Liquid Stock as an Acquisition Currency*

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Abstract

We examine how stock liquidity affects acquisitions. Relying on a simple model, we hypothesize that liquidity enhances acquirer stock as an acquisition currency, especially when the target is relatively less liquid. As hypothesized, we find that greater acquirer (lower target) liquidity increases acquisition likelihood and payment with stock, reduces acquisition premiums, and improves acquirer announcement returns in equity deals. To exploit the benefits of liquidity, firms take steps to improve stock liquidity prior to stock acquisitions. Our identification strategy relies primarily on the liquidity shock induced by stock-market decimalization. A supplementary test using the variation in stock liquidity induced by changes in composition of Russell-1000/2000 indices yields similar results.

JEL classification: G30, G34

Keywords: Stock Liquidity, Mergers and Acquisitions, Decimalization

"The Covance board also discussed with Goldman Sachs [its financial advisor] the liquid market for LabCorp stock, which would allow Covance stockholders to either keep or trade the stock portion of the consideration."

From the Board of Directors of *Covance Inc.* on its proposed merger with *Laboratory Corp of America*

1. Introduction

In well over half of the acquisitions in the U.S., the payment is fully or partially made with acquirer stock.[1] In this paper, we explore the role of stock liquidity – both of the acquirer and the target – in the merger and acquisition (henceforth "M&A") process. The effect of liquidity on M&A activity is connoted by various anecdotes, such as the quote above, that target shareholders value the liquidity of acquirers' stock.[2] Our contention is that liquidity makes the acquirer's stock more valuable as an acquisition currency, especially when the target firm's stock is relatively less liquid. We propose a simple model of stock liquidity in the context of mergers and acquisitions ("M&As") and test its predictions. Our empirical identification relies primarily on the liquidity shock induced by stock-market decimalization. In a set of supplementary tests, we exploit the exogenous variation in stock liquidity of firms induced by the annual Russell Index reconstitution. In support of this acquisition currency hypothesis, we find that stock liquidity of the acquirer relative to that of the target significantly affects the firm's ability to make acquisitions, the method of payment, the acquisition premiums, and ultimately, shareholder value. Further, we document that firms tend to take measures to manage their stock liquidity prior to undertaking stock acquisitions.

Stock liquidity can potentially affect the takeover process via different channels. In addition to the acquisition currency channel, we consider two alternative channels through which stock liquidity can impact takeovers. We label these as the governance and valuation channels. While some of our predictions overlap with those of the alternative channels, others are specific to the acquisition currency hypothesis. We rely on these unique predictions to test for the existence of a distinct acquisition currency channel. We find a significant and discernible effect of stock liquidity on the acquisition process and our evidence is strongly supportive of the acquisition currency hypothesis.

Our hypothesis is that higher liquidity of the acquirer's stock, and correspondingly lower liquidity of the target, can render an acquirer more attractive to the target and increase the likelihood that the

[1] A majority of the acquisitions over the 1990-2014 period in the U.S. have been paid for using at least some acquirer stock, i.e., all-stock or mixed stock-and-cash (e.g., Boone, Lie, and Liu, 2014).

[2] There are many other similar cases, such as Northwest Bancshares Inc. acquiring LNB Bancorp Inc., FNB Corp. acquiring PVF Capital Corp., and Pacific Premier Bancorp Inc. acquiring San Diego Trust Bank. In all these deals, the acquirers' stock liquidity was considered to be an important factor in the M&A consideration by the targets. According to the disclosures on the deal negotiation process, comments such as "the lack of liquidity in acquirer B's stock" and "the liquidity of each party's stock" are often made in the boards' explanations on either accepting or rejecting a deal.

target will accept stock as the acquisition currency. We propose a stylized model to argue that greater liquidity of the merged firm would allow shorter-term target investors to trade their stock more quickly and with lower price impact. For most target shareholders, greater liquidity of the acquirer's stock mitigates the key difference between stock and cash payment in terms of liquidity provision while maintaining benefits that are unique to stock payment (such as deferred capital gains taxes). We refer to this as the *Acquisition Currency* hypothesis.

Our acquisition currency model delivers a number of predictions that we subsequently test empirically. First, since firms with more liquid stock (relative to target) are likely to make stock acquisitions on better terms, they are more likely to make acquisitions and to make them by paying stock, *ceteris paribus*. Second, more liquid acquirers are expected to pay lower premiums in stock acquisitions, but not in cash acquisitions. This is because target shareholders will be willing to pay a "liquidity premium" for an acquirer's more liquid stock, while the liquidity of the acquirer's stock is irrelevant in cash acquisitions. Third, anticipating the benefits of using more liquid stock in stock acquisitions, firms will take deliberate steps to improve stock liquidity prior to stock acquisitions. Finally, the more liquid the acquirer's stock (relative to target), the more favorable the acquirer's deal announcement abnormal returns are expected to be for stock acquisitions. This is because acquirers' shareholders gain more (or lose less) from acquisitions paid with more liquid stock since they pay lower deal premiums.

There are, however, two alternative channels through which liquidity could affect acquisitions. We first consider the Governance channel, whereby greater stock liquidity could reduce the noise in stock prices and, thus, make it optimal for firms to give managers stronger stock-based incentives, thereby reducing agency problems. Greater stock liquidity could also facilitate the creation of blockholders and lead to better monitoring of managers (e.g., Edmans, Fang, and Zur, 2013). The reduction in agency problems, whether through stronger incentive contracting or through better monitoring, could enhance the quality of the acquisitions made by the firm.[3] However, we are not aware of clear theoretical arguments for why governance should be positively related to a firm's acquisitiveness. Further, the governance channel has no prediction in terms of the effect of target liquidity on stock payment and the acquisition premium, as predicted by the acquisition currency hypothesis. In our analysis, we conduct a number of empirical tests to distinguish between the governance and the acquisition currency channels.

The second alternative that we consider is the Valuation channel. The prediction here is that liquidity could affect acquisitions because of the greater price informativeness or lower information asymmetry that is usually associated with greater stock liquidity. Hence, target shareholders may be less

[3] A recent study by Roosenboom, Schlingemann, and Vasconcelos (2013) finds support for greater stock liquidity enhancing the acquisition process through the governance channel.

concerned about being paid with overvalued stock when the acquirer's stock is highly liquid. The literature suggests that stock acquisitions can often be motivated by the perceived overvaluation of acquirer stock (e.g., Shleifer and Vishny, 2003). The more favorable valuation of firms with more liquid stocks (Fang, Noe, and Tice, 2009) could also increase firms' incentives to make acquisitions with stock swaps. We note that while the valuation channel could induce firms to rely more on stock-for-stock acquisitions, there is no prediction that the acquisition premium would be affected by the target firm's stock liquidity, as is predicted by the acquisition currency hypothesis.

Furthermore, the acquisition currency hypothesis predicts that the sensitivity of stock payment to acquirer's liquidity in M&As could vary for targets with different shareholder characteristics. For instance, compared with long-term investors, short-term investors in the target should be more concerned with the acquirer's liquidity due to their relatively more immediate trading needs after the acquisition. But there is no such a prediction on the cross-sectional impact of acquirer's liquidity for either the governance or the valuation channels.

To test the predictions of our acquisition currency model, we use a sample of mergers and acquisitions by publicly-listed acquirers over 1985-2012. Using a variety of measures for stock liquidity, we find strong empirical support for our empirical predictions. Our first empirical result is that the likelihood of a firm making an acquisition and, in particular, making a stock acquisition, is positively related to the firm's stock liquidity. This relationship is not only statistically significant, but also economically meaningful. The odds of making an acquisition are up to four times higher following a one-standard-deviation increase in liquidity (the odds of making a stock acquisition are even higher), depending on the liquidity measure. Consistent with liquid stock being a valuable acquisition currency, the effect of liquidity on the likelihood of making a stock acquisition is stronger for firms that are financially more constrained.

Also, the fraction of the acquisition payment that is made with stock increases with the acquirer's stock liquidity relative to the target's liquidity in deals involving public targets. Furthermore, as discussed, because investors with short investment horizons are more likely to trade soon after deal completion, we expect them to value relative stock liquidity more than longer-term investors. Consistent with this notion, we find a stronger sensitivity of stock-payment to relative-liquidity in deals where targets have more short-term investors in their investor base.

Second, for stock deals, the percentage premium paid by the acquirer to the target is negatively related to the acquirer's stock liquidity relative to the target's.[4] A one-standard-deviation increase in the acquirer-target liquidity difference is associated with a reduction of up to 6% in the premium paid,

[4] We examine the impact of the acquirer's relative liquidity to the target's because target shareholders would care more about the acquirer's liquidity incremental to the target's or the expected change in liquidity brought by the deal (we discuss this in more details in subsection 5.1). Our results remain qualitatively similar if we only look at the acquirer's own liquidity.

depending on the liquidity measure. This is economically significant, when compared with the average premium of 25.9% in stock-paid acquisitions of public targets in our sample. Interestingly, a similar relation is not found in cash-paid deals, consistent with our claim that the acquirer's stock liquidity is irrelevant to target shareholders in these deals.

Third, firms tend to increase the frequency of earnings guidance and conduct stock splits prior to making stock acquisitions. By voluntarily disclosing more information than is mandated by regulations, these firms can reduce information asymmetry between insiders and investors, which leads to higher liquidity (e.g., Diamond and Verrecchia, 1991; Beyer et al., 2010). Stock splits can lead to more trading, and thus more informative stock prices, because an increase in uninformed trading attracts more informed trading (e.g., Kyle, 1985). As the literature shows, and we also confirm, these actions indeed help to increase stock liquidity.[5]

Finally, for stock deals, acquirers' three-day [-1, 1] cumulative abnormal returns (CARs) around deal announcements are positively related to the acquirer's liquidity (relative to the target's). For instance, a one-standard-deviation increase in the acquirer-target liquidity difference is associated with an increase in CARs by 0.60%-0.83%, depending on the liquidity measure. The average (median) three-day CARs for stock deals involving public targets in our sample is -3.86% (-2.94%). Therefore, the effect of the liquidity difference that we document is economically substantial. The value gains associated with more liquid acquirers are consistent with paying lower premiums for the targets.

Both stock liquidity and acquisition decisions are endogenous. To identify the causal effect of stock liquidity, we take two approaches. First, we follow the literature (e.g., Edmans, Fang, and Zur, 2013; Fang, Tian, and Tice, 2014) and adopt the introduction of decimalization as a quasi-natural experiment for its exogenous shock to stock liquidity. The NYSE and the NASDAQ switched from fractional pricing to decimal pricing in January and April 2001, respectively. The change to decimalization has been shown to have substantially narrower bid-ask spreads and improved market quality (e.g., Bessembinder, 2003; Furfine 2003). Second, we exploit the variation in stock liquidity that occurs in a narrow bandwidth of firms around the Russell 1000/2000 Index cutoff threshold following the annual Russell Index reconstitution. Since the index weights are value weighted, stocks at the top of Russell 2000 receive significantly higher weights than stocks at the bottom of Russell 1000. This leads to substantially higher liquidity for stocks at the top of Russell 2000, possibly due to (1) more trading in these stocks that arises from greater need from institutional investors for passive tracking and active benchmarking strategies, and (2) increased information disclosure and improved firm transparency

[5] See, for instance, Muscarella and Vetsuypens (1996), Coller and Yohn (1997), Lin, Singh, and Yu (2009), and Balakrishnan et al. (2014).

with higher institutional ownership in these firms. With both approaches, we confirm that the effect of stock liquidity on M&As holds; these results affirm that the effect of stock liquidity is likely causal.[6]

Our study contributes to several different strands of the literature. First, we add to the literature on the effect of stock liquidity on firms' decisions, governance, and performance. Existing empirical studies have shown that stock liquidity is positively associated with firm value (Fang, Noe, and Tice, 2009), and can affect executive compensation (Jayaraman and Milbourn, 2012), corporate governance (e.g., Bharath, Jayaraman, and Nagar, 2013; Edmans, Fang, and Zur, 2013; Back, Collin-Dufresne, Fos, Li, and Ljungqvist, 2017), and corporate innovations (Fang, Tian, and Tice, 2014; Dass et al., 2015). More generally, our findings support the notion that stock markets have real effects, as suggested by a burgeoning literature (see Bond, Edmans, and Goldstein (2012) for a summary).

We show that stock liquidity has real implications for firms' acquisition decisions and helps to lower deal premiums paid, which enhances the deal value for acquirers. Prior studies have focused primarily on the (il)liquidity of *targets* and examined its implication on deal characteristics and pricing (e.g., Shleifer and Vishny, 1992; Koeplin, Sarin, and Shapiro, 2000; Schlingemann, Stulz, Walkling, 2002; Officer, 2007; Massa and Xu, 2013). This is in contrast to our focus on stock liquidity of *acquirers* jointly with liquidity of targets. For instance, Koeplin, Sarin, and Shapiro (2000) and Officer (2007) document a price discount for unlisted targets because sellers cannot trade their equity easily.[7] Massa and Xu (2013) find that acquiring a more liquid target is associated with an increase in the liquidity of the combined firm, and public acquirers prefer more liquid targets and are willing to pay more for them. They, however, do not consider the impact of acquirers' liquidity. One exception is Maksimovic, Phillips, and Yang (2013), who show that stock liquidity increases a firm's acquisitiveness. Our study proposes a novel acquisition currency hypothesis of liquid stock, and provides consistent evidence in support of it above and beyond the impact of stock liquidity on a firm's acquisitiveness.

Our finding that acquirer's stock liquidity is positively related to acquirer's announcement returns in stock acquisitions of publicly-listed targets is consistent with Roosenboom, Schlingemann, and Vasconcelos (2013). However, they focus primarily on the relation between stock liquidity and acquirer returns in acquisitions of unlisted targets, scenarios where they argue that institutional monitoring through voice is more important than the threat of exit. More importantly, unlike all of the above studies, we also examine how firms proactively manage stock liquidity prior to M&As in anticipation

[6] It is likely that changes in composition of Russell-1000/2000 indices may lead to changes in other aspects of constituent stocks than liquidity. For instance, Appel, Gormley, and Keim (2016) show that the greater ownership by passive institutions in the top stocks of Russell 2000 results in better governance in these firms. While at least some of our results cannot be explained by the governance explanation and we show that the effect of stock liquidity on M&As holds even in firms that do not experience a change in governance following the index reconstitution, it is not feasible to completely disentangle the effect of stock liquidity from the effect of other factors like corporate governance in this Russell index setting. We therefore take these tests based on Russell Index as ancillary to the tests based on stock-price decimalization.

[7] Fuller, Netter, and Stegemoller (2002) posit that the better market reactions to acquisitions of private targets versus acquisitions of public targets may be due to such a liquidity discount for private targets.

of the impact of stock liquidity on M&As as well as how acquirers' stock liquidity affects the method of payment. Moreover, we are among the first to address the potential endogeneity concerns by exploiting an exogenous shock to stock liquidity due to stock-market decimalization and Russell index reconstitution, and delineate a causal impact of stock liquidity on M&As.

This study also improves our understanding of the determinants of M&A financing decisions. The literature has examined acquisition payment choice based on adverse selection, corporate control, and financial capacity.[8] As per this literature, factors that bidders consider include debt capacity when financing with cash, loss of corporate control from ownership dilution, the informational opaqueness of target assets, and whether they perceive their stock as being overvalued when financing with stock. For targets, uncertainty with acquirers' growth opportunities and valuations as well as deferred tax benefits with stock payment are among the main considerations when deciding whether to accept stock payment. The listing status of targets is often used as a proxy for the liquidity needs of target shareholders in the examination of their cash preference (e.g., Faccio and Masulis, 2005). But there is little known about how acquirers' stock liquidity may affect corporate M&A activity and acquisition payment choice.

