Merger-motivated IPOs

Armen Hovakimian[*]

Baruch College

Irena Hutton[**]

Florida State University

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[*] Zicklin School of Business, Baruch College, One Bernard Baruch Way, Box 10-225, New York, NY 10010. Phone: (646)312-3490, fax: (646) 312-3451, email: Armen_Hovakimian@baruch.cuny.edu
[**] Department of Finance, College of Business, Florida State University, Tallahassee, FL 32306. Phone: (850) 645-1520, fax: (850) 644-4225, email: Ihutton@cob.fsu.edu

ABSTRACT

In this paper we explore and find support for IPOs motivated by subsequent acquisition activity. Over a third of newly public firms enter the market for corporate control as acquirers within three years of the IPO. We find that the role of an IPO in facilitating subsequent acquisitions is twofold. Newly-public firms benefit from the cash funding provided by the IPO, subsequent access to public financing and publicly traded stock, which facilitates stock-based acquisitions. IPO firms also benefit from obtaining public valuations. We find that these firms take advantage of high-post IPO stock values in making stock-based acquisitions at favorable terms and obtain market feedback.

Introduction

Over the last two decades much empirical and theoretical research has focused on the motivation for Initial Public Offerings (IPO). Some commonly offered explanations for this transition from private to public ownership include better access to capital, enhanced liquidity of shares, diversification of ownership, and, finally, increased publicity. In this study, we explore an additional explanation for undertaking an IPO, namely, the role of an IPO in facilitating subsequent acquisition activity by a newly-public firm. Our results support this explanation.

This finding is important from two perspectives. First, it contributes to our understanding of the advantages to having publicly-traded shares. Second, it emphasizes the connection between IPO and merger waves and adds to the emerging literature on co-movement in waves in corporate activity.

The role of an IPO as a "springboard" for subsequent acquisition activity by a newly-public firm has been largely neglected in the past and there is little empirical evidence on the relation between these two corporate events. However, there are several notable exceptions. Brau, Francis, and Kohers (2003) suggest that an IPO may be a mechanism for obtaining currency (i.e., publicly traded stock) for subsequent merger activity. A recent survey of 336 CFO's by Brau and Fawcett (2006) demonstrates that 59% of CFO respondents agree with this statement. Rosen, Smart, Zutter (2005) find that IPO banks are more likely to be acquirers than banks in their control samples. Schultz and Zaman (2001) similarly find that IPOs of Internet firms in the late 1990's were followed by series of acquisitions. Hsieh, Lyandres and Zhdanov (2008) develop a theoretical model linking the resolution of uncertainty at the IPO to the optimal

restructuring strategy. The most comprehensive study on the topic is a paper by Celikyurt, Sevilir and Shivdasani (2007) who find that the acquisition activity of newly-public firms contributes to the firm growth more so than investment in R&D and CAPEX. At the aggregate level this relation between the IPO and subsequent mergers translates into IPO and merger waves. Hsieh, Lyandres and Zhdanov (2008) and Rau and Stouraitis (2008) find that the waves of IPO activity precede merger waves.

We formulate and test three hypotheses relating IPOs to subsequent merger activity. Since these explanations are not necessarily mutually exclusive, we focus on their relative importance rather than a single explanation.

According to the financing hypothesis, a public issue of stock (and subsequent access to public equity or debt market) not only generates funding for cash-based mergers but also facilitates stock-based acquisitions. Target's owners are likely to be more receptive to an acquisition by a publicly traded firm because of the liquidity and relative ease of valuation of the public bidder's stock. This may allow IPO firms to acquire types of targets that could be out of reach of private acquirers, e.g., targets where insiders want to maintain some ownership in the combined firm. Additionally, better access to financing may allow newly public firms to more actively participate in hot M&A markets.

The market-timing hypothesis is based on the assumption that market valuations periodically depart from the fundamental values and rational managers are able to identify and act on these misvaluations. This ability to identify "windows of opportunity" would allow IPO firms to time acquisitions to periods of overly high market valuations of their shares, when stock-based acquisitions would be particularly inexpensive. This may

allow IPO firms to pursue public targets that themselves could be overvalued and as such would be too expensive for private acquirers paying with cash. To the extent that merger and valuation waves coincide, these arguments imply that IPO firms should be more likely than private firms to make acquisitions during acquisition waves.

Another benefit of having publicly-traded stock for potential acquirers is identified by the market feedback hypothesis. Given the uncertainty about the private firm's valuation, following the IPO, market valuation provides the firm with information about the market's view regarding the firm's strategy including the value of its future acquisitions and allows for more optimal restructuring policy.

Our findings provide strong support for the financing hypothesis. We find that newly public firms make use of IPO proceeds as well as subsequent access to the public market in raising acquisition financing. This ability to raise cash as well as use stock as method of payment enables firms to acquire targets that are qualitatively different from targets of private firms. Specifically, following an IPO, firms shift away from acquisitions of subsidiaries to acquisitions of private firms. Furthermore, IPO firms pursue public targets that are larger, more liquid, have higher market-to-book ratios, and are more likely to be in the same industry with the acquirer. Additionally, IPO firms become more active participants in merger waves. Our results also indicate that high post-IPO valuations facilitate both cash-based and stock-based acquisitions, which is consistent with the market feedback hypotheses. However, the effect is stronger for stock-based acquisitions, implying that IPO acquirers do attempt to time the market.

The paper is organized as follows. In Section I, we discuss previous IPO and Mergers & Acquisitions (M&A) literature and hypotheses development. In Section II, we discuss

sample construction. In Section III, we discuss our hypothesis tests and results. Section IV concludes the paper.

I. Previous Research and Hypothesis Development

There are several existing theories explaining a private firm's decision to go public. Broadly defined, they relate to the motivation to gain market share, information production, ability to opportunistically time the market, liquidity, ease of raising capital and corporate control. In this section, we first focus on the literature highlighting corporate control considerations as a motive for going public. We then develop three hypotheses to explain how IPOs may facilitate subsequent acquisitions.

Previous Research

Corporate control decisions provide a strong reason for an IPO. Zingales (1995) argues that an IPO is a step toward having a firm taken over at an attractive price as the IPO strengthens the bargaining power of the target vis-a-vis potential acquirers. Mello and Parsons (1998) also suggest that the information received from investors in the IPO helps increase the proceeds from the sale of the controlling shareholder's rights. Boulton, Smart and Zutter (2006) find that IPO underpricing may contribute to a more dispersed ownership structure, strengthen managerial control and protect the firm from being taken over.

