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The price of corporate liquidity: Acquisition discounts for unlisted targets ☆

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Abstract

This paper documents average acquisition discounts for stand-alone private firms and subsidiaries of other firms (unlisted targets) of 15% to 30% relative to acquisition multiples for comparable publicly traded targets. My results are strongly consistent with the notion that sale prices for unlisted targets are affected by both the need for, and availability of, the liquidity provided by the buyer. Corporate parents are significantly liquidity-constrained prior to the sale of a subsidiary, particularly when the subsidiary is being sold for cash. Furthermore, acquisition discounts are significantly greater when debt capital is relatively more expensive to obtain, and when the parent firm has below-market stock returns in the 12 months prior to the sale.

JEL classifications: G34

Keywords: Liquidity discounts; Marketability discounts; Unlisted targets; Private firms

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1. Introduction

Obtaining and maintaining liquidity can be expensive for corporations and their owners. Publicly traded firms appear to hold larger-than-expected cash balances (Opler, Pinkowitz, Stulz, and Williamson, 1999), and the owners of privately held firms pay considerable costs to access the public pools of liquidity that allow them to diversify their portfolios (i.e., sell shares to the public). Whether because of information disparities between firms and public markets (Myers and Majluf, 1984), unexpected liquidity shortages (Opler, Pinkowitz, Stulz, and Williamson, 1999), or agency conflicts between stockholders and managers (Jensen and Meckling, 1976; Jensen, 1986), firms treat liquidity as a valuable resource. In this paper I investigate the cost of, and need for, accessing liquidity by selling unlisted assets.

Faced with a need for greater liquidity, publicly traded corporations and the owners of privately held firms can raise cash in a variety of ways, all of which entail considerable cost.[1] For instance, there is considerable evidence on the cost to firms of obtaining liquidity through seasoned equity offerings (Smith, 1977, 1986; Loderer, Sheehan, and Kadlec, 1991), sales of blocks of shares to private investors (private placements of public equity—Wruck, 1989), initial public offerings (Ritter, 1987), and on how the cost and availability of borrowing changes with firms' financial conditions (Hickman, 1958; Kaplan and Urwitz, 1979). Considerable evidence also exists concerning control premiums paid in acquisitions of publicly traded firms (e.g., Schwert, 1996; Officer, 2003), where shareholders have a relatively reliable source of liquidity (the public market) to begin with. However, little is known about the cost (i.e., the price discount) of obtaining liquidity by selling a subsidiary or an entire unlisted firm.

Evidence on the costs and benefits of obtaining liquidity by selling unlisted assets is important for at least two reasons. First, the sale of private firms and subsidiaries has become an increasingly important source of liquidity and restructuring for corporations (Table 4 in this paper; also see Bates, 2005), with almost two-thirds of acquisitions reported by the Securities Data Corporation (SDC) being of unlisted targets. This implies that the mergers and acquisitions (M&A) market for unlisted companies is at least as important as the M&A market for listed companies, yet, to date, academics have little to say about prices or premiums/discounts in the M&A market for unlisted targets. Second, acquisitions of unlisted targets, particularly subsidiaries of other firms, provide an ideal experiment in which to test "fire sale" (Shleifer and Vishny, 1992) and liquidity discount theories, because the characteristics of the sellers (public firms) and the sale environment (alternate sources of liquidity) can be measured with some precision at the time of the sale.

This paper describes the level and determinants of multiples paid to acquire unlisted targets, and how these prices vary with the financial performance of the seller and the characteristics of debt and equity markets around the time of the sale. I find that unlisted targets sell at a discount of 15% to 30% on average relative to control-related trades of public firms, and almost 70% of the unlisted targets in my sample are acquired at multiples less than that offered to acquire comparable publicly traded firms. While only 12% of the sample of acquisitions of unlisted firms has enough data to compute the discount relative

[1]For shareholders of publicly traded firms, the liquidity problem is less severe because their shares can be traded with relative ease in public markets. The focus of this paper is the liquidity problem for owners of assets that are not publicly traded, and therefore costly to collateralize or sell.

to multiples paid to acquire comparable publicly traded firms, I show that the data appear to be sufficiently representative to provide robust and generalizable results.

I also find that publicly listed firms that sell unlisted subsidiaries exhibit characteristics that are consistent with liquidity constraints. Specifically, relative to other firms of similar size in the same industry, selling firms have significantly lower cash balances, cash flow, net working capital, bond ratings, and Z-score (Altman, 1968), significantly higher leverage, and significantly negative 12-month abnormal returns leading up to the sale. While the subsidiaries sold are small relative to the selling firms (4% of parent assets on average), the proceeds from the sale are large relative to the parent's pre-sale cash balances (105% of existing cash balances on average). Thus, subsidiary sales appear to ease significant liquidity constraints at the selling firm. The discount for subsidiary sales from the average acquisition multiple for comparable publicly traded firms is strongly related to the parent firm's pre-sale stock return performance, with magnitudes suggesting economically substantial effects. Parent firms sell subsidiaries, especially those in industries that are unrelated to the parent firm's principal line of business, at almost twice the discount following poor return performance (when their need for liquidity is presumably greatest).

The availability of alternate sources of liquidity also impacts the sale price. Specifically, sale multiples are significantly lower relative to comparable multiples for publicly traded targets for both stand-alone private firms and subsidiaries when corporate loan spreads (over the federal funds rate) are high. This evidence is consistent with the notion that sellers obtaining liquidity by selling nontraded assets have to accept significantly higher discounts when the cost of obtaining liquidity from an alternate source (borrowing) is higher.

This setting is clearly one in which information asymmetry between buyers and sellers also affects sale multiples. While information asymmetry is endemic to all mergers or acquisitions, this problem is likely to be most severe in the current empirical setting, in which standards for information disclosure are not as high as for publicly traded firms and information about subsidiaries may be obscured by the parent's financial reporting choices. While advisors for both the buyer and seller work to limit the amount of information asymmetry between the parties, it seems obvious that lower sale multiples in acquisitions of nonpublic targets are at least partly caused by bidders lowering their offer price to protect themselves against the possibility that they are less than fully informed about the business they are acquiring. Acquisition discounts for subsidiaries do appear to be greater when my proxies indicate that there is more information asymmetry about the selling parent, but this effect is statistically and economically marginal. However, information asymmetry is a notoriously difficult construct to measure, and empirical proxies for asymmetric information are naturally imprecise. While I find only weak supporting empirical evidence, information asymmetry effects probably constitute a large fraction of the acquisition discount left unexplained by the liquidity proxies used in this paper.

Measuring acquisition *prices* for unlisted firms is relatively straightforward, as such prices are typically reported by either the seller (when a subsidiary is sold) or the buyer (when a privately held firm is acquired), and recorded in publicly available databases. It is, however, not so straightforward to identify the appropriate metric against which to compare the sale price to infer the premium or discount relative to the fair value of the assets being sold. I overcome this obstacle by comparing acquisition multiples for unlisted

targets to acquisition multiples for portfolios of comparable (industry- and size-matched) publicly traded targets.

The above procedure is different from the traditional comparables method (comparing acquisition multiples for unlisted targets to average trading multiples for all comparable publicly traded firms) that has been used and discussed extensively in the literature (Boatsman and Baskin, 1981; Alford, 1992; Berger and Ofek, 1995; Kaplan and Ruback, 1995; Kim and Ritter, 1999; Gilson, Hotchkiss, and Ruback, 2000). However, weaknesses in the traditional comparables technique (Kaplan and Ruback, 1995; Kim and Ritter, 1999) suggest that comparing unlisted targets to comparable *acquisitions* (as opposed to comparable publicly traded, but nontargeted, firms) provides more powerful evidence on the liquidity discount in acquisitions of unlisted targets. This "comparable industry transaction method" (Kaplan and Ruback, 1995, p.1067) is the approach favored here, as Kaplan and Ruback (1995) find that this technique provides lower average valuation errors in their setting (highly leveraged transactions) than the traditional comparables approach.

The remainder of this paper is organized as follows. Section 2 explains how this research is connected to the existing literature and describes the principal hypotheses. Section 3 provides a description of the data sources and outlines the estimates of acquisition discounts in greater detail. Section 4 provides univariate and multivariate analyses of acquisition discounts, explaining why these discounts vary in both the cross-section and the time series. Section 5 summarizes the findings, and offers conclusions and implications for future research.

2. Related literature and hypotheses

2.1. Related literature

This paper is related to several different strands of the literature. A number of recent papers examine the decision to sell subsidiaries (or major assets). Bates (2005) studies the use of cash generated by subsidiary sales, how firms' investment opportunities and capital structures affect the use to which subsidiary sale proceeds are put, and the market reaction to such decisions. Schlingemann, Stulz, Walkling (2002) (SSW) demonstrates that firms are more likely to divest subsidiaries that are in industries in which there has been a lot of merger and acquisition activity in the recent past, consistent with the notion that firms are likely to sell corporate assets with the most liquid markets. Lang, Poulsen, and Stulz (1995) (LPS) argue (as do I) that firms sell assets to obtain liquidity, and find that firms tend to divest subsidiaries or sell major assets following poor (absolute, not industry-adjusted) performance, and, further, that the market reaction to the sale depends on the intended use of the funds raised. Kim (1998) finds that firms in the contract drilling industry only sell illiquid assets when the costs associated with alternate sources of liquidity are prohibitively high, and, similar to SSW, that firms sell the most liquid assets (oil wells) before choosing to sell the least liquid assets. Brown, James, and Mooradian (1994) examine the stock returns to announcements of asset sales by distressed firms and find significantly lower returns when the proceeds from an asset sale are used to pay down the firm's debt.

