Going Public to Acquire? The Acquisition Motive in IPOs *

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ABSTRACT

Newly public firms make acquisitions at a torrid pace. Their large acquisition appetite reflects the concentration of IPOs in M&A intensive industries, but acquisitions by IPO firms also outpace those by mature firms in the same industry. IPO firms' acquisition activity is fueled by the initial capital infusion at the IPO and through the creation of an acquisition currency that is used to raise capital for both cash and stock financed acquisitions along with debt issuance subsequent to the IPO. IPO firms play a bigger role in the M&A process by participating as acquirers than they do as takeover targets and acquisitions are at least as important as R&D and CAPEX for their growth. The pattern of acquisition activity following an IPO is important in explaining the evolution of ownership structure of newly public firms.

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1. Introduction

Why do firms choose to go public? An IPO is one of the most consequential events in the life of a company, but our understanding of this decision remains incomplete. Existing theories offer several insights for why firms decide to go public. In theory, an IPO creates liquidity for the firm's shares, provides an infusion of capital to fund growth, allows insiders to cash out, provides cheaper and ongoing access to capital, facilitates the sale of the company, gives founders the ability to diversify their risk, allows venture capitalists and other early stage investors to exit their investment, and increases the transparency of the firm by subjecting it to capital market discipline.

Despite this abundance of theoretical arguments, empirical evidence on why firms go public and the investment and financing activities of IPO firms is limited. Pagano, Panetta and Zingales (1998) show that Italian firms went public not to finance future investments and growth, but rather, to rebalance their capital structure and to exploit sectoral misvaluation. Lowry (2003) studies aggregate IPO data and finds that firms' demands for capital and investor sentiment are the most significant determinants of IPO volume. Boehmer and Ljungqvist (2004) show that German firms go public when their investment opportunities and valuations become attractive. Rosen, Smart and Zutter (2005) find that banks that go public are more likely to become targets as well as acquirers than banks which stay private. Kim and Weisbach (2008) show that financing of capital expenditures and the desire to benefit from potential overvaluation are motives for seasoned equity offerings (SEOs) and IPOs.

We study a relatively unexplored motive for IPOs – the desire to make acquisitions. Surveys of corporate executives suggest that acquisitions are a very important motive for an IPO. A survey of CFOs by Brau and Fawcett (2006) finds that the desire to create an acquisition currency ranked as the most important reason for an IPO. In fact, survey participants ranked the importance of an acquisition currency ahead of most other commonly considered motives such as cost of capital considerations and need for VCs and founders to exit or diversify their holdings. While informative, Brau and Fawcett's (2006) survey is limited to the three-year period of 2000-2002. This timeframe coincides with the technology bubble where many internet firms went public during this period. The preponderance of such high-growth company IPOs, combined with intense M&A activity in the overall economy during this period raises the question of whether the results can be generalized to other periods. For example, the overvaluation during the internet boom could have increased managers' appetite to acquire, thereby fueling many IPOs during

this period. In fact, Schultz and Zaman (2001) document that many internet firms that went public during this period engaged in a significant amount of post-IPO acquisition activity.¹

We analyze the post-IPO acquisition activity of IPO firms over a 20 year period from 1985 to 2004. We show that there is a high incidence of newly public firms participating in mergers and acquisitions. IPO firms start engaging in M&A as early as the IPO year and 31% of IPO firms conduct at least one acquisition within their IPO year. Within the first five years of the IPO, 77% of firms conduct at least one acquisition, and the typical IPO firm makes 4 acquisitions in this five-year period. On average, IPO firms conduct acquisitions worth 41% of their market value at the time of the IPO during their first five years. It is striking that for the typical IPO firm, the average expenditure on acquisitions is substantially greater than either investment (CAPEX) or research and development (R&D). In fact, the average acquisition volume is at least as large as R&D and CAPEX combined, indicating that acquisitions play an important role in the growth of newly public companies.