Several recent studies provide interesting evidence that newly public firms enter the market for corporate control as active acquirers. Celikyurt, Sevilir and Shivdasani (2007) find that over 80% of large IPOs during 1994-2004 resulted in at least one acquisition in the following five years. After gaining greater flexibility with respect to acquisition financing, these firms become such active acquirers that their acquisition

activity contributes to the firm growth more than investment in R&D and CAPEX. Rosen, Smart, Zutter (2005) find that IPO banks are more likely to be acquirers than are banks in the control sample. Schultz and Zaman (2001) similarly find that IPOs of Internet firms in the late 1990's were followed by a series of acquisitions. Survey evidence corroborates the importance of IPOs in facilitating subsequent acquisitions. A recent survey of 336 CFO's by Brau and Fawcett (2006) demonstrates that 59% of CFO respondents agree with the statement that IPOs provide funding for future acquisitions. At the aggregate level Rau and Stouraitis (2008) examine the relation between the new issues, mergers and repurchases and find that merger waves closely follow waves of IPO activity. However, this relation by itself does not identify the role of newly-public acquirers in the synchronization of IPO and merger waves.

Emerging theoretical literature on the topic makes an attempt to examine why the decision to participate in the M&A market influences the decision to go public. Hsieh, Lyandres and Zhdanov (2008) develop a mechanism relating the decision to go public to the subsequent decision to acquire through a rational real-options based approach. They show that an IPO allows a bidding firm to pursue the optimal acquisition strategy (i.e., optimally exercise its restructuring option). This line of reasoning also extends to firms that may position themselves as targets following their IPOs. Their empirical results confirm findings by Rau and Stouraitis (2008) in that IPO waves are closely related to merger waves.

Financing Hypothesis

Access to capital represents an important motivation for going public. Lowry (2002) shows that fluctuations in IPO volume can be explained by the private firms' demand for capital. Poulsen and Stegemoller (2008) show that firms choosing to undertake an IPO face greater capital constraints than sell-out firms. Choe, Masulis and Nanda (1993) also find that equity offerings provide funding for future investment projects.

Consistent with these studies, an IPO facilitates acquisitions by generating cash, which then can be used in cash-based acquisitions. It may also allow the firm to use its publicly-traded stock as a method of payment or access the public debt and equity markets to raise acquisition financing.

From the perspective of the target's shareholders, a stock offer from a public firm is more attractive than a stock offer from a private firm. One reason is superior liquidity of a publicly-traded firm's stock. Another reason is reduced uncertainty of a public firm's valuation. An IPO establishes a publicly observable value and, while by itself it does not rule out misvaluation, it provides some assurance to the target that the shares accepted as payment are fairly valued. In addition, there is likely to be more information asymmetry around a private firm's value since privately held companies are more informationally opaque than publicly held companies, which are required to comply with disclosure requirements of the SEC.

Newly public firms may also benefit from the ability to make stock-financed acquisitions in that it may enable them to acquire a different set of target firms such as those placing more value on control rather than liquidity. In contrast, private firms have

difficulty using their stock and hence will use cash to acquire the types of firms where owners may be liquidity constrained and are looking for a complete exit (Officer (2007)). Moreover, the relative ease of obtaining merger financing should allow newly public firms to participate in the M&A market during periods of increased merger activity (i.e., merger waves).

Market Feedback Hypothesis

If the market participants have some information about the firm's value that the firm itself does not have, the market valuation following the IPO should be considered in determining its optimal investment (acquisition) strategy. Jegadeesh, Weinstein and Welch (1993) propose this hypothesis in the context of IPOs and subsequent seasoned equity offerings. They argue that high post-IPO return indicates that managers have underestimated the profitability of investment; after observing a positive market reaction they increase the scale of the project.

The idea of market feedback has been reinforced in several other studies of IPOs. Alti (2005) argues that IPOs reveal investors' private information. This information then becomes available to other firms considering going public and facilitates their IPO decisions. Subrahmanyam and Titman (1998) also show that information production by investors may influence the IPO decision. The advantage to going public is greater if managers can obtain this information at low cost.

Hsieh, Lyanders and Zhdanov (2008) build on this hypothesis by modeling market feedback with respect to the potential merger gain. The idea is that without market valuation, the estimate of a private firm's value, which includes the potential takeover gain, is noisy. The uncertainty about the takeover gain translates into the sub-

optimal exercise of the option to merge. This inefficiency influences the private firm's costly decision to go public and learn its true valuation as well as make it known to the target. By eliminating the valuation uncertainty it can exercise its restructuring option optimally.

One of the key predictions of the market feedback hypothesis is that positive post-offering returns communicate the market's favorable assessment of the firm's acquisition and not only increase the likelihood of a subsequent acquisition but also speed it up. The intuition is that the cost of delaying a high synergy acquisition is higher.

Another set of testable predictions of the market-feedback hypothesis concerns the method of payment in merger-related IPOs. Specifically, we should observe a positive relation between stock returns and the likelihood of an acquisition regardless of the method of payment. In other words, the likelihood of cash, mixed, and stock acquisitions should all increase with stock returns.

Market Timing Hypothesis

Corporate insiders and underwriters may take advantage of investors by timing IPOs to periods when stock prices are high. Ritter and Welch (2002) suggest that market conditions play the most important role in the decision to go public. Lucas and McDonald (1990) who model the equity issue decision in an asymmetric information framework, show that undervalued firms delay issuing equity if waiting is not too costly, while overvalued firms issue equity immediately. Pagano, Panetta and Zingales (1998) demonstrate that high market valuations of industry peers have a significant impact on the probability of a firm undertaking an IPO. Lerner (1994) finds that venture capital-backed biotechnology firms go public near market peaks. He also shows that the

biotechnology index is higher when firms go public then when they receive private financing.

Equity issuance is not the only corporate activity with documented market timing patterns. Shleifer and Vishny (2003) and Rhodes-Kropf and Viswanathan (2004) model acquisition activity driven by market valuation factors. The models also predict that acquiring firms that are perceived to be overvalued by the market are likely to carry out stock acquisitions. Rhodes-Kropf, Robinson and Viswanathan (2005) and Ang and Cheng (2006) provide strong empirical evidence for these predictions. Taken together, these market timing patterns in IPO and merger activity provide rationale for the timing of merger-motivated IPOs as well as post-IPO mergers to take advantage of favorable stock prices by making acquisitions at more attractive terms.

If market timing considerations are important to managers, we would expect not only to see more mergers after IPOs followed by high valuations, but also expect them to be more immediate and most likely stock-based. The connection between market valuations and the method of payment differentiates the market timing hypothesis from the market feedback hypothesis. Therefore the market-timing hypothesis predicts that IPOs with better subsequent stock performance as measured by underpricing and post-IPO returns are more likely to be followed by stock-based mergers.

In addition, using potentially overvalued shares as a means of payment may allow IPO firms to pursue public targets that themselves could be overvalued and as such would be too expensive for private acquirers paying with cash. This suggests that the targets of IPO firms could have higher valuation multiples, such as the market-to-book ratio, than the targets of private firms. Furthermore, to the extent that merger and valuation waves

coincide, these arguments imply that IPO firms should be more likely than private firms to make acquisitions during acquisition waves.

