SBA financing guarantees are introduced to the specification. Firms with high levels of collateral may be able to use bank financing backed by loan guarantees in place of seller financing. This finding provides further evidence to support the hypothesis that seller financing may be reducing the frictions between the buyer and a third party source of finance.

Banks are one of the primary sources of external capital for private firms (Berger and Udell, 1998). If a firms' use of seller financing is affected by exogenous changes in the supply of banking capital, we could interpret this as evidence that seller financing may simply be a substitute for other forms of financing that may be unrelated to deal structure. Alternatively, if seller financing does not respond to changes in the supply of bank capital, but does respond to explicit loan guarantees, we could interpret this finding as evidence that seller financing is needed to solve contracting problems. I find that the

number and total volume of bank local origination does not significantly affect the use of seller financing which is shown in Columns 7 and 8. This suggests that my earlier result, related to SBA guarantees, may reflect something other than the volume of bank activity.

SBA loan guarantees could be a measure of banking activity for the types of firms that are in my sample. Increases in lending activity due to increased competition from new entrants could affect the use seller financing. To control for this, I test whether the results of my earlier finding on the relation between SBA (7a) loan guarantees and seller financing is affected by an index of interstate banking restrictions, constructed by Rice and Strahan (2010). Columns 5 and 6 of Panel B inform us that banking restrictions are not a significant predictor of seller financing.

The results in Table 8, Panel A and Panel B suggest that the use of seller financing may help to satisfy buyer capital constraints in the financing of the transaction. As a robustness test, I explore if an exogenous change in the supply of private equity capital, instrumented by the availability of home equity capital, affects the use of seller financing. As an instrument, I use the median home prices at the time of the transaction, adjusted by the homestead exemption of each state which limits the use of home collateral.

Table 9 shows that seller financing supplements the need for scarce equity capital in areas where private equity capital commitments may be binding. The table shows the results from a reduced-form regression of seller financing on homestead collateral and a 2-stage least squares regression on private equity

capital commitments instrumented with homestead collateral. The instrumental variable regression informs us that private equity capital commitments are a significant predictor of seller financing when using homestead collateral as an instrument. The amount of seller financing as a percentage of the transaction decreases by 0.6% for a 100% increase in private equity capital commitments per household-year. These lower levels of seller financing when capital commitments to buyout funds are higher in state-years provides some additional evidence that seller financing may be replacing other forms of locally informed capital (Lerner, 1995; Coval and Moskowitz, 1999).

While this result provides additional evidence of the relation between seller financing and capital constraints it cannot be considered causal because the exclusion restrictions may be violated. For example, suppose that there is a shock to mortgage interest rates in California such that home prices rise. The increase in home prices could feasibly lead to greater bank lending and diversification into local private equity investments.

5.3 Robustness

The results of Table 3 and Table 5 provide some support for the hypothesis that firms with high levels of information asymmetry between the buyer and the seller are more likely to use seller financing as consideration of payment in an M&A transaction. As a robustness test, I use a propensity score matching approach to help mitigate asymptotic biases that arise from endogeneity or non-linearity. The propensity score design allows for the imita-

tion of some characteristics of a randomized controlled trial. My experimental design matches firms that have very similar characteristics and whose acquisitions occurred at nearly the same time, with the exception of the differences in my proxies for information asymmetry. To ensure the validity of the matching procedure I use to find the counterfactual, I use a broad set of characteristics and fixed effects to compute the propensity score. A limitation of this design is that the estimate of the average treatment of the treated (ATT) group may still be confounded by a selection bias from nonrandom assignment between the two groups.

Table 10 shows results from a sample matched by propensity score. Panel A shows the results of the logit regressions used to estimate the propensity scores. The first column in Panel A shows that, in the first stage, I match firms based on their size, profitability, age, industry, year of the sale, an indicator whether the buyer is public, and on their propensity scores. The second column in Panel A includes matching on my proxies for capital constraints – private equity capital commitments, SBA guarantees, and credit spread. The matching procedure also includes tangible assets to revenue, which may be measure for the type of collateral that may be suitable for bank financing. The matching procedure allows us to compare two firms that have similar characteristics, similar collateral that could be used for bank financing, and similar macro-economic conditions that would affect the availability of outside financing.

I compare the average treatment effect on the firms versus the untreated

firms according to propensity scores. This test, shown in Panel B, informs us that firms with higher levels of each of the four proxies for information asymmetry are more likely to use seller financing. I find evidence that firms which are identical, except for their information asymmetry use different levels of seller financing. This finding is consistent with my hypothesis that seller financing may help alleviate the adverse selection problem between the buyer and seller. If my proxies for capital constraints capture the variation in local financing for the transaction, my results will be orthogonal to the financing needs of the buyer. This provides evidence that capital constraints are not the sole explanation for the existence of seller financing.

The results in Table 6 may suffer from a limitation: Audit propensity may be driven by industry exposure. For example, suppose a state is comprised mostly of technology firms, which have a high level of information asymmetry, while another state is comprised mostly of agricultural firms, which have comparatively low levels of information asymmetry. Let us assume that the agricultural state has a high industry audit propensity relative to the high-tech state. Because of the heavy tech exposure in the high-tech state, the state audit propensity measure would indicate that firms in that state are more likely to receive an audit than firms in the agricultural state. This fact introduces noise into my measure. Since state industry composition is not uniform, private firm audit data may be required at the industry level to accurately quantify the limitation. To address this, I use a state-industry-audit measure (M. Minnis, personal correspondence with me, September 9, 2015). Table 11 informs us

that the results of using audit propensity in a reduced–form regression are not statistically different from the findings in Table 6.

Most of the transactions described in the data pertain to firms that have less than $1 million in revenue. I investigate whether the findings are robust in a sub-sample of firms that have revenues over $1 million. For this subsample, the median firm revenue is $4.4 million. Table 12 informs us that seller financing may be used to mitigate both information asymmetry problems and capital constraints in larger private transactions. The finding that seller financing is more common in larger transactions does not provide support for the hypothesis that seller financing is simply a risk-sharing agreement between two risk-averse parties. We would have expected seller financing to be less common in this sample of larger transactions if larger firms are representative of owners who may have more diversified holdings than the owners of smaller firms.

The specifications throughout this paper include Fama-French 48 industry fixed effects to control for any variation among industries in how deals are structured. Firms may be substantially different within one industry which could explain some of the results in the paper. As an additional robustness tests, I show that the use of Fama French 48 industries is not driving the results. The four panels in Table 13 report similar results as Table 6, Table 7 and Table 8 using SIC-2 codes and NAICS-3 industry fixed effects and clustering. The results suggest that the choice of Fama-French fixed effects is not driving the result.

5.4 Earnout Contracts

In this section, I investigate the empirical results from, earnouts, an alternate form of contingent payment and contract structure discussed in the literature.

Earnouts are more commonly used in situations in which the firm has valuable prospects but may lack current cash flows to service debt (i.e., high-tech firms with large growth prospects and comparably large capital investment requirements). I explore whether earnouts may be able to help mitigate the adverse selection problem, which was first shown by Kohers and Ang (2000). I also test if earnouts are less prevalent than seller financing in deal structures in the presence of information asymmetry. I also investigate if the earnout contract is more common when the buyer is a public firm, a situation in which cash flows are observable in public disclosures and audited financial statements.

I test whether earnouts have a similar relation to my proxies for information asymmetry as seller financing. By using my proxies, I find some support for the hypothesis that earnouts help mitigate information asymmetries. Table 14 informs us that earnouts are more common in transactions for high growth firms and less common in states that have high audit propensity. However, unlike seller financing, an abundance of tangible assets in the transaction does not seem to affect the use of earnouts. Similarly, there is no significant relation between accounting complexity and the use of earnouts. My results that the use of earnouts is prevalent in firms with significant growth

prospects is consistent with the findings of Kohers and Ang (2000).

Next I discuss the prevalence of earnout contracts in comparison to seller financing. If we assume that target firm cash flows cannot be verified by a third party, then the buyer cannot commit to payment types that are contingent on the cash flows of the company which limits earnout as a form of payment. To be enforceable, earnout contracts would require costly verification of the firms' performance. In contrast to seller financing in which non-payment triggers a default or change of control, failure to make earnout payments may simply result in a dispute. Verification of a firm's post-transaction financial performance would be less problematic with public firms with financial results that are scrutinized by third-party auditors and analysts. The earnout contract may also be limited in its use, as sellers are exposed to agency issues when the buyer takes control of the firm as manager. I test this in the data.

The summary statistics in Table 1 show that earnout contracts are relatively uncommon (i.e., 3.7% among all transactions, and 1.4% among private buyers) when compared to transactions that involve seller financing as consideration. The relatively more frequent use of the earnout contract in transactions in which the buyer is public provides some evidence that post-transaction information asymmetries may limit the use of earnout contracts.

One interpretation of this result is that seller financing may be more effective at mitigating information asymmetry problems, and earnouts help reduce the risk for buyers in high–growth situations. Buyers and sellers may find that contracting on the earnout is more difficult when compared to the

debt contract, because earnouts require agreement on pre-specified standards and observable financials for the enforcement of the contract – a costly proposition. The lack of use of earnouts may also relate to the inability of the contract to resolve the moral hazard problem of the buyer as efficiently as the debt contract.

Chapter 6

Conclusion

This paper examines how information asymmetries affect deal structures in the sale of privately held firms. Using a simple model in which the deal terms help a seller convey the future prospects of their firm to a prospective buyer, I show that in the presence of information asymmetry, transaction payments are more likely to include seller financing, which is a form of non-recourse debt. Using a novel database of private firm sales, I show that the use of seller financing is predicted by three accounting measures and one industry factor that relates to firm disclosures. My results differ from the prior literature because the private firm setting of the paper avoids the many confounding factors related to the use of stock in public markets that make it difficult to ascertain the true effect of information asymmetry on deal structure (Hansen, 1987; Finnerty et al., 2012).

My results suggest that the market for private firms relies critically on seller financing to help mitigate information asymmetries and to provide liquidity. Seller financing is used in approximately 50% of transactions in which the buyer and seller are private, and this presents an upper bound of $100 billion per year in transactions that rely on this financing. I find that

my measures of capital scarcity – (i.e., credit spread, private equity capital commitments, and SBA financing) – are strong predictors of the use of seller financing. Sellers of private firms appear to supplement the availability of informed capital by accepting seller financing as a form of payment. Relative to banks and other investors, sellers may be ideal holders of firm debt because of their familiarity with the assets and their ability to realize higher liquidation value in case of default. The study also provides evidence that after controlling for capital constraints, more opaque firms are more likely to provide seller financing, and this provides some evidence that information asymmetries may be mitigating the adverse selection problem faced by buyers.