Finally, we also contribute to the literature in understanding acquirers' behavior prior to acquisitions. The literature has shown that, in order to increase their stock price prior to making stock acquisitions, acquirers tend to manage earnings up (Erickson and Wang, 1999; Louis, 2004), disclose good news or withhold bad news (Ge and Lennox, 2011), or manipulate financial media coverage (Ahern and Sosyura, 2014). We find that firms are likely to take more direct actions that improve stock liquidity prior to a stock acquisition.

The rest of the paper is organized as follows. Section 2 presents the testable predictions derived from a stylized model. Section 3 describes the data and the variables. Section 4 presents the specifications and main results of the empirical tests. Section 5 discusses the various robustness checks of our empirical analysis. Concluding remarks are presented in Section 6.

2. A Simple Model and Testable Predictions

Liquidity is generally considered to be a desirable feature of assets (e.g., Easley and O'Hara, 2003). Amihud and Mendelson (1980) argue that firms with illiquid stocks will tend to have a lower valuation and higher expected returns to compensate investors for anticipated trading costs. Over the past years, a large theoretical as well as empirical literature has emerged that explores the relation between stock liquidity, trading between heterogeneously informed investors, incentive contracting, and governance.

[8] There is a large literature on acquisition payment method (e.g., Hansen, 1987; Travlos, 1987; Stulz, 1988; Fishman, 1989; Amihud, Lev, and Travlos, 1990; Berkovitch and Narayanan, 1990; Eckbo, Giammarino, and Heinkel, 1990; Brown and Ryngaert, 1991; Martin, 1996; Ghosh and Ruland, 1998; Eckbo and Thorburn, 2000; and Fuller, Netter, and Stegemoller, 2002). See Faccio and Masulis (2005) for a literature review.

Some of the earlier papers in this literature are Grossman and Stiglitz (1980), Kyle (1985), Holmstrom and Tirole (1993), and Maug (1998).

Our focus in the paper is on the effect of stock liquidity on the takeover process. As we discuss, there are several channels through which stock liquidity could potentially affect mergers, the method of payment, and the acquisition premium. We propose and test a particular liquidity channel that we refer to as the *Acquisition Currency* hypothesis. We offer a simple model to sharpen intuition and develop predictions that we test empirically. We also discuss alternative ways in which liquidity could impact the takeover process and elaborate on tests that allow us to distinguish the Acquisition Currency hypothesis from alternative liquidity channels.

2.1. Liquidity channels

Acquisition Currency Hypothesis: Our main hypothesis is that, for stock-for-stock acquisitions, target shareholders prefer stock that is more liquid. This preference derives from future trading costs that target shareholders expect to bear. We use a stylized model to argue that, on account of a preference for liquid stock, target shareholders would be willing to accept a lower acquisition premium from acquirers with more liquid stock. *Ceteris paribus*, we expect the acquisition premium to be decreasing in the liquidity of acquirer stock, while increasing in the liquidity of target stock. As a consequence, acquirers with liquid stock are more likely to engage in acquisitions and to pay in stock when they acquire. We also expect acquirers to take steps, such as conducting stocks splits and enhancing information flow to investors, in an effort to improve stock liquidity prior to making stock acquisitions. Other predictions of our hypothesis are discussed in the context of our model developed below.

Alternative Liquidity Channels

As noted, there are alternative channels through which liquidity could affect the M&A process. We briefly outline two types of alternative channels. A channel that has received theoretical and empirical attention in the extant literature is the potential effect of liquidity on the firm's governance and incentive contracting. A second channel for the effect of stock liquidly on M&As could operate through acquirer valuation and reduction in asymmetric information.

Governance: It has been argued (e.g., Holmstrom and Tirole, 1993) that greater stock liquidity leads to stock prices that are more accurate in terms of reflecting firm value and managerial performance. As a result, managers could be offered stronger stock-based incentive contracts, thereby reducing agency problems and enhancing firm value. Greater stock liquidity could also ease the formation of blockholdings and strengthen monitoring (e.g., Edmans, et al., 2013). The reduction in agency problems, whether through stronger managerial incentives or better monitoring, would be expected to improve the quality of the acquisitions made by the firm. Roosenboom, Schlingemann, and Vasconcelos (2013) find evidence in support of stock liquidity affecting the acquisition process but through the governance channel.

As we discuss below, the acquisition-currency channel has predictions that are distinct from those of the governance channel. For instance, the governance channel has no predictions in terms of the effect of acquirer's liquidity on its acquisitiveness or the effect of target's liquidity on stock payment and the acquisition premium, as predicted by our acquisition-currency hypothesis. Our empirical tests allow us to distinguish between these two channels.

V*aluation:* An alternative effect of liquidity could be through the improved price informativeness or reduction in information asymmetry that could occur when the stock is more liquid. Hence, with greater liquidity, target shareholders may be less concerned about being paid with overvalued stock. Overvaluation is a concern since stock overvaluation can motivate stock acquisitions (e.g., Shleifer and Vishny, 2003).[9] We note that the empirical predictions differ between the channels: while the valuation channel could induce firms to rely more on stock-for-stock acquisitions, there is no prediction that the acquisition premium would be affected by the target firm's stock liquidity, as is predicted by the acquisition currency hypothesis.

2.2. A simple model of liquid stock as an acquisition currency

We sketch a simple model to illustrate the potential effect of stock liquidity – of publicly-traded acquirers and targets – on the market for corporate control where acquirer stock is used as the acquisition currency (or medium of exchange). We begin by describing the timing of events in our single-period model. There are three salient dates $\mathrm{t} = 0,1 \,\&\, 2.$ On date $\mathrm{t} = 0$, firm A decides on whether to acquire a target firm T. Both the target and acquirer are publicly traded firms.[10] If there is an acquisition, its terms are negotiated and the acquisition is completed on date 0 as well. As we explain below, the premium paid for the acquisition can depend on a number of factors such as the synergy value created by the merger, bargaining power of A and T, as well as the preferences of target investors with regard to stock liquidity. To establish a pre-acquisition price, we will assume that there is stock market trading on dates prior to the arrival of the acquirer (say date $t = 0^{-}$). On date 0^{-} the likelihood of an acquisition is considered to be very low (essentially zero) and stock price reflects the stand-alone value of the target firm. Date 1 is an intermediate date on which the stock market is open and trading occurs. It is on date 1 that the liquidity properties of the target and acquirer stock can have a material effect on the payoffs to investors. Finally, date 2 represents the terminal date on which any uncertainty regarding firm values is resolved. All market participants are taken to be risk-neutral. For simplicity, there is no discounting of value between dates.

[9] There are several other studies that examine stock acquisitions with overvalued stock of the acquirer; these include Rhodes-Kropf, Robinson, and Viswanathan (2005), Ang and Cheng (2006), Dong et al. (2006), and Fu, Lin, and Officer (2013).

[10] The intuition of our Acquisition Currency hypothesis holds for private targets too. However, since it is empirically difficult to quantify the liquidity of a private target, we focus on public targets wherever our empirical tests involve stock liquidity of targets.

In the absence of an acquisition, target stock price (or payoff) is expected to be V_T on the terminal date $t = 2$. If there is a merger, we assume that there are synergistic benefits that result in a non-stochastic value enhancement of V_0 per share to the pre-merger firm values V_T, V_A. Each of the firms has N shares outstanding.

We now describe the liquidity preferences of target firm shareholders. We take the target firm T to have two types of shareholders. First, there are small or 'atomistic' retail investors. The atomistic investors have the attributes of noise traders and they are as likely to buy or to sell for non-information related reasons. Their orders are small and are taken to have a negligible price impact.[11] The atomistic investors have limited funds, but they are not subject to liquidity shocks and expect to hold the stock till the terminal date. In particular, if there is a liquidity-induced price drop on date 1, these investors can choose not to trade. Hence, while they do not have the resources to take advantage of a liquidity-induced price drop, they are not compelled to sell at the depressed price. In the absence of significant liquidity-driven selling, as discussed below, we take the atomistic investors to be marginal investors with the stock market price equal to the firm's expected share value. To fix the pre-acquisition stock price, we assume that there is no substantial selling pressure on date 0^-. Since market participants regard the possibility of an acquisition to be a low-probability (essentially zero) event at date 0^-, the market clearing price is given by the expected final value of V_T.

The second class of investors (large investors) in the target firm are those with more significant holdings, such as institutional investors. In aggregate, these large investors hold a fraction η of the target stock. The investors are taken to be similar in terms of the (liquidity) risks they face and each owns a quantity of shares normalized to 1. We argue that stock liquidity may be especially relevant to these investors if they face the risk of significant liquidity shocks that could force a sale of their stock positions. Mutual funds, for instance, face the risk of large redemptions that can induce a sale of assets, often at depressed prices.[12] Specifically, there is taken to be a probability π of redemptions at date 1 that affect several of these large investors, say a fraction α. Since the total quantity of shares to be sold is relatively large, we assume that it results in the stock price being depressed below its expected value on date 2. The prices are depressed on account of the inventory holding costs that market makers have to bear as well as the price discounts that may be necessary to attract sufficient new investors to clear the market.[13] The extent to which stock prices are depressed and the speed with which the prices recover depend on the stock's liquidity reflecting investor demand for the stock as well as factors such as firm transparency (that reduce the potential for information asymmetry). Stock liquidity is partially

[11] This is the implication, for instance from Kyle (1985), in which price impact is λx, proportional to trade volume x and the liquidity parameter λ.
[12] See, for instance, Coval and Stafford (2007) on mutual fund fire sales.
[13] See Duffie (2010) on the role of slow-moving capital.

under the control of firm management through, for example, its disclosure policy choices, payout policies, and stock splits.[14] In particular, we assume that the larger investors face a liquidity cost of λ_T in target stock (in the absence of a merger), so that in the event of having to liquidate, they can sell their holding for only $(V_T - \lambda_T)$. As is common in the literature, we refer to λ_T as a liquidity parameter, though it actually represents (il)liquidity. Hence, from the perspective of these investors, accounting for the potential liquidity costs they face, the shares are only worth $(V_T - \pi\,\alpha\,\lambda_T)$ in the absence of an acquisition. Recall here that the atomistic shareholders are unable to buy at the depressed price and will retain their shares till date 2.

The acquirer expects the merger to create a synergy value of V_0. Prior to the acquisition, the acquirer stock has a liquidity parameter of λ_A, where $\lambda_T > \lambda_A$. We assume that if there is an acquisition, the management of firm A will continue its liquidity policy for the merged firm and the liquidity parameter of the merged firm will stay at λ_A. This assumption simplifies expressions, but the results would be very similar if we assume instead that the merged firm is expected to have a liquidity parameter λ_M as a function of λ_A and λ_T, as long as $\lambda_T > \lambda_M \geq \lambda_A$.[15]

We next consider the negotiation over the acquisition premium and the decision to merge. We assume that a factor that can affect the merger decision is that it entails a non-pecuniary effort cost C (e.g., search for a suitable target) borne by the management of the acquirer prior to any merger negotiations (hence, cost C is sunk and does not affect acquisition terms). To obtain the acquisition premium, we assume that the boards of the acquirer and the target bargain over the acquisition price in an effort to maximize the total wealth of their respective shareholders, taking account of the anticipated trading costs of the target's shareholders. The benefits received by shareholders are weighted by their respective share ownership of the firms.

If the acquisition currency is stock, we assume that the likelihood that the target's large shareholders face a liquidity shock and sell the shares of the merged firm is unaffected by the merger. The surplus that is potentially created by the merger consists of two pieces. One is the synergistic value V_0. The other is the anticipated reduction in liquidity costs when the target's large shareholders obtain the stock in the merged firm in exchange for their holdings in the target. To obtain the surplus created by the merger, we note that a fraction η of the target's shareholders are large shareholders. In the absence of a merger, they face a probability $\pi\alpha$ of being subject to liquidity shocks and a resulting cost of λ_T. While a merger does not affect the likelihood of a liquidity shock, it is less costly since the

[14] See, for example, Diamond and Verrecchia (1991), Muscarella and Vetsuypens (1996), Coller and Yohn (1997), Lin, Singh, and Yu (2009), Beyer, et al. (2010), and Balakrishnan et al. (2014).
[15] We will come back to this issue in Section 5.1.

liquidity parameter decreases to λ_A. Hence, the total surplus value (weighted value per share) created by the merger relative to the stand-alone value of the target firm can be expressed as:

$$\Delta V = V_0 + \eta\pi\alpha(\lambda_T - \lambda_A). \qquad \text{(E-1)}$$

We assume that the bargaining between the boards of the target and the acquirer can be treated as a Nash bargaining game in which (for simplicity) the bargaining powers of the two parties are taken to be equal. As a result, the acquisition takes place at a price, say P, such that the surplus ΔV is shared equally between A and T.

To obtain P, we note that the value that the acquirer receives from the acquisition is given by

$$V_T + V_0 - P,$$

while the weighted-average value received by shareholders of the target is given by:

$$P - V_T + \eta\pi\alpha(\lambda_T - \lambda_A).$$

Given their equal bargaining power, we equate the value received by the shareholders of the two firms to obtain the equation below:

$$P - V_T + \eta\pi\alpha(\lambda_T - \lambda_A) = V_T + V_0 - P \qquad \text{(E-2)}$$

or,

$$P = V_T + \frac{1}{2}(V_0 + \eta\pi\alpha(\lambda_A - \lambda_T)). \qquad \text{(E-3)}$$

It is easily verified that this acquisition price results in the shareholder of A and T sharing the surplus ΔV from (E-1) equally.[16] Also, observe that the acquisition premium $\frac{1}{2}(V_0 + \eta\pi\alpha(\lambda_A - \lambda_T))$ is decreasing in the liquidity of the acquirer (i.e., decreases as λ_A decreases) and increasing in the liquidity of the target (i.e., increasing as λ_T decreases). From the perspective of the acquirers, they will be willing to spend resources C (recall that this is non-pecuniary managerial effort) to uncover a target as long as:

[16] If we substitute for *P* from equation (E-3) and simplify, the acquirer's surplus can be expressed as: $V_0 - \frac{1}{2}(V_0 + \eta\pi\alpha(\lambda_A - \lambda_T)) = \frac{1}{2}(V_0 + \eta\pi\alpha(\lambda_T - \lambda_A) = \frac{1}{2}(\Delta V)$ from equation (E-1). A similar substitution shows that the surplus received by the target is also $\frac{1}{2}(\Delta V)$.

$$\frac{1}{2}(\Delta V) \geq C. \qquad \text{(E-4)}$$

The above (weak) inequality implies that an increase in acquirer stock liquidity and a decrease in target stock liquidity (which increases the left-hand-side of (E-4)), makes it more likely that the inequality is satisfied and, hence, increases the likelihood of a stock-for-stock acquisition

Our simple model above yields a number of predictions that we test in our empirical analysis. We note that some of these predictions are specific to the acquisition currency hypothesis and allow us to distinguish this channel from the two alternatives we have discussed.

Prediction 1: Firms with more liquid stock are more likely to make acquisitions and pay for these acquisitions with stock, ceteris paribus. Also, the more liquid is acquirers' stock relative to targets', the more of the overall payment for the acquisitions is paid in stock.