II. Data

We obtain a sample of IPOs and mergers from the Thomson Financial's SDC New Issues and Mergers & Acquisitions databases. Both samples are restricted to domestic IPOs and mergers over 1980-2006. Since we examine the decision to go public and its role in facilitating subsequent merger activity, we collect the data on acquisitions that take place within a three-year period following the firm's IPO. Merger data are available through the end of 2006 and we end the IPO sample in 2003 to allow us to track the three-year merger activity for all IPO firms in our sample.

We apply a set of standard restrictions to our IPO data by excluding ADRs, unit offers and partnerships and IPOs with offer price under $5. We eliminate penny stocks to make sure that the results are not overly affected by small firms. We also exclude financial firms (one-digit SIC 6) and utilities (two-digit SIC 49) from the IPO sample. This dataset consists of 6,149 firms. Additionally, we require that the IPOs used in subsequent analyses are included in COMPUSTAT during the fiscal year of the IPO and have returns in CRSP during the first calendar month following the IPO.[1] This results in a final sample of 5,771 IPOs.

We restrict the sample of mergers to completed domestic mergers by public acquirers in which at least 50% of the target's shares were acquired and at least 90% of the post-transaction firm's shares were owned by the acquirer. We require that the merger transaction value exceeds $1 million. Additionally, we restrict our focus only to

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[1] All variables are trimmed at 1% and 99% where appropriate.

acquisitions of private, public and subsidiary targets[2]. The resulting set contains 30,075 observations. Both IPO and merger sets are then combined to result in 8,005 observations, which include 4,265 mergers by 2,059 firms. The remaining IPO firms did not conduct any acquisitions in the first three years after the IPO.

We also construct a control sample of completed mergers carried out by private bidders. We require that the private acquirer is identified by the SIC code and has a deal value available in SDC. After we impose the restriction of a minimum deal size of $1 million and eliminate financial firms and utilities, the initial sample of 17,934 acquisitions is reduced to 4,466. Additionally, we retain only acquisitions of private, public and subsidiary targets and mergers in which at least 50% of the target's shares were acquired and at least 90% of the post-merger firm's shares were owned by the acquirer. This results in the final sample of 3,808 private mergers.

III. Hypothesis Testing and Results

Table 1 demonstrates that a significant number of firms become acquirers shortly after the IPO. In the sample of 5,771 IPOs, 2,059 (36%) completed at least one acquisition in the three years following the IPO.[3] Considering that roughly 13% of IPO firms are acquired within 3 years of the IPO (Boulton, Smart and Zutter (2006)), our results suggest that newly public firms are more likely to enter the market for corporate control as acquirers rather than targets.

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[2] We eliminate mergers where the target is classified by SDC as government, investor, joint venture, mutually owned or unknown.

[3] The fraction of firms engaging in post-IPO acquisitions is lower than that reported by Celikyurt, Sevilir and Shivdasani (2007). We attribute this to differences in sample selection. Our study covers a longer time period, includes smaller IPOs and excludes acquisitions with missing transaction values.

Many firms make more than one acquisition, averaging slightly over two mergers per firm. The median number of days from the IPO to the first merger is 331, while the average number of days is slightly over a year (410 days). Although the median IPO ($35.85 million) is larger than the median merger ($21.94 million), the size of an average merger ($111.87 million) exceeds that of an average IPO ($66.52 million)[4] suggesting that IPO proceeds may not serve as a sole funding source for these post-IPO mergers.

Figure 1 graphically demonstrates annual IPO, aggregate merger activity, and merger activity by IPO and private firms in our sample. The aggregate merger activity is based on 33,833 acquisitions (30,075 by public acquirers and 3,808 by private acquirers) for which transaction values are available in SDC. We observe an IPO wave in the 1980's followed by another IPO wave in the 1990's. Both IPO waves are followed by an increase in the aggregate merger activity. These aggregate patterns of IPO and merger activity are similar to those reported in Rau and Stouraitis (2008). In addition, compared to private acquirers, the waves of mergers by IPO firms track the aggregate merger waves more closely. Below we explore the mechanism connecting the IPO activity to subsequent acquisition activity.

Method of Merger Payment

We test the predictions of the discussed three hypotheses by modeling the method of payment as a function of IPO size, time between IPO and merger, access to public equity and debt, target type, merger wave indicator, post-IPO valuations as well as several control variables.

$$M^{*}{}_{i} = \gamma X_{i} + \beta_{1} IPOSize_{i} + \beta_{2} Time_{i} + \beta_{3} Equity_{i} + \beta_{4} Debt_{i} + \beta_{4} DebtRating_{i} +$$

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[4] These raw numbers are adjusted to 2006 dollars using the CPI-U index.

$$\beta_5 Wave_i + \beta_6 TargetType_i + \beta_7 Underpricing_i + \beta_8 Return_i + \beta_9 MB_i + \varepsilon_{it}. \quad (1)$$

The dependent variable M^*_i is the stock portion of merger payment. Since this variable falls in the interval [0,1], we use the two-boundary Tobit to estimate equation (1). We measure *IPOSize* as logarithm of IPO proceeds net of issuance costs. The amount of time between the IPO and the merger (*Time*) is measured in years. Similarly to Celikyurt, Sevilir and Shivdasani (2007), we include several variables that capture access to public financing. The ease of obtaining public equity (*Equity*) is measured by the amount of funding raised through annual stock financing and scaled by total assets[5,6]. Access to public debt is measured by the availability of credit rating (*DebtRating*) and the amount of funding raised through annual debt financing scaled by total assets (*Debt*).[7] We also include public/private/subsidiary status of the target as an additional control variable since these firm types may have different payment preferences.

The industry-level merger wave (*MergerWave*) is used to capture the increased likelihood of acquisition during periods of industry consolidation. The merger wave variable is constructed as the number of acquisitions in the industry defined by the two-digit SIC and scaled by the total number of industry acquisitions during the sample period[8].

Since the likelihood of a stock merger increases with market valuations according to the market timing and market feedback hypotheses, we use IPO underpricing, stock return and market-to-book ratio. IPO underpricing (*Underpricing*) is computed as the

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[5] This variable is measured by Compustat item data111/data6
[6] This variable is measured by Compustat item data108/data6
[7] This variable is measured by Compustat item data111/data6
[8] The variable in constructed from a larger sample of 33833 (30075 public and 3808 private) acquisitions and captures industry acquisition activity at t=0 relative to the merger.

first trading day closing price less the offer price, scaled by the offer price. Our measure of stock return (*Return*) is calculated as a raw three-month return preceding the merger year. The market-to-book ratio (*MB*) is the ratio of market value of equity measured at the end of the year preceding the merger and scaled by the book value of equity[9].