The appetite for making acquisitions increases after an IPO. Only 19% of IPO firms make an acquisition as a private firm in the five years before they go public. After an IPO, 74% complete an acquisition in their first five years as a public company. The typical IPO firm completes only 0.43 acquisitions in the five years prior to IPO, compared to 4 acquisitions in the five years after its IPO, highlighting the importance of acquisitions for newly public companies.

We conduct a number of tests to provide some insight on the determinants of post-IPO M&A activity. Our first observation is that the M&A activity of IPO firms is strongly linked to the amount of M&A activity within their industry. In other words, IPOs tend to occur in industries with high M&A activity. Yet, industry clustering of IPOs and M&A does not fully explain the acquisition appetite of IPO firms – by most benchmarks, IPO firms are more prolific acquirers than the mature public firms within their industry.

We consider three potential avenues by which an IPO can facilitate future M&A activity and explore whether these explain the acquisition volumes by IPO firms. An IPO can allow companies to pursue M&A by providing an infusion of cash, by opening the possibility of paying for an acquisition with overvalued stock, and by resolving the uncertainty about the pre-IPO valuation of the firm and the

¹ In other work, Brown, Dittmar and Servaes (2005) study post-IPO performance of 47 roll-up IPOs which involve the creation of a publicly listed entity by the consolidation of several small businesses at the time of the IPO. While roll-up IPOs also engage in acquisitions soon after their listing, both these IPOs and their M&A activity are fundamentally different than the broader set of IPO firms and their M&A activity, which we consider in this paper.

gains from a potential takeover. We evaluate these motives by studying the volumes of cash and stock financed M&A volumes post-IPO.

Our results provide some support for each of these motives. We find that volume of cash financed M&A in every annual interval up to five years following the IPO is correlated with the proceeds from the IPO. Cash financed M&A is also positively correlated with the amount of capital raised through SEOs, suggesting that IPOs facilitate acquisitions both because of the initial capital raised, but also by creating access to public equity markets for subsequent capital raising. Interestingly, IPO proceeds are correlated with R&D and CAPEX only in the years immediately after the IPO, suggesting that the desire to raise acquisition capital is a longer term motivation for going public than raising capital for organic growth.

Firms with greater IPO underpricing conduct more stock financed acquisitions in the years following the IPO. However, IPO underpricing is unrelated to R&D and CAPEX. Since IPO underpricing is closely linked to equity overvaluation for IPO firms, this suggests that IPO firms with overvalued equity find it easier to grow by acquiring other firms than by investing in internal projects. We also find evidence that the level of ex-ante uncertainty about the valuation of the IPO firm is positively related to the total amount of cash and stock financed acquisitions conducted after the IPO, consistent with the IPO lowering uncertainty about firm value and allowing the firm to exercise its option to make acquisitions more efficiently. Cash financed acquisition volumes by IPO firms are also strongly linked to the amount of debt raised in the post-IPO periods, suggesting that improved access to debt markets represent a channel through which going public facilitates acquisition activity. A similar pattern is not observed for R&D and CAPEX outlays.

Overall, our results show that IPOs significantly change the ability of firms to conduct acquisitions and suggest that this ability to pursue acquisitions might be an important motive for the IPO. Yet we acknowledge that it is difficult to disentangle whether firms went public to pursue acquisitions or whether the IPO presented these firms with windows of opportunities to conduct M&A using overvalued stock. In addition, going public might have improved these firms' ability to pursue acquisitions by providing access to a broader source of funding options, even if the acquisitions themselves were not the primary motive for the IPO. Irrespective of the interpretation, we show that acquisition activity by IPO firms is very meaningful in the context of their R&D and CAPEX outlays. This finding complements Kim and Weisbach (2008)'s results that equity capital raised from IPOs and SEOs is an important determinant of R&D and CAPEX in the post-IPO period. Together, these studies illuminate the mechanisms by which going public allows companies to exploit their growth options to become mature public companies.