This paper helps improve our overall understanding of information asymmetries in M&A. I also shed new light on the sale of private firms, which is an area generally not well understood by the finance literature despite its importance in the U.S. economy. My empirical finding that sellers are accepting more risk with the debt component of the deal structure is another key contribution of this paper when we consider that sellers are generally individuals or families with under-diversified portfolios.

Tables and Figures

Table 1: **Summary Statistics.** Panel A shows summary statistics for variables used in the paper. Continuous variables have been winsorized at 1% and 99%. Figures are taken from the most recent financial statements before the close of the transaction. The data represent transactions from 1991 to 2014. Panel B shows summary statistics for transactions in which the buyer was a private firm. The data are split for firms which were purchased for cash (seller financing= 0) and firms which had a form of contingent payment (seller financing= 1). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

(Panel A) **Full Sample Summary Statistics**

Variable	**mean**	**sd**	**p25**	**median**	**p75**	**N**
Seller Characteristics:						
Firm Age (Yrs)	15.3	13.4	6	12	21	14,177
Price ($ '000s)	11,600	41,800	125	325	2,255	19,145
Revenue ($ '000s)	9,128	30,100	280	696	2,841	19,143
EBITDA ($ '000s)	636.9	3,100.9	13	61	200	14,984
Operating Profit/Revenue	0.064	0.393	0.010	0.084	0.196	18,804
Tangible Assets/Revenue	0.335	0.469	0.087	0.214	0.407	19,221
Tobin's Q	2.569	4.200	1.000	1.083	2.287	16,903
PVGO/Price	0.842	1.181	0.515	0.876	1.182	14,327
Transaction Characteristics:						
Public Buyer (Ind)	0.248	0.432	0.000	0.000	0.000	19,533
Seller Financing (Ind)	0.497	0.500	0.000	0.000	1.000	19,533
Seller Financing Percentage	0.251	0.330	0.000	0.000	0.488	19,533
Earnout (Ind)	0.037	0.189	0.000	0.000	0.000	19,533
Price/Revenue	1.055	2.415	0.321	0.528	0.901	19,034
Price/EBITDA	5.817	22.586	1.391	3.432	7.877	14,336
Other Factors:						
Credit Spread	0.114	0.057	0.076	0.098	0.133	18,989
PE Buyout Capital/Household	738.1	1725.3	14	97	393	17,973
SBA Financing/Household	186.4	115.0	90	181	254	4,287
% of Households with Income > $200k	0.040	0.024	0.024	0.033	0.048	8,917
Industry Accounting Complexity (Ind)	0.207	0.405	0.000	0.000	0.000	19,533
Audit Propensity	0.203	0.056	0.179	0.188	0.223	17,980

Table 1 (Continued)

(Panel B) **Summary Statistics for Private Firm Buyers**

Private firms	Seller Financing = 0			Seller Financing = 1			Difference	Difference
Variable	mean	sd	median	mean	sd	median	in Mean	in Median
Seller Characteristics:								
Firm Age	14.7	12.8	11.0	16.4	13.6	13.0	1,6***	2,0***
Price ($ '000s)	587	4,604	155	1,028	5,918	248	441***	93***
Revenue ($ '000s)	1,097	4,611	390	1,665	6,950	542	567***	152***
EBITDA ($ '000s)	112	459	49	175	641	59	63***	10***
Op Profit/Revenue	0.130	0.198	0.106	0.123	0.170	0.097	-0.007**	-0.009***
Tangible Assets/Rev	0.254	0.384	0.158	0.246	0.316	0.171	0.007	0.012***
Tobin's Q	1.682	2.498	1.000	2.107	3.166	1.048	0.425***	0.048***
PVGO/Price	0.689	1.013	0.836	0.841	0.810	0.942	0.152***	0.106***
Transaction Characteristics:								
Seller Financing Percentage	0.000	0.000	0.000	0.527	0.290	0.500	0.527***	0.500***
Earnout	0.014	0.117	0.000	0.014	0.119	0.000	0.001	0.000
Price/Revenue	0.550	0.567	0.430	0.617	0.691	0.489	0.067***	0,059***
Price/EBITDA	4.317	17.453	2.565	6.594	21.994	3.549	2.277***	0,984***
Other Factors:								
Credit Spread	0.114	0.057	0.098	0.117	0.062	0.098	0.004***	0.000
PE Commitment/H	663.5	1,708.0	94.8	718.0	1,747.7	92.8	54.5*	-2.0*
SBA Financing/H	188.1	118.0	183.6	180.0	113.3	171.3	-8.1**	-12.3***
% Households > $200k	0.0	0.0	0.0	0.0	0.0	0.0	-0.002***	-0.001***
Ind Acctg Complex	0.2	0.4	0.0	0.2	0.4	0.0	0.020***	0.000***
Audit Propensity	0.211	0.051	0.223	0.202	0.056	0.188	-0.009***	-0.035***

Table 2: **Comparison of Database.** This table presents a comparison of our database to another available database provided by PeerComps. The PeerComps database is compiled from small business loans. Data on key financials, geographic distribution, time series distribution and distributions of transactions by state and industry are reported.

	PeerComps	**BVR**
Financials (Median)		
Price ($000)	872.8	342.3
Price/Sales	0.70	0.54
Net Sales ($000)	1,575.8	732.1
Observations	6,977	16,969
State Distribution		
Top 3 (FL, CA, TX)	37%	44%
Top 5 (add GA, CO)	46%	51%
Top 10 (add AZ, PA, MA, OR, NC)	60%	63%
Time Series Distribution		
2001-2007	60%	46%
Peak Year	11%	9%
2001-2010	77%	68%
Industry Distribution		
Manufacturing	16%	12%
Health Care and Social Assistance	14%	4%
Retail Trade	14%	20%
Professional, Scientific, and Technical Services	13%	5%
Accommodation and Food Services	10%	19%
Other Services (except Public Administration)	8%	14%
Others	25%	26%

Table 3: **Univariate Tests of Seller Financing.** This table reports the prevalence of seller financing sorted on proxies for information asymmetry. For firms below and above the median, the table reports the percentage of transactions which use seller financing (Left) and the unconditioned amount of seller financing that is used in transactions (Right). Results are reported for all firms and a subsample in which the buyer was private. Industries have an indicator of one (1) if the American Institute of Certified Public Accountants' (AICPA) Audit and Accounting Practice Guides and the Financial Accounting Standards Board's (FASB) Topic 900 identify the industry of the firm as one with "high levels of accounting complexity". Industry high growth receives a one (1) if the average Tobin's Q of the industry is above the all industry average. Industry low tangible assets receive a one (1) if the average tangible asset-to-revenue ratio of the industry is above the all-industry average. The table also results at the firm level for the independent variables tangible asset-to-revenue ratio, Tobin's Q (ln), and PVGO/Price ratio. The reported numbers are the percentage of firms which use seller financing. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

	Seller Financing Frequency			**Seller Financing Percentage**		
	Low	High	Diff in Means	Low	High	Diff in Means
Industry Accounting Complexity:						
All Firms	51.25%	54.39%	3.14%***	24.79%	26.32%	1.52%**
Private Buyer	53.08%	57.21%	4.14%***	27.92%	30.73%	2.81%***
Industry High Growth:						
All Firms	46.32%	50.99%	4.67%***	25.86%	23.17%	2.69%***
Private Buyer	53.22%	57.36%	4.13%***	27.74%	31.42%	3.69%***
Industry Low Tangible Assets:						
All Firms	47.13%	51.43%	4.30%***	24.48%	25.53%	1.05%**
Private Buyer	50.36%	56.71%	6.36%***	27.06%	29.47%	2.41%***
Tangible Assets/Revenue:						
All Firms	51.59%	47.85%	-3.73%***	26.86%	23.41%	-3.46%***
Private Buyer	56.19%	52.60%	-3.59%***	29.64%	27.68%	-1.96%***
Tobin's Q:						
All Firms	46.90%	51.82%	4.92%***	22.98%	26.73%	3.75%***
Private Buyer	48.30%	60.04%	11.74%***	23.88%	33.25%	9.37%***
PVGO/Price:						
All Firms	45.98%	51.84%	5.86%***	21.16%	27.40%	6.24%***
Private Buyer	48.57%	57.20%	8.63%***	23.65%	31.24%	7.59%***

Table 4: **Correlation Matrix.** This table reports the correlation of the variables used in the paper.

	Age	Price	Rev	EBITDA	OP/S	TA/S	TobQ	PV/P	Pub	SF	EO	P/S	P/E	YS	PE	SBA	With	Hse	AC
Age	1.00																		
Price	0.05	1.00																	
Revenue	0.14	0.72	1.00																
EBITDA	0.13	0.68	0.63	1.00															
OP/S	0.06	−0.04	−0.03	0.26	1.00														
TA/S	0.00	0.23	0.10	0.08	−0.16	1.00													
Tobin's Q	−0.10	0.08	−0.03	−0.04	−0.06	−0.15	1.00												
PVGO/P	0.00	−0.05	−0.06	−0.23	−0.54	0.10	0.04	1.00											
Public Buyer	−0.09	0.55	0.43	0.19	−0.31	0.24	0.18	0.07	1.00										
Seller Finance	0.05	−0.09	−0.05	−0.05	0.03	−0.04	0.05	0.01	−0.11	1.00									
Earnout	0.01	0.14	0.13	0.03	−0.05	0.05	0.00	0.02	0.21	−0.01	1.00								
Price/Sales	−0.12	0.37	0.06	0.03	−0.27	0.37	0.36	0.07	0.46	−0.05	0.07	1.00							
Price/EBITDA	0.09	0.03	0.03	0.08	0.08	0.00	0.04	−0.04	−0.01	0.03	0.02	0.02	1.00						
Credit Spread	0.04	−0.01	−0.01	−0.01	0.01	−0.03	−0.02	−0.01	−0.01	0.01	0.00	−0.01	−0.06	1.00					
PE Capital/HH	0.06	−0.03	−0.02	−0.04	−0.07	−0.05	0.01	0.01	0.01	0.01	−0.03	−0.02	−0.03	−0.08	1.00				
SBA Fin/HH	−0.05	0.00	0.01	0.00	0.00	−0.08	0.02	−0.02	−0.01	−0.02	−0.02	−0.01	−0.01	0.04	0.18	1.00			
CBSA Wealth	0.02	0.10	0.04	−0.05	−0.14	0.02	0.02	0.03	0.19	−0.06	0.06	0.15	−0.03	0.09	0.49	0.20	1.00		
House Collateral	0.07	0.02	0.00	−0.02	−0.12	0.02	0.02	0.07	0.07	−0.02	−0.01	0.06	−0.07	−0.06	0.44	0.14	0.43		
Accntg Complx	−0.02	0.03	0.06	0.08	0.07	−0.04	0.01	−0.11	0.02	0.02	0.08	−0.04	0.02	−0.02	−0.05	0.01	−0.06	1.00	
Audit	−0.07	−0.01	0.00	0.01	0.04	−0.03	0.01	−0.01	0.00	−0.03	0.02	0.01	0.05	0.08	−0.16	0.00	−0.06	−0.05	1.00