X is a vector of independent variables capturing crucial firm and industry characteristics suggested by theory and found important in prior studies. One of such control variables is an indicator variable that equals one if the firm declared acquisition financing as a reason for going public and zero otherwise. Firms that go public to obtain acquisition financing may be more likely to conduct cash mergers. In constructing this indicator variable we rely on the disclosed use of IPO proceeds obtained from SDC. While nearly 9% of firms announced future acquisitions as a motive for raising public equity, these numbers are smaller relative to the fraction of firms stating acquisition financing as a motive for going public obtained by Poulsen and Stegemoller (2008) from hand-collected prospectus data. However, we are not aware of a bias in the SDC data.

We also control for valuation uncertainty, as it may affect the method of merger payment. The target may be more willing to accept acquirer's stock if there is less uncertainty about the acquiring firm, allowing the target to better assess the value of the acquirer and minimize the likelihood of accepting overvalued stock. The proxies of uncertainty are adopted from prior empirical work. Our first proxy of uncertainty is a high-tech firm indicator based on the firm's SIC.[10] The opacity of high-tech firms, which protects their competitive advantage, also exacerbates their valuation difficulty. Additionally high-tech firms are likely to be somewhat unique with respect to their

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[9] This variable is measured by Compustat item data60.
[10] We include high-tech indicators for both the acquirer and the target.

operations or technology [Kohers and Kohers (2001)]. Therefore, it may be difficult to find comparable deals on which to base relative valuation of these firms.

Another measure of uncertainty is the horizontal merger indicator. Arguably, the target operating in the same industry as the acquirer is easier to value and vice versa. Our third measure of uncertainty is venture capital (VC) backing. Megginson and Weiss (1991) find that certification by venture capitalists can reduce the amount of uncertainty around an IPO. Lastly, stocks of large firms are more likely to get better press and analyst coverage and be informationally transparent. Therefore, we include firm size, measured by the market value of equity.

Liquidity of the acquiring firm's stock should play a role in facilitating post-IPO mergers. If the current shareholders keep partial ownership in the post-merger firm then stock liquidity may be important. As a measure of liquidity, we use turnover, which is computed as the daily number of traded shares divided by the daily number of shares outstanding and then averaged over a 3-month period preceding the year of the merger.[11] Finally, all CRSP and Compustat variables used in our analyses are measured at $t=-1$ relative to the merger year unless noted otherwise.

In Table 2, we report the results of the method of payment regression. The dependent variable in this Tobit model is proportion of stock used in acquisition financing. Overall, our results provide strong support for the financing hypothesis. We find that the proportion of stock in the acquisition payment decreases with primary IPO proceeds and mergers that follow IPOs closely are less likely to be associated with stock payments. We also find that the availability of public debt financing reduces the

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[11] In unreported analyses we adjust for the upward bias in trading volume of Nasdaq stocks following Becker-Blease and Paul (2006). The results remain qualitatively unchanged.

likelihood of stock-financed acquisitions while the ease of tapping the public equity market increases it. Perhaps the ease of obtaining equity financing reflects the ease of structuring a stock-financed acquisition rather than the firm's ability to sell stock to raise funds for a cash acquisition.

Our results indicate that high market valuations are positively related to the size of stock payments. The coefficients of underpricing and pre-merger stock returns are significant and positive. This relation is consistent with the market f timing hypothesis. Additionally, firms that disclose acquisition financing as one of the motives for going public are less likely to pay with stock. Given the amount of cash raised, post-IPO acquirers spend more of it on acquisitions consistent with the motive for raising money.

We also find that lower valuation uncertainty and greater liquidity facilitate stock-based acquisitions. The coefficients of VC, size and turnover are significant and positive. Interestingly, payments in mergers involving either technology targets or technology acquirers are more likely to have a larger stock component. Stock payment in this setting can be desirable as it can mitigate information asymmetry about the target's value (Hansen (1987)). Additionally, high-tech firms are typically cash poor and tend to "burn" through cash, which can explain their tendency to pay with stock.

Last, but not least, we find that acquisitions of subsidiary targets are associated with larger cash payments, while private targets are more likely to accept stock payments. This result indicates that different types of acquisition targets may have a preference with respect to acquisition payment. This preference may constrain private acquirers and force them to acquire the types of firms with preference for cash. Overall, our method of payment analysis lends support to the financing hypothesis. Furthermore, we find that

high market valuations lead to a higher fraction of stock in the acquisition financing, consistent with market-timing.

Probability of Merger

Next, we examine the effect of post-IPO stock performance on the likelihood of a merger. To allow for differences between stock and cash acquisitions, we separately model the decision to carry out a stock, mixed or cash acquisition using logit regressions. The dependent variable is coded one if the firm conducts a cash (mixed, or stock) acquisition in a particular year and zero otherwise. The sample is limited to the three years immediately following the IPO, resulting in a panel with up to three annual observations per firm-issuance.

The results of these regressions are reported in Table 3. They indicate that larger IPO proceeds are positively and significantly related to the likelihood of a cash merger and negatively related to the likelihood of a mixed or stock merger. Access to public debt financing is also strongly and positively related to the likelihood of a cash merger with both debt proceeds and availability of the credit rating being positive and significant. The effect of debt proceeds is slightly weaker for mixed mergers and is negative for stock mergers. Firms with better access to equity financing are less likely to conduct cash mergers and are more likely to use stock in their acquisitions. Additionally, better liquidity increases the likelihood of stock acquisitions. Collectively, these results provide support for the financing hypothesis.

Stock returns are significant and positive in all three regressions indicating that high returns increase the likelihood of both cash and stock mergers. The effect of underpricing is more ambiguous as it is negatively related to the occurrence of cash

mergers and is insignificant in the mixed and stock regressions. While stock returns positively affect the likelihood of stock and cash mergers consistent with market feedback, the relation between stock return and merger likelihood is the strongest in the stock merger regression supporting the timing motive.

In Table 4 we examine an additional prediction of the financing hypothesis with respect to acquisitions of certain target types. Specifically, we are interested in whether going public enables firms to acquire targets that are different from targets acquired by private firms. We focus on acquisitions of subsidiary, private and public targets. Officer (2007) documents the need for balance sheet liquidity of divesting firms prior to the cash sale of a subsidiary. Firms divesting segments either are likely looking for full divestiture due to poor strategic fit or have a need for liquidity and therefore prefer a cash deal. Therefore, we anticipate that the acquirer's access to public financing after the IPO may facilitate those acquisitions. Conversely, owners of private or public targets may be more likely to maintain some post-merger ownership in the firm. Here we should expect to see a positive relation between the acquirer's ability to use stock financing and acquisitions of private and public targets.

Consistent with our hypothesis, cash raised in the IPO and the subsequent ability to raise cash through debt financing facilitate acquisitions of subsidiaries. Further, the ability to raise equity financing is inversely related to the probability of subsidiary acquisitions. These results reflect an overall cash preference of subsidiary targets. We also find that acquisitions of private targets are positively related to access to public equity and are inversely related to IPO proceeds. Interestingly, access to debt financing is also positively related to the probability of a private acquisition. The results in the public

acquisition regressions are much weaker as most variables associated with firm characteristics are insignificant. Moreover, we find that acquisitions of public targets are negatively related to the access to public financing, which is counterintuitive. In summary, we find some evidence that the enhanced ability to access cash and use stock facilitate acquisitions of subsidiaries and private targets.