Prediction 1 follows directly from equations (E-3) and (E-4) that, as discussed, imply that greater (lower) acquirer (target) stock liquidity lowers the premium paid and, thereby, increases the likelihood of a stock-for-stock acquisition. While we have not explicitly considered acquisitions using cash, the above arguments imply that if a firm is cash-constrained (and forced to use some stock), the use of stock will increase as it becomes a more attractive acquisition currency.

Prediction 1 provides a test that separates the acquisition currency hypothesis from the alternatives. This is because our hypothesis predicts that the method of payment and the acquisition premium will depend on the liquidity of *both* the acquirer and the target. The alternative governance and valuation hypotheses have no such predictions.

The investment horizons of shareholders in targets are expected to matter as well. Due to their relatively short horizon in trading needs, short-term investors are likely to value acquirer's stock liquidity more. Hence, we expect that, *ceteris paribus*, the sensitivity of stock payment to the acquirer's stock liquidity will increase in shareholding by short-term investors in the target.

Our next prediction follows from equation (E-3) that the acquisition premium is lower (higher) if the acquirer's (target's) stock is highly liquid. We note that this prediction applies only to stock-for-stock acquisitions. It does not apply to cash deals, because acquirers' stock liquidity is irrelevant to target shareholders in cash deals. We can state the second testable prediction:

Prediction 2: In stock-financed acquisitions, the higher the liquidity of acquirers' stock relative to that of targets', the lower will be the acquisition premium paid. This is <u>not</u> the case in cash-financed acquisitions.

Knowing that target shareholders will prefer more liquid stock in a stock-for-stock deal, which can in turn put acquirers' shareholders in a more favorable position in the exchange (e.g., paying lower premium), acquirers have an incentive to increase their stock liquidity in anticipation of a stock deal in the near future. They can, for instance, improve their transparency in the stock market by disclosing more information than what regulations mandate (e.g., providing more informative earnings guidance). They can also conduct stock splits to facilitate more trading by uninformed investors. Market makers

can thus provide liquidity services at lower cost, which would result in higher propensity of trading and increase in liquidity. While we do not consider the role of information in our simple model, it has been argued that with a higher level of trading, the stock price can become more informative if the greater presence of uninformed trading attracts more trading from informed investors (Kyle, 1985).

The extant literature provides evidence that enhanced information disclosure and stock splits help to increase stock liquidity. For instance, Coller and Yohn (1997) find that bid-ask spread reduces following management forecasts, while Lin, Singh, and Yu (2009) find declining incidence of no trading and lower liquidity risk following stock splits.[17] This leads us to our third prediction:

Prediction 3: Acquirers are more likely to take actions, such as providing earnings guidance and conducting stock splits, to increase their stock liquidity prior to stock deals.

It follows from our model that firms with more liquid stocks will be better positioned to make acquisitions and pay lower premiums than firms that are otherwise similar, but have less liquid stocks. This leads to our fourth testable prediction:

Prediction 4: The more liquid the acquirer's stock is relative to that of the target's stock, the more the gains to acquirer shareholders in a stock deal, ceteris paribus.

3. Data and Summary Statistics

3.1. Data and sample

We obtain our data on M&As from Thomson One Securities Data Corporation's (SDC) U.S. Mergers and Acquisitions database. We start with all M&As that occurred between January 1, 1985 and December 31, 2012. We then impose the following selection criteria in reaching the final sample of 4,966 deals: (1) the acquirer is publicly listed and has accounting and financial information in Compustat and CRSP, (2) the acquirer acquires more than 50% of the target, (3) the target is either a public or a private firm, (4) the deal value is at least $50 million, and (5) information on deal payment method and status, acquirer characteristics (to be discussed below), and target characteristics (for public targets) is available. We exclude subsidiary targets because the payment of acquisitions of subsidiary targets is mostly in cash and, thus, acquirer's stock liquidity is less likely to play a significant role in the acquisition.

The tests of *Prediction 1* and *Prediction 3* require the inclusion of all firm-years, whether or not there is an acquisition. We thus start with all publicly-listed firms in Compustat/CRSP and require data on a firm's main characteristics in a year to be available in order for it to be included in the sample. These characteristics include three measures of stock liquidity, total assets, market-to-book ratio, leverage,

[17] Several other papers find similar evidence. For instance, Balakrishnanet al. (2014) show that firms respond to an exogenous loss of public information by providing more timely and informative earnings guidance, which results in an improvement in liquidity. Muscarella and Vetsuypens (1996) study splits of American Depositary Receipts (ADRs) that are not associated with splits in their home-country stock, and argue that the positive announcement return of stock splits reflect the increase in liquidity.

asset tangibility, stock return, and return volatility. The final sample consists of 13,899 firms and 118,229 firm-years for the period of 1984-2012.[18]

3.2. Summary statistics

We use three different measures of stock liquidity that are prevalent in the literature: Amihud's (2002) illiquidity ratio, bid-ask spread, and share turnover. Major M&A deal characteristics such as method of payment and deal premium are constructed following the convention in the literature. We also use a set of control variables that have been shown in the literature to affect a firm's acquisition decisions, method of payment, and deal premium. Definitions of all variables are provided in the Appendix A. To reduce the impact of outliers, we follow the literature and winsorize all continuous variables at the 1st and 99th percentiles.

Table 1 reports summary statistics of key firm and deal characteristics for sample firms. Panel A presents summary statistics of sample firms' characteristics. The average (median) Amihud's Illiquidity ratio is –4.79 (–4.63), while the average (median) bid-ask spread is 4.19 (3.97). The average share turnover is 63.6%. Acquisitions occur in about 10% of the firm-years, while slightly less than half of them are paid in stock. Panel B presents characteristics of acquirers of both public and private targets across a total of 4,966 deals. Consistent with *Prediction 1*, the average acquirer has higher stock liquidity (as per all three measures) than the average Compustat-CRSP firm (reported in Panel A), and their differences in both means and medians are statistically significant (results of statistical tests are not tabulated for brevity). Also, acquirers have higher prior-year industry-adjusted stock returns and market-to-book ratios, but lower stock return volatility than the average Compustat-CRSP firm.

Panel C reports characteristics of public targets in the 2,501 deals. On average, public targets appear to have lower liquidity, but significantly higher market-to-book ratios, than acquirers. Panel D presents deal characteristics for all deals involving public targets. In an average deal, over 60% of the payment is in stock and the acquirer pays a premium of 25.9% over the target's stock price as of two days prior to the deal announcement. The average (median) three-day announcement abnormal returns for acquirers are –2.3% (–1.7%). 15% of the deals are tender offers and there are competing bidders involved in 7.7% of the deals.

4. Main Empirical Results

[18] We start our sample one year earlier than the M&A sample starting year because our tests involve the examination of the impact of a firm's lagged stock liquidity on its acquisition decision.

In this section, we present the specifications and results of our empirical tests. We test our predictions regarding the effect of liquidity on firms' acquisition decisions, deal premiums, and deal announcement returns as well as firms' actions to affect stock liquidity prior to acquisitions.

4.1. Acquisitions and Acquirer's Stock Liquidity

4.1.1. The decision to acquire and to pay for the acquisition with stock

To test *Prediction 1* about the effect of stock liquidity on the likelihood of firms making acquisitions and the likelihood of acquisitions being paid in stock, we use the sample of all Compustat-CRSP firms and estimate the following logit regression of a firm's acquisition decision on its stock liquidity:

$$Y_{it} = \alpha_0 + \alpha_1 \, Liquidity_{it-1} + \alpha_2 \, Controls_{it-1} + \mu_t + \varepsilon_{it} \, . \quad (1)$$

Y_{it} is an indicator variable that equals one if firm *i* makes an acquisition (or, alternatively, stock acquisition) in year *t* and zero otherwise. $Liquidity_{i,t-1}$ is firm *i*'s stock liquidity as of year *t–1* and $Controls_{it-1}$ include a set of firm *i*'s characteristics as of year *t–1*, such as *Leverage*, *Δ Leverage*, *PPE/Asset*, *Market-to-Book*, *Ind_stock_return*, *Firm Size*, and *Volatility*. Definitions of these variables are provided in Appendix A. The first three variables capture a firm's ability to issue debt in financing a potential acquisition. *Market-to-Book* and *Ind_stock_return* are included to measure the firm's valuation and performance, respectively. We use a firm's stock volatility, *Volatility*, to capture its information environment that may affect the firm's acquisition decision. As per *Prediction 1*, we expect a significantly positive coefficient on $Liquidity_{i,t-1}$ for both of the dependent variables – the acquisition indicator and the stock acquisition indicator. As a robustness check, we also estimate Equation (1) using a linear probability model with firm fixed effects. All the findings continue to hold. For brevity, we leave them unreported.

In all the regressions here and throughout the paper, unless otherwise specified, we include both year and Fama-French 48 industry fixed effects to ensure that we identify the estimates using within-year and within-industry variations in firm decisions and deal characteristics. Robust standard errors are clustered at the industry level.

Table 2 presents the results obtained from estimating Equation (1) in the full sample. The estimated coefficients on all three proxies for stock liquidity have the predicted positive sign and are statistically significant at 1% level. This suggests that, *ceteris paribus*, firms are more likely to make acquisitions when their stock liquidity is higher. In accordance with the odds ratios obtained from the logistic regressions, the odds of acquisition are 3.94 and 2.41 times higher after a one-standard-deviation decrease in

Amihud's illiquidity ratio and bid-ask spread, respectively.[19] Also, the odds of acquisition increase by 0.94 times following a one-standard-deviation increase in share turnover.[20] Thus, the impact of stock liquidity on the odds of making an acquisition is economically significant. We also find that the likelihood of acquisition is positively related to prior-year industry-adjusted stock returns and negatively related to change in leverage, suggesting that firms with better stock performance and firms with a decline in leverage are more likely to make acquisitions.

Next, we repeat the analysis by estimating Equations (1), except that the dependent variable is a dummy variable that equals one for stock acquisitions. We present the results in Table 3. Consistent with our prediction, a firm's likelihood of making a stock acquisition increases with its stock liquidity. Specifically, the estimated coefficients on stock liquidity measures are all positive and statistically significant at 1% level. Compared with its effect on the likelihood of acquisition (as reported in Table 2), the economic impact of stock liquidity on the likelihood of stock acquisition is even greater. The odds of stock acquisition are 4.06 and 2.53 times higher for a one-standard-deviation decrease in Amihud's illiquidity ratio and bid-ask spread, respectively, and are 0.95 times higher following a one-standard-deviation increase in share turnover. We also find that the likelihood of stock acquisition is significantly related to certain firm characteristics. A firm is more likely to make stock acquisitions when its prior-year industry-adjusted stock returns and market-to-book ratio are higher, or when its assets are less tangible.

The beneficial role of stock liquidity should be more pronounced in firms that are financially constrained and, thus, have less access to cash to pay for acquisitions. As such, we examine whether the effect of stock liquidity on the decision to make stock acquisitions is stronger in firms that are financially constrained. We use three measures of financial constraints based on Kaplan and Zingales (1997), Whited and Wu (2006), and firm age (more mature firms are less likely to be constrained), respectively. Our sample is then divided into terciles every year based on the three respective measures and the firms in the middle terciles are dropped. A dummy variable, *Constraint Dummy*, is then defined to be equal to one if a firm is in the most-constrained tercile and zero if a firm is in the least-constrained tercile every year. We augment Equation (1) by interacting $Liquidity_{it-1}$ with $Constraint\ Dummy_{i,t-1}$. We predict a positive coefficient on the interaction term, indicating a stronger relation between stock liquidity and the likelihood of stock acquisition for financially-constrained firms. We run a linear probability model regression in this case because interaction terms in a logit model could lead to incorrect inferences (Ai and Norton, 2003). The regression results, reported in Table 4, are consistent with this prediction. The estimated coefficient on the interaction

[19] The unconditional odds are 1.29 and 1.71, respectively.
[20] The unconditional odds are 1.26.

term is positive and statistically significant for the three liquidity measures, while the coefficients on the liquidity measures themselves remain strongly positive.[21] This finding provides further support for our prediction about the beneficial role of stock liquidity in acquisitions.

4.1.2. Fraction of acquisition payment in stock

To test the other implication of *Prediction 1* regarding the effect of liquidity on the extent to which stock is used to pay for an acquisition, we focus on the sample of acquisitions that involve public targets and estimate regressions based on the following Tobit model:

$$Stockpay_{it} = \beta_0 + \beta_1 \, Relative\ Liquidity_{it-1} + \beta_2 \, Controls_{it-1} + \mu_t + \varepsilon_{it} \,. \qquad (2)$$

$Stockpay_{it}$ is the fraction of equity in the payment for an acquisition by firm *i* in year *t*; it takes a value between 0 and 1. $Relative\ Liqudity_{it-1}$ is the difference of stock liquidity between acquirer *i* and its target, both as of year *t*-1. $Controls_{it-1}$ include the same set of variables as in Equation (1) and several additional variables that are meant to capture deal characteristics such as *Ln(deal size)*, *Relative Size*, *Cash/Deal*, and *Tender Offer*. If the deal size is large, the target is large relative to the acquirer, or if the acquirer has small cash holding relative to the deal size, then the fraction of equity used for payment is likely to be larger. Stock financing is also more likely in tender offers (Martin, 1996).

Our model suggests that target shareholders will take into account both acquirer's liquidity and target's liquidity when considering the form of acquisition payment. The coefficient β_1 in Equation (2) captures the preference for any incremental liquidity that target shareholders expect to have as shareholders of the merged firm, relative to their status-quo liquidity.[22] We expect β_1 to be significantly positive: that is, the more liquid the acquirer's stock is relative to the target's stock, the greater will be its use of stock to pay for the acquisition. We also estimate an alternative specification that includes acquirer's and target's liquidity as separate covariates in Equation (2). For the alternative, we expect a positive coefficient on acquirer's liquidity and a negative coefficient on target's liquidity.

The results from this analysis, presented in Panel A of Table 5, show that stock liquidity has a significant positive effect on the fraction of acquisition payment made in stock. The estimated coefficient on *Relative Liquidity* is positive and statistically significant at 1% level. The more liquid the acquirer's stock is relative to the target's, the higher is the fraction of acquisition payment made in stock. For example, in column (1), a one-standard-deviation increase in *Relative Liquidity* is associated with a 14.3% increase from the average fraction of payment that is made in stock. In tests left

[21] The only exception is when AMH is used as the liquidity measure and firm age is used to measure a firm's financial constraint, the interaction term is positive but statistically insignificant.
[22] A further discussion of this is in Section 5.1.

unreported, we find that the results in Table 5 are robust if we instead include both the acquirer's and the target's liquidity separately as explanatory variables. In particular, the coefficient on the acquirer's liquidity is significantly positive and the coefficient on the target's liquidity is significantly negative.[23] Moreover, we find that the fraction of payment in stock is also highly related with both firm and deal characteristics. For example, acquirers with higher return run-up, more volatile stock returns, lower asset tangibility, higher leverage, or less cash holding relative to the deal size pay more in stock. Also, more stock is paid in larger deals and when the target is large in size relative to the acquirer.