Table 5: **Multivariate Analysis of Proxies for Information Asymmetry.** Panel A reports odds ratios from a logistic regression (Columns 1 to 4) on an indicator variable representing whether the payment consideration in an M&A transaction included seller financing and coefficients from an ordinary least squares regression on the percentage of seller financing (Columns 5 to 8). Controls are included for an indicator variable for firm age (ln years), operating profit-to-revenue ratio, revenue (ln), and whether the buyer was a public firm. Industry (FF-48) and year fixed effects are included. The independent variables are tangible asset-to-revenue ratio, Tobin's Q (ln), present value of growth options to price ratio, and an indicator of one (1) if the firm is from an industry with high accounting complexity. Panel B reports the results from a comparable specification described in Panel A on indicator variables for industries with above average Tobin's Q and on industries with above average tangible asset-to-sales ratio. Reported below the coefficients, in parentheses, are heteroskedasticity-consistent t-statistics, clustered on FF-48 industry. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

(Panel A) **Firm Level Results**

Dep Var:	Logit (Odds Ratio) **Seller Financing Indicator**				OLS **Seller Financing Percentage**			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Proxies for IA:								
Tangible Assets/Revenue	0.891***				-0.0162**			
	(-2.61)				(-2.54)			
Tobin's Q		1.216***				0.0231***		
		(5.50)				(8.62)		
PVGO/Price			1.118**				0.0130**	
			(2.44)				(2.11)	
Industry Acctg Complexity				1.233**				0.0243*
				(2.23)				(1.90)
Controls:								
Public Buyer	0.237***	0.205***	0.224***	0.265***	-0.170***	-0.185***	-0.178***	-0.163***
	(-14.72)	(-15.25)	(-13.07)	(-12.98)	(-13.05)	(-12.43)	(-10.93)	(-13.02)
Firm Age	1.055***	1.072***	1.063***	1.088***	0.0122***	0.0125***	0.0119***	0.0153***
	(3.75)	(6.07)	(5.02)	(3.67)	(4.55)	(6.20)	(4.47)	(4.89)
Operating Profit/Revenue	1.085	1.113	1.232	1.100	-0.0219	-0.0153	-0.00578	-0.0186**
	(1.18)	(1.57)	(1.43)	(1.23)	(-1.63)	(-1.12)	(-0.52)	(-1.99)
Revenue	1.186***	1.173***	1.200***	1.216***	0.00842***	0.00642**	0.00958***	0.0103***
	(7.41)	(6.89)	(8.24)	(7.00)	(2.80)	(2.22)	(3.43)	(4.35)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Clustered Std Errors	FF-48	FF-48	FF-48	FF-48	FF-48	FF-48	FF-48	FF-48
# of Observations	13,609	11,999	10,808	13,645	13,609	11,999	10,808	13,645

Table 5 (Continued)

(Panel B) **Industry Group Results**

	Logit (Odds Ratio) **Seller Financing Indicator**		OLS **Seller Financing Percentage**	
Dep Var:	**(1)**	**(2)**	**(3)**	**(4)**
Industry Groups:				
High Growth	1.209***		1.022***	
	(4.20)		(3.16)	
Asset Intensive		0.841***		0.987**
		(-4.77)		(-2.35)
Controls:				
Public Buyer Indicator	0.248***	0.271***	0.843***	0.851***
	(-15.93)	(-15.42)	(-13.09)	(-12.85)
Firm Age	1.085***	1.079***	1.015***	1.015***
	(3.98)	(3.70)	(4.79)	(4.67)
Operating Profit/Revenue	1.117	1.108	0.983*	0.982*
	(1.60)	(1.48)	(-1.81)	(-1.92)
Revenue	1.223***	1.208***	1.011***	1.010***
	(12.80)	(12.01)	(4.59)	(4.16)
Year FE	Yes	Yes	Yes	Yes
Clusters	FF-48	FF-48	FF-48	FF-48
Observations	13,645	13,645	13,645	13,645

Table 6: **Instrumenting with Propensity for having Audited Financial Statements.** This table reports odds ratios from a logistic regression (Column 1) on an indicator variable representing if a transaction included seller financing and coefficients from an ordinary least squares regression on the percentage of seller financing (column 2). Column 4 and 5 show results from a 2-stage least squares procedure on an (a) indicator variable representing whether the consideration of a purchase of a private firm included seller financing and (b) on the percentage of seller financing. The first stage relationship is reported in Column 3. Audit Propensity is an indicator for the likelihood that a firm has received an audit based on the state of the firm. Controls are included for revenue (ln), firm age (ln years), the operating profit-to-revenue ratio, and the revenue price. Industry (FF-48) and year fixed effect are included. Reported below the coefficients, in parentheses, are heteroskedasticity-consistent t-statistics, clustered at the State level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

	Logit (Odds Ratio)	OLS	1st Stage OLS	2nd Stage LPM	2nd Stage OLS
Dep Var:	Seller Financing Indicator	Seller Financing Percent	Accounting Complexity	Seller Financing Indicator	Seller Financing Percent
Audit Propensity	0.148**	-0.376***	-0.216***		
	(-2.36)	(-2.74)	(-2.90)		
Acctg Complexity (Instrumented)				2.165*	1.832*
				(1.68)	(1.83)
Controls:					
Firm Age	1.036	0.00722**	0.00283	0.00945	0.00528
	(1.42)	(2.04)	(0.81)	(0.86)	(0.61)
Op Profit/Revenue	1.425***	-0.0161	0.117***	-0.153	-0.226
	(3.73)	(-1.11)	(3.69)	(-0.85)	(-1.52)
Revenue	1.267***	0.0144***	0.0185***	0.0200	-0.0182
	(7.56)	(3.56)	(3.61)	(0.82)	(-1.02)
Year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	No	No	No
Clusters	State	State	State	State	State
# of Observations	12,000	12,000	12,000	12,000	12,000
Adj R-squared		0.0640	0.009		
Robust F-Test			8.3925		
Prob > F			0.0628		

Table 7: **Multivariate Analysis of Credit Spread Impact on Seller Financing.** This table reports the results from an ordinary least squares regression on the percentage of seller debt financing. Tangible assets-to-revenue Ratio, Tobin's Q, PVGO/price, industry Accounting complexity, audit propensity as previously described. Credit spread is the difference between AAA and junk bonds for the day of the transaction. Reported below the coefficients, in parentheses, are heteroskedasticity consistent t-statistics clustered as reported. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Dep Var: Seller Financing Percentage	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Capital Constraint:					
Credit Spread	0.162***	0.142***	0.192***	0.170***	0.189***
	(3.26)	(2.81)	(3.76)	(3.54)	(2.97)
Proxies for IA:					
Tangible Assets/Revenue	-0.0132**				
	(-2.13)				
Tobin's Q		0.0361***			
		(9.67)			
PVGO/Price			0.0207***		
			(2.88)		
Industry Acctg Complx				0.0174**	
				(2.43)	
Audit Propensity					-0.504*
					(-1.97)
Controls:					
Public Buyer	-0.165***	-0.187***	-0.165***	-0.156***	-0.164***
	(-13.42)	(-13.48)	(-12.19)	(-13.07)	(-13.25)
Firm Age	0.0105***	0.0111***	0.0107***	0.0145***	0.00655*
	(3.23)	(5.53)	(4.00)	(4.55)	(1.85)
Op Profit/Revenue	-0.0337*	-0.0245	-0.0136	-0.0306***	-0.0265**
	(-2.02)	(-1.54)	(-1.12)	(-3.40)	(-2.26)
Revenue	0.00794**	0.00699**	0.0115***	0.0108***	0.00656
	(2.57)	(2.63)	(4.05)	(4.49)	(1.03)
Industry FE	Yes	Yes	Yes	No	Yes
Clusters	FF-48	FF-48	FF-48	FF-48	State
# of Observations	13,384	11,806	10,640	13,416	13,060

Table 8: **Multivariate Analysis of Capital Constraints and Seller Financing.** This table reports the results an ordinary least squares regression on the percentage of seller debt financing. Tangible assets-to-revenue ratio, Tobin's Q, PVGO/price, industry accounting complexity, and audit propensity as previously described. Panel A reports PE capital commitments per household to buyout funds (ln) by state-year. Local wealth represents the percentage of households with annual income in excess of $200,000. Panel B uses Small Business Association (SBA) Financing per household (ln) is the amount of SBA loan guarantee funding provided to a matched sample by CBSA-year. As additional controls for banking activity, the panel uses interstate banking restrictions (Rice and Strahan, 2010) and the volume of bank originations per household in a CBSA-year. Reported below the coefficients, in parentheses, are heteroskedasticity-consistent t-statistics with errors clustered as reported. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