In Table 5 we compare the characteristics of acquisitions by newly-public firms to those made by private firms. First, we observe significant differences in the types of targets acquired by public and private firms. Public firms acquire mostly private targets (63.33 percent), followed by a significant number of subsidiaries (28.39 percent) and, finally a relatively small number of public targets (8.28 percent). In contrast, the majority of acquisitions by private firms involve subsidiary targets (64.36 percent). Acquisitions of private and public targets by private acquirers account for 26.68 percent and 8.96 percent, respectively.

This evidence supports our results in Table 4 in that public firms can use both cash and stock to finance acquisitions and can acquire targets with varying liquidity preferences. However, a private acquirer's stock is relatively unattractive. Therefore these firms are forced to make cash-financed acquisitions and pursue targets willing to accept it, which may explain the focus on subsidiary targets. Consistent with this conjecture, we observe large differences in the amount of stock financing used by public and private acquirers. Public acquirers rely on stock payments more heavily than private acquirers. We find that, on average, public acquirers use as little as 14 percent of stock in subsidiary acquisitions, but as much as 65 percent of stock in public acquisitions. In contrast, private firms use only 1 percent of stock in the average subsidiary acquisition.

Among acquisitions by private acquirers, acquisitions of private targets have the largest stock component – nearly 7 percent.

Second, public acquirers make more horizontal acquisitions than private firms. This difference persists across all three types of targets and is most pronounced for public targets. Mitchell and Mulherin (1996) document a significant industry component in merger waves. Perhaps public firms are more likely to acquire during periods of industry consolidation. Indeed, we find that acquisitions by IPO firms take place in more heated markets than acquisitions by private acquirers. The values of the total and industry-specific merger waves are larger for public acquirers regardless of the target type.

Since going public appears to facilitate acquisitions of a different type of targets relative to those acquired by private firms, we examine characteristics of public targets in more detail. Ideally, we would like to examine the characteristics of private and subsidiary targets as well, but data availability limits those analyses. We focus our comparison on size, market-to-book, 1-year pre-merger returns and 1-year pre-merger liquidity. Consistent with our expectations, public targets acquired by public firms are much larger, have higher market-to-book and pre-merger liquidity than public targets acquired by private firms. The differences are quite dramatic in that values of these variables differ by at least a factor of two. We also find that, on average, both public and private acquirers acquire public firms after a period of strong stock performance. In both cases, the average pre-merger returns of public targets exceed 20 percent. Collectively, these results suggest that going public enables firms to acquire larger, more liquid and richly valued public targets.

Lastly, we examine whether newly-public firms have an advantage over private targets in that they are able to participate in acquisitions during merger waves. In Figure 1 we report that waves of acquisitions by private firms do not fully overlap with waves of acquisitions by public firms. The correlation between these waves is reported in Table 6 and is 0.66 and statistically significant. Furthermore, we find that acquisitions by newly public firms follow aggregate merger waves more closely than acquisitions by private firms.

In Figures 2-4 we decompose public and private merger waves by target type. The time-series patterns of acquisitions of private and subsidiary targets are largely similar for public and private acquirers with respective correlations of 0.59 and 0.73 both of which are statistically significant. However, acquisitions of public targets follow very different patterns with the correlation between the two time series of only 0.17. Additionally, the pattern of acquisitions by public firms regardless of target type is very similar to the aggregate merger waves. This is not the case for acquisitions by private firms. This indicates that the decision to go public may allow firms to participate in acquisitions during merger waves.

Overall, access to funding as well as the ability to use stock as a method of payment in acquisitions enables newly-public firms to acquire a different type of target compared to those acquired by private firms. Following their IPOs, firms replace subsidiary targets with private targets. Moreover, compared to private firms, IPO firms are able to pursue public targets that are larger, more liquid, have higher market-to-book ratios, and are more likely to be in the same industry with the acquirer. Additionally, these acquisitions are more likely to take place in more active merger markets.

IV. Conclusions

In this paper, we examine the role of IPOs in facilitating subsequent acquisition activity by the newly-public firms. Our results suggest that IPOs give advantage to public firms over private firms in that IPO proceeds, as well as subsequent access to public financing, provide funding for cash acquisitions, allow firms to use stock to acquire targets with a preference for stock payment, and take advantage of hot merger markets. We also find that, in addition to these financing considerations, firms can benefit from information production by the outside investors uses IPOs to elicit market feedback with respect to the optimal restructuring strategy. They may also use IPOs in a manner consistent with market timing by purchasing targets with stock during periods of high market valuations.

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**Figure 1. Aggregate IPO Activity, Aggregate Acquisition Activity, and Acquisition Activity by IPO and Private Firms**
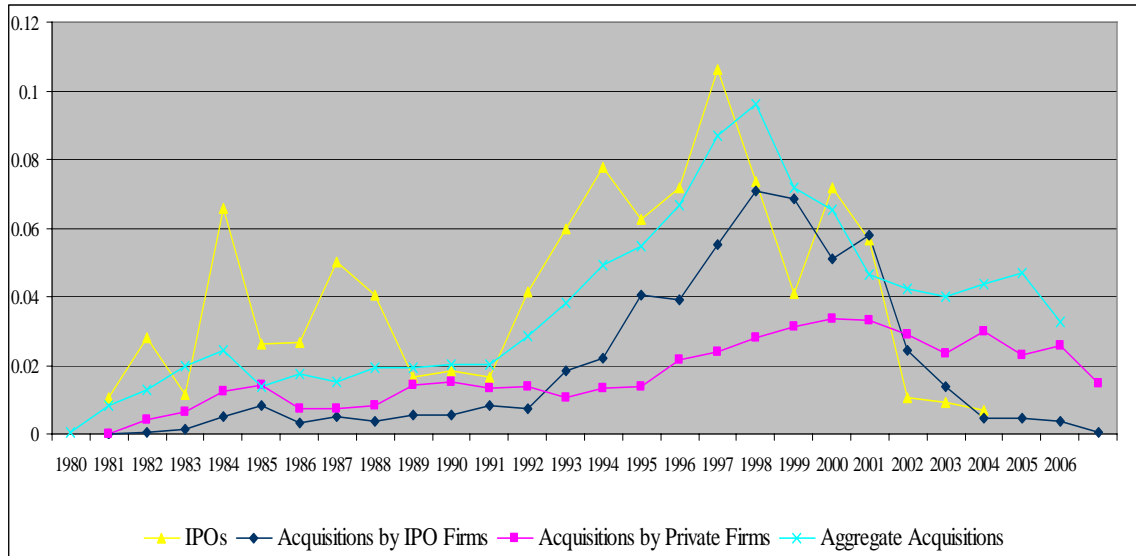
This figure shows aggregate IPO, aggregate acquisition activity, and acquisition activity by IPO (newly public) and private firms. Annual IPO values are scaled by the total number of IPOs during the sample period. Annual acquisition values of IPO and private firms are scaled by the sum of their acquisitions. Aggregate acquisition values are based on all acquisitions by public and private firms with available transaction values. Annual aggregate acquisition activity is scaled by the total aggregate acquisition activity during the sample period.