4.1.3. The effect of target shareholder characteristics

In this section, we examine the effect of target shareholder characteristics – such as ownership by blockholders and the investment horizon of investors – on the relation between stock acquisitions and *Relative Liquidity*. In general, longer-horizon investors and blockholders (typically longer horizon) would not be expected to place much value on an acquirer's stock liquidity in the near term. In Panel B of Table 5, we interact *Relative Liquidity* with *Blockholder*, which is the number of blockholders with 5% or more stock ownership in the target in the quarter prior to deal announcement. The coefficients on *Relative Liquidity* remain significantly positive with a greater economic magnitude than those in Panel A, suggesting that the effect of the acquirer's stock liquidity (relative to the target's) on stock payment is greater for targets with no blockholders (*Blockholder* = 0). The coefficients on the interaction term *Relative Liquidity x Blockholder* are negative and statistically significant at the 1% level in columns (1) and (2). The results indicate that the impact of the acquirer's relative stock liquidity on stock payment for the acquisition becomes weaker when there are more blockholders in the target. As noted, blockholders tend to be longer-term investors; hence, following the logic of our model, since blockholders do not expect to exit the firm in the near term, they may attach lesser value to acquirer's stock liquidity. This would make cash offer more likely.[24] Economically, each additional blockholder in the target reduces the sensitivity of stock-payment to *Relative Liquidity* by 12.5%-24% (depending on the liquidity measure), when compared with the benchmark case of no blockholders in the target.

[23] The literature has established that most acquisitions made by private acquirers are paid with cash. For example, in their sample of M&As involving public targets during 1987-2007, Massa and Xu (2013) find that of all transactions involving a private (public) acquirer, 71% (35%) are paid for with cash, 2% (29%) with stock, and the rest with a mixture of both. Although we do not examine cases involving private acquirers due to the lack of data on their characteristics, this empirical regularity seems to be consistent with our finding that target shareholders tend to prefer cash over stock when acquirers' stock is "extremely illiquid" for private acquirers.

[24] Also, when corporate control is a concern for an acquirer, the acquirer is less likely to accept blockholders into its investor base of the new firm and thus may avoid payment in stock. Consistent with this, Harford, Humphery-Jenner, and Powell (2012) find that when entrenched managers make offers to buy private targets or public targets with blockholders, they are less likely to use all-equity offers so as to avoid blockholders in the combined firm. Therefore, when targets are owned by blockholders, the acquirer's stock liquidity is, not surprisingly, less relevant for acquisition payment in stock.

In Panel C of Table 6, we analyze the effect of investor horizon on the sensitivity of stock-payment to *Relative Liquidity*. We interact *Relative Liquidity* with *Short Horizon*. *Short Horizon* is defined as the ratio of target's equity held by short-term institutional investors to that held by long-term institutional investors in the quarter prior to the announcement date. Our classification of institutional investors into short- and long-term investors follows Yan and Zhang (2009) and is based on their portfolio turnover over the past four quarters. The estimated coefficients on *Relative Liquidity* remain positive and statistically significant at the 1% level. Moreover, the coefficients on the interaction term between *Relative Liquidity* and *Short Horizon* are all positive and significant at the 1% level. This is consistent with our prediction that the impact of the acquirer's relative liquidity on stock payment increases in the presence of short-term institutional shareholders in the target, who value liquidity more due to their relatively frequent trading needs. Estimated coefficients on other variables in both Panels B and C are consistent with those in Panel A and are left unreported for brevity.

In sum, our finding on the effect of target shareholder characteristics provides strong support for the acquisition currency hypothesis. It also helps to distinguish this hypothesis from the alternative governance and valuation hypotheses that lack any clear predictions regarding the impact of target shareholder attributes.

4.2. Acquisition Premium and Acquirer's Stock Liquidity

We examine the effect of the acquirer-target difference in stock liquidity on deal premium to test *Prediction 2* using the same sample of acquisitions that involve public targets as in Section 4.1.2. In particular, we estimate an OLS regression using Equation (2) except that the dependent variable is deal premium. Because the deal premium implication of *Prediction 2* applies to stock deals but not to cash deals, we estimate regressions separately for the two types of deals. In these regressions, we control for both acquirer's and target's characteristics as well as deal characteristics used in the tests of *Prediction 1*. We expect the coefficient β_1 to be significantly negative for stock deals, but we expect no such a relation for cash deals. Alternatively, we include acquirer's and target's liquidity separately in the regressions and, for stock deals (but not in cash deals), we expect a negative coefficient on acquirer's liquidity and a positive coefficient on target's liquidity.

Table 6 presents results that are consistent with *Prediction 2*. In the subsample of stock acquisitions, the estimated coefficient on *Relative Liquidity* is negative and statistically significant for the three liquidity measures. In particular, the price premium is lower by 1.66%-5.95% (depending on the liquidity measure) for a one-standard-deviation increase in *Relative Liquidity*. Note that the average premium is 25.9%, and thus the result is economically significant, ranging between 6.4% and 23% of the mean premium. In tests left unreported, we include both the acquirer's and the target's liquidity

separately as explanatory variables. We find that the coefficient on the acquirer's liquidity is significantly negative and the coefficient on the target's liquidity is significantly positive.

Our finding complements that of Officer (2007), who finds that premiums in cash acquisitions are smaller than in stock acquisitions, because cash provides immediate liquidity and stock does not. The regression estimates indicate that the premium is positively related to the acquirer's prior-year stock return and is lower in a "related" deal where both the acquirer and the target are from the same industry. In the subsample of cash acquisitions, the estimated coefficient on *Relative Liquidity* is not statistically significant; this is consistent with the notion that acquirer's stock liquidity is irrelevant for target shareholders in a cash deal.

4.3. Acquirers Enhance Their Stock Liquidity Before Acquisitions

To test *Prediction 3*, we investigate whether potential acquirers exhibit a greater propensity to undertake liquidity-enhancing steps prior to making stock acquisitions. Our test is based on the following model specification:

$$Liqenhance_{it} = \gamma_0 + \gamma_1 Stockacq_{it+1} + \gamma_2 Controls_{it} + \mu_t + \varepsilon_{it}. \quad (3)$$

$Liqenhance_{it}$ represents the liquidity-enhancing steps that acquirer *i* undertakes in year *t*. The first such step that we consider is a stock split, which we define as a dummy variable that equals one if a stock split is conducted in year *t* and zero otherwise. We estimate the coefficients of Equation (3) using a logit model. The second action that we consider is the guidance on earnings provided by the firm; in this case, the coefficients are estimated using an OLS regression. We define the measure of earnings guidance as the difference in the frequency of earnings guidance provided by the management from year *t*-1 to *t*.[25] $Stockacq_{i,t+1}$ is a dummy that equals one if a stock acquisition is made by firm *i* in year *t*+1 and zero otherwise. We test *Prediction 3* using the sample of all Compustat-CRSP firms. *Prediction 3* implies a significantly positive estimated coefficient γ_1 on $Stockacq_{i,t+1}$.

The prior literature discussed earlier has shown that stock splits and other actions that can mitigate information asymmetry, such as providing earnings guidance, are associated with a subsequent improvement in a firm's stock liquidity. In *Prediction 3*, we argue that firms are likely to undertake such liquidity-enhancing actions prior to embarking on a stock acquisition. Before testing *Prediction 3*, we verify that the findings in the prior literature on the impact of stock-splits and earnings guidance on stock liquidity hold in our sample. To that end, we regress the liquidity measures as of year *t* on a dummy variable indicating whether the firm splits its stock in year *t–1* and on the frequency of earnings

[25] Alternatively, we define the measure of earnings guidance as the natural logarithm of one plus the frequency of earnings guidance provided by the management in year t, and the results (unreported for brevity) also hold.

guidance in year *t–1*, while controlling for various characteristics of the firm and its information environment.

We obtain data on earnings guidance from First Call. The sample period for the tests involving earnings guidance is from 1994 to 2012; this is governed by the availability of data coverage. The results, presented in Table B.1 of Appendix B, show that stock splits and the frequency of earnings guidance are both strongly associated with greater stock liquidity in the following year. The estimated coefficients on the two main variables of interest are positive and statistically significant for all three measures of stock liquidity. As expected, firms with larger size, higher market-to-book ratios, more cash holding, lower leverage, better operating performance, lower stock return volatility, and more analysts' coverage have higher stock liquidity. Also, stocks of firms with more R&D investment and lower asset tangibility are more liquid.

Next, we test *Prediction 3*, which is whether firms tend to conduct stock splits or provide more earnings guidance prior to making stock acquisitions. Panel A of Table 7 presents the baseline results from estimating Equation (3). In Column (1), we estimate a logit regression where the dependent variable is an indicator that equals one if a firm splits its stock in year *t*, while in Column (2) we estimate an OLS regression where the dependent variable is the difference between the number of earnings guidance provided in years *t* and *t–1*. In both cases, consistent with our prediction, the estimated coefficients on the main variable of interest, $Stockacq_{it+1}$, are positive and significant at 1% level.

One might be concerned that both stock splits/earnings guidance provisions and the decision to engage in stock acquisitions are endogenous, and thus the estimated coefficients on $Stockacq_{it+1}$ might be biased. To address this concern, we instrument $Stockacq_{it+1}$ with the total number of acquisitions that occurred in the same year and the same Fama-French 48 industry. To the extent that acquisitions occur in waves (e.g., Harford, 2005) and it is reasonable to assume that acquisitions made in the industry are unlikely to be related to an individual firm's stock split/earnings guidance decisions except through its decision to make stock acquisitions, this instrument satisfies both the relevance and exclusion conditions for the IV estimation.

Panel B of Table 7 reports both first- and second-stage estimates from this IV regression. In the first stage, the decision of stock acquisitions is shown to be positively related to the number of acquisitions made in the industry and the correlation is statistically significant at 1% level. We also find that the number of acquisitions made in the industry is a strong instrument as seen from the large F-value for the first-stage regression.[26] The second-stage results confirm those in Panel A that the

[26] Note that an F-value over 10 is typically considered as a sign of a strong instrument.

coefficients on the instrumented $Stockacq_{it+1}$ remain positive (with larger magnitudes than those in OLS) and statistically significant. In sum, the evidence provides support to *Prediction 3* that firms tend to take steps to improve stock liquidity prior to making stock acquisitions.

4.4. Announcement Returns and Acquirer's Stock Liquidity

Lastly, we test *Prediction 4* using an OLS regression model based on Equation (1), except that the dependent variable is the three-day [-1, 1] cumulative abnormal return (CAR) around deal announcement and the explanatory variable of interest is $Relative\ Liquidity_{it-1}$.[27] Since the test requires target firm's liquidity and we need to control for the effect of both acquirer and target characteristics, our sample consists of stock acquisitions only involving public targets. We estimate the three-day CARs using the CRSP equally-weighted index and the market model, where the parameters for the market model are estimated over the (–120, –30) day interval. We control for both acquirer's and target's characteristics (described earlier) as well as other relevant deal characteristics. In particular, we add two additional controls of deal characteristics: *Competing_Bid* and *Related Deal*. Acquirers may pay higher premiums in competing bids as well as in diversification deals that are not related to the acquirer's primary industry. We expect the estimated coefficient on the main variable of interest, $Relative\ Liquidity_{it-1}$, to be significantly positive.

According to the results presented in Table 8, we find that, for all three liquidity measures, the acquirer's announcement CARs are positively and statistically significantly related to *Relative Liquidity* in a stock deal. The more liquid acquirers' stock is relative to targets', the higher (or less negative) are the acquirers' announcement CARs. For a one-standard-deviation increase in *Relative Liquidity*, the CARs increase by 0.6%-0.83%, depending on the measure of liquidity. This improvement in acquirer's announcement returns is economically significant, given that the average (median) CARs for stock deals in our sample of public targets is –3.86% (–2.94%). Consistent with prior literature, acquirers' CARs are negatively related to their price run-up, market-to-book ratio, and stock return volatility, but positively related to the target's market-to-book ratio. Wang and Xie (2009) find that both acquirer and target announcement returns increase with the shareholder-rights difference between the acquirer and the target, because higher synergy can be achieved when better-governed acquirers take over poorly-governed targets and the synergy is shared by both parties. Following their study, we control for the difference of the anti-takeover measures that acquirers and targets have and find that our finding is robust.[28]

[27] In unreported tests, we include acquirer's and target's liquidity separately in the regressions. Our results are not affected by using this alternative specification.

[28] Because the data on anti-takeover measures are not available for all of our sample firms, we do not include this variable in our main test and tabulate the results.

5. Discussion and Robustness Tests

We discuss further extensions of our hypothesis as well as various robustness checks to dealing with endogeneity of stock liquidity.

5.1. The expected stock liquidity of the combined firm

We have shown that the acquirer's stock liquidity relative to the target's liquidity prior to the deal has a significant impact on the method of payment and deal premium. As suggested by the model, the anticipated stock liquidity in the combined firm after deal completion (relative to the target's current stock liquidity) will affect target shareholders' decisions on the deal's terms.[29] We now consider and test an explicit form for post-acquisition liquidity. Specifically, we assume that the expected stock liquidity of the post-deal new firm is size-weighted average of the acquirer's and the target's pre-deal liquidity:

$$Liquidity_{new} = w\, Liquidity_{Acquirer} + (1 - w)\, Liquidity_{Target}$$

where $w = \frac{Size_{Acquirer}}{Size_{Acquirer} + Size_{Target}}$ and *Size* is market capitalization.[30] If target shareholders are mainly concerned with the expected liquidity after the deal relative to the target's current liquidity, then:

$$Liquidity_{new} - Liquidity_{Target} = w(Liquidity_{Acquirer} - Liquidity_{Target}).$$

Therefore, the expected difference in stock liquidity for target shareholders is proportional to the acquirer-target liquidity difference (*Relative Liquidity*) that we have used in examining its impact on deal payment in stock and deal premium, with the proportion being positively (negatively) related to the acquirer's (target's) size.

We repeat the estimations in Tables 5 and 6 by replacing the acquirer-target liquidity difference with the expected difference in stock liquidity. All of our earlier findings continue to hold qualitatively. For brevity, we do not tabulate the results but they are available upon request. This validates our use of the acquirer-target liquidity difference (*Relative Liquidity*) in examining its impact on deal payment and pricing.

5.2. Endogeneity of stock liquidity and identification strategy

So far the OLS specification helps to establish a correlation between liquidity and firms' acquisition decisions as well as deal characteristics. However, stock liquidity is not exogenously given. Indeed, we

[29] In the model, we abstract away from the issue of post-acquisition liquidity by assuming that acquirers' managers will act to maintain their firm's liquidity at the level that it was prior to the acquisition.

[30] This assumption is consistent with the finding in Massa and Xu (2013) that the post-deal combined firm's stock liquidity is positively related to the target's stock liquidity prior to the deal. The combined liquidity measure from our theoretical model is difficult to estimate directly and requires information about the composition of liquidity investors.

even hypothesize that firms may take deliberate actions to endogenously increase stock liquidity prior to making stock acquisitions. Also, failure to control for any omitted factor that is related to both liquidity and firms' acquisition decisions can result in a biased estimate of the effect of liquidity. To address this empirical challenge, we exploit an exogenous shock to firms' stock liquidity that arises from stock-market decimalization as our primary identification strategy. For robustness, we also supplement it with another exogenous shock from the annual reconstitution of Russell 1000/2000 indexes. We next discuss the two identifications in details.