(Panel A) **Private Equity Buyout Fund Capital Commitments**

Dep Var: Seller Financing Percentage	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
Capital Constraint:							
PE Cap Commit/H	-0.00303**	-0.00201	-0.00225*	-0.00313**	-0.00284**		-0.00272**
	(-2.50)	(-1.57)	(-1.98)	(-2.58)	(-2.51)		(-1.98)
% Household > $200k						-0.855***	-0.628***
						(-4.04)	(-2.82)
Proxies for IA:							
Tangible Assets/Rev	-0.0198						
	(-1.59)						
Tobin's Q		0.0246***					
		(5.72)					
PVGO/Price			0.0128**				
			(2.19)				
Ind Acctg Compl				0.0231**			
				(2.48)			
Audit Propensity					-0.362**	-0.158	-0.158
					(-2.51)	(-1.43)	(-1.46)
Controls:							
Public Buyer	-0.158***	-0.177***	-0.174***	-0.150***	-0.167***	-0.161***	-0.161***
	(-12.54)	(-13.55)	(-12.29)	(-14.53)	(-13.28)	(-8.33)	(-8.36)
Firm Age	0.0115**	0.0115***	0.0114**	0.0145***	0.00896**	0.0135**	0.0138**
	(2.63)	(3.01)	(2.18)	(2.87)	(2.47)	(2.35)	(2.42)
Op Profit/Revenue	-0.0272***	-0.0207**	-0.00678	-0.0238**	-0.0193**	-0.0243**	-0.0246**
	(-2.83)	(-2.23)	(-0.48)	(-2.32)	(-2.03)	(-2.14)	(-2.16)
Revenue	0.00800*	0.00637	0.0100**	0.00987**	0.00801*	0.00136	0.00160
	(1.77)	(1.33)	(2.27)	(2.32)	(1.88)	(0.29)	(0.35)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	No	Yes	Yes	Yes
Cluster	State	State	State	State	State	CBSA	CBSA
# of Observations	13,074	11,676	10,560	13,277	13,277	6,328	6,328

Table 8 (Continued)

(Panel B) **SBA Financing**

Dep Var: Seller Financing Percentage	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Capital Constraint:								
SBA Finance/H	-0.0177**	-0.0172*	-0.0264**	-0.0171*		-0.0201**		-0.0173*
	(-1.98)	(-1.86)	(-2.45)	(-1.91)		(-2.45)		(-1.89)
Banking Restrictions					-0.00848	0.00766		
					(-1.37)	(1.34)		
Bank Originations							-0.00287	0.00154
							(-0.47)	(0.22)
Proxies for IA:								
Tangible Assets/Rev	-0.0115							
	(-0.72)							
Tobin's Q		0.0231***						
		(2.69)						
PVGO/Price			0.0180**					
			(2.06)					
Acctg Complexity				0.0288*	0.0270***	0.0201	0.0294***	0.0288*
				(1.83)	(3.44)	(1.52)	(2.61)	(1.82)
Controls:								
Public Buyer	-0.150***	-0.164***	-0.149***	-0.159***	-0.164***	-0.0966***	-0.196***	-0.159***
	(-6.91)	(-7.43)	(-5.84)	(-8.43)	(-11.85)	(-4.89)	(-14.37)	(-8.44)
Op Profit/Revenue	-0.0311*	-0.0142	0.00575	-0.0145	-0.0364**	-0.0217	-0.0218**	-0.0145
	(-1.71)	(-0.97)	(0.23)	(-0.99)	(-2.54)	(-1.15)	(-2.37)	(-0.99)
Revenue	0.00105	0.00286	0.00764	0.00298	0.00805	-0.00631	0.00317	0.00300
	(0.18)	(0.48)	(1.15)	(0.51)	(1.49)	(-1.44)	(0.81)	(0.51)
State FE	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Industry FE	Yes	Yes	Yes	No	No	No	No	No
Cluster	CBSA	CBSA	CBSA	CBSA	State	State	CBSA	CBSA
# of Observations	3,341	2,784	2,208	3,362	17,222	4,025	8,302	3,362

Table 9: **Instrumenting with Propensity for Homestead Capital.** This table reports odds ratios from an ordinary least squares regression (column 1) and a 2-stage least squares procedure on the percentage of seller financing (column 3). The first stage relationship of median home price (adjusted for the regulatory homestead exemption for each state) on private equity capital commitments per household to buyout funds (ln) by state-year is reported in Column 2. Controls are included for revenue (ln), firm age (ln years), the operating profit-to-revenue ratio, and the revenue (ln). Industry (FF-48) and year fixed effect are included. Reported below the coefficients, in parentheses, are heteroskedasticity-consistent t-statistics, clustered at the State level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

	OLS	1st Stage OLS	2nd Stage LPM
Dep Var:	Seller Financing Indicator	PE Capital Commit	Seller Financing Percent
Homestead Collateral	-0.0167**	2.958***	
	(-2.09)	(6.61)	
PE Cap Commit/Household			-0.00559*
			(-1.94)
Controls:			
Public Buyer Dummy	-0.175***	0.309	-0.172***
	(-8.00)	(0.96)	(-8.16)
Firm	0.0150*	0.0645	0.0163**
	(1.94)	(0.54)	(2.12)
Operating Profit/Revenues	-0.0119	-0.386	-0.0147
	(-1.23)	(-1.50)	(-1.64)
Revenue	0.000840	0.228*	0.00160
	(0.13)	(1.93)	(0.25)
Audit Propensity	-0.187		
	(-1.05)		
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Cluster	State	State	State
# of Observations	4,130	4,130	4,130
Adjusted R-squared	0.039	0.269	0.040
Robust F-Test		43.711	
Prob > F		0.000	

Table 10: **Propensity Score Matching (PSM) for Proxies of Information Asymmetry.** This table shows the results from a propensity score matching (PSM) analysis that compares the information asymmetry proxies for transactions which had seller financing with transactions which did not have seller financing. The matching is performed based on the size, age, profitability of the firm, an indicator if the buyer was public, and propensity scores calculated using the logit regression in Panel A, showing odds ratios and heteroskedasticity-consistent z-statistics. Industry (FF-48) and year fixed effect are included. The second column includes matching on tangible assets to revenue, PE capital commitments per household, SBA financing per household, and credit spread. Matching is performed without replacement using the nearest neighbor technique (1-to-1). The maximum difference between the propensity scores of the treated (seller financing occurred) and the control (no seller financing) is limited to 0.5%. Panel B shows the coefficients for the average treatment effect on the use of seller financing (ATT), with heteroskedasticity consistent t-statistics in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

(Panel A) **Determinants of Transaction**

Dep Var:	**Seller Financing Indicator**	
	1st Stage Logit (Odds Ratio)	1st Stage Logit (Odds Ratio)
Public Buyer Indicator	0.232***	0.548***
	(-15.47)	(-5.45)
Firm Age	1.053***	1.010
	(3.60)	(0.19)
Operating Profit/Revenue	1.098	1.071
	(1.31)	(0.50)
Revenue	1.186***	1.114***
	(7.39)	(2.98)
Tangible Assets/Revenue		0.789***
		(-3.00)
PE Cap Commit/Household		0.993
		(-1.28)
SBA Finance/Household		0.971
		(-0.28)
Credit Spread		1.036
		(0.06)
Year FE	Yes	Yes
Industry FE	Yes	Yes
# of Observations	13,642	3,202

(Panel B) **Treatment Effects**

	T Asset/ Revenue	Tobin's Q	PVGO/Price	Acctg Complex	Audit Propensity	Audit Propensity
Matched Sample, ATT	-0.020***	0.073***	0.054***	0.033***	-0.008***	-0.004***
t-statistic	(-2.80)	(4.95)	(2.75)	(4.37)	(-8.14)	(-1.95)
Matching Rate	73%	72%	75%	73%	74%	82%

Table 11: **Industry-Audit Propensity as Proxy.** This table reports odds ratios from a logistic regression (Column 1) on an indicator variable that represents whether the payment consideration in the purchase of a private firm included seller financing and coefficients from an ordinary least squares regression on the percentage of seller debt financing (Column 2). The data represent transactions in which the buyer was a private firm. Industry-Audit Propensity is an indicator for the likelihood that a firm will have received an audit based on the state and industry of the firm. Controls are included for revenue (ln), firm age (ln years), the operating profit-to-revenue ratio, and the revenue price. Industry (FF-12) and year fixed effects are as indicated. Reported below the coefficients, in parentheses, are heteroskedasticity consistent t-statistics, clustered as reported. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Dep Var:	**Logit (Odds Ratio) Seller Financing Indicator**	**OLS Seller Financing Percentage**
Firm Age	1.046*	0.00952**
	(1.79)	(2.31)
Operating Profit/Revenue	1.428***	-0.0179
	(3.03)	(-0.84)
Revenue	1.262***	0.0137***
	(8.58)	(3.69)
Audit-Industry Propensity	0.292**	-0.243***
	(-2.41)	(-3.58)
Year FE	Yes	Yes
Industry FE	Yes	Yes
Clusters	State-Ind	State-Ind
# of Observations	11,977	11,977

Table 12: **Multivariate Analysis of Proxies for Information Asymmetry firms with revenue > $1 million.** This table reports odds ratios from a logistic regression on an indicator variable representing whether the payment consideration in the purchase of a private firm included seller financing. Controls are included for an indicator variable for firm age (ln years), operating profit-to-revenue ratio, and revenue (ln). Industry (Fama French 48) and year fixed effects are also included. The independent variables tangible asset-to-revenue ratio, Tobin's Q (ln), PVGO/price, industry accounting complexity, and audit propensity are as previously described. The data represents transactions in which the buyer was private and the target had more than $1 million in revenue. Reported below the coefficients, in parentheses, are heteroskedasticity-consistent t-statistics, clustered at the industry level (FF-48). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

	Logit (Odds Ratio) Seller Financing Indicator				
Dep Var:	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Proxies for IA:					
Tangible Assets/Revenue	0.859***				
	(-3.16)				
Tobin's Q		1.261***			
		(3.84)			
PVGO/Price			1.184**		
			(2.35)		
Industry Acctg Complexity				1.464**	
				(2.42)	
Audit Propensity					0.0907**
					(-2.16)
Controls:					
Firm Age	1.033	1.009	1.008	1.049	0.982
	(0.70)	(0.19)	(0.18)	(0.96)	(-0.24)
Operating Profit/Revenue	1.372	1.328	2.564*	1.971**	1.600
	(0.96)	(0.84)	(1.89)	(2.04)	(1.36)
Revenue	1.131**	1.139**	1.144**	1.159***	1.114*
	(2.32)	(2.37)	(2.49)	(3.64)	(1.79)
Year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	No	Yes
Clusters	FF-48	FF-48	FF-48	FF-48	FF-48
# of Observations	3,090	2,817	2,567	3,098	2,966