Figure 2. Acquisitions of Public Targets by IPO and Private Firms
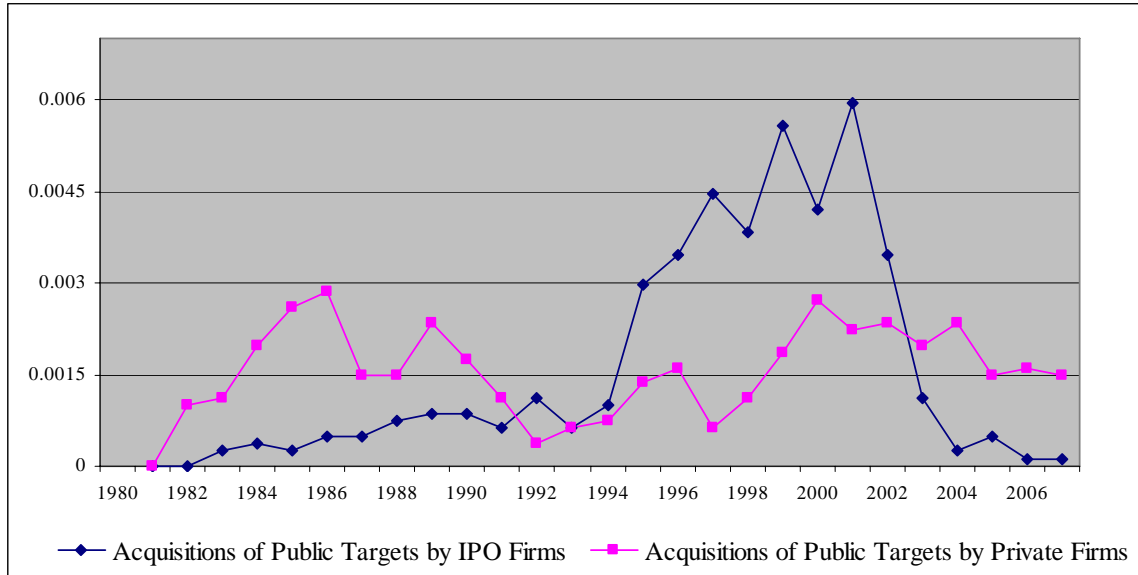
This figure shows acquisitions of public targets by IPO (newly-public) and private firms. Annual acquisition values are scaled by the sum of acquisitions by newly-public and private firms.

Figure 3. Acquisitions of Private Targets by IPO and Private Firms
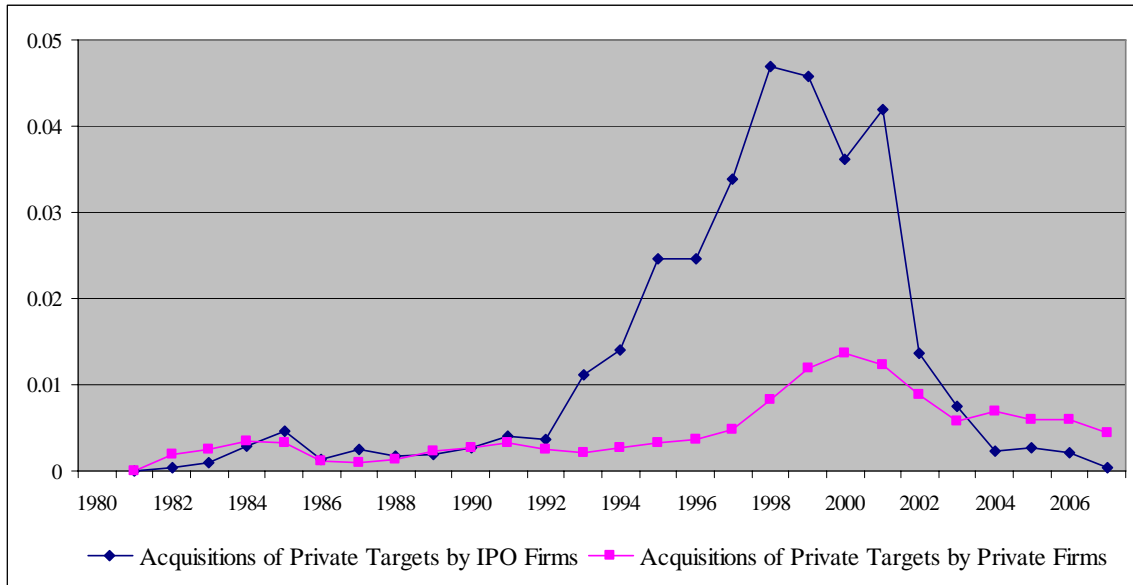
This figure shows acquisitions of private targets by IPO (newly-public) and private firms. Annual acquisition values are scaled by the sum of acquisitions by newly-public and private firms.

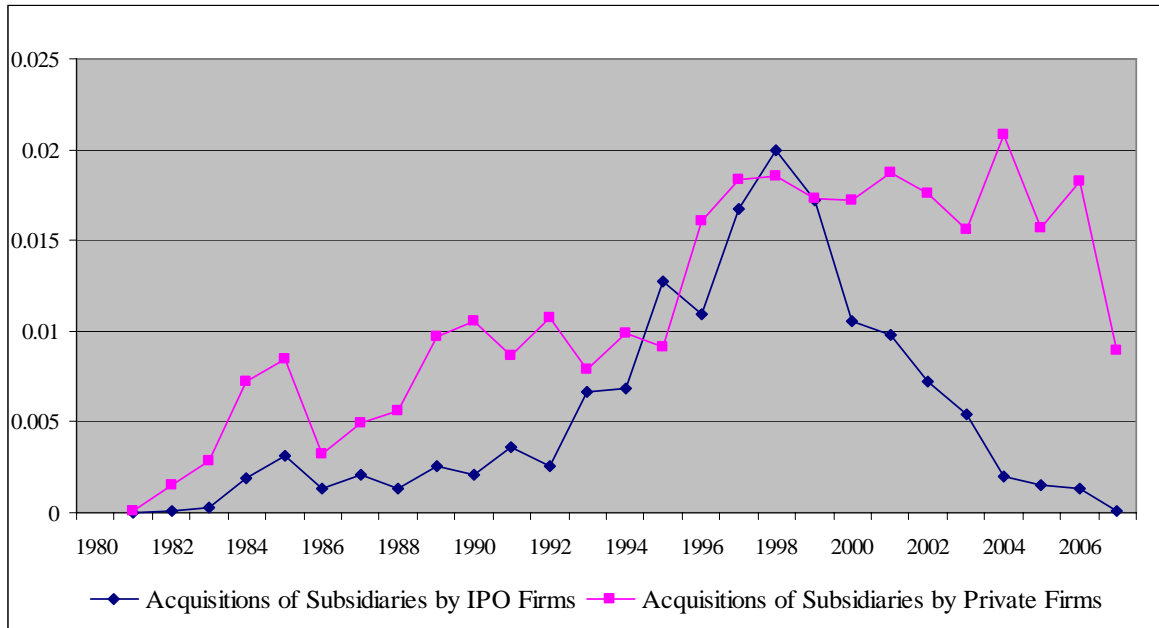**Figure 4. Acquisitions of Subsidiary Targets by IPO and Private Firms**