Ours is not the only large-sample study to explore the link between IPOs and M&A. In contemporaneous work, Rau and Stouraitis (2008) study the timing of various corporate event waves and establish that IPO waves are followed by M&A waves, a result consistent with our findings. To understand whether this pattern results from the participation of IPO firms in the M&A process or whether it reflects an industry phenomenon, Rau and Stouraitis (2008) consider how often IPO firms become takeover targets. They find that only 3% of the cash financed M&A activity and 2% of stock financed M&A activity can be explained by the acquisition of newly public companies. A fundamental difference between our paper and theirs is that we focus on the role of IPO firms as bidders in the M&A process while they focus on the role of IPO firms as takeover targets. Our results show that IPO firms are very active acquirers both in the number and the volume of completed acquisitions. In fact, IPO firms participate much more actively in the M&A process by being bidders rather than targets, offering an explanation for the post-IPO M&A wave pattern documented by Rau and Stouraitis (2008).

Our findings on the importance of M&A for IPO firms have broader implications for the evolution of ownership structure of firms. Helwege, Pirinsky and Stulz (2007) document that U.S. firms become widely held after they go public and show that stock market performance and liquidity explain why firms experience a reduction in insider ownership after the IPO. We show that the acquisition appetite of IPO firms is a critical determinant of their ownership dynamics as well. Both cash and stock financed acquisitions can increase the dilution in insider ownership by increasing the number of shares outstanding. Consistent with this view, we find that both cash and stock financed acquisitions are positively related to the dilution in insider ownership. Thus, acquisitions play an important role in explaining why U.S. firms become widely held after they go public.

The organization of the paper is as follows. In Section 2, we review existing theories on the motivations for firms to go public and explain our empirical design. In Section 3, we introduce our sample and present the univariate results on the acquisition activity of the IPO firms. Section 4 reports the multivariate results. Section 5 analyzes the relationship between post-IPO acquisitions and post-IPO ownership dilution. Section 6 concludes.

2. Motivations for IPOs and Empirical Design

The theoretical literature offers several reasons why companies choose to go public. Subrahmanyam and Titman (1999) propose that information production by outside investors improves investment decisions and drives the decision to go public. Chemmanur and Fulghieri (1999) also argue that information production costs explain IPO decisions. In their model, an IPO provides cheaper capital

by creating a liquid security in the company, whose value reflects all available information, and thereby reduces the need for all investors to engage in costly and duplicative information production. Mello and Parsons (1998) postulate that liquidity considerations are important in driving the IPO decision and note that the increased liquidity of the stock lowers the cost of capital. Enhancing the liquidity of the stock can facilitate acquisitions by making it less costly to raise acquisition financing through SEOs and make the equity more appealing as an acquisition currency in stock financed acquisitions.

Other papers emphasize the benefits that an IPO provides by creating an observable market price for the stock. Zingales (1995) argues that by establishing a market price for the shares, an IPO allows the owners to increase the value that they can extract from selling their company. Hsieh, Lyandres and Zhdanov (2007) suggest that going public reduces the uncertainty about the value of the firm and allows the firm to conduct acquisitions more efficiently as a public firm than as a private firm.

We consider three reasons why the IPO decision may be linked to M&A considerations. The most obvious channel through which an IPO allows companies to pursue acquisitions is by providing an infusion of capital. Under the capital infusion motive, an IPO establishes a war chest that can be used to fund cash financed acquisitions. Second, as an alternative to cash, an IPO creates publicly traded stock that serves as an acquisition currency that can be used to pay for future M&A. A third potential motive arises from management's ability to observe the firm's valuation as a public company. Hsieh, Lyandres and Zhdanov (2007) develop a real options based model where, as a private firm, managers face uncertainty about true firm value and therefore, about the optimal acquisition strategy. By going public, managers learn the true value of their firm and the value of the takeover gain. Thus, by resolving ex-ante uncertainty about the true value of the bidder, an IPO allows a bidder to exercise its acquisition option optimally after it becomes a public firm.