5.2.1. Stock-market decimalization

As discussed, a change in tick size from 1/16 to 1/100 has been shown to affect stock liquidity substantially. One concern, though, is that other events happened around the decimalization period 2000-2001 and thus the interpretation of findings may be confounded. We thus follow Edmans, et al. (2013) and focus on the cross-sectional variations of the impact of decimalization on different stocks. Intuitively, decimalization should have a greater impact on liquidity of stocks whose trading is more affected by the change in tick size, namely, those with low prices and those that are less actively traded. The effect of decimalization on firm acquisitions should thus vary accordingly.

Therefore, to our purpose, we run regressions based on the following specification:

$$Y_{i,t} = \alpha_0 + \alpha_1 High\_Impact_{it-1} + \alpha_2\, High\_Impact_{it-1}\, X\, Decimal + \alpha_3 Decimal + \alpha_4 Controls + \epsilon_{i,t}. \quad (4)$$

$Y_{i,t}$ is the outcome variable regarding a firm's acquisition decision that includes the likelihood of (stock) acquisition, the fraction of payment in stock, and deal premium. $High\_Impact_{it-1}$ is a dummy variable that is either Low_price or $Less\_active$. Low_price, defined following Edmans, et al. (2013), equals one if a firm's closing price at the end of fiscal year *t-1* falls below the median closing price in that year and zero otherwise. $Less\_active$ equals one for the less actively-traded stocks in which the total number of trades as of year *t-1* is less than the sample median in that year and zero otherwise. $Decimal$ is a dummy that equals one if a firm's fiscal year *t-1* ends after January 31, 2001 for firms traded on the NYSE and AMEX or after April 9, 2001 for firms traded on the NASDAQ, and zero otherwise. The coefficient on the interaction variable, α_2, is of key interest, as it captures the expected greater impact of decimalization on stock liquidity and thus on firm acquisition decisions for low-priced and less-actively-traded firms.

In determining the sample period for the tests involving decimalization, we face a trade-off as follows. On the one hand, retaining the full sample years (1984-2012) gives us more observations to

make a powerful comparison of firm acquisition decisions before and after decimalization. On the other hand, acquisitions made far away from decimalization are more likely to have been affected by confounding factors. We therefore follow Edmans, et al. (2013) to start the sample period from 1996 and end in 2007 to ensure the equal number of sample years in the pre- and post-decimalization periods. Nevertheless, in robustness checks (results not reported for brevity), we find that our results are not affected qualitatively if we use the full sample years. To ensure that our estimation is not affected by time-specific confounding factors, we include year fixed effects from 1996-2000 and 2003-2007 but omit them for 2001 and 2002 to reflect the exogenous change in stock liquidity around decimalization. We also include the same control variables as in the main regressions and choose to not report their coefficient estimates for brevity.

While it has been widely accepted in prior studies, we first test to confirm the impact of decimalization on stock liquidity and, in particular, the varying impacts across different stocks as discussed above for our sample of firms. Specifically, we regress our measures of stock liquidity on $Decimal$ while controlling for several factors that we adopt following Balakrishnan, et al. (2014) who examine the impact of firm disclosure on stock liquidity. The results are presented in Table B.2 of Appendix B. We find that stock liquidity improves following decimalization for both high- (more-) and low-priced (less-actively-traded) stocks, although the impact is greater for low-priced (less-actively-traded) stocks. For both groups of stocks, the coefficients on $Decimal$ are positive and significant for all three measures of stock liquidity. The economic and statistical significance of the coefficients are both greater for low-priced (less-actively-traded) stocks. Overall, the findings validate the use of decimalization as an exogenous shock to stock liquidity.

Next, in Table 9 that report results of tests based on Specification (4), we present robust and consistent evidence regarding the impact of liquidity on a firm's acquisition decision and the payment in stock. Columns (1) and (4) present results regarding a firm's likelihood of making acquisitions with the variable $High\_Impact_{it-1}$ measured by Low_price and $Less\_active$, respectively. Correspondingly, Columns (2) and (5) present results regarding a firm's likelihood of making acquisitions paid in stock. In both cases, the coefficient α_1 is negative but the coefficient α_2 is positive, and both are statistically significant. It suggests that while low-priced/less-actively-traded firms are less likely to make (stock) acquisitions before decimalization, this is less evident after decimalization due to the improvement in stock liquidity, especially for acquisitions paid in stock. Consistent with the smaller impact of decimalization on the liquidity of high-priced/more-actively-traded stocks, the effect of decimalization on acquisition decisions by these firms is positive but not significant as can be seen from the estimated coefficient α_3. Similar findings are presented in Columns (3) and (6) regarding the fraction of payment in stock.

Table 10 shows the results of the impact on deal premium for stock deals and cash deals, respectively. In Columns (1) and (3) for stock deals, the coefficient α_2 is negative and statistically significant while the coefficient α_1 is not significantly different from zero. That is, while low-priced/less-actively-traded acquirers pay similar premium as high-priced/more-actively-traded acquirers in stock deals before decimalization, they pay significantly less after decimalization. We do not find similar results for cash deals in Columns (2) and (4), which is consistent with the earlier finding in Table 6. Overall, the results with decimalization as an exogenous shock to liquidity collaborate those obtained in the OLS regressions, and thus the endogeneity of stock liquidity is unlikely to be biasing our findings.

5.2.2. Russell index reconstitution

As a robustness check, we utilize another quasi-natural experiment to identify the causal effect of stock liquidity. Specifically, we exploit the variation in stock liquidity that occurs in a narrow bandwidth of firms around the Russell 1000/2000 cutoff threshold following the annual Russell index reconstitution. Every year, on the last Friday of June, the Russell indexes are reconstituted that the largest 1000 firms are assigned into Russell 1000 and the next 2000 firms into Russell 2000 based on their end-of-May market capitalization. Each stock's index weight is then determined using Russell's proprietary float-adjusted market capitalization as of the end of June. Since the index weights are value weighted, stocks at the top of Russell 2000 receive significantly higher weights than stocks at the bottom of Russell 1000. This could lead to substantially higher liquidity for stocks at the top of Russell 2000, possibly due to the following two reasons.

The first reason corresponds to the market microstructure component of stock liquidity – the compensation to the market makers for holding inventory and facilitating trades (e.g., Amihud and Mendelson, 1991). There is disproportionately more money passively tracking Russell 2000 relative to its total market capitalization and also a substantially greater number of products and dollar amounts actively benchmarked to Russell 2000 than to Russell 1000.[31] Thus, in stocks at the top of Russell 2000 (relative to stocks at the bottom of Russell 1000), there is more passive trading in response to fund flows by passive funds (who will match their portfolio weights more closely for stocks at the top of an index to minimize tracking error) and more active trading due to benchmarking strategies. This contributes to the higher liquidity of stocks at the top of Russell 2000. The second reason corresponds to the adverse selection component of stock liquidity – the information-related price impact of a trade, as described in Kyle (1985). The greater institutional ownership in stocks at the top of Russell 2000 than in stocks at the bottom of Russell 1000 incentivizes firms to increase information disclosure and

[31] We provide more details on this in Appendix B.

improve firm transparency, and hence reduces the adverse selection part of trading cost (Boone and White, 2015).[32]

Consistent with the impact of Russell index assignment on the liquidity of constituent stocks, we confirm (shown in Figure B.2 of Appendix B) that there is a jump in stock liquidity around the midway point from the bottom stocks of Russell 1000 to the top stocks of Russell 2000. However, because Russell's index weight calculation uses its proprietary float-adjusted end-of-June market capitalization that is meant to account for stock liquidity of the index constituents, the difference in liquidity for the bottom stocks of the Russell 1000 and the top stocks of the Russell 2000 is not likely to be exogenous. Therefore, we adopt an instrument variable estimation approach in our empirical tests. Specifically, we rank stocks based on their *end-of-May* market capitalization, and select the sample using a bandwidth of firms ranked around the 1000th rank for each year of the sample. We instrument for stock liquidity with an indicator of a stock being in the right bandwidth (ranked below the 1000th rank) in a given year, and identify the impact of the instrumented stock liquidity on firm acquisition decisions and deal characteristics. Our identification relies on the assumption that, for firms around the 1000th-rank mid-point, being ranked slightly below or above the mid-point does not directly affect M&As except through its impact on stock liquidity.

Using a bandwidth of 300 firms around the 1000th-rank mid-point, we find consistent evidence that supports our acquisition currency hypothesis and suggests that the predicted effects of stock liquidity on M&As are causal. Table 11 shows the two-stage regression results of the instrument variable estimation. In Panel A, the first-stage estimation results are presented. They confirm the validity of the relevance condition for the IV estimation that firms included in the right bandwidth exhibit significantly higher stock liquidity than firms in the left bandwidth. The difference is statistically significant for all three measures of liquidity. Panels B through E present the second-stage estimation results that correspond to a firm's decision to make acquisitions, the decision to make acquisitions paid in stock, fraction of acquisition payment in stock, and deal premium, respectively. The estimated coefficients on the instrumented liquidity measures all have predicted signs and are statistically significant, confirming the findings in the OLS regressions in the respective Tables 2, 3, 5, and 6. For brevity, we do not report the coefficients on all the control variables. The results, not tabulated but available upon request, are robust to the number of firms included in the bandwidth and the functional form of the control variables in our regression model.

It is likely that changes in the composition of Russell-1000/2000 indices may lead to changes in other aspects of constituent stocks than liquidity. For instance, Appel, Gormley, and Keim (2016) show that the greater ownership by passive institutions in the top stocks of Russell 2000 results in

[32] See also Diamond and Verrecchia (1991) and Beyer et al. (2010).

better governance in these firms. One may thus be concerned whether our findings are a result of the difference in corporate governance for acquirers across the midway point of Russell 1000/2000 indices. This governance interpretation, however, cannot explain why stock acquisitions and premiums are affected by target stock liquidity and how their relation may hinge on the characteristics of target shareholders. Nevertheless, we conduct tests to disentangle the effect of stock liquidity from that of corporate governance. Specifically, we show that even among firms whose governance is less likely to be affected by index reconstitution, the effect of stock liquidity on M&As continues to hold (results presented in Table B.2 of Appendix B). Of course, it is a daunting task to completely disentangle the effect of stock liquidity from the effect of other factors like corporate governance that are related to index reconstitution. We therefore take the tests with this setting as ancillary to the tests with the primary decimalization setting. Therefore, for the interest of brevity, we leave the more detailed discussions of Russell index reconstitution, its impact on constituents' stock liquidity, the two-stage IV regression specification, and related robustness checks in Appendix B.

6. Conclusion

We claim, with the aid of a simple model, that liquidity can enhance the role of acquirer stock as an acquisition currency. Firms with more liquid stocks are more likely to make acquisitions and pay for them with equity, especially when the target's stock liquidity is relatively low. Acquirers with liquid stock pay lower price premiums and experience less negative deal announcement abnormal returns in stock deals. To exploit the benefits of more liquid stock in M&As, firms tend to take actions to enhance their information environment and improve stock liquidity prior to stock acquisitions, such as conducting stock splits and providing more earnings guidance.

We exploit the exogenous shock to stock liquidity induced by the introduction of decimalization to identify the impact of stock liquidity. With this identification, we claim that the impact of stock liquidity on acquisitions and deal characteristics is causal. In addition, we reach similar conclusions using annual changes in the composition of the Russell 1000 and the Russell 2000 indices as another shock to liquidity.

References

Ahern, K. R., & Sosyura, D., 2014. Who writes the news? Corporate press releases during merger negotiations. *Journal of Finance*, *69*(1), 241-291.

Ai, C., & Norton, E., 2003. Interaction terms in logit and probit models. *Economics Letters*, 80, 123-129.

Amihud, Y., 2002. Illiquidity and stock returns: cross-section and time-series effects. *Journal of Financial Markets*, *5*(1), 31-56.

Amihud, Y., Lev, B., & Travlos, N. G., 1990. Corporate control and the choice of investment financing: The case of corporate acquisitions, *Journal of Finance, 45*, 603–616

Amihud, Y., & Mendelson, H., 1980. Dealership market: Market-making with inventory. *Journal of Financial Economics*, *8*(1), 31-53.

Amihud, Y., & Mendelson, H., 1991. Liquidity, asset prices and financial policy. *Financial Analysts Journal*, 47(6), 56-66.

Ang, J. S., & Cheng, Y., 2006. Direct evidence on the market-driven acquisition theory. *Journal of Financial Research*, *29*(2), 199-216.

Appel, I., Gormley, T., & Keim, D., 2016. Passive investors, not passive owners. *Journal of Financial Economics*, 121(1), 111-141.

Back, K., Collin-Dufresne, P., Fos, V., Li, T., & Ljungqvist, A., 2017. Activism, strategic trading, and liquidity. Unpublished working paper.

Balakrishnan, K., Billings, M., Kelly, B., & Ljungqvist, A., 2014. Shaping Liquidity: On the Causal Effects of Voluntary Disclosure, *Journal of Finance, 69*, 2237-2278.

Berkovitch, E., & Narayanan, M. P., 1990. Competition and the medium of exchange in takeovers. *Review of Financial Studies*, *3*(2), 153-174.

Bessembinder, H., 2003. Trade execution costs and market quality after decimalization. *Journal of Financial and Quantitative Analysis*, 38, 747–77.

Beyer, A., Cohen, D. A., Lys, T. Z., & Walther, B. R., 2010. The financial reporting environment: Review of the recent literature. *Journal of Accounting and Economics, 50*,179–234.

Bharath, S. T., Jayaraman, S., & Nagar, V., 2013. Exit as governance: An empirical analysis. *Journal of Finance*, *68*(6), 2515-2547.

Bond, P., Edmans, A., & Goldstein, I., 2012. The real effects of financial market. *Annual Review of Financial Economics, 4*, 339-360.

Boone, A. L., Lie, E., & Liu, Y., 2014. Time trends and determinants of the method of payment in M&As. *Journal of Corporate Finance*, 27, 296-304.

Boone, A. L., & White, J. T., 2015. The effect of institutional ownership on firm transparency and information production. *Journal of Financial Economics*, *117*, 508-533.

Brown, D. T., & Ryngaert, M. D., 1991. The mode of acquisition in takeovers: Taxes and asymmetric information, *Journal of Finance, 46*, 653–669.

Chang, S., 1998. Takeovers of privately held targets, method of payment, and bidder returns. *Journal Of Finance*, 53, 773-784.

Coller, M., & Yohn, T. L., 1997. Management Forecasts and Information Asymmetry: An examination of bid-ask spreads. *Journal of Accounting Research*, *35*(2), 181-191.

Coval, J., & Stafford, E., 2007. Asset fire sales (and purchases) in equity markets. *Journal of Financial Economics* 86, 479–512.

Dass, N., Huang, S., Maharjan, J., Nanda, V., & Xiao, S., 2015. The effect of stock liquidity on corporate innovation. Unpublished working paper.

Diamond, D. W., & Verrecchia, R. E., 1991. Disclosure, Liquidity, and the Cost of Capital. *Journal of Finance, 46*(4), 1325-1359.

Dong, M., Hirshleifer, D., Richardson, S., & Teoh, S. H., 2006. Does investor misvaluation drive the takeover market? *Journal of Finance*, *61*(2), 725-762.

Duffie, D., 2010. Presidential address: Asset price dynamics with slow-moving capital. *Journal of Finance*, 65 , 1237-1267.

Easley, D., & O'Hara, M., 2003. Microstructure and asset pricing. *Handbook of the Economics of Finance*, *1*, 1021-1051.