While all the above papers study some aspect of the divestiture decision, none examine the pricing of subsidiary sales or how the cost or availability of alternate sources of liquidity affects the price that the owner of an unlisted asset is prepared to accept when

faced with the need for liquidity. The current paper differs from Bates (2005) and SSW (2002) primarily because of my focus on the pricing of subsidiary sales taking the sale as given, as opposed to focusing on the sale decision (SSW, 2002) or the use of funds produced by the sale (Bates, 2005). My study is most similar in spirit to LPS (1995), though it differs from LPS in two important respects: 1) while LPS report the "accounting gain/loss" on subsidiary sales, they do not examine the market pricing of subsidiary sales or provide evidence on how subsidiary sale pricing varies with the cost of alternate sources of financing; 2) while LPS show that parents divesting subsidiaries perform poorly prior to the sale,[2] their performance characteristics are not industry adjusted and they do not consider cash balances and cash flow specifically—in this paper I demonstrate that firms selling substantial assets are liquidity constrained (low cash balance and cash flow) and performing poorly relative to industry- and size-matched peers.

There is also a considerable literature on asset "fire sales." Shleifer and Vishny (1992) describe a model in which sellers of assets are forced to accept discounted prices because negative economic shocks forcing parent firms into fire sales of assets are likely to be correlated across firms in an industry, implying that likely buyers (firms in the same industry as the seller) are also liquidity constrained at the time that sellers want to divest subsidiaries. Shleifer and Vishny use this observation to predict asset fire sales, implying depressed sale prices when financially constrained firms sell assets and a greater likelihood that the assets will be sold to buyers outside the industry (that are not impaired by the common shock). Evidence consistent with Shleifer and Vishny (1992) is reported in Pulvino (1998) (used aircraft), Brown (2000) (real estate investment trusts), and Kruse (2002) (general corporate assets).

With the exception of Pulvino (1998), however, none of these studies examine the issue of pricing in distressed-firm fire sales of assets—Pulvino shows that financially constrained airlines receive lower prices than unconstrained airlines when selling used aircraft, and that financially constrained airlines are more likely to sell to firms outside the aviation industry during market downturns. This study is reasonably similar to Pulvino's, except that my sample is more general and I demonstrate that pricing in both subsidiary sales and sales of private firms is affected by the cost or availability of alternate sources of liquidity for the owners of assets that are not publicly traded.

While the academic literature thus far has little to say on the issue of pricing in direct sales of subsidiaries or private firms, there has been considerable academic interest in recent years in the effect of unlisted acquisitions on *bidder* returns. Indeed, Fuller, Netter, and Stegemoller (2002) show that bidders earn superior returns around the announcement of acquisitions of unlisted targets relative to listed targets, and posit (but do not demonstrate) that this return difference may be attributable to lower acquisition prices or premiums in acquisitions of unlisted targets.

2.2. Hypotheses

The owner(s) of an unlisted firm cannot trade their equity easily: for private stand-alone firms the obvious alternative to selling to another company is to undertake an IPO (Poulsen and Stegemoller, 2005), and for parent firms the alternative to selling to another company is to spin-off the entirety of (or carve out a piece of) the subsidiary into public

[2]See p.12 and Table 2 in Lang, Poulsen, and Stulz (1995).

markets. All of these alternatives entail substantial transaction costs (out-of-pocket costs of offering securities to the public, and any underpricing of the securities sold), and the sale process for unlisted firms can be opaque (Fuller, Netter, and Stegemoller, 2002) and involve significantly fewer competing bids than is observed in sales of publicly traded targets (Table 1, below).

This suggests that unlisted firms will sell at a discount to comparable listed firms in the mergers and acquisitions market at least because of the value of the provision of liquidity from the buyer to the seller. More often than not, especially for sales of subsidiaries by parent firms, payment is made in the form of cash (Table 1, below, but also see Fuller, Netter, and Stegemoller, 2002), which further suggests that acquisitions of unlisted targets are motivated by the sellers' desire for liquidity and that the value of such liquidity should be reflected in the price paid by the buyer. This intuition is formalized in the hypothesis below:

H1: *On average, unlisted targets sell at discount to (or at a lower premium over "fair value" than) comparable listed targets.*

Furthermore, the bargaining position of the owners of an unlisted firm should be affected by their need for liquidity and the availability of alternate sources of liquidity. In other words, if the sale prices of unlisted targets reflect a discount for the liquidity provided by the buyer (H1), then the provision of liquidity should be relatively more valuable both when the seller's need for liquidity is the greatest and when capital market conditions make obtaining liquidity from other sources more difficult. In both cases, the seller's ability to bargain over the sale price is weakened by their need for a sale (Shleifer and Vishny's (1992) fire sales) and/or their inability to pursue alternate (costly) methods of exchanging nontraded shares for either cash or securities that are easier to cash out of. This leads to the following two related hypotheses:

H2a: *Unlisted targets sell at a greater discount to comparable listed targets when the seller's pre-sale financial condition is worse (fire sales).*

H2b: *Unlisted targets sell at a greater discount to comparable listed targets when debt and equity market conditions make alternate sources of liquidity more difficult or costly to obtain.*

H1 concerns the average discount in acquisitions of unlisted targets, but while H1 may be empirically verified in the data, the existence of discounts in the sale of unlisted firms relative to listed firms does not, in itself, have to be because of the value of liquidity provided to the seller(s) by the bidder. While "liquidity discounts" is one natural interpretation of average acquisition discounts for unlisted targets, there are various potential alternative hypotheses. In particular, there is likely to be considerable information asymmetry between buyers and sellers of unlisted corporations. Thus, in addition to representing the "price" of liquidity provided to the seller, acquisition discounts may reflect the unwillingness of buyers to pay too high a premium for assets sold in an opaque information environment such as that which surrounds private companies and subsidiaries. While I do explore the effect of information asymmetry on acquisition

Table 1
Sample statistics

This table contains averages and medians (in parentheses) for a sample of successful and unsuccessful acquisition bids for more than 50% of the equity of both publicly traded and unlisted targets from the SDC Mergers and Acquisitions database for 1979–2003. Bids are included in the sample if the bid has a deal value of more than $50 m and the method of payment is all-cash, all-stock, or a mix of cash and stock. Total assets are reported by SDC for all targets and by Compustat for parent firms for the year prior to the acquisition attempt. Pre-bid market value of equity is measured using data from CRSP 50 days prior to bid announcement. Subsidiary percent of parent assets is the ratio of subsidiary assets (from SDC) to parent assets (from Compustat). Cash from subsidiary sale as % of parent-firm cash balance (truncated) is the ratio of the cash received from the subsidiary sale to the parent-firm's cash balance from Compustat for the year prior to the acquisition attempt, with observations less than 0% and greater than 500% discarded from the sample. Parent abnormal announcement returns are the cumulative difference between parent stock returns and the CRSP value-weighted index over the three-trading-day window centered on bid announcement. Successful is a dummy variable equal to one if the bid is ultimately consummated, and zero otherwise. Cash is a dummy variable equal to one if the bid is all-cash, and zero otherwise. Post-bid competition is a dummy variable equal to one if SDC records another bid for the same target by a different bidder in the six months following bid announcement, and zero otherwise. The numbers in square brackets are the numbers of observations in each subsample. [a] indicates that the mean or median in the Stand-alone or Subsidiary unlisted target category is significantly different from the mean or median in the Publicly traded target category at the 1% level using a two-sided t or Wilcoxon test.

	Publicly traded targets	Unlisted targets	
		Stand-alone	Subsidiary
Target total assets ($m)	2,007.61 (292.55) [4,206]	262.16[a] (52.50)[a] [417]	1,173.39 (255.15)[a] [416]
Parent total assets ($m)			30,108.02 (5,468.70) [2,912]
Parent pre-bid market value of equity ($m)			12,090.22 (2,221.80) [3,144]
Subsidiary percent of parent assets (%)			12.94% (3.95%) [219]
Cash from subsidiary sale as % of parent-firm cash balance (truncated)			104.30% (48.81%) [2,106]
Parent abnormal announcement return $(-1,+1)$			1.92% (0.64%) [3,149]
Successful (0/1)	0.77 [4,559]	0.95[a] [2,829]	0.93[a] [5,328]
Cash (0/1)	0.53 [4,559]	0.60[a] [2,829]	0.94[a] [5,328]
Post-bid competition (0/1)	0.08 [4,559]	0.01[a] [2,829]	0.02[a] [5,328]

discounts later in this paper, proxies for information asymmetry (such as the relative size of the target to the bidder and metrics for growth opportunities at the target firm—see, for example, Hansen, 1987; Martin, 1996) are relatively broad and imprecise, which adversely affects my ability to quantify the extent to which asymmetric information influences acquisition discounts. However, I do control for the method of payment in acquisitions when matching acquisitions of unlisted targets to portfolios of comparable publicly traded targets, and find that this control does not qualitatively influence my results. To the extent that bidders choose equity as a method of payment to mitigate information asymmetry problems (Hansen, 1987), the acquisition discount for unlisted firms is still apparent after controlling for the method of payment.