We develop predictions of these motives to understand the cross-sectional variation in M&A activity by IPO firms. Under the capital infusion motive, the amount of primary proceeds raised in the IPO should be positively linked to the amount of cash financed M&A activity. Of course, there is no reason to expect that capital infusion in an IPO is relevant only for M&A funding needs. Therefore, we also explore whether R&D and CAPEX are similarly linked to the IPO proceeds. More broadly, if the desire to establish a funding source for M&A drives the IPO decision, we also expect that subsequent financing events such as SEOs and debt offerings would be linked to future M&A activity.

The capital infusion motive does not offer any insights regarding stock financed M&A activity. Under the acquisition currency motive, IPOs allow firms to pursue M&A by using stock as a method of

payment. However, in the absence of market imperfections and with equally informed bidders and targets, the ability to issue stock that is publicly traded should not be a relevant consideration in an acquisition. However, with information asymmetry between managers, public markets, and potential targets, the ability to issue overvalued stock to pay for an acquisition may provide a motive to conduct an IPO. Shleifer and Vishny (2003) argue that overvalued equity drives many firms to conduct acquisitions, providing a motivation for why managers may desire stock as an acquisition currency. Hence, if the acquisition currency motive is important, we expect to see a higher amount of stock financed acquisitions for IPO firms with overvalued stock. We use IPO underpricing as a measure of overvaluation around the IPO as suggested by Purnanandam and Swaminathan (2004) who show that the most overvalued IPO firms have the greatest IPO underpricing.

In the context of the acquisition currency motive, we consider a special group of IPOs, – carve-out IPOs. In a carve-out IPO, a public parent issues shares in a subsidiary firm. It is possible that the acquisition motive is weaker for carve-out IPOs than for new company IPOs since the parent company of the carved-out subsidiary already has an acquisition currency. However, the stock of a diversified parent with multiple business divisions may offer fewer opportunities to exploit sectoral misvaluation. Thus, it is possible that acquisition currency motives may remain a relevant consideration for carve-out IPOs even though the parent possesses the ability to issue publicly traded stock before the IPO.

The valuation uncertainty resolution motive suggests that private firms with high levels of ex-ante valuation uncertainty should undertake more cash and stock financed acquisitions after their IPO. A key insight of the valuation uncertainty motive is that the benefit of an IPO occurs equally for both cash and financed acquisitions because the IPO itself, irrespective of the form of consideration, informs bidder management about true firm value. In addition to this prediction, Hsieh, Lyandres and Zhdanov (2007) argue that going public is costly due to underwriting fees and the dilution of the original owner's equity ownership. The benefit of an IPO is that it allows the firm to optimally exercise its option to acquire other firms. Trading-off these costs against the benefits from optimal exercise of the acquisition option generates the prediction that firms with a higher cost of going public will engage in more acquisitions early on in order to maximize the benefits of an IPO.

A related argument is that by reducing information asymmetry, an IPO may increase a firm's ability to borrow. This idea is related to Rajan (1992) who suggests that a reduction in asymmetric information can weaken the hold-up problem between the firm and its lenders. In other words, going public may weaken the monopoly power of relationship banks over the IPO firm and may improve the firm's ability to pursue debt financed acquisitions. Consistent with this view, Schenone (2009) finds that

firms experience a drop in interest rates after their IPO. Thus, the idea of uncertainty resolution also offers the prediction that the amount of debt capital raised subsequent to the IPO should be positively correlated with the amount of cash financed acquisitions.