Table 13: **Robustness Tests with SIC-2 and NAICS-3**

(Panel A) **Multivariate Regression on Audited Financial Statements.** This table reports odds ratios from a logistic regression (column 1 and 3) on an indicator variable representing if a transaction included seller financing and coefficients from an ordinary least squares regression on the percentage of seller financing (column 2 and 4). Audit Propensity is an indicator for the likelihood that a firm has received an audit based on the state of the firm. Controls are included for revenue (ln), firm age (ln years), the operating profit-to-revenue ratio, and the revenue price. Industry and year fixed effect are as indicated. Reported below the coefficients, in parentheses, are heteroskedasticity-consistent t-statistics, clustered at the State level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Dep Var:	Seller Financing Percent	Seller Financing Indicator	Seller Financing Indicator	Seller Financing Percent
Audit Propensity	0.145**	0.687***	0.143**	0.690***
	(-2.40)	(-2.80)	(-2.44)	(-2.78)
Controls:				
Firm Age	1.034	1.007*	1.036	1.007*
	(1.37)	(1.75)	(1.33)	(1.86)
Operating Profit/Revenue	1.405***	0.981	1.411***	0.982
	(3.71)	(-1.31)	(3.88)	(-1.33)
Revenue	1.275***	1.014***	1.276***	1.014***
	(7.57)	(2.77)	(7.65)	(3.16)
Year FE	Yes	Yes	Yes	Yes
Industry FE	SIC-2	SIC-2	NAICS	NAICS
Clusters	State	State	State	State
# of Observation	11,989	12,000	11,982	12,000
Adjusted R-squared		0.065		0.065

Table 13 (Continued)

(Panel B) **Multivariate Analysis of Credit Spread Impact on Seller Financing.** This table reports the results from an ordinary least squares regression on the percentage of seller debt financing. Tangible assets-to-revenue Ratio, Tobin's Q, PVGO/price, industry Accounting complexity, audit propensity as previously described. Credit spread is the difference between AAA and junk bonds for the day of the transaction. Reported below the coefficients, in parentheses, are heteroskedasticity consistent t-statistics clustered as reported. Industry fixed effects are as reported. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Dep Var:	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Capital Constraint:								
Yield Spread	0.160^{***}	0.145^{***}	0.189^{***}	0.191^{***}	0.167^{***}	0.153^{***}	0.199^{***}	0.195^{***}
	(2.85)	(2.79)	(3.23)	(2.84)	(3.42)	(2.97)	(4.08)	(3.06)
Proxies for IA:								
Tangible Assets/Rev	−0.0122				−0.0131			
	(−1.56)				(−1.39)			
Tobin's Q		0.0357^{***}				0.0358^{***}		
		(8.28)				(6.78)		
PVGO/Price			0.0199^{***}				0.0202^{***}	
			(4.14)				(4.41)	
Audit Propensity				-0.500^{*}				-0.501^{**}
				(−1.99)				(−2.05)
Controls:								
Public Buyer	-0.165^{***}	-0.187^{***}	-0.164^{***}	-0.164^{***}	-0.164^{***}	-0.185^{***}	-0.163^{***}	-0.160^{***}
	(−11.04)	(−11.23)	(−11.84)	(−13.50)	(−9.80)	(−11.68)	(−9.82)	(−11.56)
Firm Age	0.00925^{***}	0.00962^{***}	0.0101^{***}	0.00555	0.0101^{***}	0.0105^{***}	0.0105^{***}	0.00620^{*}
	(2.76)	(3.76)	(3.65)	(1.50)	(2.99)	(3.82)	(3.73)	(1.69)
Op Profit/Revenue	-0.0335^{*}	−0.0258	−0.0143	-0.0264^{**}	-0.0317^{*}	−0.0249	−0.0124	-0.0243^{**}
	(−1.96)	(−1.52)	(−1.32)	(−2.19)	(−1.93)	(−1.40)	(−0.94)	(−2.19)
Revenue	0.00661^{**}	0.00558^{*}	0.0106^{***}	0.00518	0.00689	0.00596	0.0110^{**}	0.00547
	(2.15)	(1.91)	(3.41)	(0.73)	(1.40)	(1.31)	(2.08)	(0.85)
Industry FE	SIC	SIC	SIC	SIC	NAICS	NAICS	NAICS	NAICS
Clusters	SIC	SIC	SIC	State	NAICS	NAICS	NAICS	State
# Observations	13,384	11,806	10,640	13,060	13,384	11806	10640	13060
Adj R-squared	0.025	0.035	0.031	0.029	0.025	0.035	0.031	0.029

Table 13 (Continued)

(Panel C) **Private Equity Buyout Fund Capital Commitments with SIC/NAICS.** This table reports the results an ordinary least squares regression on the percentage of seller debt financing. Tangible assets-to-revenue ratio, Tobin's Q, PVGO/price, industry accounting complexity, and audit propensity as previously described. Panel C reports PE capital commitments per household to buyout funds (ln) by state-year. Industry fixed effects are as reported. Reported below the coefficients, in parentheses, are heteroskedasticity-consistent t-statistics with errors clustered as reported. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Dep Var: Seller Financing Percentage	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Capital Constraint:								
PE capital/H	-0.00297**	-0.00192	-0.00223*	-0.00280**	-0.00300**	-0.00190	-0.00226*	-0.00283**
	(-2.47)	(-1.51)	(-1.98)	(-2.48)	(-2.45)	(-1.50)	(-1.99)	(-2.46)
Proxies for IA:								
Tangible Assets/Rev	-0.0183				-0.0181*			
	(-1.52)				(-1.72)			
Tobin's Q		0.0241***				0.0246***		
		(5.72)				(5.73)		
PVGO/Price			0.0122**				0.0126**	
			(2.16)				(2.28)	
Audit Propensity				-0.363**				-0.366**
				(-2.54)				(-2.60)
Controls:								
Public Buyer	-0.161***	-0.180***	-0.175***	-0.169***	-0.157***	-0.176***	-0.172***	-0.165***
	(-12.57)	(-12.92)	(-11.74)	(-13.65)	(-10.20)	(-10.27)	(-9.73)	(-10.94)
Firm Age	0.0106**	0.0104***	0.0112**	0.00818**	0.0112**	0.0110***	0.0113**	0.00872**
	(2.48)	(2.79)	(2.02)	(2.24)	(2.54)	(2.92)	(2.03)	(2.34)
Op Profit/Revenue	-0.0271***	-0.0225**	-0.00720	-0.0199**	-0.0247**	-0.0208**	-0.00554	-0.0176*
	(-2.81)	(-2.46)	(-0.53)	(-2.03)	(-2.60)	(-2.36)	(-0.40)	(-1.88)
Revenue	0.00736	0.00558	0.00969*	0.00719	0.00756	0.00587	0.0101**	0.00748
	(1.42)	(1.06)	(1.85)	(1.46)	(1.60)	(1.19)	(2.10)	(1.65)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	SIC	SIC	SIC	SIC	NAICS	NAICS	NAICS	NAICS
Clusters	State	State	State	State	State	State	State	State
# of Observations	13,247	11,676	10,560	13,277	13,247	11676	10560	13277
Adjusted R-squared	0.059	0.062	0.061	0.062	0.057	0.061	0.060	0.060

Table 13 (Continued)

(Panel D) **SBA Financing with SIC/NAICS.** This table reports the results an ordinary least squares regression on the percentage of seller debt financing. Tangible assets-to-revenue ratio, Tobin's Q, PVGO/price, industry accounting complexity, and audit propensity as previously described. Panel D uses Small Business Association (SBA) Financing per household (ln) which is the amount of SBA loan guarantee funding provided to a matched sample by CBSA-year. Industry and state fixed effects are as reported. Reported below the coefficients, in parentheses, are heteroskedasticity-consistent t-statistics with errors clustered as reported. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Dep Var: Seller Financing Percentage	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Capital Constraint:						
SBA Finance	-0.0157*	-0.0164*	-0.0239**	-0.0177*	-0.0176*	-0.0275**
	(-1.70)	(-1.75)	(-2.18)	(-1.91)	(-1.88)	(-2.49)
Proxies for IA:						
Tangible Assets/Rev	-0.0171			-0.0246		
	(-0.90)			(-1.46)		
Tobin's Q		0.0226**			0.0243***	
		(2.54)			(2.72)	
PVGO/Price			0.0189**			0.0179**
			(2.12)			(2.04)
Controls:						
Public Buyer	-0.153***	-0.171***	-0.158***	-0.160***	-0.183***	-0.164***
	(-6.59)	(-7.11)	(-5.85)	(-6.56)	(-6.69)	(-5.79)
Operating Profit/Rev	-0.0295	-0.0122	0.00712	-0.0268	-0.0144	0.00349
	(-1.57)	(-0.82)	(0.28)	(-1.39)	(-0.91)	(0.13)
Revenue	-0.000444	0.000580	0.00661	0.000966	0.00191	0.00894
	(-0.07)	(0.09)	(0.96)	(0.16)	(0.31)	(1.23)
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	SIC	SIC	SIC	NAICS	NAICS	NAICS
Clusters	CBSA	CBSA	CBSA	CBSA	CBSA	CBSA
# Observations	3,341	2,784	2,208	3,341	2,784	2,208
Adjusted R-squared	0.041	0.053	0.047	0.039	0.054	0.043

Table 14: **Multivariate Analysis of Earnout.** This table reports odds ratios from a logistic regression on an indicator variable representing whether the payment consideration in the purchase of a private firm included an earnout. Controls are included for an indicator variable for firm age (ln years), operating profit-to-revenue ratio, revenue (ln), and if buyer was a public firm (Public Buyer). Industry (Fama French 48) and year fixed effects are also included. The independent variables tangible asset-to-revenue ratio, Tobin's Q (ln), PVGO/price, industry accounting complexity, and audit propensity are as previously described. The data represent transactions for which the buyer was a private firm. Reported below the coefficients, in parentheses, are heteroskedasticity-consistent t-statistics, clustered as reported. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Dep Var: Earnout	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Proxies for IA:					
Tangible Assets/Revenue	0.832				
	(-0.86)				
Tobin's Q		1.309***			
		(2.72)			
PVGO/Price			0.947		
			(-0.45)		
Industry Acctg Complexity				1.038	
				(0.11)	
Audit Propensity					0.0100*
					(-1.72)
Controls:					
Firm Age	1.066	1.065	1.127	1.184	1.026
	(0.69)	(0.64)	(1.30)	(1.59)	(0.22)
Operating Profit/Revenue	0.645	0.549	0.581	0.846	0.938
	(-0.79)	(-1.17)	(-0.52)	(-0.24)	(-0.12)
Revenue	1.647***	1.674***	1.697***	1.798***	1.641***
	(5.00)	(4.39)	(5.26)	(7.23)	(6.78)
Year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	No	Yes
Cluster	FF-48	FF-48	FF-48	FF-48	State
# of Observations	11,759	10,271	9,177	12,055	11,573