Several other hypotheses have been suggested in the literature. Bidders in acquisitions of unlisted targets are substantially smaller than bidders acquiring publicly traded firms. If large firms are more likely to experience agency problems leading to empire building and hubris in takeover bidding (Jensen, 1986; Roll, 1986), it is possible that acquisition discounts for unlisted targets reflect "better" bidding activity by smaller firms (Moeller, Schlingemann, and Stulz, 2004) rather than a liquidity discount. Another potential explanation for acquisition discounts is the possibility that unlisted firms are riskier acquisitions than listed firms because of the nature of unlisted firms' businesses (high growth, uncertain prospects, and so on).

While this paper does not offer direct tests of these two alternatives, there are several reasons to expect that acquisition discounts are driven by liquidity rather than bidding firms' agency problems or the nature of the business activities of unlisted firms. Specifically, in untabulated analysis, I find that there is no significant relation between acquisition discounts and bidder size in acquisitions of unlisted firms, despite the fact that bidder size varies considerably in this sample. Furthermore, I compute acquisition discounts by matching acquisitions of unlisted targets to acquisitions of publicly traded firms by industry and size of the target. While the data do not offer any other robust matching variables, matching by industry and size ensures that at least two sources of risk or uncertainty (industry beta and size) that may make unlisted targets different from listed targets are controlled for here.

Furthermore, this paper not only documents the *average* acquisition discount, but also demonstrates how these discounts vary with the *need for liquidity* (H2a) and the *availability of liquidity* (H2b). Thus, the link between liquidity and acquisition discounts is made clearer. While acquisition discounts may reflect factors other than the owner's need for liquidity, the significant relation between acquisition discounts and the need for or availability of liquidity (as hypothesized in H2a and H2b) will imply that acquisition discounts reflect, at least in part, the price of obtaining liquidity by selling an unlisted asset. In the words of Shleifer and Vishny (1992), "illiquidity makes assets cheap."[3]

3. Data and empirical methods

3.1. The sample

My sample of acquisition attempts for both publicly traded and unlisted targets (stand-alone private corporations and subsidiaries of other corporations) comes from the SDC

[3]Shleifer and Vishny (1992, p.1343).

Mergers and Acquisitions database (SDC) from 1979 to 2003. This sample includes successful and unsuccessful bids for at least 50% of the target's equity, conditional on a deal value of at least $50 million, and only includes bids that are all-cash, all-common-stock, or a mix of cash and common stock.[4] The initial sample contains 12,716 bids. However, the empirical tests offered below have greatly reduced sample sizes because in many cases acquisition multiple data from SDC is missing or inaccurate, and this data is critical to inferring the acquisition discount for unlisted targets relative to comparable publicly traded firms.

Table 1 documents the salient features of this sample. Both stand-alone and subsidiary unlisted targets have significantly lower total assets at the median in the year before the acquisition than do publicly traded targets, although the difference is greatly exacerbated for stand-alone private firms (median of $53 million of total assets) versus publicly traded targets (median of $293 million of total assets). Parent firms selling subsidiaries are identified by SDC, and have median pre-bid market value of equity of $2.2 billion, although the much higher mean is evidence of substantial outliers in the distribution. Unfortunately, SDC does not report the total assets of the parent firm, so I obtain parent-firm total asset data by matching parent firms to Compustat. With median total assets of $5.5 billion, parents selling subsidiaries appear to be highly leveraged—the median *book* value of total assets for parent firms in my sample is more than twice the median *market* value of equity. At the median, parents are selling subsidiaries accounting for just 4% of the parent's total assets, although the average of 13% indicates that the sample contains some large subsidiary sales.[5]

While the subsidiaries being sold in this sample are only a small fraction of parent-firm total assets at the median, the infusion of liquidity provided by the subsidiary sale is substantial. Table 1 documents the ratio of the cash from a subsidiary sale as a percentage of the parent firm's pre-sale cash balance, measured from Compustat one year prior to the acquisition bid for the subsidiary. This ratio has an extremely dispersed distribution, with the raw data affected by parent firms with negative or extremely small positive cash balances. The summary statistics for the ratio of cash infusion to cash balance in Table 1 are for a truncated distribution, where ratios smaller than zero or larger than 500% are discarded. In this truncated distribution, the average parent firm in the sample receives cash from the subsidiary sale equal to 105% of their pre-sale cash balance (49% at the median). This suggests that the subsidiary sales in this sample are providing considerable infusions of liquidity for the parent firms.[6]

The average cumulative abnormal return over the bid announcement window for the parents is 1.9%, which is statistically significantly different from zero (test statistic not tabulated). This indicates that, at least on average, the market reacts favorably to the

[4]Bids with debt or preferred securities as compensation types are omitted.

[5]The subsidiary percent of parent assets variable has relatively few observations (220) for two reasons. The first is that SDC does not report total asset data for parent firms, and therefore parent firm accounting data (including the book value of assets) is taken from Compustat. The matching process from SDC to Compustat creates noise and reduces the number of usable observations. The second is that SDC's coverage of accounting data for subsidiary targets is relatively thin, further reducing the sample size. This issue is addressed further below, as it also affects the number of usable premium and acquisition discount observations for subsidiary targets.

[6]While it would be desirable to report statistics on how important the provision of liquidity is to the owner(s) of stand-alone unlisted firms sold in this sample, data on the wealth or portfolios of owners of stand-alone unlisted firms are extremely difficult to obtain.

Table 2
Raw acquisition multiple data from SDC

Price to book value of equity, Price to earnings per share, Deal value to EBITDA, and Deal value to sales are acquisition multiples reported by SDC. In all cases the numerator is a measure of the price offered by the acquirer for the target's equity (i.e., excluding assumed liabilities) and the denominator is an accounting measure from the year prior to the acquisition attempt. The top number is the subsample average, the number in parentheses is the subsample median, and the number in square brackets in the number of observations in the subsample. [a,b,c] indicates that the mean or median in the Stand-alone or Subsidiary unlisted target category is significantly different from the mean or median in the Publicly traded target category at the 1%, 5%, or 10% levels (respectively), using a two-sided t or Wilcoxon test.

	Publicly traded targets	Unlisted targets	
		Stand-alone	Subsidiary
Price to book value of equity	5.48	774.54[a]	40.84[a]
	(2.36)	(5.98)[a]	(2.19)
	[4,046]	[273]	[292]
Price to earnings per share	51.28	90.88[c]	176.22[a]
	(21.40)	(20.30)	(18.30)[a]
	[3,219]	[249]	[283]
Deal value to EBITDA	27.44	272.46[a]	123.87[a]
	(9.94)	(10.75)[a]	(9.26)
	[3,233]	[205]	[195]
Deal value to sales	6.44	309.97[a]	15.38[b]
	(1.58)	(1.85)[a]	(1.05)[a]
	[4,196]	[619]	[1,036]

divestiture of subsidiaries in this sample. In results discussed in later sections of this paper, I find that parent firms selling subsidiaries are significantly liquidity-constrained relative to their peers prior to the sale, and the average positive market reaction to the sale announcement may reflect the fact that, on average, subsidiary sales provide such large liquidity infusions for parent firms. Compared to acquisitions of publicly traded targets, acquisitions of unlisted targets are significantly more likely to be completed successfully (77% of offers for publicly traded targets are successful versus 95% of offers reported by SDC for unlisted stand-alone targets), and, correspondingly, significantly less likely to involve competing bids for the targets (post-bid competition). Furthermore, offers for unlisted targets are significantly more likely to be all-cash offers (as opposed to mixed method of payment or all-stock) than are those for publicly traded targets.

Table 2 contains summary statistics for the acquisition multiple data that are the focus of the analysis in this paper. Four different acquisition multiples reported by SDC are analyzed here—price to book value of equity, price to earnings, deal value to EBITDA, and deal value to sales.[7] Each acquisition multiple is the ratio of a measure of the value offered by the bidder for the target (price per target share or deal value excluding assumed liabilities) divided by a measure from the target's accounting statements for the year prior

[7]SDC reports several additional valuation multiples, for example, deal value to pre-tax income. For brevity, and because the additional variables do not add much texture to the analysis, I omit these variables from this paper. Including these variables results in substantially similar qualitative results as those reported in the remainder of this paper.

to the acquisition attempt (book value of equity per share, earnings per share, total earnings before interest, taxes, and depreciation, or sales).

The raw acquisition multiples described in Table 2 are not particularly interesting in their own right, as differences in acquisition multiples across categories of acquisitions (publicly traded targets or unlisted targets) could simply reflect differences in the type of target in the different categories. For example, while the median price to book value of equity ratio in acquisitions of unlisted stand-alone companies (5.98) is significantly higher than the median of the same metric in acquisitions of publicly traded targets (2.36), this difference could reflect the fact that unlisted targets are young, high growth companies that would command higher market-to-book ratios if they were publicly traded.

However, I present the raw acquisition multiples in Table 2 for two reasons. First, they demonstrate the attrition in the original sample due to lack of data from SDC. For example, while SDC reports 2,829 acquisition attempts for stand-alone private firms in the original sample (Table 1), SDC reports acquisition multiple data for only 10% to 20% of these observations (ranging from 205 in the deal value to EBITDA category to 619 in the deal value to sales category). The fraction of transactions with acquisition multiple data is similar for subsidiary targets. Second, the raw acquisition multiples demonstrate how noisy these data are, with extreme outliers in both tails of the distribution. For example, the average of the price to book value of equity multiple reported by SDC for acquisitions in the stand-alone unlisted target category is 774.54, with a maximum of 167,250 and a minimum of 0.23.[8] While the medians are more reasonable as measures of an inherent market-to-book plus a premium, as the medians are not as affected by the outliers, the raw acquisition multiple data in all categories are clearly problematic. In the next section, I describe how I deal with this issue and in Section 3.3, I demonstrate how the fraction of the sample with "reasonable" data is fairly representative of the full sample reported by SDC.