3. Univariate Analysis of post-IPO Acquisition Activity

3.1. Data

Our IPO data comes from Securities Data Company (SDC) and covers all U.S. IPOs over the 20 year period from January 1985 to December 2004 with total proceeds equal to or greater than \$100 million in 2004 dollars (\$57 million in 1985 dollars).² We impose this size cutoff to ensure that we have IPOs of a certain minimum size so that reliable data on their M&A activity is available.³ This probably biases us *against* finding a significant role for acquisitions since Brau and Fawcett (2006) report that the desire to create an acquisition currency in IPOs is greater for smaller firms. Nonetheless, it is important to note that the amount of IPO proceeds raised by our sample accounts for 76% of all IPO proceeds reported in SDC over this period. We also restrict our sample to those firms for which Compustat data is available for the IPO year. Firms are retained in the sample until the first year in which they exit Compustat. Data on subsequent capital raising and acquisition transactions come from the SDC New Issues and Mergers and Acquisitions databases. In tabulating acquisitions, we do not include buybacks, recapitalizations, or exchange offers.

Table 1 reports descriptive statistics for the sample. We have 1295 IPOs that meet the sample selection criteria. The number of IPOs in our sample varies over time, with a sharp rise in 1999 and 2000, coincident with the internet boom. The average amount of the total proceeds (primary and secondary capital) raised in the IPO is \$181 million in 1985 dollars. On average, 17% of the total proceeds in IPOs come from the sale of existing secondary shares, and 34% of the sample firms have sold secondary shares. We calculate the level of underpricing for each IPO by dividing the difference between the first day closing price and the offer price by the offer price. In our sample, the average level of underpricing is 25%, but this average is influenced heavily by the 1999-2000 period, where underpricing averaged 81%. Excluding these two years, the average underpricing in the sample drops to 11%. Our sample contains both initial listings of companies as well as equity carve-outs, which comprise 12% of the sample.

² Throughout, we adjust dollar values for inflation and report them in 1985 dollars for comparability.

³ Inspection of SDC's M&A data supports this concern. For IPOs where proceeds are below \$100 million (in 2004 dollars), deal values for subsequent M&A transactions are missing for almost 50% of all recorded acquisitions. This compares to 40% of missing deal values for transactions involving bidders with IPO proceeds greater than this cutoff. In addition, our spot-checking suggests that some small deals may go unrecorded in SDC.

3.2. *Post-IPO M&A Activity*

We track all M&A activity for our sample firms for up to five years including the IPO year. We include mergers and acquisitions of public and private companies, as well as acquisitions of assets. Table 2 summarizes the acquisition activity undertaken by the IPO firms. Year 0 denotes the year of the IPO, and we report the cumulative volume of M&A activity for windows extending out to five years after the IPO date.⁴ As a result of acquisitions and delistings of IPO firms, our sample size drops to 902 by the end of year five.

It is important to note that SDC does not report transaction values for almost 40% of M&A deals in our sample, especially for those transactions where the target firm is a private firm or a subsidiary of a public firm. We consider these transaction values to be zero. This causes us to underestimate, potentially very substantially, the actual acquisition volumes for IPO firms.

Panel A of Table 2 shows that 31% of the IPO firms make at least one acquisition in their IPO year. This frequency rises each year, so that over the five years after the IPO, 77% of firms make at least one acquisition. The average number of acquisitions by an IPO firm in the IPO year is 0.65 and increases to 4.15 by the end of the fifth year. There is dispersion in the number of acquisitions across firms, with IPO firms completing a median of 2 transactions over the first five years. In aggregate, 3,747 acquisitions are completed in the 4,510 firm-years, indicating that newly public firms tend to be active acquirers. Zingales (1995) argues that an IPO allows firms to be acquired at a higher price by establishing a public market valuation. Our results indicate, however, that IPO firms play a much bigger role in M&A activity by their participation as bidders than they do by becoming targets. Panel A of Table 2 reports that only 4% of IPO firms get acquired in the first five years after going public, suggesting that the desire to make acquisitions is likely to be a more important driver of the going public decision than the desire to get acquired based on the market price established through the IPO process.