Eckbo, B. E., Giammarino, R. M., & Heinkel, R. L., 1990, Asymmetric information and the medium of exchange in takeovers: Theory and tests. *Review of Financial Studies, 3*, 651–675.

Eckbo, B. E., & Thorburn, K. S., 2000. Gains to bidder firms revisited: domestic and foreign acquisitions in Canada. *Journal of Financial and Quantitative Analysis*, *35*(1), 1-25.

Edmans, A., Fang, V., & Zur, E., 2013. The effect of liquidity on governance. *Review of Financial Studies, 26*, 1443–1482.

Erickson, M., & Wang, S. W., 1999. Earnings management by acquiring firms in stock for stock mergers. *Journal of Accounting and Economics*, *27*(2), 149-176.

Faccio, M., & Masulis, R. W., 2005. The choice of payment method in European mergers and acquisitions. *Journal of Finance*, *60*(3), 1345-1388.

Fang, V. W., Noe, T. H., & Tice, S., 2009. Stock market liquidity and firm value. *Journal of Financial Economics*, *94*(1), 150-169.

Fang, V. W., Tian, X., & Tice, S., 2014. Does stock liquidity enhance or impede firm innovation? *Journal of Finance*, *69*(5), 2085-2125.

Fishman, M. J., 1989. Preemptive bidding and the role of the medium of exchange in acquisitions. *Journal of Finance*, 41-57.

Fu, F., Lin, L., & Officer, M., 2013. Acquisitions driven by stock overvaluation: Are they good deals? *Journal of Financial Economics*, 109, 24-39.

Fuller, K., Netter, J., & Stegemoller, M., 2002. What do returns to acquiring firms tell us? Evidence from firms that make many acquisitions, *Journal of Finance, 57*, 1763–1793.

Furfine, C., 2003. Decimalization and market liquidity. *Economic Perspectives*, 27, 2–12.

Ge, R., & Lennox, C., 2011. Do acquirers disclose good news or withhold bad news when they finance their acquisitions using equity? *Review of Accounting Studies*, *16*(1), 183-217.

Ghosh, A., & Ruland, W., 1998. Managerial ownership, the method of payment for acquisitions, and executive job retention, *Journal of Finance, 53*, 785–798.

Grossman, S. J., & Stiglitz, J. E., 1980. On the impossibility of informationally efficient markets. *The American Economic Review*, 393-408.

Hansen, R. G., 1987. A theory for the choice of exchange medium in mergers and acquisitions, *Journal of Business, 60*, 75–95.

Harford, J., 2005. What drives merger waves? *Journal of Financial Economics, 77*, 529-560.

Harford, J., Humphery-Jenner, M., & R. Powell, 2012. The sources of value destruction in acquisitions by entrenched managers. *Journal of Financial Economics*, 106(2), 247-261.

Holmström, B., & Tirole, J., 1993. Market liquidity and performance monitoring. *Journal of Political Economy*, 678-709.

Jayaraman, S., & Milbourn, T. T., 2012. The effect of auditor expertise on executive compensation. *Available at SSRN 1955488*.

Kaplan, S. N., & Zingales, L., 1997. Do investment-cash flow sensitivities provide useful measures of financing constraints? *The Quarterly Journal of Economics*, 169-215.

Koeplin, J., Sarin, A., & Shapiro, A., 2000. The private company discount. *Journal of Applied Corporate Finance, 12*, 94-101.

Kyle, A. S., 1985. Continuous auctions and insider trading. *Econometrica: Journal of the Econometric Society*, 1315-1335.

Lin, J. C., Singh, A. K., & Yu, W., 2009. Stock splits, trading continuity, and the cost of equity capital. *Journal of Financial Economics*, *93*(3), 474-489.

Louis, H., 2004. Earnings management and the market performance of acquiring firms. *Journal of Financial Economics, 74*, 121-148.

Maksimovic V., Phillips, G., & L.Yang, 2013. Private and Public Merger Waves. *Journal of Finance*, 68(5), 2177-2217.

Martin, K. J., 1996. The method of payment in corporate acquisitions, investment opportunities, and management ownership, *Journal of Finance, 51*, 1227–1246.

Massa, M., & Xu, M., 2013. The value of (stock) liquidity in the M&A market. *Journal of Financial and Quantitative Analysis, 48*, 1463-1497.

Maug, E., 1998. Large shareholders as monitors: is there a trade-off between liquidity and control? *Journal of Finance*, 53(1), 65-98.

Moeller, S. B., Schlingemann, F. P., & Stulz, R. M., 2007. How do diversity of opinion and information asymmetry affect acquirer returns? *Review of Financial Studies*, *20*(6), 2047-2078.

Muscarella, C. J., & Vetsuypens, M. R., 1996. Stock Splits: Signaling or Liquidity? The case of ADR solo-splits. *Journal of Financial Economics*, *42*(1), 3-26.

Officer, M. S., 2007. The price of corporate liquidity: Acquisition discounts for unlisted targets. *Journal of Financial Economics*, *83*(3), 571-598.

Officer, M. S., Poulsen, A. B., & Stegemoller, M., 2009. Target-firm information asymmetry and acquirer returns. *Review of Finance*, *13*(3), 467-493.

Rhodes–Kropf, M., Robinson, D. T., & Viswanathan, S., 2005. Valuation waves and merger activity: The empirical evidence. *Journal of Financial Economics*, *77*(3), 561-603.

Roosenboom, P., Schlingemann, F. P., & Vasconcelos, M., 2013. Does stock liquidity affect incentives to monitor? Evidence from corporate takeovers. *Review of Financial Studies*, *27*(8), 2392-2433.

Schlingemann, F. P., Stulz, R. M., & Walkling, R. A., 2002. Divestitures and the liquidity of the market for corporate assets. *Journal of Financial Economics*, *64*(1), 117-144.

Shleifer, A., & Vishny, R. W., 1992. Liquidation values and debt capacity: A market equilibrium approach. *Journal of Finance*, *47*(4), 1343-1366.

Shleifer, A., & Vishny, R. W., 2003, Stock market driven acquisitions, *Journal of Financial Economics, 70*, 295–311.

Stulz, R., 1988. Managerial control of voting rights: Financing policies and the market for corporate control. *Journal of Financial Economics*, *20*, 25-54.

Travlos, N. G., 1987, Corporate takeover bids, method of payment, and bidding firms' stock returns, *Journal of Finance, 42*, 943–963.

Yan, S., & Zhang, Z., 2009. Institutional Investors and Equity Returns: Are Short-term Institutions Better Informed? *Review of Financial Studies*, *22*(2), 893-924.

Wang, C., and Xie, F., 2009, Corporate governance transfer and synergistic gains from mergers and acquisitions. *Review of Financial Studies* 22.2: 829-858.

Whited, T., & Wu, G., 2006. Financial constraints risk. *Review of Financial Studies*, 19(2), 531-559.

Table 1: Summary Statistics

This table presents summary statistics of firm and deal characteristics. Panel A is for the overall sample of Compustat-CRSP firms in the sample period 1984-2012, while panel B is for acquirers of both private and public targets. Panel C is for public targets, and Panel D is for deals involving public targets.

Variable	N	Mean	SD	Median
Panel A: Overall Sample of Compustat-CRSP Firms				
AMH	118229	-4.790	3.056	-4.629
Spread	118229	4.189	1.411	3.974
Sturnover	118229	0.636	0.747	0.383
Acquisition (Dummy)	118229	0.096	0.294	0
Stockacq (Dummy)	118229	0.044	0.205	0
Firm Size	118229	5.615	2.216	5.478
Ind_Stock_Return	118229	-0.001	0.605	-0.074
Leverage	118229	0.338	0.349	0.294
Δ Leverage	118229	-0.001	0.299	0
Market-to-Book	118229	2.065	2.499	1.348
Tangibility	118229	0.243	0.243	0.157
Volatility	118229	0.627	0.391	0.525
Panel B: Acquirers of both public and private targets				
AMH	4966	-2.133	1.988	-1.495
Spread	4966	5.055	1.286	4.772
Sturnover	4966	0.798	0.731	0.550
Ind_Stock_Return	4966	0.158	0.677	0.040
Leverage	4966	0.374	0.277	0.363
Δ Leverage	4966	-0.010	0.171	-0.003
Market-to-Book	4966	2.262	2.117	1.566
Runup	4966	0.055	0.276	0.019
Volatility	4966	0.456	0.261	0.386
Panel C: Public Targets				
AMH	2501	-3.954	2.423	-3.798
Spread	2501	4.339	1.188	4.091
Turnover	2501	0.689	0.692	0.446
Leverage	2501	0.361	0.294	0.357
Market-to-Book	2501	24.563	55.13	5.074
Panel D: Characteristics of deals involving public targets				
Acquirer's CAR	2471	-0.023	0.083	-0.017
Competing Bid	2501	0.077	0.266	0
Ln(deal size)	2501	6.134	1.425	5.908
Percent_stockPMT	2501	0.608	0.431	0.794
Premium	2306	0.259	0.404	0.253
Related Deal	2499	0.603	0.489	1
Relative Size	2501	-1.901	1.354	-1.781
Tender Offer	2501	0.150	0.357	0

Table 2: Stock Liquidity and Likelihood of Acquisition

This table presents coefficient estimates from logit regressions that examine the impact of firms' stock liquidity on the likelihood of making acquisitions for the full sample. The dependent variable is a dummy variable that takes a value of one if a firm makes an acquisition in the fiscal year, and zero otherwise. The liquidity measure used in each regression is indicated at the top of the table. Other explanatory variables are defined in Appendix A. Year and industry (defined based on Fama-French 48 industry) fixed effect are included in all regressions. Robust standard errors are clustered by industry and reported in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% respectively.

	(1) AMH	(2) Spread	(3) Turnover
Liquidity	0.251***	0.538***	0.233***
	(0.012)	(0.024)	(0.031)
Leverage	-0.054	-0.074	-0.229***
	(0.077)	(0.070)	(0.074)
Δ Leverage	-0.216***	-0.240***	-0.178***
	(0.038)	(0.035)	(0.032)
Tangibility	-1.188***	-1.201***	-1.271***
	(0.222)	(0.223)	(0.243)
Market-to-Book	-0.021**	-0.006	0.026***
	(0.009)	(0.006)	(0.007)
Firm Size	-0.095**	-0.013	0.138***
	(0.040)	(0.039)	(0.045)
Ind_Stock_Return	0.373***	0.341***	0.319***
	(0.030)	(0.028)	(0.027)
Volatility	0.067	0.077	-0.411***
	(0.076)	(0.064)	(0.075)
Constant	-1.231***	-5.049***	-3.566***
	(0.463)	(0.350)	(0.382)
Observations	118229	118229	118229
Pseudo R^2	0.097	0.092	0.082
Year and Industry Fixed Effects	Yes	Yes	Yes

Table 3: Stock Liquidity and Likelihood of Stock Acquisition

This table presents coefficient estimates from logit regressions that examine the impact of firms' stock liquidity on the likelihood of making stock acquisitions for the full sample. The dependent variable is a dummy variable that takes a value of one if a firm makes a stock acquisition in the fiscal year, and zero otherwise. The liquidity measure used in each regression is indicated at the top of the table. Other explanatory variables are defined in Appendix A. Year and industry (defined based on Fama-French 48 industry) fixed effect are included in all regressions. Robust standard errors are clustered by industry and reported in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% respectively.

	(1) AMH	(2) Spread	(3) Turnover
Liquidity	0.287***	0.583***	0.235***
	(0.019)	(0.034)	(0.049)
Leverage	-0.199***	-0.236***	-0.389***
	(0.069)	(0.044)	(0.038)
Δ Leverage	-0.104**	-0.124***	-0.066*
	(0.045)	(0.041)	(0.039)
Tangibility	-1.103***	-1.140***	-1.226***
	(0.234)	(0.235)	(0.265)
Market-to-Book	0.019*	0.034***	0.062***
	(0.010)	(0.008)	(0.010)
Firm Size	-0.062	0.050	0.211***
	(0.053)	(0.044)	(0.050)
Ind_Stock_Return	0.391***	0.350***	0.338***
	(0.032)	(0.031)	(0.031)
Volatility	0.763***	0.740***	0.265***
	(0.108)	(0.066)	(0.072)
Constant	-1.706***	-6.011***	-4.393***
	(0.289)	(0.301)	(0.291)
Observations	118090	118090	118090
Pseudo R^2	0.165	0.157	0.148
Year and Industry Fixed Effects	Yes	Yes	Yes

Table 4: Stock Liquidity and Likelihood of Stock Acquisition: Effect of Firms' Financial Constraints

This table presents coefficient estimates from OLS regressions that examine how the impact of firms' stock liquidity on the likelihood of making stock acquisitions varies in firms with varying extents of financial constraints for the full sample. The dependent variable is a dummy variable that takes a value of one if a firm makes a stock acquisition in the fiscal year, and zero otherwise. The liquidity measure used in each regression is indicated at the top of the table. The full sample is divided into terciles based on the financial constraint measure (Kaplan-Zingales Index in columns 1-3; Whited-Wu Index in columns 4-6; and firm's age in columns 7-9). In columns 1-6 (columns 7-9) *Constraint Dummy* takes a value of one for firms that fall in the highest (lowest) tercile and zero for firms that fall in the lowest (highest) tercile. Other explanatory variables are defined in Appendix A. Year and industry (defined based on Fama-French 48 industry) fixed effect are included in all regressions. Robust standard errors are clustered by industry and reported in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% respectively.

	(1) AMH	(2) Spread	(3) Turnover	(4) AMH	(5) Spread	(6) Turnover	(7) AMH	(8) Spread	(9) Turnover
Liquidity	0.009***	0.016***	0.011***	0.008***	0.017***	0.001	0.009***	0.012***	0.005***
	(0.001)	(0.002)	(0.002)	(0.001)	(0.003)	(0.006)	(0.002)	(0.001)	(0.002)
Liquidity X Constraint Dummy	0.002***	0.004***	0.003*	0.003**	0.007***	0.018***	0.001	0.018***	0.016***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)	(0.006)	(0.001)	(0.004)	(0.003)
Constraint Dummy	0.000	-0.000	-0.001	-0.000	0.001	0.000	-0.021*	-0.022	-0.030***
	(0.003)	(0.003)	(0.003)	(0.011)	(0.011)	(0.010)	(0.012)	(0.015)	(0.004)
Leverage	-0.008***	-0.009***	-0.013***	-0.009**	-0.010***	-0.015***	-0.003	-0.005**	-0.009***
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.004)	(0.003)	(0.002)	(0.003)
Δ Leverage	-0.004	-0.004	-0.002	-0.002	-0.003	0.000	-0.004	-0.005	-0.001
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.003)
Tangibility	-0.033***	-0.035***	-0.036***	-0.041***	-0.042***	-0.044***	-0.045***	-0.047***	-0.048***
	(0.009)	(0.009)	(0.009)	(0.011)	(0.012)	(0.013)	(0.011)	(0.014)	(0.005)
Market-to-Book	0.004**	0.005***	0.005***	0.004**	0.005***	0.006***	0.003**	0.004***	0.005***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
Firm Size	0.000	0.004	0.008***	0.001	0.004*	0.010***	-0.003**	0.000	0.003***
	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.004)	(0.001)	(0.001)	(0.001)
Ind_Stock_Return	0.020***	0.018***	0.018***	0.024***	0.023***	0.022***	0.019***	0.017***	0.017***
	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)	(0.004)	(0.003)	(0.002)
Volatility	0.037***	0.035***	0.015***	0.041***	0.041***	0.021***	0.035***	0.041***	0.015***
	(0.007)	(0.007)	(0.005)	(0.007)	(0.007)	(0.006)	(0.006)	(0.008)	(0.003)
Constant	0.054***	-0.069***	-0.025**	0.065***	-0.060***	-0.013	0.107***	0.002	0.041**
	(0.010)	(0.015)	(0.010)	(0.024)	(0.018)	(0.017)	(0.035)	(0.023)	(0.016)
Observations	87483	87483	87464	78225	78225	78225	85908	85929	85929
Pseudo R^2	0.059	0.057	0.054	0.065	0.063	0.061	0.065	0.065	0.062
Year and Industry F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 5: Stock Liquidity and the Fraction of Acquisition Payment in Stock

Panel A of this table presents coefficient estimates from Tobit regressions that examine the impact of liquidity on the fraction of deal payment in stock for the sample of deals involving public targets. The liquidity measure used in each regression, indicated at the top of the table, is the difference between the acquirer's and the target's liquidity (*Relative Liquidity*). Other explanatory variables are defined in Appendix A. Year and industry (defined based on Fama-French 48 industries) fixed effect are included in all regressions. Robust standard errors are clustered by industry and reported in parentheses. Panels B and C augment the tests in Panel A by interacting *Relative Liquidity* with *Blockholder* and *Short horizon*, respectively. *Blockholder* is defined as the number of blockholders with 5% or more stock ownership in the target in the quarter prior to deal announcement. *Short horizon* is defined as the ratio of shareholding by short-term investors to shareholding by long-term investors in the quarter prior to the announcement date. For brevity, coefficient estimates on other variables are not reported. *, **, and *** indicate significance at 10%, 5%, and 1% respectively.