3.2. Measuring acquisition discounts

It is obviously impractical to measure acquisition premiums using market return or price data in this sample, as neither of these measures are commonly available for unlisted targets. I resolve this issue by using a variant of the Kaplan and Ruback (1995) "comparable industry transaction method" to calculate acquisition discounts.[9] The comparable industry transaction technique is implemented in the following way. For each unlisted target I form portfolios of comparable acquisitions of publicly traded targets from the SDC data, where comparable acquisitions are those for which the publicly traded

[8]Neither the minimum nor the maximum are tabulated.

[9]I also calculate acquisition premiums for unlisted targets using the traditional comparables technique, matching unlisted targets to comparable publicly traded firms by industry and size. These results are omitted here for brevity. While the results of the traditional comparables technique are very similar to those for subsidiary targets reported in this paper, there are several weaknesses to that approach in addition to the concerns noted in the existing literature (Kaplan and Ruback, 1995; Kim and Ritter, 1999). Matching data from SDC to Compustat can be problematic because SIC codes are often assigned differently across financial databases (Kahle and Walkling, 1996). Furthermore, unlisted targets are inherently different from Compustat comparables because unlisted targets are being acquired while very few of the Compustat comparable firms are subject to an acquisition bid. Kaplan and Ruback (1995) find that forming comparable portfolios using firms in the same industry undergoing the *same transaction* (the "comparable industry transaction method" in that paper) results in substantially more precise valuation estimates compared to the traditional comparables technique and performs almost as well as valuation methods using forecasted cash flows (APV).

target is in the same two-digit SIC code as the unlisted target, has deal value excluding assumed liabilities within 20% of the deal value excluding assumed liabilities for the unlisted target (deal value measures are from SDC), and is announced within the three-calendar-year window centered on the announcement of the unlisted acquisition.[10]

Acquisitions of publicly traded firms are allowed to enter multiple comparable portfolios for unlisted targets (i.e., I match with replacement of comparable publicly traded firms). For example, in matching acquisitions of unlisted firms to acquisitions of comparable publicly traded firms using the deal value to sales ratio, the median acquisition of a publicly listed firm is matched to two different acquisitions of unlisted targets, with the 10th percentile being one match and the 90th percentile being six matches. However, 2,357 of the available 4,196 deal value to sales ratios for acquisitions of publicly traded targets (Table 2) are used by the matching procedure, so it is not the case that the matching procedure is picking up only a small subsample of acquisitions of publicly traded targets as comparables. There are 1,150 portfolios of comparables for unlisted targets for the deal value to sales ratio, and the median comparable portfolio of acquisitions of publicly traded targets contains three comparables.

I then compute the acquisition discount as the percent difference between the acquisition multiple (price to book value of equity, price to earnings, deal value to EBITDA, or deal value to sales) for the unlisted target and the average corresponding multiple for the portfolio of comparable publicly listed targets. The acquisition discount is a negative number if the acquisition multiple for the unlisted target is less than the average multiple in acquisitions of comparable publicly traded targets, and positive if the acquisition multiple for the unlisted target is more than the average multiple in acquisitions of comparable publicly traded targets. While the percent difference in multiples is *not* equal to the percent difference in premiums between unlisted and listed targets, under a relatively benign assumption it is a conservative measure of the percent difference in premiums between the two acquisition categories. Some fairly simple algebra (omitted for brevity) demonstrates that as long as premiums in acquisitions of *publicly traded* targets are positive, the percent difference in acquisition *multiples* between listed and unlisted targets will be of the same sign as the percent difference in *premiums* between listed and unlisted targets, but of smaller magnitude. In other words, the percent difference in multiples understates the true difference in premiums between unlisted targets and comparable acquisitions of publicly traded targets while reducing the noise associated with merging SDC data to Compustat.

Table 3 reports descriptive statistics for the acquisition discount computed separately for each multiple reported by SDC (price to book value of equity, price to earnings, deal value to EBITDA, and deal value to sales) and for the per-target average of these acquisition discounts. Noise in the acquisition multiples data from SDC produces extreme outliers in the right-hand tail, and I discard observations for which the percent difference in multiples between that reported for the unlisted target and the average for the portfolio of

[10]I thank an anonymous referee for suggesting a window centered on bid announcement. Prior versions of this paper employed a window that captured comparable multiples only for announced acquisitions of publicly traded targets that occurred in the three years prior to the acquisition of an unlisted target firm. While some results changed with the change in the window for comparables, none of the important results in this paper are affected by shifting the window for comparables around the announcement date. I discuss the results that did change in footnote 19.

Table 3
Estimates of acquisition discounts for unlisted targets

This table contains means and medians (in parentheses) of estimates of acquisition discounts for the sample of acquisition attempts for unlisted targets over the 1979–2003 period. Acquisition discounts are the percent difference between acquisition multiples (price to book equity, price to earnings, deal value to EBITDA, or deal value to sales) for an unlisted firm and the average multiple for industry- and size-matched comparable acquisitions of publicly traded targets. The portfolio of comparable acquisitions for each unlisted target is all acquisitions of publicly traded targets in the same two-digit SIC code as the unlisted target with deal value excluding assumed liabilities (from SDC) within 20% of deal value excluding assumed liabilities for the unlisted target and occurring within a three-year window centered on the acquisition announcement for the unlisted target. Because of outliers in acquisition multiple data, the acquisition discount estimates are truncated: estimates larger than one are discarded from the sample (to be symmetric with the implicit lower bound of −1). The average acquisition discount is the per-target equally weighted average of the acquisition discounts computed using the four separate multiples reported by SDC. The numbers in square brackets are the numbers of observations in each subsample. ***, **, * indicates that the mean or median is significantly different from zero at the 1%, 5%, or 10% levels (respectively), using a two-sided t or Wilcoxon test.

	Unlisted targets	
Premium metric	Stand-alone	Subsidiary
Excess price to book value of equity	0.1561^{***} $(0.1522)^{***}$ [106]	-0.2747^{***} $(-0.3518)^{***}$ [145]
Excess price to earnings per share	-0.2285^{***} $(-0.2782)^{***}$ [148]	-0.2890^{***} $(-0.3803)^{***}$ [136]
Excess deal value to EBITDA	-0.1718^{***} $(-0.2014)^{***}$ [111]	-0.2691^{***} $(-0.3507)^{***}$ [107]
Excess deal value to sales	-0.1815^{***} $(-0.1872)^{***}$ [308]	-0.2999^{***} $(-0.4091)^{***}$ [590]
Average acquisition discount	-0.1728^{***} $(-0.1951)^{***}$ [364]	-0.2831^{***} $(-0.3595)^{***}$ [643]

comparable acquisitions is greater than +1. While this bound is arbitrary, it seems sensible to discard observations that suggest more than a 100% difference between the multiples in acquisitions of unlisted and listed targets.[11]

Almost every multiple displayed in Table 3 produces significantly negative estimates of the average and median acquisition discount for both stand-alone private firms and subsidiaries. The sole exception is that of the estimates of the acquisition discount for stand-alone private firms using the acquisition price to book value of equity multiple—in that case, the percent difference in acquisition multiples between stand-alone unlisted targets and portfolios of comparable acquisitions of publicly traded firms has a

[11]The upper bound can be increased to +2 without qualitatively affecting most of the results, but the upper bound of +1 is symmetric with the implicit lower bound of −1, and, given the conservative nature of the percent difference in multiples estimates, the upper bound of +1 allows for significantly more than 100% difference in premiums.

significantly positive mean and median. That exception aside, the bulk of the evidence in Table 3 suggests that both stand-alone private targets and targets that are subsidiaries of other firms are acquired at significantly lower multiples on average (and at the median) than are comparable publicly traded firms.

The last row in Table 3 presents descriptive statistics for the equally weighted average for each unlisted target of the acquisition discount estimates; I refer to this equally weighted average of the estimates produced by the individual multiples as the *acquisition discount* in the remainder of this paper. The acquisition discount averages −17% for stand-alone private firms (−20% at the median, 65% of the estimates are negative) and −28% for subsidiary targets (−36% at the median, 74% of the estimates are negative). In other words, unlisted targets are acquired at approximately a 15% to 30% discount relative to comparable publicly traded targets on average, suggesting that obtaining liquidity by selling out to another firm carries a substantial price, consistent with H1 above.

To attempt to control for the effect of information asymmetry on acquisition discounts, I replicate the above matching procedure by including the requirement that the comparable acquisitions of publicly traded targets have the same method of payment as the acquisition of an unlisted target to which they are matched. For the purposes of the additional method-of-payment matching constraint, the method of payment is defined as a dummy variable indicating all-cash or other (where "other" includes mixed cash and stock and all-stock offers, as in Table 1). Theory suggests that bidders facing less than complete information sets about their proposed targets will choose stock as the method of payment in acquisitions (Hansen, 1987). Therefore, controlling for the method of payment in the matching procedure should help isolate some of the effect of information asymmetry on acquisition discounts. By comparing transactions with similar methods of payment I should also be comparing transactions executed in similar information environments, and the resulting acquisition discounts should therefore be relatively free of the influence of information asymmetry. With the additional method-of-payment matching constraint, the average acquisition discount for stand-alone unlisted targets is −13% (versus −17% without the method-of-payment constraint) and −22% for subsidiary targets (versus -28%), with both means statistically significantly different from zero. These results suggest that while information asymmetries between the bidder and unlisted target do contribute to acquisition discounts, approximately three-quarters of the average discount is likely related to other factors, the most obvious of which is the need for, and availability of, liquidity.