Panel B of Table 2 shows the acquisition activity of IPO firms in the context of their organic growth initiatives by comparing acquisition volume to R&D and CAPEX outlays. The typical IPO firm spends \$69 million (in 1985 dollars) more on acquisitions than on R&D and CAPEX combined in the first five years after the IPO. Although the median acquisition volume is lower than the median R&D and CAPEX combined, it should be noted that assuming that the M&A transaction value is zero when it is unreported in SDC underestimates the true median. Panel C shows that IPO firms spend on average 246%

⁴ Our M&A data extend through September 2008. Hence, for firms that went public in the last quarter of 2004, we have slightly less than the full five years of their post-IPO M&A activity.

of the initial IPO proceeds for acquisitions and 197% for R&D and CAPEX combined over the first five years. Panel D reports that acquisition spending as a percentage of market value at the time of the IPO is 41%, while this percentage is 27% for R&D and CAPEX combined.⁵ Overall, Table 2 shows that IPO firms engage in significant M&A activity starting as early as their IPO year, and external growth through acquisitions is at least as important as, and possibly more important than, organic growth through R&D and CAPEX.

Perhaps IPO firms are naturally acquisitive, and their focus on M&A actions in the post-IPO period is unrelated to the IPO. The data do not favor this interpretation. Panel A of Table 3 shows that only 19% of the firms make an acquisition as a private firm in five years before they go public, whereas this percentage rises sharply to 74% in the five years after the IPO. The number of acquisitions made also shows a striking increase after the IPO. IPO firms make 0.43 acquisitions, on average, in their last five years as a private firm, but make 3.64 acquisitions, on average, in first five years after the IPO. The median number of acquisitions over the five-year period rises from zero to 2 after the IPO. Panel B of Table 3 reports the mean and the median acquisition volume over the pre- and post-IPO five-year periods. This comparison also shows a sharp rise in acquisition activity. The pre-IPO acquisition volume averages 26% of market value as of the IPO date, whereas the post-IPO acquisition volume averages 46%.

The comparison between pre-IPO and post-IPO M&A volumes should be interpreted with caution because of the possibility that acquisition activity is under-reported for private firms in SDC. The SDC database compiles its list of M&A transactions based on SEC filings and company press releases. This creates the likelihood that some acquisitions by private acquirers will not be recorded if SEC filings or press releases are missing. However, acquisitions where the target is a public company should be immune to this potential recording bias because SEC filings are mandatory in these cases. Thus, we compare the acquisition activity involving publicly listed targets as well. Table 3 shows a sharp difference in the acquisition of public companies pre- and post-IPO. In the five years before an IPO, 14% of sample firms acquired a public target, but 56% of firms acquired a public target in the five years following an IPO. The total number of acquisitions of public companies rises more than six-fold in the post-IPO period from 327 to 2,079, and the average volume of public company acquisitions as a percentage of the market value of the firm (at the time of the IPO) jumps from 25% in the pre-IPO period to 33% post-IPO.

⁵ The median market value is \$600 million and the mean market value is \$2,422 million (in 1985 dollars), for our sample of IPO firms.

3.3. *Univariate Tests*

We start by providing some univariate comparisons illustrating the importance of industry, capital infusion and valuation effects on the acquisition activity of IPO firms. It is possible that the acquisition activity of IPO firms and that of mature firms are fundamentally related to each other if both are driven by acquisition opportunities available in their industry. Thus, we explore if the acquisition activity of IPO firms is concentrated in industries undergoing intensive M&A activity.

To study the link between the M&A of IPO firms and industry-level M&A activity, we calculate a measure of industry M&A activity for the 48 Fama-French industry groupings. For each industry and each year, we calculate the total volume of acquisitions normalized by the aggregate market capitalization of the industry components. For each year from 1985 to 2004, we classify an industry to be a high (low) acquisition intensive industry if this metric is above (below) its median value among the 48 Fama-French industries in that year. Since we compare acquisition activity over five time horizons in Table 4, we recompute this measure over each horizon so that the timeframe for evaluating industry M&A intensity corresponds with the timeframe for which we display the M&A activity of IPO firms. An IPO firm is assigned to a high (low) acquisition intensive industry if its industry is a high (low) acquisition intensive industry in the IPO year.