Panel A:			
	(1)	(2)	(3)
	AMH	Spread	Turnover
Relative Liquidity	0.059***	0.060***	0.013***
	(0.002)	(0.005)	(0.002)
Runup	0.361***	0.346***	0.318***
	(0.007)	(0.008)	(0.014)
Volatility	1.291***	1.236***	1.101***
	(0.006)	(0.005)	(0.022)
Relative Size	0.152***	0.117***	0.117***
	(0.002)	(0.003)	(0.003)
ln(deal size)	0.096***	0.075***	0.061***
	(0.001)	(0.001)	(0.002)
Cash/Deal	-0.005***	-0.005***	-0.010***
	(0.001)	(0.001)	(0.001)
Leverage	-0.002	0.024***	0.030*
	(0.005)	(0.006)	(0.018)
Δ Leverage	-0.248***	-0.251***	-0.323***
	(0.007)	(0.007)	(0.011)
Tangibility	-0.487***	-0.486***	-0.223***
	(0.006)	(0.006)	(0.019)
Market-to-Book	0.089***	0.088***	0.087***
	(0.001)	(0.001)	(0.003)
Tender Offer	-1.786***	-1.794***	-1.727***
	(0.010)	(0.010)	(0.015)
Observations	2501	2501	2501
Pseudo R^2	0.284	0.282	0.339
Year and Industry Fixed Effects	Yes	Yes	Yes
Panel B: Effect of Target Blockholding			
	AMH	Spread	Turnover
Relative Liquidity	0.075***	0.092***	0.016***
	(0.002)	(0.005)	(0.005)
Relative Liquidity X Blockholder	-0.012***	-0.022***	-0.002
	(0.000)	(0.002)	(0.001)
Blockholder	-0.020***	-0.028***	-0.032***
	(0.001)	(0.001)	(0.002)
Other controls	Yes	Yes	Yes
Observations	2501	2501	2501
Pseudo R^2	0.287	0.285	0.340
Year and Industry Fixed Effects	Yes	Yes	Yes

Panel C: Effect of Target Investor Horizon			
	AMH	Spread	Turnover
Relative Liquidity	0.064***	0.074***	0.011***
	(0.002)	(0.006)	(0.004)
Relative Liquidity X Short Horizon	0.003***	0.003***	0.004***
	(0.000)	(0.001)	(0.001)
Short Horizon	-0.008***	-0.004***	-0.002***
	(0.001)	(0.001)	(0.000)
Other controls	Yes	Yes	Yes
Observations	2051	2051	2051
Pseudo R^2	0.302	0.299	0.362
Year and Industry Fixed Effects	Yes	Yes	Yes

Table 6: Stock Liquidity and Deal Premium Paid

This table presents the coefficient estimates from OLS regressions that examine the impact of stock liquidity on the deal premium for the subsamples of stock and cash acquisitions involving public targets, respectively. The dependent variable is *Premium* which is defined as the effective offer price as a percentage premium over the target firm's market share price as of two days prior to the takeover announcement. The liquidity measure used in each regression, indicated at the top of the table, is the difference between the acquirer's and the target's liquidity (*Relative Liquidity*). Other explanatory variables are defined in Appendix A. Year and industry (defined based on Fama-French 48 industry) fixed effect are included in all regressions. Robust standard errors are clustered by industry and reported in parentheses. *, **, and *** indicate significance at 10%, 5% and 1% respectively.

	AMH		Spread		Turnover	
	(1)	(2)	(3)	(4)	(5)	(6)
	Stock	Cash	Stock	Cash	Stock	Cash
Relative Liquidity	-0.018**	-0.006	-0.050***	0.022	-0.024**	-0.008
	(0.009)	(0.011)	(0.018)	(0.022)	(0.012)	(0.016)
Runup	0.065***	-0.120			0.121	0.348***
	(0.024)	(0.085)	(0.024)	(0.081)	(0.023)	(0.079)
Related Deal	-0.050**	-0.054	-0.048**	-0.054	-0.024	-0.053
	(0.022)	(0.038)	(0.021)	(0.039)	(0.024)	(0.038)
Competing Bid	-0.029	-0.087**	-0.032	-0.090**	-0.021	-0.086**
	(0.051)	(0.037)	(0.051)	(0.037)	(0.054)	(0.038)
Leverage_a	-0.043	-0.020	-0.058	-0.004	0.014	-0.015
	(0.041)	(0.061)	(0.042)	(0.060)	(0.042)	(0.060)
Leverage_t	0.046	0.078	0.055	0.076	0.097**	0.076
	(0.032)	(0.065)	(0.033)	(0.063)	(0.047)	(0.064)
Tender Offer	-0.025	0.061	-0.030	0.063	-0.014	0.061
	(0.076)	(0.038)	(0.076)	(0.038)	(0.066)	(0.037)
ln(deal size)	-0.013	0.003	-0.003	0.023	0.012	0.013
	(0.022)	(0.027)	(0.020)	(0.029)	(0.019)	(0.029)
Market-to-Book_a	-0.004	-0.004	-0.002	-0.005	-0.002	-0.003
	(0.005)	(0.009)	(0.005)	(0.010)	(0.004)	(0.009)
Market-to-Book_t	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.257**	0.365***	0.237**	0.345***	0.121	0.348***
	(0.099)	(0.063)	(0.093)	(0.070)	(0.116)	(0.059)
Observations	1334	673	1334	673	1334	673
Adjusted R^2	0.028	0.073	0.030	0.075	0.015	0.073
Year and Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Table 7: Liquidity-enhancing Activity Prior to Stock Acquisitions

This table reports estimates on the effect of future stock acquisitions on a firm's liquidity-enhancing activities that include stock splits and increase in earnings guidance. In Column (1) of Panel A, a logit regression is run with the dependent variable being a dummy that equals one if there is a stock split conducted in year t. In Column (2) of Panel A, an OLS regression is run with the dependent variable being the difference between the number of earnings guidance provided by the firm in year t and t-1. The sample period for the regression of Column (2) is 1994-2012. The main explanatory variable, *Stockacq*, is a dummy variable that takes a value of one if the firm makes a stock acquisition in year t+1 and zero otherwise. Other explanatory variables are defined in Appendix A. Year and industry (defined based on Fama-French 48 industry) fixed effect are included in all regressions. Robust standard errors are clustered by industry and reported in parentheses. Panel B reports the IV estimation results of the regressions in Panel A with *Stockacq* being instrumented using the total number of M&As in the same industry (defined using Fama-French 48 industry) of the firm in the year (*Number of acquisitions*). Both the first-stage and second-stage estimation results are reported. *, **, and *** indicate significance at 10%, 5%, and 1% respectively.

Panel A:		
	(1)	(2)
	Stock Split	Earnings Guidance
Stockacq	0.372***	0.316***
	(0.117)	(0.082)
Leverage	-1.321***	-0.360***
	(0.092)	(0.055)
Δ Leverage	0.655***	0.243***
	(0.066)	(0.037)
Market-to-Book	0.107***	0.004
	(0.006)	(0.006)
Firm Size	0.377***	0.325***
	(0.012)	(0.012)
Ind_Stock_Return	0.769***	-0.065***
	(0.027)	(0.015)
Volatility	-0.459***	-0.504***
	(0.088)	(0.048)
Constant	-4.796***	-5.762***
	(0.419)	(0.288)
Observations	118229	101312
Adjusted/ Pseudo R^2	0.149	0.165
Year and Industry Fixed Effects	Yes	Yes

	Panel B:		
	1st Stage	2nd Stage	
	(1)	(2)	(3)
	Stockacq	Stock Split	Earnings Guidance
Number of acquisitions	0.001***		
	(0.000)		
Instrumented Stockacq		0.783***	0.421**
		(0.211)	(0.178)
Leverage	-0.013***	-0.014***	-0.027***
	(0.002)	(0.004)	(0.007)
Δ Leverage	-0.002	0.018***	-0.006
	(0.003)	(0.002)	(0.008)
Market-to-Book	0.006***	0.002*	0.004***
	(0.001)	(0.001)	(0.002)
Firm Size	0.009***	0.004**	0.009***
	(0.001)	(0.002)	(0.002)
Ind_Stock_Return	0.018***	0.008**	-0.022***
	(0.001)	(0.004)	(0.006)
Volatility	0.016***	-0.005	-0.032***
	(0.002)	(0.004)	(0.008)
Constant	-0.032***	0.013	-0.709***
	(0.011)	(0.023)	(0.033)
Observations	118208	118208	101291
Year Fixed Effects	Yes	Yes	Yes
F-Stats		31.60	
Adjusted R^2		0.065	

Table 8: Stock Liquidity and Acquirer's Announcement Returns in Stock Deals

This table presents coefficient estimates from OLS regressions that examine the effect of stock liquidity on the acquirer's three-day [-1, 1] cumulative abnormal returns around the announcements of stock acquisition involving public targets. The liquidity measure used in each regression, indicated at the top of the table, is the difference between the acquirer's and the target's liquidity (*Relative Liquidity*). Other explanatory variables are defined in Appendix A. Year and industry (defined based on Fama-French 48 industry) fixed effect are included in all regressions. Robust standard errors are clustered by industry and reported in parentheses. *, **, and *** indicate significance at 10%, 5% and 1% respectively.

	(1) AMH	(2) Spread	(3) Turnover
Relative Liquidity	0.003***	0.005**	0.012***
	(0.001)	(0.003)	(0.004)
Runup	-0.036***	-0.037***	-0.038***
	(0.005)	(0.005)	(0.006)
Tender Offer	0.018	0.018	0.018
	(0.015)	(0.015)	(0.015)
Competing Bid	0.002	-0.000	-0.002
	(0.011)	(0.011)	(0.011)
Related Deal	-0.001	-0.001	-0.000
	(0.007)	(0.007)	(0.007)
Volatility	-0.036**	-0.038**	-0.046***
	(0.016)	(0.017)	(0.016)
Market-to-Book_a	-0.003	-0.004*	-0.004*
	(0.002)	(0.002)	(0.002)
Leverage_a	0.017	0.019	0.018
	(0.013)	(0.013)	(0.012)
Market-to-Book_t	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)
Leverage_t	0.001	-0.001	-0.002
	(0.009)	(0.009)	(0.009)
(Acquirer) Firm Size	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)
Constant	-0.050***	-0.044***	-0.044***
	(0.011)	(0.012)	(0.011)
Observations	1433	1433	1433
Adjusted R^2	0.104	0.101	0.110
Year and Ind. Fixed Effects	Yes	Yes	Yes

Table 9: Decimalization of 2001 – Effect on Likelihood of Acquisition and Payment in Stock

This table presents coefficient estimates from regressions of the following specification:

$$Y_{i,t} = \alpha_0 + \alpha_1 \text{ High\_Impact}_{i,t-1} + \alpha_2 \text{ High\_Impact}_{i,t-1} \text{ X Decimal} + \alpha_3 \text{ Decimal} + \alpha_4 \text{ Controls} + \varepsilon_{i,t}$$

where, $Y_{i,t}$ is the outcome variable regarding a firm's acquisition decision (Columns 1 and 4), a firm's stock acquisition decision (Columns 2 and 5), and the fraction of payment in stock (Columns 3 and 6). $High\_Impact_{i,t-1}$ is *Low_Price* for columns 1-3, and *Less_Active* for columns 4-6. *Low_Price* is a dummy variable that equals one if a firm's closing price at the end of fiscal year *t-1* falls below the median closing price in that year and zero otherwise. *Less_Active* is an indicator variable that equals 1 for the less actively-traded stocks in which the total number of trades as of year *t-1* is less than the sample median in that year and zero otherwise. *Decimal* is a dummy that equals one if fiscal year *t-1* ends after January 31, 2001 for firms traded on the NYSE and AMEX or after April 9, 2001 for firms traded in NASDAQ and is zero otherwise. We include year fixed effects from 1996-2000 and 2003-2007 to control for time trends in those years that are likely drive by factors other than decimalization. *, **, and *** indicate significance at 10%, 5% and 1% respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Acquisition decision	Stock acquisition decision	Fraction of payment in stock	Acquisition decision	Stock acquisition decision	Fraction of payment in stock
Low Price	-0.513***	-0.528***	-0.151			
	(0.050)	(0.066)	(0.108)			
Low Price X Decimal	0.190***	0.559***	0.343***			
	(0.067)	(0.105)	(0.135)			
Less Active				-0.591***	-0.679***	-0.055***
				(0.057)	(0.083)	(0.002)
Less Active X Decimal				0.185***	0.745***	0.046***
				(0.071)	(0.116)	(0.007)
Decimal	0.070	0.075	-0.074	0.013	-0.007	-0.018***
	(0.078)	(0.127)	(0.165)	(0.079)	(0.127)	(0.006)
Leverage	-0.217***	-0.413***	-0.104	-0.145**	-0.330***	-0.073***
	(0.059)	(0.084)	(0.130)	(0.057)	(0.084)	(0.002)
Δ Leverage	-0.203***	-0.127*	-0.318*	-0.205***	-0.111	-0.204***
	(0.051)	(0.074)	(0.178)	(0.049)	(0.070)	(0.004)
Tangibility	-1.432***	-1.381***	-0.227	-1.277***	-1.322***	-0.045***
	(0.129)	(0.175)	(0.198)	(0.128)	(0.177)	(0.003)
Market-to-Book	0.025***	0.061***	0.072***	-0.022***	0.008	0.072***
	(0.006)	(0.006)	(0.021)	(0.008)	(0.008)	(0.000)
Firm Size	0.133***	0.230***		-0.191***	-0.253***	
	(0.013)	(0.017)		(0.019)	(0.027)	
Ind_Stock_Return	0.275***	0.275***		0.329***	0.323***	
	(0.023)	(0.032)		(0.023)	(0.030)	
Volatility	0.119**	0.882***	1.201***	-0.678***	-0.035	0.549***
	(0.060)	(0.072)	(0.212)	(0.069)	(0.086)	(0.002)
Runup			0.334***			0.402***
			(0.119)			(0.004)
Relative Size			0.101***			0.125***
			(0.027)			(0.001)
ln(deal size)			0.105***			0.024***
			(0.024)			(0.000)
Cash/Deal			0.007			-0.011***
			(0.010)			(0.000)
Tender Offer			-1.619***			-1.035***
			(0.106)			(0.005)
ln(Shares outstanding)				0.472***	0.712***	0.086***
				(0.026)	(0.038)	(0.000)
Constant	-2.830***	-5.022***	-0.346	-8.395***	-13.768***	1.456***
	(0.194)	(0.274)	(0.387)	(0.420)	(0.599)	(0.001)
Observations	73896	73637	1877	73896	73637	1877
Pseudo R^2	0.076	0.149	0.289	0.102	0.190	0.732
Year and Ind. F.E.	Yes	Yes	Yes	Yes	Yes	Yes