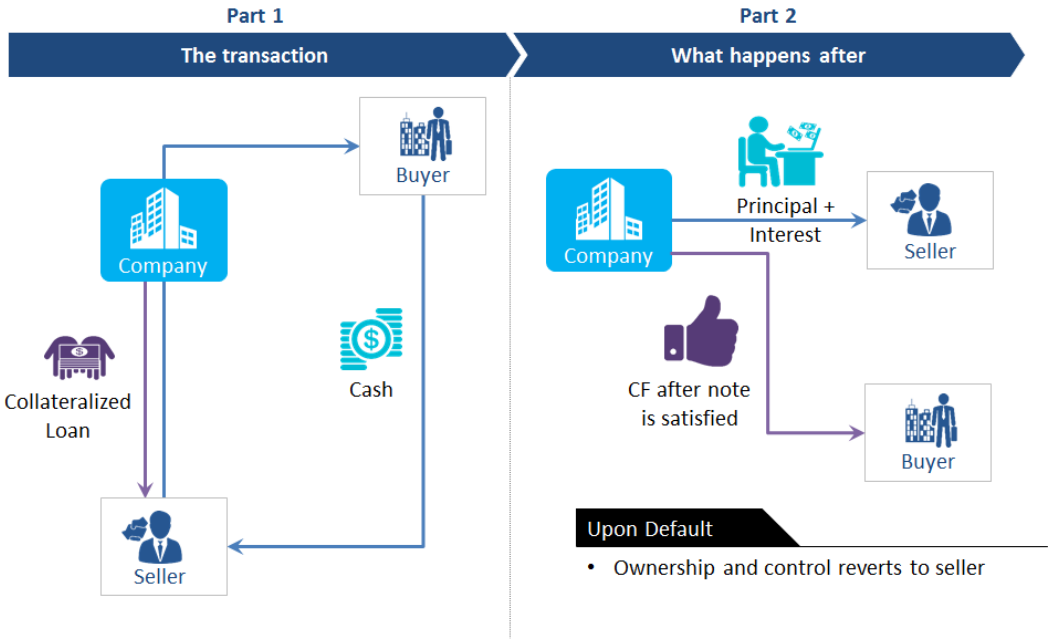

Figure 1: How Seller Financing Works

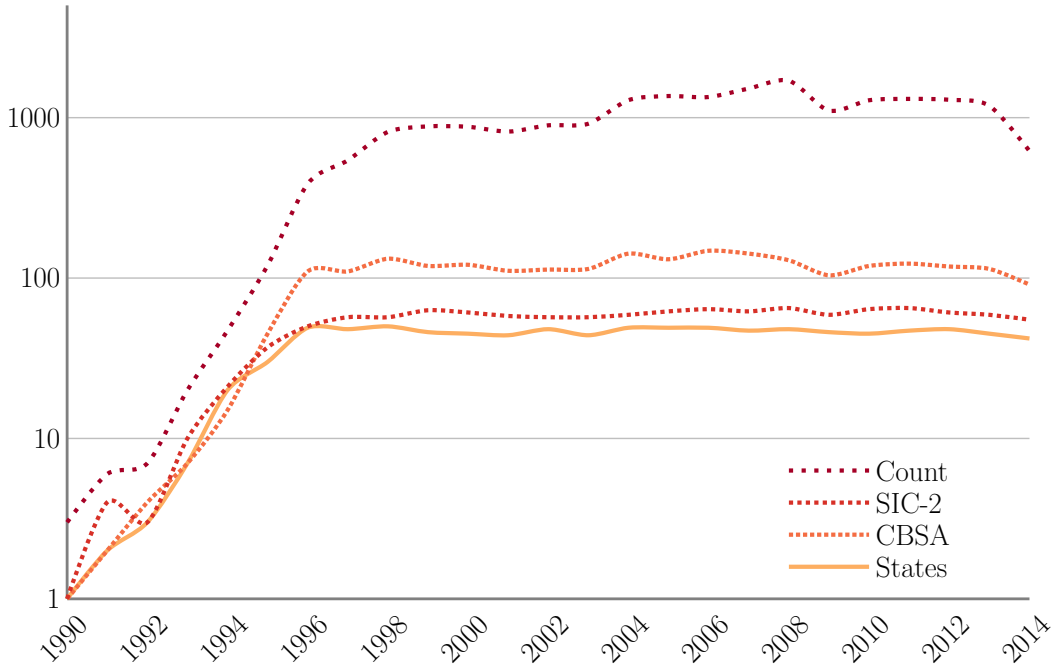

Figure 2: Transaction Histogram. The figure shows the number of transactions (count) and the number of different Standard Industrial Classification (SIC-2) codes, Core-Based Statistical Area's (CBSA) and U.S. States in each year.

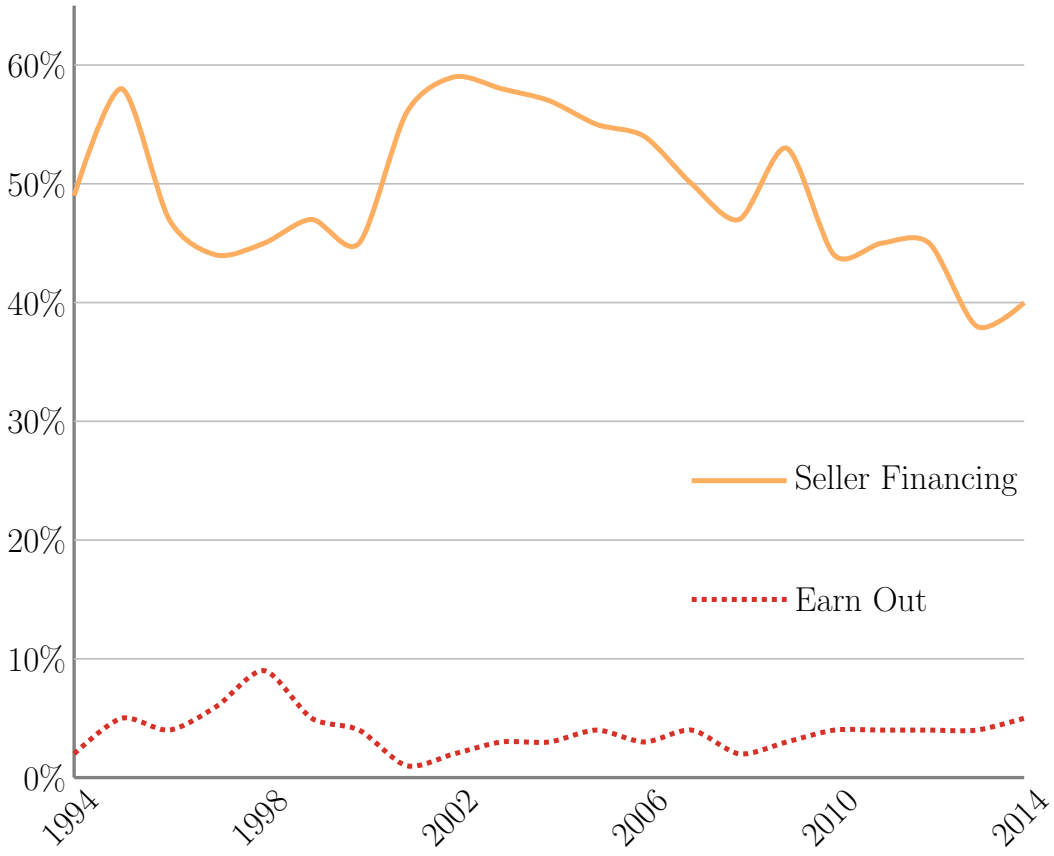

Figure 3: Transaction Contract Term Frequency. The figure shows the percentage of transactions in a given year in which seller financing and earnouts were used.

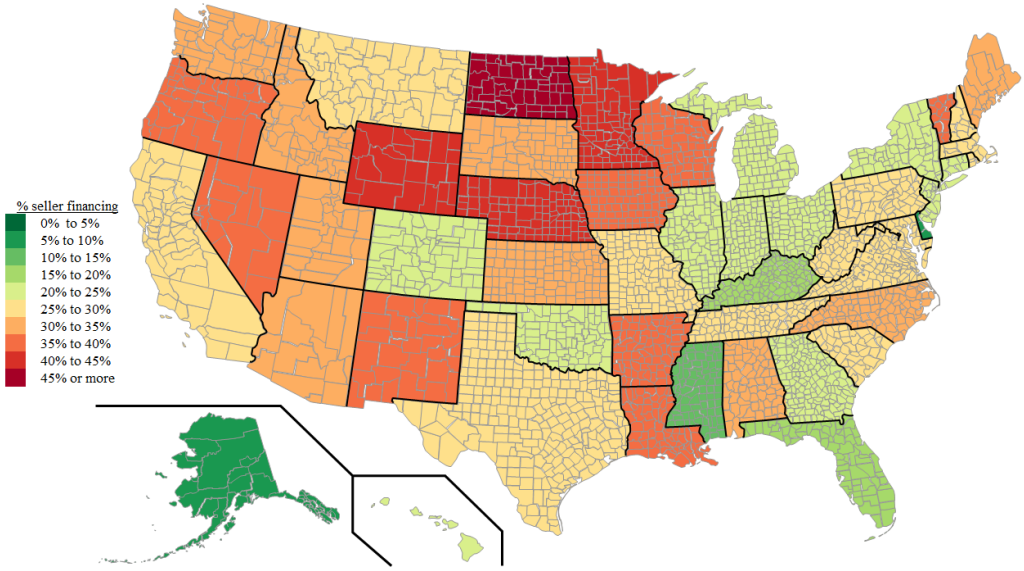

Figure 4: Seller Financing Frequency by U.S. State. This figure shows the percentage of acquisitions of private firms from 1990 to 2014 that used seller financing by U.S. State.