Panel A of Table 4 shows that in the IPO year, IPO firms make acquisitions worth about 11% of their market values when they reside in an M&A active industry, but only worth 2% when they reside in an inactive industry. The difference persists in each of the following time periods. Though it narrows considerably over the years 0-4 horizon (48% vs. 30%), the M&A activity of IPO firms in active industries remains higher than in inactive industries. These results suggest that a substantial portion of the M&A activity of IPO firms is due to industry-level M&A activity, perhaps because firms go public to exploit industry-level M&A opportunities.

For comparison, we calculate the amount of R&D and CAPEX undertaken by IPO firms. The data suggest that companies substitute between these outlays and M&A activities to some degree. IPO firms in M&A active industries expend fewer resources on organic growth through R&D and CAPEX than do firms in less M&A active industries. In less active M&A industries, IPO firms report spending equivalent amounts on expenditures for organic and M&A growth, averaging about 30% of firm value over the five years following the IPO.⁶ However, the bulk of the difference between M&A and R&D and

⁶ The possibility exists, however, that M&A expenditures are higher than R&D and CAPEX in less M&A active industries due to undisclosed transaction values for M&A.

CAPEX growth for IPO firms arises from M&A active industries where total outlays on M&A over the five year period are more than twice those on R&D and CAPEX.

To evaluate the importance of cash infusion from the IPO, we examine how the amount of new capital raised during the IPO explains the volume of subsequent cash financed acquisition activity. A typical IPO involves offering two types of shares: primary shares and secondary shares. Primary shares are sold to raise new capital for the firm whereas secondary shares are sold by existing owners to monetize their holdings. Under the capital infusion motive, the amount of cash financed acquisitions after the IPO should be positively related to the proceeds from the sale of primary shares. Cash infusions can be used for funding either organic or external growth. Hence, if cash infusion is an important motive in IPOs, we also expect a positive correlation between primary IPO proceeds and R&D and CAPEX.

The middle columns of Table 4 show the average volume of cash financed acquisitions and of R&D and CAPEX, normalized by firm market value at the time of the IPO, broken down by whether the firms raise more or less primary IPO capital (normalized by firm market value at the time of the IPO) than the median firm. Firms with higher normalized primary IPO proceeds spend 48% of their market value for acquisitions in the first five years after going public whereas firms with lower primary IPO proceeds spend only 11% for acquisitions. Panel C shows that the difference in acquisition volumes between these two subsamples is statistically significant.

Firms with higher primary IPO proceeds also exhibit greater R&D and CAPEX than firms with lower proceeds. However, the effect of raising more primary capital in the IPO is much larger for acquisitions than it is for R&D and CAPEX. This result suggests that raising acquisition capital might be a more important driver of the going public decision than raising capital for organic growth. Such a pattern might arise if overvaluation around the IPO leads firms to raise more primary proceeds (through a high offer price or by offering more shares) in the IPO. Overall, the univariate comparison is supportive of the capital infusion motive since the sale of primary shares raises investment capital for the firm, while the sale of secondary shares allows the insiders to monetize their holdings without providing a cash infusion to the firm.⁷ Kim and Weisbach (2008) document a similar result for IPO and SEO firms where R&D, CAPEX and acquisition amounts are greater for firms raising more primary capital than secondary capital.

⁷ We do not observe the same pattern if we use the amount of secondary shares sold in an IPO to split the sample. In fact, firms with higher secondary IPO proceeds have a significantly lower total acquisition volume compared to firms with lower secondary IPO proceeds. Note that these results cannot be driven by a size effect where large IPO firms have larger primary and secondary proceeds, and also make more acquisitions. This is because we normalize IPO proceeds by firm size instead of simply using the dollar values of the proceeds. The differing patterns of M&A activity based on the splits between primary and secondary shares are also inconsistent with a size effect at work.