3.3. Robustness and generalizability

Given the outliers in the raw multiples data documented in Table 2, it is prudent to investigate further the extent to which SDC provides a reliable source of accounting data. For this reason, I compute the *actual* premiums paid by acquiring firms for public targets by taking the percent difference between acquisition multiples for public targets and accounting multiples (market-to-book equity ratio, price to earnings ratio, market value to EBITDA ratio, and market value to sales ratio[12]) for those firms from Compustat for the

[12]The market price per share of common equity is the fiscal year-end closing price (annual data item #199), the number of shares outstanding and total book value of common equity are given as of the end of the fiscal year (annual data item #25 and #60, respectively), earnings-per-share is diluted and excluding extraordinary items

fiscal year prior to the acquisition. For publicly traded target firms, the median acquisition premium averaged across all four multiples is 50.53%. Again, however, this distribution contains many outliers, the vast majority of which appear to stem from Compustat's coverage of previously-public firms that declare bankruptcy or otherwise cease trading prior to being taken over. After trimming these outliers (to constrain the premium to be greater than −50% and less than 100%), the average premium over the *actual* market multiple for publicly traded targets is 37%, clearly within the range of premiums reported in the existing literature using stock price and return data. For example, Schwert (1996) reports average premiums for publicly traded targets of 30% using cumulative abnormal returns to the target stock and Officer (2003) finds premiums for public targets that average 55% by comparing SDC acquisition prices to target stock prices prior to the acquisition attempt. Apart from some outliers, which constitute approximately 5% of each tail of the premium distribution, the value to accounting multiples reported by SDC appear to result in sensible premiums for publicly traded targets and therefore should provide reasonably accurate data for unlisted firms.[13]

An additional concern with the statistics in Table 3 is that the sample is so dramatically reduced by the limited availability of multiples data from SDC and the obvious outliers in the multiples data reported by SDC. For example, of the 5,328 acquisitions of subsidiaries reported by SDC, the availability of sensible multiples data for both the unlisted target and comparable public acquisitions limits the number of observed average acquisition discounts to 643 (12% of the original sample). Given these data constraints, the generalizability of my results is a concern. One way to address this issue is to document how the sample with acquisition discount data differs from the full sample of acquisitions of unlisted targets reported by SDC.

Panel A of Table 4 presents the time series of acquisitions of unlisted targets and the fraction of that sample with acquisition discount data. Reliable acquisition discount data do not appear in the SDC sample until 1984 (subsidiaries) or 1985 (stand-alone private firms), despite the fact that SDC initiates (scant) coverage of acquisitions of unlisted targets in 1979. While there is time-series variation in the fraction of the sample with acquisition discount data (for example, the largest fraction of acquisitions of stand-alone private firms with acquisition discount data is in the early 1990s), such data are not clustered in any one year or any one period. Acquisition discount data appears to be reasonably well spread out over time for both stand-alone private firms and subsidiaries, although the most marked decline in coverage is at the end of the time series (2002/2003). This decline in data availability at the end of the sample is not a product of the three-year matching window extending out past the end of the original sample. I include acquisitions of publicly traded firms from 2004 in the pool of potential comparable transactions for acquisitions of unlisted firms from 2003. This decline in data availability at the end of the sample period is also evident when matching to comparable transactions using a strictly backward-looking window.

(*footnote continued*)
(annual data item #57), EBITDA is assumed to be the Compustat field labeled "operating income before depreciation" (annual data item #13), and sales is annual data item #12.

[13]There may be additional issues with SDC data for unlisted firms that are not likely to be as problematic for publicly traded targets, such as the ability of the owners of unlisted assets to manipulate earnings.

Table 4
How representative is the sample of acquisition discounts?

This table presents the time-series distribution of acquisitions of unlisted targets (Panel A) and the medians (or means for indicator variables) of various characteristics for acquisitions of unlisted targets (Panel B), both conditioned on the availability of acquisition discount data (Table 4). Year is the bid announcement year and Parent publicly listed is an indicator variable equal to one when a subsidiary's parent firm can be matched from SDC to the CRSP database, and zero otherwise. Deal value (excluding assumed liabilities) is reported by SDC. In Panel B, the numbers in square brackets are the numbers of observations in each subsample, and ***, **, * indicates that median (or mean) is significantly different between the two data-availability-based subsamples at the 1%, 5%, or 10% levels (respectively) using a two-sided Wilcoxon (or *t*) test.

Panel A: Distribution by year

Year	Stand-alone unlisted targets		Subsidiary unlisted targets	
	Number of transactions	% with acquisition discount data	Number of transactions	% with acquisition discount data
1979	1	0.00	1	0.00
1980	1	0.00	2	0.00
1981	2	0.00	1	0.00
1983	1	0.00	0	0.00
1982	0	0.00	0	0.00
1984	5	0.00	33	3.03
1985	32	6.25	140	14.29
1986	85	27.06	231	17.75
1987	58	12.07	210	16.67
1988	83	15.66	301	14.95
1989	81	7.41	258	18.99
1990	41	17.07	198	12.12
1991	42	19.05	140	14.29
1992	56	32.14	154	12.99
1993	84	22.62	192	18.75
1994	98	30.61	245	16.33
1995	109	17.43	279	7.53
1996	219	10.96	314	7.01
1997	293	12.63	413	15.50
1998	335	11.94	473	8.67
1999	333	11.41	434	13.83
2000	374	9.63	385	11.17
2001	159	8.18	269	9.29
2002	155	6.45	303	6.60
2003	182	7.69	352	4.55
Total	2,829	12.87	5,328	12.07

Panel B: Medians (or means for indicator variables) of sample characteristics conditioned on data availability

	Stand-alone unlisted targets		Subsidiary unlisted targets	
	w/ acquisition discount data	w/o acquisition discount data	w/o acquisition discount data	w/o acquisition discount data
Successful	0.96 [364]	0.95 [2,465]	0.94 [643]	0.93 [4,685]
Cash	0.48 [364]	0.61*** [2,465]	0.88 [643]	0.94*** [4,685]

Table 4 (*continued*)

Deal value (excluding assumed liabilities) ($m)	105.50 [364]	102.00 [2,463]	151.80 [643]	140.00*** [4,685]
Parent pre-bid market value of equity ($m)			2,394.84 [405]	2,216.63 [2,739]
Parent publicly listed			0.63 [643]	0.59** [4,685]
Subsidiary percent of parent assets (%)			3.74% [111]	3.99% [108]
Cash from subsidiary sale as % of parent-firm cash balance (truncated)			61.04% [251]	46.48%** [1,855]

Panel B documents the characteristics of two subsamples of unlisted targets – those acquisitions for which I can measure the acquisition discount and those acquisitions for which I cannot. There are a couple of notable differences between the two subsamples. Acquisitions of unlisted targets for which I can measure the acquisition discount are significantly less likely to be all-cash offers. However, for acquisitions of subsidiaries the fraction of all-cash offers in the sub-sample with acquisition discount data is still almost 90%—while this is significantly lower than the 94% of subsidiary acquisitions without discount data that are all cash offers, it still indicates that the vast majority of offers in the subsample with measurable acquisition discounts are cash purchases of subsidiaries. As would be expected, subsidiary acquisitions with acquisition discount data are significantly larger and more likely to have publicly traded parents than targeted subsidiaries without such data, consistent with a slight bias in the data collection methods of SDC (favoring large targets that are listed indirectly via the parent). Bids with discount data also offer statistically significantly greater cash infusions to their parents as a percentage of parent pre-sale cash balances, although the economic significance of this difference (61% versus 46%) is not great. There are no other significant differences in Table 4 between the data-availability subsamples.

Overall, the results in Table 4 are consistent with the contention that the unlisted targets for which I do measure acquisition discounts (approximately 12% of the sample) are not substantially different from the remainder of the population of unlisted targets reported by SDC. There is very little time-clustering in the portion of the sample with available acquisition discount data, and the differences in characteristics between the data-availability subsamples is not suggestive of any important biases in my results. There is almost no evidence in Table 4 that would suggest that my results are not reasonably robust and generalizable.

4. The relation between acquisition discounts and the need for, or availability of, liquidity

Section 3 demonstrates that discounts in acquisitions of unlisted targets are reasonably robust and average approximately 15% to 30% of the acquisition multiple for acquisitions

of comparable publicly traded firms (H1). The remainder of this paper is dedicated to explaining the cross-sectional variation in these acquisition discounts, with the intention of demonstrating that acquisition discounts vary with unlisted firms owners' need for liquidity and/or the availability of alternate sources of liquidity (H2a and H2b).