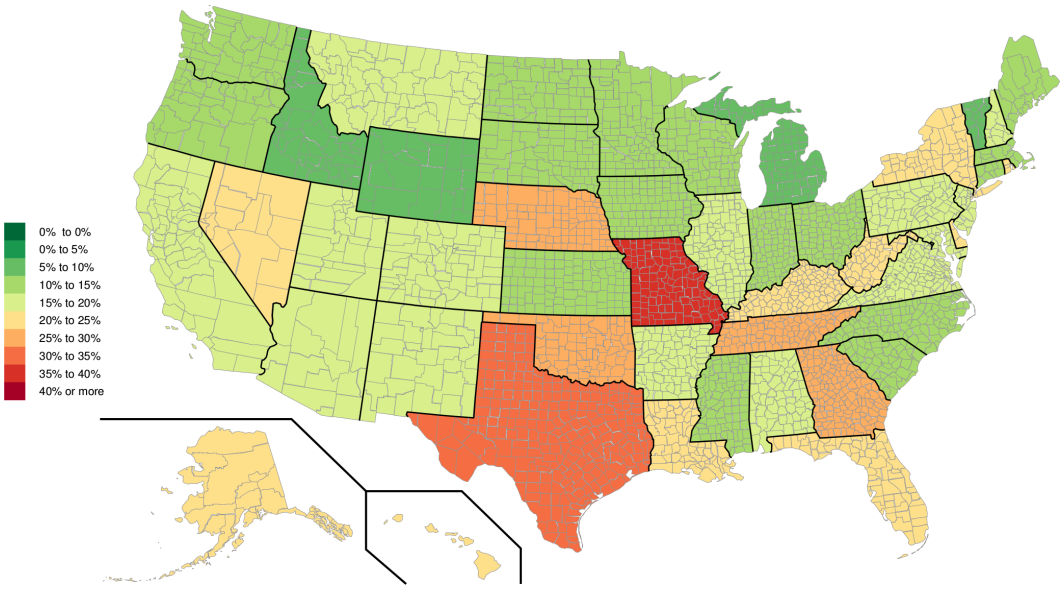

Figure 5: Private Firm Audit Propensity by U.S. state. The percentage of private firms which have financial audits by U.S. state. Source: Minnis (2011)

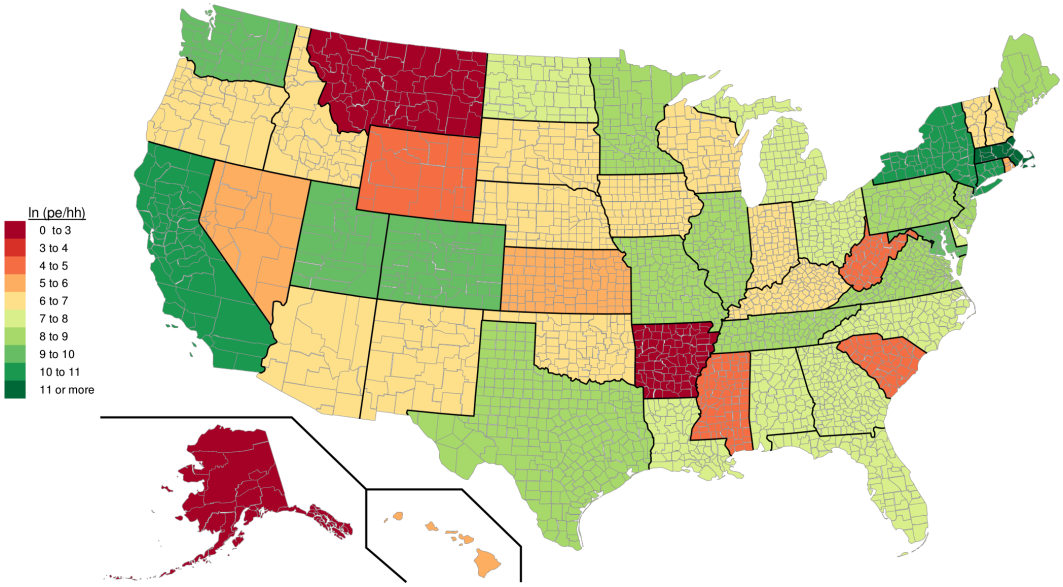

Figure 6: Capital Commitments to Private Equity Buyout Funds by U.S. State. This figure shows the dollars of capital commitments per household (ln) that were committed to U.S. private equity funds dedicated to buyouts and mezzanine debt. The data represents totals for each state from 1990 to 2014. Source: National Venture Capital Association, Thompson Reuters, American Community Survey

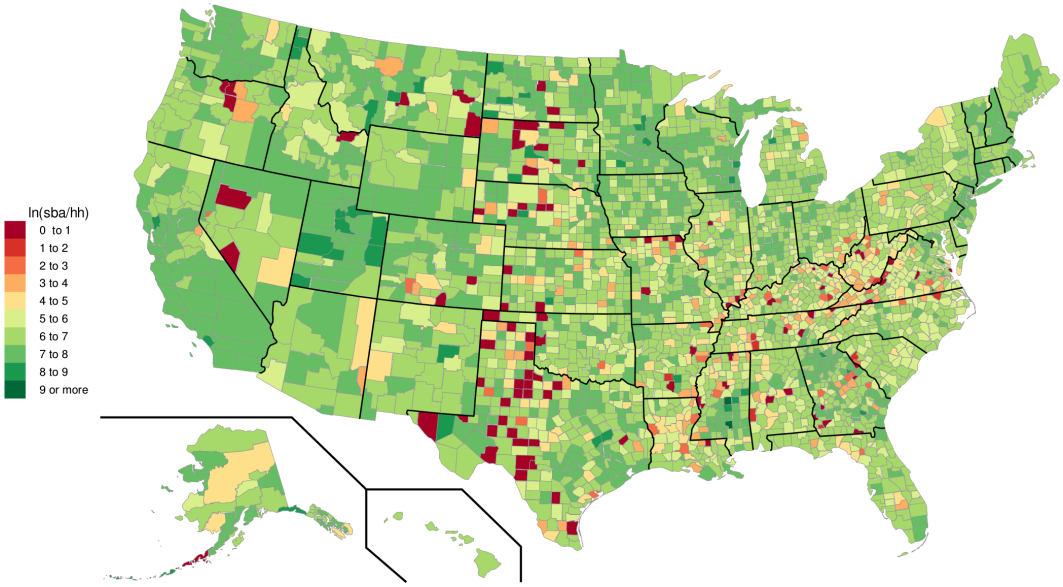

Figure 7: SBA Loan Guarantees by U.S. county. This figure represents the loan guarantees by the U.S. Small Business Association for the purposes of acquisition or expansion of a company with less than 1,000 employees for each U.S. County scaled by households in that county. The data represents totals from 2007 to 2014. Source: USAspending.gov.

Appendices

Appendix A

Theoretical Framework

Since Leland and Pyle (1977), the theoretical literature on information asymmetry in M&A has focused on the trade-off between the use of cash and stock. My framework relates to Ross (1977), who examines the actions and reward of managers who issue debt securities to finance the projects of a firm.

Suppose that an entrepreneur who owns a firm with cash flows described by the linear function $s(v) \in V \in [v_{lo}, v_{hi}]$ is interested in selling the firm. While selling the firm is not a necessity, the entrepreneur ("seller") incurs a private cost $v_{lo} > c > 0$ for retaining an ownership interest.[1] To avoid any further entanglements related to the operation, the sellers would prefer to sell the firm for an all-cash consideration, ceteris paribus. In this market, I assume that there are no transaction costs or tax effects, and the risk-free rate of return is zero. All agents are risk neutral.

There is a pool of equivalent buyers, with access to capital markets, who are competing to purchase the firm. The buyer's valuation function includes the cash flow of the firm, but has no holding cost $c = 0$ for ownership. Before

[1] The holding cost for entrepreneurs may be related to the requirement of personal guarantees on any firm liabilities.

the transaction, only the seller observes the private information about the firm's expected cash flow v_q. The information is revealed to the buyer only after the contemplated acquisition is completed at $t = 1$. Buyers know the private holding cost of the seller and the range of firm values, in which v_{lo} represents that portion of the firm's cash flow that is externally verifiable.

At $t = 0$, the buyers make non-negotiable first-and-final offers for the firm that the seller may accept or decline (Samuelson, 1984). There is no further negotiation. An all-cash transaction may be characterized by a pair (v_q, p) where v_q represents the cash flow of the firm and p is the cash consideration paid by the buyer to the seller.

If sellers are limited to making cash offers, we end up with a lemons problem for firms at an equilibrium price $p = v_{lo} + c$ when prospective buyers cannot distinguish firm types (Akerlof, 1970). The risk-free cash flow of the firm may be financed using senior bank debt $v_{lo} \geq B$, while the balance may be financed using risky equity capital c.

Suppose that the parties can agree to a contract that takes the form $C = [p, d]$ in which p is the cash consideration paid by buyer to seller, and d is a note that is secured only by the assets of the firm being sold (i.e., non-recourse debt).[2] The mechanics of the transaction are such that at $t = 0$, the buyer purchases the firm using financing provided by the seller (i.e., seller financing). As the new owner, the buyer observes at $t = 1$ the cash flows v_q of the firm,

[2]If the debt has additional collateral or is personally guaranteed by the buyer, the contingent nature of the payment would be eliminated.

which is now encumbered by a note to the seller. If the firm fails to make the principal and interest payments to the seller at $t = 1$, the firm incurs a significant bankruptcy cost $b_k > c + e$ arising from the firms' inability to meet the repayment of the note.[3] Since the note to the seller is collateralized by the assets of the firm, the seller receives the assets as a recovery to the default of the note. Because of the bankruptcy cost, the firmnow has residual value of $v_q - b_k$. Figure 1 illustrates the transaction. The payoffs function of the seller and buyer are, respectively:

$$\underset{v}{\text{Max}} S(v) = -v_q + p + \min(d, v_q) + c - E[b_k]$$
$$\underset{v}{\text{Max}} B(v) = E[v_q] - p.$$

Buyers recognize that an all-cash offer will only be accepted by a risk-neutral seller when the consideration is equal to or greater than the value of the firm less the holding cost. The offer of the winning bidder is accepted by the seller such that the buyer pays the true value of the firm ($NPV = 0$).