This figure shows acquisitions of subsidiary targets by IPO (newly-public) and private firms. Annual acquisition values are scaled by the sum of acquisitions by newly-public and private firms.

Table 1. Summary Statistics

	Summary Statistics
IPO size	66.52, (35.85)
Merger size	111.87, (21.94)
Number of mergers/firm within 3 years of IPO	2.07
Time to first merger (years)	1.124, (0.907)
% firms with first merger completed within 6 months of IPO	9.34% [n=539]
% merging firms with first merger completed within 1 year of IPO	19.23% [n=1110]
% firms with first merger completed within 2 years of IPO	29.56% [n=1706]
% firms with first merger completed within 3 years of IPO	35.68% [n=2059]
% firms stating acquisition financing as a reason to go public	8.89% [n=513]
Observations	5771 IPOs; 2059 firms merged; 4265 total mergers

This table reports summary statistics for the sample. IPO size is IPO proceeds net of fees and expenses. Merger size is transaction value net of fees and expenses. IPO size and merger size are adjusted to 2006 dollars using the CPI. Time to first merger is the number of years between the IPO date and effective merger date. Medians are reported in parentheses.

Table 2. Analysis of Factors Affecting Method of Payment

	Model 1
Intercept	-1.102**
	(-6.6)
Time since IPO	0.085**
	(4.2)
Merger motive indicator	-0.082*
	(-2.3)
IPO proceeds	-0.087**
	(-3.8)
SEO proceeds	0.347**
	(7.3)
Debt proceeds	-0.313**
	(-5.7)
Credit rating indicator	-0.169**
	(-3.0)
MB	-0.002
	(-1.7)
Return	0.060**
	(2.5)
Underpricing	0.225**
	(4.1)
Liquidity	0.003**
	(2.9)
Size	0.071**
	(4.3)
Merger wave	1.708**
	(3.2)
VC backing	0.095**
	(3.4)
High-tech target	0.134**
	(3.5)
High-tech acquirer	0.131**
	(3.5)
Horizontal merger dummy	-0.006
	(-0.2)
Target is a subsidiary	-0.504**
	(-14.9)
Target is public	0.410**
	(9.0)
Year dummies	yes
Obs.	3387
R2	0.172

The table reports parameter estimates from the tobit regression. The dependent variable is the proportion of acquisition payment in the form of stock. Time from IPO is the number of years between the IPO and effective acquisition date. Merger motive indicator equals one if the firm disclosed acquisition financing as an IPO motive and zero otherwise. IPO proceeds is a log of IPO proceeds value net of fees and expenses.

SEO (debt) proceeds is measured by the amount of annual stock (debt) financing scaled by total assets. The credit rating indicator equals one is the firm had a credit rating prior to the merger and zero otherwise. Market-to-book is market value of equity/book value of equity. Return is unadjusted three month return. Underpricing is the difference between the offer price and the first trading day close scaled by the offer price. Size is a log of market value of equity of the acquirer. Merger wave is the number of mergers in the acquirer's industry during the acquisition year scaled by the total number of industry mergers during our sample period. VC backing is 1 if the firm had pre-IPO VC finance and 0 otherwise. Liquidity is a log of turnover measures by the ratio of the daily number of shares traded to the daily number of shares outstanding and averaged over three months. Horizontal indicator takes is equal to 1 if both the target and the acquirer are in the same 2-digit SIC industry and 0 otherwise. High-tech target indicator equals 1 if the target is in the high-tech industry and 0 otherwise. High-tech acquirer takes on a value of 1 if the firm is in the high-tech industry and 0 otherwise. The subsidiary and public indicator take on a value of one if the target is a subsidiary or public firm, respectively, and zero otherwise. All financial variables are as of pre-merger year end unless noted otherwise. All unscaled $ values are adjusted to 2006 dollars using CPI index. T-statistics are reported in parentheses. Values significantly different from zero at the 5% and the 1% level are marked * and ** respectively.

Table 3. Analysis of Factors Affecting Likelihood of All-Cash, Mixed and All-Stock Acquisitions

	All-Cash	Mixed	All-Stock
Intercept	-5.718	-8.295**	-11.775**
	(-10.2)	(-7.9)	(-10.6)
Merger motive indicator	0.704**	0.560**	-0.152
	(8.5)	(4.9)	(-1.1)
IPO proceeds	0.122**	-0.156**	-0.301**
	(2.6)	(-2.2)	(-4.0)
SEO proceeds	-0.258**	0.196*	0.376**
	(-3.2)	(2.1)	(3.4)
Debt proceeds	0.805**	0.361**	-0.583*
	(9.2)	(3.2)	(-2.2)
Credit rating indicator	0.835**	-0.339	-0.274
	(8.2)	(-1.6)	(-1.3)
MB	0.001	-0.001	-0.001
	(1.0)	(-1.7)	(-0.6)
Return	0.119*	0.164*	0.256**
	(2.0)	(2.2)	(4.4)
Underpricing	-0.625**	0.203	0.266
	(-4.1)	(1.2)	(1.7)
Liquidity	-0.001	-0.012*	0.012**
	(-0.2)	(-2.3)	(3.5)
Size	0.183**	0.175**	0.520**
	(5.6)	(4.0)	(10.6)
Merger wave	7.560**	14.365**	10.067**
	(5.4)	(7.7)	(4.9)
VC backing	-0.223**	-0.102	0.079
	(-3.5)	(-1.1)	(0.9)
High-tech acquirer	0.887**	0.922**	1.647**
	(11.9)	(9.5)	(18.2)
Year dummies	yes	yes	yes
Obs.	12439	12439	12439
R2	0.103	0.089	0.219

The table reports parameter estimates from logit regressions. The dependent variable is 1 if the firm-year contains an all-cash (mixed, all-stock) acquisition and 0 otherwise. Merger motive indicator equals 1 if the firm disclosed acquisition financing as an IPO motive and 0 otherwise. IPO proceeds is the natural log of IPO proceeds value net of fees and expenses. SEO (debt) proceeds is measured by the amount of annual stock (debt) financing scaled by total assets. The credit rating indicator equals one is the firm had a credit rating prior to the merger and zero otherwise. Market-to-book is measured at the end of the pre-merger year. Return is unadjusted three month return. Underpricing is the difference between the offer price and the first trading day close scaled by the offer price. Size is a natural log of market value of equity of the acquirer. Merger wave is the number of mergers in the acquirer's industry during the acquisition year scaled by the total number of industry mergers during our sample period. VC backing is 1 if the firm had pre-IPO VC finance and 0 otherwise. Liquidity is a log of turnover measures by the ratio of the daily number of shares traded to the daily number of shares outstanding and averaged over three months. High-tech acquirer takes on a value of 1 if the firm is in the high-tech industry and 0 otherwise. All financial

variables are as of pre-merger year end unless noted otherwise. All unscaled $ values are adjusted to 2006 dollars using CPI index. T-statistics are reported in parentheses. Values significantly different from zero at the 5% and the 1% level are marked * and ** respectively.