I first document that, on average, the sellers of unlisted firms are in need of the infusion of liquidity that comes from the sale. Table 5 presents summary statistics for abnormal accounting and stock return metrics for parent firms for the year prior to subsidiary sales. The focus of the table is on parent firms divesting unlisted subsidiaries, because documenting the need for liquidity by the owners of unlisted stand-alone firms would be extremely difficult due to data limitations. All accounting data for parent firms is from Compustat, and abnormal accounting performance is relative to the average metric for industry- and size-matched portfolios comprised of all firms on Compustat in the year prior to the subsidiary acquisition in the same two-digit SIC code and with total assets within 20% of those for the divesting parent firm.[14]

The average and median parent firm selling a subsidiary has significantly negative abnormal cash balance and cash flow (both scaled by assets) relative to industry peers. Table 1 shows that, even in a conservative distribution that truncates the size of cash inflow from a subsidiary sale at 500% of the parent's pre-sale cash balance, subsidiary sales double parents' pre-sale cash holdings on average. Relative to industry comparables, parent firms selling a subsidiary go from negative median abnormal cash/assets of −1.59% prior to the transaction (Table 5) to significantly positive median *expected* abnormal cash/assets of +4.02% after the subsidiary sale (not tabulated). At the end of the fiscal year of the sale, parents selling subsidiaries report *actual* cash/assets (from Compustat) that are insignificantly different from industry comparables.[15] In other words, subsidiary sales appear to alleviate significant cash constraints for parent firms, and the cash from the sale is sufficient to move parents from below-median cash/assets to above-median cash/assets relative to industry- and size-matched portfolios.

Although not tabulated, I also examine a simple event study documenting the time series of average abnormal (relative to industry- and size-matched comparables) cash/assets for parent firms for the five years prior to and following a subsidiary sale. This time series shows average abnormal cash/assets for parents firms decreasing monotonically from approximately zero five years prior to the sale to significantly negative in the year prior to the subsidiary sale, and not becoming significantly negative at any time in the five years following the sale. This suggests that parent firms sell subsidiaries at the point when their need for cash is the greatest, and that subsidiary sales are timed to improve the parents' cash position.

Cash balance and cash flow may not be adequate measures of liquidity. The remaining rows of Table 5 explore other commonly used metrics for liquidity in an attempt to provide

[14]Table 6 reports abnormal accounting and stock-return performance statistics using the full sample of subsidiary sales with Compustat or CRSP data. However, only a fraction (12%) of the subsidiary sale sample has data that produces a sensible acquisition discount. Limiting the sample to only those observations with both acquisition discount data (Table 5) and the appropriate Compustat or CRSP data required to compute pre-sale performance metrics does not materially change the results in Table 6 (although some of the significance levels drop because of the smaller sample sizes).

[15]Expected cash/assets following the sale is calculated by adding the cash from the subsidiary sale (from SDC) to the numerator of the pre-sale cash/assets ratio. Actual post-sale cash/asset ratios are calculated using data from Compustat for the fiscal year ending after the subsidiary sale.

Table 5
Liquidity of subsidiary parents prior to subsidiary sales

This table contains average and median (in parentheses) differences between parent-firm liquidity measures and the average for all firms on Compustat in the same industry (two-digit SIC code) as the parent firm and with total assets within 20% of that for the parent firm in the year prior to the acquisition attempt, and for parent-firm compound 12-month abnormal returns. Cash is the cash balance, cash flow is earnings before depreciation but after interest, taxes, and dividends, and net working capital is current assets minus current liabilities, and all are scaled by total assets. Leverage is the book value of long-term debt divided by the sum of the book value of long-term debt and the market value of equity. Altman's *Z*-score is defined in Altman (1968). All accounting data (including the long-term debt rating) are from Compustat from the year prior to the acquisition. Parent compound 12-month abnormal return is the compounded difference between parent firm monthly returns and CRSP value weighted index return over the 12 months prior to, but not including, the bid announcement month. The Cash category includes all bids for which the method of payment is all cash, and the Non-cash or mixed category contains all bids for which the method of payment is either all stock or a mix of cash and stock. The numbers in square brackets are the numbers of observations in each subsample. ***, **, * indicates that the mean or median is significantly different from zero at the 1%, 5%, or 10% level (respectively), using a two-sided *t* or Wilcoxon test. ^{a,b,c} indicates that the mean or median in the Non-cash or mixed method-of-payment category is significantly different from the mean or median in the Cash method-of-payment category at the 1%, 5%, or 10% levels (respectively), using a two-sided t or Wilcoxon test.

	Full sample	Method of payment	
		Cash	Non-cash or mixed
Abnormal cash/Assets	-0.0135^{***}	-0.0150^{***}	0.0112^{a}
	$(-0.0159)^{***}$	$(-0.0163)^{***}$	(-0.0103)
	[2,424]	[2,280]	[144]
Abnormal cash flow/Assets	-0.0240^{***}	-0.0248^{***}	-0.0119
	$(-0.0063)^{***}$	$(-0.0070)^{***}$	$(0.0025)^{b}$
	[2,192]	[2,062]	[130]
Abnormal net working capital/Assets	-0.0356^{***}	-0.0381^{***}	0.0052^{b}
	$(-0.0141)^{***}$	$(-0.0149)^{***}$	$(0.0138)^{c}$
	[1,852]	[1,743]	[109]
Abnormal leverage	0.0405^{***}	0.0460^{***}	-0.0486^{**a}
	$(0.0100)^{***}$	$(0.0156)^{***}$	$(-0.0657)^{***a}$
	[2,348]	[2,212]	[136]
Abnormal Altman's *Z*-score	-0.5992^{***}	-0.6472^{***}	0.1904^{b}
	$(-0.4116)^{***}$	$(-0.4402)^{***}$	$(0.0436)^{b}$
	[1,764]	[1,663]	[101]
Abnormal long-term debt rating	0.7888^{***}	0.8050^{***}	0.4843
	$(0.5000)^{***}$	$(0.5000)^{***}$	(0.2083)
	[1,631]	[1,549]	[82]
Parent compound 12-month abnormal return	-0.0315^{***}	-0.0390^{***}	0.0894^{a}
	$(-0.0542)^{***}$	$(-0.0546)^{***}$	(-0.0479)
	[3,039]	[2,861]	[178]

a more complete picture of parent-firm financial health prior to subsidiary sales. At the average and median, parent firms have significantly negative abnormal net working capital and significantly positive abnormal leverage. *Z*-scores (introduced in Altman, 1968) are convenient combinations of a variety of accounting and stock market information that give a snapshot of a firm's financial health. As the original *Z*-score bankruptcy bounds are likely to be outdated, I compute *Z*-scores relative to industry comparables as a metric of aggregate parent-firm pre-sale financial position. The average and median abnormal

Z-scores (difference between parent-firm Z-score and the average in the industry- and size-matched portfolio) for parents selling subsidiaries are significantly negative, suggesting that these firms are in substantially worse financial condition than their peers. Furthermore, the average abnormal long-term debt rating is significantly positive—parent firms selling subsidiaries have not only abnormally low liquidity and abnormally high leverage, but also Standard & Poor's credit ratings that are almost a full rating category worse than similarly sized firms in the same industry, indicating a lower capacity to borrow to make up for the cash shortfall.[16]

Subsidiary sales also follow 12 months of very poor stock returns at the parent level. Parent compound 12-month abnormal returns are the compounded monthly difference between parent returns and the CRSP value-weighted index for the 12 months ending the month prior to the sale announcement, and at the median parent firms selling subsidiaries suffer abnormal returns of −5% in the 12 months prior to the sale. Parent-firm compound abnormal returns in the 12 months prior to the acquisition announcement are significantly negative at both the mean and median. These cumulative stock returns are strongly supportive of the prior-year abnormal accounting measures in the remainder of the table, and consistent with the hypothesis that parents sell subsidiaries in order to ease financial constraints (Shleifer and Vishny's, 1992 fire sales).

While the vast majority of subsidiary sales are for cash, there are some (6%) that involve the swap of (at least some) bidder equity for the subsidiary. The most striking results in Table 5 emerge when the sample is stratified by method of payment. Characteristics associated with financial distress or constraints (significantly negative average abnormal cash-to-assets, working capital-to-assets, Z-score, and compound abnormal returns; significantly positive average abnormal leverage) only obtain in the subsample of subsidiary sales in which the bidder pays cash to acquire the subsidiary, and in almost all cases the average abnormal performance statistics are significantly different between the subsamples based on method of payment in the direction that suggests that those parent firms that sell subsidiaries for cash are the most financially constrained in the sample. This evidence reinforces the notion that cash sales of subsidiaries are designed to ease a liquidity crisis or pay down abnormally high debt loads, and is also consistent with the findings in Lang, Poulsen, and Stulz (1995). The fraction of subsidiary sales that are all-cash transactions is also strongly related to liquidity needs. For parent firms with negative abnormal cash/assets (relative to the average industry- and size-matched comparables), 95% of the subsidiary sales are all-cash, while for parents with positive abnormal cash/assets, only 92% of the subsidiary sales are all-cash transactions.[17]

Having established that subsidiary sales are *on average* motivated by the need for liquidity, I now turn to the relation between the need for, or alternate sources of, liquidity and acquisition discounts (H2a and H2b). As described in the hypothesis section (2.2), owners with a greater need for liquidity, or owners facing liquidity constraints when alternate sources of liquidity (debt and equity markets) are unavailable or costly to access, will be in a weaker bargaining position relative to the proposed buyer of the corporation

[16]Compustat assigns numerical values to credit ratings that equate to one point per rating category (2 being AAA and 11 being BBB, the lowest investment grade categorization).

[17]Neither number is tabulated, but the fractions of all-cash transactions are significantly different from one another at the 5% level. This result also holds in multivariate regressions that explain the determinants of the method of payment in subsidiary sales, controlling for other factors that are known to influence the method-of-payment choice in acquisitions (such as relative size and proxies for information asymmetry).

being sold and therefore will be prepared to accept a lower acquisition price compared to the "fair" value of the assets (i.e., a more negative acquisition discount).