Table 10: Decimalization of 2001 – Effect on Deal Premium

This table presents coefficient estimates from regressions of the following specification:

$$Y_{i,t} = \alpha_0 + \alpha_1 \text{ High\_Impact}_{i,t-1} + \alpha_2 \text{ High\_Impact}_{i,t-1} \text{ X Decimal} + \alpha_3 \text{ Decimal} + \alpha_4 \text{ Controls} + \varepsilon_{i,t}$$

where, $Y_{i,t}$ is the outcome variable regarding a firm's deal premium for the subsamples of stock (Columns 1 and 3) and cash acquisitions (Columns 2 and 4) involving public targets. $High\_Impact_{i,t-1}$ is *Low_Price* for columns 1-3, and *Less_Active* for columns 4-6. *Low_Price* is a dummy variable that equals one if a firm's closing price at the end of fiscal year *t-1* falls below the median closing price in that year and zero otherwise. *Less_Active* is an indicator variable that equals 1 for the less actively-traded stocks in which the total number of trades as of year *t-1* is less than the sample median in that year and zero otherwise. *Decimal* is a dummy that equals one if fiscal year *t-1* ends after January 31, 2001 for firms traded on the NYSE and AMEX or after April 9, 2001 for firms traded in NASDAQ and is zero otherwise. We include year fixed effects from 1996-2000 and 2003-2007 to control for time trends in those years that are likely drive by factors other than decimalization. *, **, and *** indicate significance at 10%, 5% and 1% respectively.

	(1)	(2)	(3)	(4)
	Deal premium (stock deals)	Deal premium (cash deals)	Deal premium (stock deals)	Deal premium (cash deals)
Low Price	0.031	-0.053		
	(0.056)	(0.392)		
Low Price X Decimal	-0.093*	0.176		
	(0.056)	(0.452)		
Less Active			-0.092	0.096
			(0.057)	(0.082)
Less Active X Decimal			-0.160*	-0.197
			(0.090)	(0.280)
Decimal	-0.329***	-0.098	-0.336***	-0.080
	(0.086)	(0.175)	(0.083)	(0.200)
Runup	0.087**	-0.214	0.089***	-0.074
	(0.033)	(0.271)	(0.031)	(0.066)
Related Deal	-0.032	-0.019	-0.031	-0.043
	(0.019)	(0.141)	(0.019)	(0.057)
Competing Bid	-0.067	-0.005	-0.071	-0.070*
	(0.068)	(0.149)	(0.071)	(0.040)
Leverage_a	-0.054	0.337	-0.090*	-0.050
	(0.051)	(0.563)	(0.045)	(0.110)
Leverage_t	0.113**	-0.122	0.110*	0.101
	(0.052)	(0.464)	(0.057)	(0.094)
Tender Offer	-0.012	0.096	0.006	0.069
	(0.072)	(0.156)	(0.077)	(0.044)
ln(deal size)	0.028	-0.097	0.045	0.003
	(0.039)	(0.147)	(0.043)	(0.030)
Market-to-Book_a	-0.005	0.011	-0.006	-0.000
	(0.005)	(0.067)	(0.006)	(0.011)
Market-to-Book_t	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
ln(Shares outstanding)			0.006	0.020
			(0.008)	(0.017)
Constant	0.406***	0.133	0.307*	-0.043
	(0.060)	(0.415)	(0.163)	(0.290)
Observations	1044	463	1044	463
Adjusted R^2	0.058	0.458	0.068	0.065
Year and Ind. F.E.	Yes	Yes	Yes	Yes

Table 11: Instrument Variable Regressions of Stock Liquidity Using Annual Reconstitution of Russell 1000/2000 Indices

Panel A presents estimates of the first-stage IV regression of stock liquidity on an indicator of end-of-May market capitalization ranking. The sample is obtained by ranking stocks based on their end-of-May market capitalization, as reported in CRSP, and selecting firms ranked 701st through 1300th for each year of the sample during 1998-2006. Specifically,

$$Liquidity_{it} = \alpha + \beta\ R2000_{it} + \sum_{n=1}^{N} \gamma_n\ (Ln(May\ market\ cap)_{it})^n + \rho\ Ln(June\ float\ adj.\ market\ map)_{it} + \mu_t + \varepsilon_{it}$$

where *R2000* is an indicator variable that equals one if firm *i's* end-of-May market capitalization is ranked beyond 1001st in year *t* and zero otherwise; $Ln(May\ market\ cap)_{it}$ is the natural logarithm of firm *i*'s end-of-May market capitalization in year *t*; $Ln(June\ float\ adj.market\ cap)_{it}$ is the natural logarithm of firm *i*'s end-of-June float-adjusted market capitalization in year *t*, as provided by Russell. $Liquidity$ is firm *i*'s stock liquidity at the end of September in reconstitution year *t*.

Panels B through E report estimates from the second-stage IV regression. Specifically,

$$Y_{it} = \tau + \theta\ \widehat{Liquidity}_{it} + \sum_{n=1}^{N} \sigma_n\ (Ln(May\ market\ cap)_{it})^n + \varphi\ Ln(June\ float\ adj.\ market\ map)_{it} + \mu_t + \omega_{it}$$

where Y_{it} takes a value of one if firm *i* makes an acquisition in the period of July 1st in year *t* to the end of next May (panel B); takes a value of one if firm *i* makes a stock acquisition in the period of July 1st in year *t* to the end of next May (panel C); is the fraction of deal payment in stock if a deal involving a public target occurs during the period of July 1st of the reconstitution year to the end of next May (panel D); and is the deal premium paid for a deal involving a public target that occurs during the period of July 1st of the reconstitution year to the end of next May (panel E). In panel E, we also control for *Related Deal, Competing Bid, Tender Offer*, and *ln(deal size)*. The liquidity measure used in each regression is indicated at the top of the table. *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

Panel A: 1st stage			
	AMH	Spread	Turnover
R2000	0.100**	0.080***	0.019**
	(0.047)	(0.026)	(0.009)
Observations	5271	5271	5271
Adjusted R^2	0.518	0.737	0.047
Bandwidth	300	300	300
Polynomial order	1	1	1
Controls	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Panel B: 2nd Stage (Likelihood of Acquisition)			
	AMH	Spread	Turnover
Liquidity	0.242***	0.302***	1.277***
	(0.077)	(0.118)	(0.404)
Observations	5271	5271	5271
Bandwidth	300	300	300
Polynomial order	1	1	1
Controls	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes

Panel C: 2nd Stage (Likelihood of Stock Acquisition)			
	AMH	Spread	Turnover
Liquidity	0.223*** (0.045)	0.278*** (0.057)	1.174*** (0.217)
Observations	5271	5271	5271
Bandwidth	300	300	300
Polynomial order	1	1	1
Controls	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes

Panel D: 2nd Stage (Fraction of Acquisition Payment in Stock)			
	AMH	Spread	Turnover
Liquidity	0.334** (0.146)	0.291*** (0.088)	0.013*** (0.005)
Observations	278	278	278
Bandwidth	300	300	300
Polynomial order	1	1	1
Controls	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes

Panel E: 2nd Stage (Deal Premium)						
	AMH		Spread		Turnover	
	Stock	Cash	Stock	Cash	Stock	Cash
Acquirer's Liquidity	-0.111*** (0.047)	0.568 (0.518)	-0.250** (0.110)	0.295 (0.178)	-0.006*** (0.002)	0.023 (0.019)
Observations	126	131	126	131	126	131
Bandwidth	300	300	300	300	300	300
Polynomial order	1	1	1	1	1	1
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Appendix A: Variable Definitions

A.1. Key variables

A.1.1. Stock liquidity

We use three different measures of liquidity in our analysis that are common in the literature. The first is Amihud's (2002) Illiquidity ratio. It is defined as the natural logarithm of *AvgILLIQ X* 10^9 where *AvgILLIQ* is the yearly average of illiquidity, which is measured as the absolute return divided by dollar trading volume:

$$AvgILLIQ_{i,t} = \frac{1}{Days_{i,t}} \sum_{d=1}^{Days_{i,t}} \frac{|R_{i,t,d}|}{DolVol_{i,t,d}}.$$

Here $Days_{i,t}$ is the number of valid observation days for stock *i* in fiscal year *t*, and $R_{i,t,d}$ and $DolVol_{i,t,d}$ are the daily return and daily dollar trading volume, respectively, for stock *i* on day *d* of fiscal year *t*. This measure reflects the average stock price sensitivity to one dollar trading volume. Higher *AvgILLIQ* is interpreted as lower stock liquidity. In our analysis, we take a minus of the Amihud's Illiquidity ratio so that it measures a stock's liquidity instead of illiquidity.

The second measure is the natural logarithm of the yearly average of daily bid-ask spread:

$$Bid - Ask\ Spread_{i,t} = \frac{1}{Days_{i,t}} \sum_{d=1}^{Days_{i,t}} \frac{Ask_{i,t,d} - Bid_{i,t,d}}{\frac{(Ask_{i,t,d} + Bid_{i,t,d})}{2}}$$

where $Days_{i,t}$ is the number of valid observation days for stock *i* in fiscal year *t*, and $Ask_{i,t,d}$ and $Bid_{i,t,d}$ are the closing ask and bid prices of stock *i* on day *d* of fiscal year *t*. Higher Bid-Ask Spread is interpreted as lower stock liquidity. Like the Amihud's Illiquidity ratio, we take a minus of Bid-Ask $Spread_{i,t}$ so that it measures a stock's liquidity instead of illiquidity.

The third measure is the yearly average of monthly trading turnover, which is calculated as:

$$Turnover_{i,t} = \frac{1}{12} \sum_{m=1}^{12} \frac{Vol_{i,t,m}}{Shrout_{i,t,m}}$$

where $Vol_{i,t,m}$ and $Shrout_{i,t,m}$ are the number of shares traded and shares outstanding of firm *i* in month *m* of fiscal year *t*, respectively.

A.1.2. Some major deal characteristics

Stock acquisition: In the literature, definitions of stock deals vary across studies. For example, some define deals paid by 100% of stocks and deals paid with a combination of stock and cash as "stock" deals (e.g., Chang, 1998; Officer, Poulsen, Stegemoller, 2009). In other studies, "stock" deals are defined as those containing only stock, and "cash" deals are defined similarly (e.g., Moeller, Schlingemann, and Stulz, 2007). We take two approaches in the examination of payment method. First, we take the proportion of stock paid in each deal. Second, we define a deal as "stock" deal if the proportion of stock in the total payment is no less than 60% (i.e., the majority of the payment is in the form of stock) and a deal as "cash" deal if the proportion of cash in the total payment is no less than 60%. In robustness checks, we also define "stock" ("cash") deals as those containing stock (cash) payment only and find that our results are qualitatively similar.

Deal premium: It is the market value acquisition premium offered to the target, defined as the effective offer price as a percentage premium over the target firm's market share price as of two days prior to the takeover announcement.

A.2. All other variables

- *Blockholder* is the number of blockholders with 5% or more stock ownership in the target in the quarter prior to deal announcement.
- *Cash* is the cash and short term investments to lagged asset ratio.
- *Cash/Deal* is the amount of acquirer cash plus marketable securities normalized by the value of the merger or acquisition.
- *Competing_Bid* is a binary variable that takes one if there was a competing bid, and zero otherwise.
- *Decimal* is a dummy that equals one if fiscal year *t-1* ends after January 31, 2001 for firms traded on the NYSE and AMEX or after April 9, 2001 for firms traded in NASDAQ and is zero otherwise.
- *Firm Size* is the natural log of book value of total assets.
- *Firm's Age* is the age of the firm in years.
- *Ind_stock_return* is the annual stock return in the prior year, adjusted for the mean contemporaneous industry stock return.
- $KZ_{i,t} = -1.002\frac{CF_{i,t}}{AT_{i,t-1}} - 39.398\frac{Div_{i,t}}{AT_{i,t-1}} - 1.315\frac{C_{i,t}}{AT_{i,t-1}} + 3.319Leverage_{i,t} + 0.283Q_{i,t}$

where cash flow (CF) is the sum of income before extraordinary items and depreciation and amortization, dividends (DIV) are measured as common and preferred dividends, C is cash and short term investments.

- *Less_Active* is an indicator variable that equals 1 for the less actively-traded stocks in which the total number of trades as of year *t-1* is less than the sample median in that year and zero otherwise.
- *Leverage* is the debt to assets ratio.
- *Ln(1+guidance)* is the natural logarithm of one plus the frequency of earnings guidance forecasts provided by the management.
- *Ln(deal size)* is the natural logarithm of value of transaction.
- *Ln(Shares outstanding)* is the natural logarithm of number of shares outstanding.
- *Log Number of Analysts* is the natural logarithm of one plus maximum number of analysts following the stock for the year. It is coded as 0 if there is no coverage from *I/B/E/S*.
- *Low_Price* is a dummy variable that equals one if a firm's closing price at the end of fiscal year *t-1* falls below the median closing price in that year and zero otherwise
- *Market-to-Book* is the market value to book value of total assets.
- *NYSE Dummy* is a binary variable that is equal to one if the firm is listed in the New York Stock Exchange and zero otherwise.
- *R&D* is a binary variable that takes one if the R&D expenditure to lagged assets is greater than zero, and zero otherwise.
- *Related Deal* is a binary variable that takes one if both firms (acquirer and target) are from the same two-digit SIC code; and zero otherwise.
- *Relative Liquidity* is the simple difference between the acquirer's and the target's stock liquidity.
- *Relative Size* is the natural logarithm of target market capitalization a month prior to acquisition divided by bidder market capitalization a month prior to acquisition.
- *ROA* is the earnings before extraordinary items to lagged asset ratio.
- *Runup* is the firm's market-adjusted cumulative return for the 90 trading days [-120, -30] prior to the acquisition announcement date.
- *Short horizon* is the ratio of shareholding by short-term investors to shareholding by long-term investors in the quarter prior to the announcement date.
- *Stock Split* is a binary variable that indicates whether or not there was a stock split.
- *Tangibility* is the net total value of property, plant and equipment, divided by total assets.

- *Tender Offer* is a binary variable that takes a value of one if the acquirer involves a tender offer as reported in SDC and zero otherwise.
- *Volatility* is the volatility in the firm's stock return over the 12 months preceding the acquisition.
- *Δ Leverage* is the change in leverage from t-2 to t-1.