Table 4. Analysis of Factors Affecting Likelihood of Private, Subsidiary and Public Target Acquisitions

	Private Target	Subsidiary Target	Public Target
Intercept	-7.095**	-6.305**	-9.248**
	(-14.0)	(-10.3)	(-9.8)
Merger motive indicator	0.431**	0.604**	0.145
	(5.3)	(6.4)	(0.6)
IPO proceeds	-0.292**	0.236**	-0.053
	(-6.8)	(4.1)	(-0.5)
SEO proceeds	0.131*	-0.132	-0.564*
	(2.0)	(-1.4)	(-2.6)
Debt proceeds	0.438**	0.743**	0.381
	(5.2)	(7.8)	(1.5)
Credit rating indicator	0.024	0.757**	0.233
	(0.2)	(6.3)	(1.1)
MB	0.002	-0.001	-0.001
	(1.5)	(-1.2)	(-1.6)
Return	0.287**	0.090	0.010
	(4.9)	(1.11)	(0.1)
Underpricing	0.047	-0.357	-0.016
	(0.4)	(-1.9)	(-0.1)
Liquidity	0.004	0.001	-0.003
	(1.4)	(0.06)	(-0.7)
Size	0.363**	0.119**	0.432**
	(12.3)	(3.0)	(5.4)
Merger wave	13.351**	7.117**	5.854*
	(10.7)	(4.3)	(2.0)
VC backing	-0.188**	-0.165*	-0.141
	(-3.4)	(-2.1)	(-1.0)
High-tech acquirer	1.340 **	0.923**	0.871**
	(21.9)	(10.7)	(5.7)
Year dummies	yes	yes	yes
Obs.	12439	12439	12439
R2	0.150	0.088	0.081

The table reports parameter estimates from logit regressions. The dependent variable is 1 if the firm-year contains an all-cash (mixed, all-stock) acquisition and 0 otherwise. Merger motive indicator equals 1 if the firm disclosed acquisition financing as an IPO motive and 0 otherwise. IPO proceeds is a log of IPO proceeds value net of fees and expenses. SEO (debt) proceeds is measured by the amount of annual stock (debt) financing scaled by total assets. The credit rating indicator equals 1 is the firm had a credit rating prior to the merger and 0 otherwise. Market-to-book is measured as market value of equity/book value of equity. Return is unadjusted three month return. Underpricing is the difference between the offer price and the first trading day close scaled by the offer price. Size is a log of market value of equity of the acquirer. Merger wave is the number of mergers in the acquirer's industry during the firm-year scaled by the total number of industry mergers during our sample period. VC backing is 1 if the firm had pre-IPO VC finance

and 0 otherwise. Liquidity is a log of turnover measures by the ratio of the daily number of shares traded to the daily number of shares outstanding and averaged over three months. High-tech acquirer is 1 if the firm is in the high-tech industry and 0 otherwise. All financial variables are as of pre-merger year end unless noted otherwise. All unscaled $ values are adjusted to 2006 dollars using CPI index. T-statistics are reported in parentheses. Values significantly different from zero at the 5% and the 1% level are marked * and ** respectively.

Table 5. Post-IPO and Private Acquirer Merger Characteristics by Target Type

	IPO acquirers			Private acquirers		
	Subsidiary	Private	Public	Subsidiary	Private	Public
N	1211	2701	353	2451	1016	341
%	28.39%	63.33%	8.28%	64.36%	26.68%	8.96%
Merger size	90.70, (24.24)	62.39, (18.15)	563.11, (127.07)	91.71, (18.21)	59.26, (12.37)	300.19, (66.20)
Relative size	36.56, (11.55)	44.25, (15.82)	12.10, (3.05)	na	na	na
Percentage of stock financing	14.02, (0)	41.02, (17.29)	65.31, (100.00)	0.95,(0)	6.61, (0)	2.94, (0)
Horizontal merger	70.68%	64.59%	66.86%	67.58%	63.39%	56.01%
Acquirer's market-to-book	4.53, (2.79)	6.75, (3.77)	6.57, (3.87)	na	na	na
Target's market-to-book	na	na	3.365, (2.434)	na	na	0.762, (1.214)
Target return	na	na	0.231, (-0.058)	na	na	0.235, (0.142)
Target liquidity	na	na	12.811, (7.528)	na	na	4.263, (2.938)
Merger wave	0.065, (0.060)	0.072, (0.085)	0.068, (0.079)	0.049, (0.035)	0.055, (0.053)	0.040, (0.029)
Industry merger wave	0.065, (0.062)	0.073, (0.071)	0.070, (0.069)	0.056, (0.049)	0.065, (0.059)	0.046, (0.041)
Observations	4265			3808		

The table reports descriptive statistics for acquisitions of subsidiary, private and public targets by IPO and private acquirers. Merger size is acquisition transaction value net of expenses. Market-to-book is measured as market value of equity/book value of equity. Relative size is acquirer's market value of equity scaled by merger size. Return is unadjusted one year return. Liquidity is turnover measured by the ratio of the daily number of shares traded to the daily number of shares outstanding and averaged over one year. Industry merger wave is the number of mergers in the acquirer's industry during the acquisition year scaled by the total number of industry mergers during our sample period. Merger wave is the total number of IPO and private mergers during the acquisition year scaled by the total number of IPO and private mergers during our sample period. All financial variables are as of pre-merger year end unless noted otherwise. All unscaled $ values are adjusted to 2006 dollars using CPI index. Medians are reported in parentheses.

Table 6. Correlations Between Waves of Acquisition Activity of IPO and Private Firms

Target Type	Correlation
All Targets	0.664 (0.000)
Private targets	0.728 (0.000)
Subsidiary targets	0.592 (0.001)
Public targets	0.173 (0.388)

This table reports Pearson correlations between waves of acquisitions by IPO and private firms. The waves are partitioned by the target type. P-values are reported in parentheses.