Table 6 presents univariate evidence on the difference in average acquisition discounts for subsamples stratified by parent pre-sale 12-month compound abnormal returns, the method of payment in the proposed acquisition of the unlisted firm, and two proxies for the availability of alternate sources of liquidity. I use parent-firm pre-sale compounded 12-month abnormal returns as a proxy for parent firms' need for liquidity. While any of the variables in Table 5 could conceivably be used as such a proxy, I have data on pre-sale stock returns for a greater proportion of parents selling subsidiaries than for any of the other variables listed in Table 5. Moreover, stock returns provide a convenient metric that is clearly consistent with the other liquidity parameters in Table 5 and that has support in the literature as a metric for parent-firm pre-sale performance (Lang, Poulsen, and Stulz, 1995). The method of payment in acquisitions of unlisted firms is introduced because cash provides more immediate liquidity than a stock-swap does. Therefore, if acquisition discounts for unlisted firms reflect the "price" of liquidity, acquisition discounts should be more negative when buyers pay cash to the owners of unlisted target firms than when they pay with bidder stock.

Following Harford (2005), I use the four-quarter moving average of the spread of commercial and industrial (C&I) loan rates (on loans greater than $1 million) over the federal funds rate as a proxy for the availability of liquidity in debt markets—the cost of obtaining liquidity via a bond issue or a bank loan should be increasing with this spread (all else equal).[18] Harford (2005) (and the references therein) use the C&I rate spread as a proxy for "aggregate liquidity," although in this paper this proxy is intended to specifically measure the cost of obtaining liquidity in debt markets. I also measure IPO volume and underpricing as metrics for the ease with which private owners of a stand-alone firm or corporate owners of a subsidiary can sell equity in the unlisted firm as an alternative to selling the whole firm to a willing buyer. IPO volume is measured as the four-quarter moving average of the number of IPOs per quarter scaled by the number of firms listed on CRSP (in thousands) at the beginning of the quarter (as in Lowry, 2003), and IPO underpricing is the quarterly average of the first-day returns for all IPOs in a quarter. Each acquisition of an unlisted target is matched to the C&I loan spread, IPO volume, and average IPO underpricing in the quarter in which the acquisition announcement date falls, and I compare these metrics to time-series medians based on the full quarterly time series of C&I loan spreads, IPO volume, and average IPO underpricing.

The univariate statistics in Table 6 are strongly supportive of hypotheses H2a and H2b. Specifically, acquisition discounts for subsidiary targets are significantly more negative when the parent firm's compound 12-month abnormal return is less than zero (−36%) than when the parent firm's 12-month return is greater than zero (−25%). Parent firms experiencing below market-average stock return performance over the year prior to the sale sell unlisted subsidiaries at approximately a 10% greater discount to the average multiple for comparable publicly traded targets than do "healthy" parent firms.

[18]Some of this data is available on the Federal Reserve Board's website (http://www.federalreserve.gov/releases); the remainder was generously provided by Jarrad Harford. Most of the results in this paper are qualitatively unaffected by using the raw spread per month (in place of the four-quarter moving average), but the moving average is a more desirable explanatory variable both econometrically (because it smoothes out the considerably heteroskedasticity in the raw spread) and economically (because it takes some time for firms to raise new debt capital).

Table 6
Acquisition discounts, the need for liquidity, and the availability of alternate sources of liquidity

The table presents average acquisition discounts for stand-alone and subsidiary unlisted targets for various subsamples based on parent-firm pre-sale stock return performance, method of payment, and debt and equity market characteristics. The Cash category includes all bids for which the method of payment is all cash, and the Non-cash or mixed category contains all bids for which the method of payment is either all stock or a mix of cash and stock. C&I loan spread is the four-quarter moving average of the spread between the interest rate on commercial and industrial (C&I) loans greater than $1 m and the intended federal funds rate. The time-series median C&I loan spread is based on the quarterly time series of four-quarter moving averages of spreads between 1985 and 2003. IPO volume is measured as the four-quarter moving average of the number of IPOs per quarter per thousand firms listed on CRSP at the beginning of the quarter. IPO data is from Jay Ritter's website (http://bear.cba.ufl.edu/ritter/ipodata.htm), and the time-series median of IPO volume is based on the quarterly time series of four-quarter moving averages of IPO volume from 1979 to 2004. All other variables are defined in previous tables. The numbers in square brackets are the numbers of observations in each subsample. ***,**,* indicates that the average acquisition discount is significantly different between the paired subsamples at the 1%, 5%, or 10% levels (respectively), using a two-sided test.

	Unlisted targets	
	Stand-alone	Subsidiary
Parent pre-sale stock returns		
Parent compound 12-month abnormal return > 0		−0.2466 [167]
Parent compound 12-month abnormal return < 0		−0.3560** [223]
Method of payment		
Cash	−0.2246 [176]	−0.2825 [566]
Non-cash or mixed	−0.1243** [188]	−0.2878 [77]
Debt markets		
C&I loan spread > time-series median	−0.2283 [141]	−0.3437 [248]
C&I loan spread < = time-series median	−0.1377* [223]	−0.2451** [395]
Equity markets		
IPO volume > time-series median	−0.1545 [222]	−0.2735 [358]
IPO volume < = time-series median	−0.2015 [142]	−0.2953 [285]

One alternative to the "need for liquidity" explanation for this result (H2a) is that a subsidiary *causes* the parent's poor pre-sale performance and then is sold at a discount relative to comparable publicly traded targets because the subsidiary is a poor performer. This alternative would also generate the results in Table 6 (greater discounts for subsidiaries sold by poorly performing parents). While it is difficult to dismiss this

explanation without detailed subsidiary operating performance data, several facets of the data support the interpretation that poor parent-firm performance unrelated to the subsidiary in question causes a fire sale of the subsidiary. The divested subsidiaries in this sample are generally small parts of the parent's overall business (4% of parent assets at the median—Table 1), and therefore unlikely to be large enough in relative terms to *cause* parent-firm underperformance. However, the cash from subsidiary sales is large enough on average to generate much-needed liquidity for the parent-firm's potentially-beleaguered principal operations. Furthermore, I show in Table 7 that the relation between subsidiary sale discounts and parent pre-sale performance is driven by sales of *non-core* (or unrelated) subsidiaries. I find it unlikely that, on average, a small, unrelated subsidiary could be responsible for poor performance at the parent. While this is undoubtedly the case in some portion of the sample, the sample averages are much more likely to be driven by poorly performing parent firms selling small, non-core subsidiaries at a discount (fire sales) to generate liquidity for their primary operations (H2a).

The method of payment in acquisitions of unlisted stand-alone firms affects acquisition discounts. For stand-alone unlisted firms, acquisition discounts average −22% when the buyer is paying cash to the owners, but only −12% when the buyer is exchanging stock in the larger firm for the equity in the unlisted target. Given that cash provides immediate liquidity while stock does not (especially if the former owners of the unlisted target become blockholders in the bidder), this result supports the conjecture that sellers of unlisted targets accept lower acquisition multiples in return for the provision of liquidity.

Access to alternate sources of capital also has a significant impact on acquisition discounts for unlisted targets. The average acquisition discount is −25% for subsidiaries when the commercial and industrial loan spread is below its time-series median (looser credit conditions), and −34% for subsidiaries when the loan spread is above its time-series median (tighter credit conditions). Low credit spreads make debt capital cheaper to access for parent firms as an alternative source of liquidity, reducing the necessity to accept low sale multiples in return for the provision of liquidity. Furthermore, the same pattern is evident, albeit with weaker statistical significance, in the acquisition discounts for unlisted stand-alone firms (−23% in tighter credit conditions versus −14% in looser credit conditions). These results are strongly consistent with hypothesis H2b, indicating that sellers of unlisted assets accept lower sale prices when alternative sources of liquidity are more expensive, or difficult, to access.[19]

Table 7 presents multivariate regression tests of the hypothesized relations between acquisition discounts and the need for, or availability of, liquidity (H2a and H2b), controlling for other measures of liquidity and other factors that could affect acquisition discounts. For stand-alone private firms, acquisition discounts are significantly more negative (lower sale prices) when buyers pay cash in the acquisition, providing immediate liquidity to the trapped owners of non-traded shares, and are weakly negatively associated with credit spreads (as in Table 6).

[19]The insignificant difference between acquisition discounts for unlisted stand-alone firms conditional on above- or below-median IPO volume is the main result that changes with the comparables window (footnote 10). If the window for finding comparable acquisitions of publicly traded targets is the three years preceding the acquisition of an unlisted target, the acquisition discount for stand-alone private targets is significantly less negative when IPO volume is higher than its time-series median than when IPO volume is lower than its time-series median, consistent with IPO volume representing the ease with which liquidity can be obtained by selling shares to the public instead of selling the whole firm to another corporation.

Table 7
The determinants of acquisition discounts

The table contains the results of OLS regressions with the average acquisition discount for unlisted targets (Table 4) as the dependent variable. High M&A activity is an indicator variable equal to one when the liquidity index (as defined in Schlingemann, Stulz, and Walkling, 2002) is greater than the time-series median for the target's industry, and zero otherwise. Parent in same industry as subsidiary is an indicator variable equal to one if the parent firm and the subsidiary being sold are in the same two-digit SIC code, and zero otherwise. Parent abnormal cash/assets and parent abnormal cash flow/assets are defined in Table 5. Parent cash flow sigma is the standard deviation of the cash flow/assets ratio for the parent firm over the 20 years preceding the subsidiary sale. Parent earnings forecast coefficient of variation is the ratio of the standard deviation of analysts' earnings forecasts for the parent firm divided by the average forecast, where forecasts are from the period ending closest to the subsidiary sale date and for earnings per share in the quarter ending after the subsidiary sale. Analysts' earnings forecasts are provided by I/B/E/S. All other independent variables are defined in prior tables. White-corrected heteroskedasticity-consistent standard errors are in parentheses. $^{***},^{**},^{*}$ indicates that the regression coefficient is significantly different from zero at the 1%, 5%, or 10% levels (respectively).