Proposition 1. *There exists a fully separating equilibrium as a contract design such that (i) the buyer takes control of the firm; (ii) the firm has an obligation to pay a fixed payment d; (iii) the firm incurs a bankruptcy cost $b_k > c + e$ for $c = e$ if firm fails to make the payment; and (iV) the seller has a repossession strategy to take control of the firm, if the firm fails to make the fixed payment*

[3]The relationship between the buyers' equity and the bankruptcy cost may be interpreted as the representations and warranties section of a purchase agreement. Representations by the seller that induce the buyer to invest equity capital in the purchase of the firm could be later disputed.

To prove the proposition, I must check two incentive conditions: the low–cash flow firm does not imitate a high–cash flow firm and a high–cash flow firm does not mimic a low–cash flow firm.

The IR_B constraints must be satisfied in equilibrium to ensure that buyers at least break even in the transaction. Since the seller knows the value of the firm, he would only accept contingent payment offers when there are no losses from trade. To avoid the bankruptcy cost, the seller would avoid contracts in which the firm is unable to make the payment $v_q < d$. A fully revealing equilibrium is

$$S_{lo}(v) \geq S_{lo(q)}(v) = -v_q + p + \min(d, v_q) + c - E[b_k],$$

subject to:

$$\begin{aligned}
&(IR_S) : p \geq v_q - c + b_k \\
&(IR_B) : p \geq \sum_{n=1}^{n} \frac{E[v_q]}{n} \\
&(IC_S) : b_k > c + e, \text{ for } c = e, \text{ and } p = e + B,
\end{aligned}$$

where $S_{lo(q)}$ is the payoff to the low–cash flow firm when imitating the high–cash flow firm. The seller of a high–cash flow firm has an incentive to accept a payment consideration in such a way that seller of the low–cash flow firm v_{lo} finds it suboptimal to accept the same terms. The low–cash flow seller, facing the IC constraint, chooses the all-cash offer over a contingent payment.

In equilibrium we observe cash transactions of $p = v_{lo} + c$ and seller financed transactions $d = v_{hi} - c$ for $c = e$. Seller financing is a feasible signal, since seller financing is costly for all sellers and imposes a cost of bankruptcy on firms with low cash flows which try to pool with firms that have high cash flows. Hence, a contract in which the seller provides nonrecourse debt to finance the transaction, creates a separating equilibrium that helps to mitigate the adverse selection problem that exist in the market for private firms.

The low type firm's problem is trivial. The low type firm is not concerned about distinguishing itself from the high type firm: the high type firm has no incentive to mimic the low type. Further, given the equilibrium choice made by the high type firm, the low–cash flow firm is always worse off imitating the high–cash flow firm compared to the case when if it follows its fully revealing strategy.

As described in Hansen (1987), the use of stock as payment from the surviving firm to finance the purchase only partially solves the adverse selection problem.[4] Transactions in which the buyer is a private firm and accepts illiquid private securities as payment, leaves the seller with the same private cost c thus partially eliminating any gains from trade. This increase in cost leaves sellers who accept stock payments as strictly worse offer than those who accept debt

[4]For publicly traded buyers, the literature suggests that a mix of cash and stock partially solves a double-sided information problem (Hansen, 1987). A convertible security solution has also been proposed as a partial solution, as the debt component deters unskilled buyers from buying the venture because their lack of skill makes the venture more risky (Finnerty et al., 2012). However the equity component of the convertible faces the same issues.

payments as consideration. This is described by

$$S_{sf}(v) > S_{stock}(v) = (-v_q + p + \min(d, v_q) + c - E[b_k]) - (-v_q + p \times [h]),$$

where h is the percentage of shares sold.

Appendix B

Variable Definitions

Audit Propensity: The propensity of a firm to have received a financial audit as their attestation choice based on the location of the firm as described in Minnis (2011). The author provides some evidence that regulatory differences across U.S. states exogenously affect the use of auditing services by private firms. Factors such as the Certified Public Accountant (CPA) licensure requirements, education requirements, non-profit audit requirements, and audit requirements regulated at the state level are explanations for the state level of the audit propensity index. (Source: Michael Minnis, University of Chicago)

Bank Origination: Bank origination represents the volume of bank originations from banks and thrifts which are required to report their loans, subject to size requirements (Greater than $1B after 2005 and greater than $250M before 2005). Small business loans of up to $1M capture that portion of the local lending that may affect transactions of the size that dominates the database. Complete lending information is not available at the local level. (Source: CRA data from the Federal Financial Institutions Examination Council's (FFIEC) Web Site.)

Banking Restrictions: This discrete measure informs us of the Interstate Banking Restrictions. States that are most open to out-of-state entry score zero points, while states with limitations score one point. Points are added to a state's banking regulation score for the following criteria: imposition of a minimum age of three or more years on bank target of interstate acquirers, failure to permit de novo interstate branching, failure to permit the acquisition of individual branches by an out-of-state bank, and imposition of a deposit cap of less than 30 percent.

Credit Spread: Bank of America–Merrill Lynch U.S. High Yield CCC or Below Option-Adjusted Spread matched to the Date of Sale (Source: Federal Reserve Bank of St. Louis).

Date of Sale: The date the transaction was closed (Source: Business Valuation Resources).

Earnout: Equals one (1) if the consideration included a form of contingent payment with pre-specified performance standards (Source: Business Valuation Resources).

EBITDA: Earnings before Interest, Depreciation and Amortization from the most recent financial statement before closing (Source: Business Valuation Resources).

Fama-French Industry: I assign each firm in the transaction database to the Fama French 48-Industry portfolio based on its 4-digit Standard In-

dustrial Classification (SIC) code (Source: Business Valuation Resources; Kenneth French).

Firm Age: Time in years from the date of sale (Source: Business Valuation Resources; author calculation).

House Collateral: Using the difference between median single family home values within Federal Information Processing Standards (FIPS) areas and state homestead exemption limits, I calculate the available homestead equity that could be used as collateral for use by prospective buyers in a transaction in thousands of U.S. dollars. (Source: Zillow; homesteadlaws.uslegal.com, CBSA county crosswalk)

Household Wealth: The percentage of households with incomes greater than $200,000 in a CBSA (Source: American Community Survey of the U.S. Census Bureau).

Industry Accounting Complexity: Equals one (1) if the American Institute of Certified Public Accountants' (AICPA) Audit and Accounting Practice Guides and the Financial Accounting Standards Board's (FASB) Topic 900 identify the industry of the firm as one with 'high levels of accounting complexity'. The following Fama-French 48 industries are identified as such: 1, 7, 11, 11, 18, 26, 27, 29, 30, 31, 32, 34, 35, 40 ,44, 45, 46, 47, and 48 (Source: AICPA Audit and Accounting Practice Guides; FASB Topic 900) .

Industry High Growth: Equals one (1) if the average tobin's Q of the industry is above the all industry average. The following Fama-French 48 industries are identified as such: 6, 7, 12, 13, 15, 17, 19, 20, 21, 24, 29, 30, 31, 32, 33, 36, 38 and 48.

Industry Low Tangible Assets: Equals one (1) if the the average tangible asset-to-sales ratio of the industry is above the all industry average. The following Fama French 48 industries are identified as such: 6, 7, 12, 13, 15, 17, 19, 20, 21, 24, 29, 30, 31, 32, 33, 36, 38 and 48.

Operating Profit/Revenue: Gross profit minus total operating expenses scaled by revenue from the most recent financial statement before closing (Source: Business Valuation Resources).

PE Buyout Capital/Household: State level private equity commitments for buyout funds and mezzanine debt are calculated as the difference between the annual state-level total capital commitments to private equity funds and the venture capital fund commitments from 1990 to 2014. This variable is scaled by the number of households in the state (Source: 2015 National Venture Capital Association Yearbook; U.S. Census Bureau; author calculation).

Pratt's Stats: This online database provides financial details on over 24,000 acquired private companies and contains over 100 data points for most transactions (Source: Business Valuation Resources. Retrieved from www.bvmarketdata.com on January 22, 2015).

Price: Total dollar value of consideration paid for the business which was sold. The selling price include the value of interest-bearing liabilities assumed and any value afforded the non-compete agreement. However, the price specifically excludes: 1) any value afforded the real estate; 2) any value afforded the earnout; and 3) any value afforded the employment agreement or consulting agreement (Source: Business Valuation Resources).

Price/EBITDA: The price of the firm scaled by Earnings before interest, taxes, depreciation and amortization (EBITDA) (Source: author calculation).

Price/Revenue: The price of the firm scaled by revenue (Source: author calculation).

Public Buyer: Equals one (1) if the buyer of the firm is publicly traded (Source: Business Valuation Resources).

PVGO/Price: Present value of growth options to price ratio represents the ratio of the difference between the enterprise value (Price) of the firm and the present value of the expected free cash flow (EBITDA) of the firm to the enterprise value based on a discount rate calculated using the unlevered industry betas with an adjustment for size premium and a private company discount rate (Source: Business Valuation Resources; data website of Aswath Damodaran, Berk (1995); Koeplin et al. (2000); author calculation).

Revenue: Annual gross revenue, net of returns and discounts allowed from the most recent financial statement before closing (Source: Business Valuation Resources).

SBA Financing/Household: The amount of CBSA-year level financing provided by the SBA as part of the 7(a) loan guarantee program scaled by the number of households in the CBSA (Source: USAspending.gov as provided by the U.S. Department of the Treasury and the Office of Management and Budget; U.S. Census Bureau; author calculation).

Seller Financing: Equals one (1) if a portion of the consideration paid was in the form of a promissory note with the assets and/or stock of the firm as collateral (Source: Business Valuation Resources).

Seller Financing Percentage: The percentage of the total consideration for which a note from the firm was used as consideration (Source: Business Valuation Resources).

Tangible Assets/Revenue: Total assets net of any intangibles or other assets scaled by revenue from the most recent financial statement before closing (Source: Business Valuation Resources; author calculation).

Tobin's Q: Ratio of the enterprise value (Price) to the book value of the assets (Source: Business Valuation Resources; author calculation).

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