	Stand-alone unlisted targets		Subsidiary targets			
Intercept	0.0968	0.3319	0.0456	0.2523	0.3270	0.4098*
	(0.1406)	(0.2855)	(0.1029)	(0.1983)	(0.2817)	(0.2250)
C&I loan spread	−0.1815*	−0.2320*	−0.2222***	−0.3059***	−0.3088***	−0.4500***
	(0.0945)	(0.1400)	(0.0688)	(0.0994)	(0.1083)	(0.1489)
IPO volume		−0.0013		−0.0030		
		(0.0047)		(0.0032)		
Cash		−0.1015**		−0.0066		
		(0.0484)		(0.0525)		
High M&A activity (liquidity index) (0/1)		−0.1168**		−0.0388		
		(0.0581)		(0.0443)		
Parent compound 12-month abnormal return					0.3141***	
					(0.0879)	
Parent compound 12-month abnormal return * Parent in same industry as subsidiary					−0.2562*	
					(0.1363)	
Parent abnormal cash/Assets					−0.3418	
					(0.2488)	
Parent abnormal cash flow/ Assets					0.2300	
					(0.4376)	
Parent cash flow sigma					−0.1847	
					(0.5357)	
Parent earnings forecast coefficient of variation						−0.3831
						(0.2432)
Adjusted-R^2	0.01	0.02	0.01	0.01	0.06	0.05
Number of observations	364	363	643	643	264	116

In addition to the variables examined in Table 6, however, the regressions in Table 7 also contain an explanatory variable that measures the intensity of M&A activity in the target's industry in the year of the acquisition. As in Schlingemann, Stulz, Walkling (2002), I calculate the ratio of the sum of the market value of deals announced in an industry (defined by two-digit SIC codes) in a year to the sum of the book values of firms in the industry in the same year. Schlingemann, Stulz and Walkling (2002) call this ratio the liquidity index, and as in that paper I constrain the ratio to have a value between zero and one, and use it only if the industry contains at least 10 firms. Because Table 7 contains cross-sectional regressions, and the intensity of M&A activity may not be comparable across industries (some industries may be consolidating while others are growing), I generate an indicator variable equal to one if the liquidity index is above its time-series median for the target's industry when the sale of a private firm is announced, and zero otherwise.

The significantly negative coefficient on this indicator variable in the second column of Table 7 suggests that acquisition discounts are significantly greater (more negative) when M&A intensity in the subsidiary's industry in the year of the sale is higher than the time-series median of M&A intensity in that industry, contrary to what would be expected if the intensity of M&A activity were capturing the liquidity effects hypothesized in this paper. I cannot explain why acquisition discounts appear to be related to proxies for the availability of alternate sources of liquidity in an intuitive direction but not to the intensity of M&A activity in the stand-alone unlisted target's industry, except to posit that M&A intensity has a greater effect on deal multiples for publicly traded targets than for privately held targets (thereby making privately held targets look "cheap" during times of high M&A intensity).

However, I do find considerable support for both H2a and H2b in the subsample of subsidiary acquisitions. Acquisition discounts for subsidiaries relative to acquisitions of comparable public firms are significantly negatively associated with the loan spread in all specifications in Table 7—parent firms appear to sell subsidiaries at significantly lower prices relative to publicly traded assets when debt capital (an alternate source of liquidity) is relatively more expensive to access. Acquisition discounts are also significantly positively related to parent-firm stock return performance in the year prior to the sale – acquisitions of subsidiaries are priced at significantly greater discounts to comparable public acquisitions when parent firms have lower 12-month compound abnormal stock returns (H2a).

Clearly, however, acquisition discounts for subsidiaries are most sensitive to prior parent-firm performance for sales of subsidiaries outside the parent's core line of business. While the interaction of parent stock return and the indicator variable for core subsidiaries (parent in same industry as subsidiary) is only statistically significant at the 10% level, it is negative and almost of the same magnitude as the coefficient on parent-firm prior return performance in Table 7. This suggests that the most significant fire sales in this sample occur in sales of non-core parts of a parent's operations. These results are strongly consistent with H2a, as poor parent pre-sale performance increases the need for liquidity, and appears to increase the price paid for accessing pools of liquidity by selling non-core subsidiaries for cash. These results also support the notion that financially constrained or poorly performing parents sell non-core subsidiaries at substantial discounts to raise cash to support their core line of business.

Table 7 also includes several independent variables that directly measure the extent of liquidity constraints at parent firms selling subsidiaries, namely the abnormal cash/assets

and cash flow/assets ratios defined in Table 5 and the standard deviation of cash flow/assets (as in Opler, Pinkowitz, Stulz, and Williamson, 1999).[20] These variables are included to further test the hypothesis that acquisition discounts are related to liquidity needs. While the relation between acquisition discounts and either of the abnormal cash measures (cash balance and cash flow) is not statistically significant in Table 7, the univariate relation between acquisition discounts and parent abnormal cash flow/assets (not tabulated) is significantly positive. This suggests that parent firms with lower cash flow than industry- and size-matched peers sell subsidiaries at significantly lower acquisition discounts. Opler, Pinkowitz, Stulz, and Williamson (1999) report that firms with greater cash flow volatility have greater liquidity needs, but I do not find a significant relation in Table 7 between the standard deviation of parent-firm cash flow over the 20 years prior to the sale and the acquisition discount accepted when selling a subsidiary.

The last independent variable in Table 7 is the coefficient of variation of analysts' earning forecasts, which is a direct measure of information asymmetry that has been employed in the literature (Officer, 2004; Barry and Brown, 1985). I measure the coefficient of variation of earnings forecasts made closest but prior to the subsidiary sale, where all earnings forecasts are for the parent firm and for the quarter following the one in which the subsidiary sale is announced. This coefficient of variation therefore proxies for the extent of pre-sale differential information about the subsidiary's parent.[21] While the coefficient on the earnings forecast coefficient of variation in Table 7 is not statistically significantly different from zero (p-value = 0.12), it does have the sign that would be expected if it were capturing the effect of information asymmetry—acquisition discounts are greater when information asymmetry is higher—and the variable does have a significantly negative coefficient in a univariate regression (not tabulated). However, the in-sample standard deviation of the coefficient of variation is approximately half that of the in-sample standard deviation of the C&I loan spread, suggesting that, relative to the effect of information asymmetry, changes in the external liquidity environment are associated with economically more significant changes in acquisition discounts.

5. Conclusions and implications

In this paper I document discounts for acquisitions of unlisted targets that average approximately 15% to 30% relative to multiples paid to acquire comparable publicly traded firms. I find consistent evidence that parent firms are liquidity-constrained prior to the sale of unlisted subsidiaries, and that the extent of these liquidity constraints is significantly associated with acquisition discounts—consistent with the hypotheses offered here, acquisitions of unlisted subsidiaries are priced at greater discounts to comparable publicly traded targets when the parent firm has poorer pre-sale performance (i.e., is in greater need of liquidity). Furthermore, I find strong support for the contention that acquisition discounts are related to aggregate debt market liquidity—acquisition discounts for unlisted targets are significantly more negative when aggregate liquidity is tight and

[20]As in Table 6, "abnormal" refers to the difference between the accounting ratio for the parent and the average ratio for industry- and size-matched comparables from Compustat.

[21]Ideally, I would like to measure the information asymmetry concerning the target specifically, rather than the target's parent, but this is impractical when the target firm is not publicly listed. Using other popular proxies for information asymmetry (such as the relative size of the target to the bidder or the market-to-book ratio for the target's parent) results in qualitatively similar findings that are not statistically significant at conventional levels.

hence liquidity from the sale of nontraded assets more valuable. I also find some evidence that acquisition discounts are affected by information asymmetry, as would be expected in an environment in which a bidder is buying a firm that may not have made many (verifiable) public disclosures before being sold. The most that can be concluded, however, is that information asymmetry is the likely explanation for the portion of acquisition discounts that I cannot relate to aggregate or firm-specific liquidity factors. My results broadly support the notion that acquisition prices for unlisted targets are sensitive to the liquidity needs of the owners of nontraded firms and reflect a lack of bargaining power caused by either greater liquidity needs or tighter aggregate debt market liquidity conditions.

Acquisition discounts for unlisted targets appear to be the price paid by their owners for access to an important source of liquidity. While recent research has concluded that the listing status of the target firm significantly affects the returns to bidders (Fuller, Netter, and Stegemoller, 2002; Moeller, Schlingemann, and Stulz, 2004; Faccio, McConnell, and Stolin, 2004), little attention has been paid to the prices or premiums in acquisitions of unlisted firms. This paper remedies that omission, and finds an important link between results in the M&A and divestitures literatures. Selling a part, or the whole, of a firm is an important source of liquidity for the trapped owners of equity in nontraded assets—but a source that comes with a price that appears to at least equal that of alternate sources of liquidity (public and private debt and equity markets). However, the results in this paper imply that selling part of an unlisted firm is a last-resort source of liquidity for owners that need sources of cash when borrowing additional funds is unappealing. As such, the price paid to access liquidity by selling unlisted assets is reflected in the discounted sale price and, potentially, in the returns accruing to the buyers of unlisted firms.

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