To assess the role of acquisition currency, we also examine the effect of IPO underpricing in explaining subsequent stock financed acquisition activity of the IPO firms. If the acquisition currency motive holds, IPO firms with greater underpricing should be more likely to undertake stock financed acquisitions after their IPO to take advantage of their overvalued currency. The last five columns in Panel A of Table 4 show the normalized volume of stock financed acquisitions along with normalized R&D and CAPEX for firms with greater than the median level of underpricing, and Panel B shows the results for firms with below the median level of underpricing. Consistent with a role for acquisition currency motives, we find that firms with greater underpricing conduct significantly more stock financed acquisitions, especially in the first three years after the IPO. We also observe a tendency for more underpriced IPOs to spend more on R&D and CAPEX, though the difference between the two groups is much smaller than the difference in acquisition spending.

3.4. *M&A Activity of IPO Firms versus Mature Firms*

The results in Table 4 suggest that industry effects are important in understanding the M&A actions of IPO firms. To see if industry effects are the entire story behind acquisitions by IPO firms, we compare the acquisition activity of IPO firms to that of mature public firms within their industry. A priori, we do not have a clear prediction regarding this comparison. Several factors suggest that IPO firms should be less active acquirers than mature companies. If IPO firms face more information asymmetry or greater valuation uncertainty, access to both equity and debt capital may be less available to them relative to mature firms. If IPO firms go public mainly to capitalize on attractive investment opportunities in their industries, one might expect a greater focus on internal investment by IPO firms, whereas mature firms might be more inclined to pursue acquisitions if their industries offer limited growth prospects. In addition, the typically smaller size of newly public firms may simply limit the number of feasible acquisitions these firms can pursue after the IPO. At the same time, IPO firms might be expected to be more active acquirers if the desire to make acquisitions prompted the IPO or if they are more likely to be overvalued, prompting them to use their stock to finance acquisitions.

To provide perspective on these issues, we construct measures of acquisition activity for IPO firms and mature firms. Mature firms are defined as those which went public at least five years ago and which have a market capitalization greater than \$100 million (in 2004 dollars) at the beginning of the five-year period in which the two samples of firms are analyzed. We impose a \$100 million size cutoff for mature firms so that they are of comparable size to the IPO firms.⁸

⁸ The median market value is \$793 million for the sample of mature firms, compared to \$600 million for the sample of IPO firms.

Our methodology for calculating the acquisition intensity of IPO and mature firms controls for industry and time-trends in M&A activity. To calculate the acquisition intensity of IPO firms within an industry, we first classify the IPO firms across 12 Fama-French industries. For each industry and for each year from 1985 to 2004, we calculate the total number and the total volume of acquisitions conducted by each IPO firm over the next five years, where the total volume is normalized by the market value of the firm at the time of the IPO. Then, we pool all the 20 years of firm data for each industry and calculate the mean number of acquisitions and the mean acquisition volumes in each Fama-French industry to obtain a measure of the acquisition activity of an average IPO firm in that industry. We repeat the same procedure for mature firms to calculate a comparable metric for the acquisition intensity of mature firms within an industry. For example, for the year 1985, we first find the total number and volume of the acquisitions conducted by each mature firm from 1985 to 1989, where the total acquisition volume is normalized by the market value of the firm in 1985. After pooling all the 20 years of firm data for each industry, we calculate the mean number of acquisitions and the mean acquisition volumes in each Fama-French industry to obtain a measure of the acquisition activity of an average mature firm in that industry.

The greater acquisition appetite of IPO firms cannot be explained by industry effects alone. Panel A of Table 5 shows that in 11 of the 12 Fama-French industry groups, IPO firms make more acquisitions, on average, than mature public firms (at the 10% level of significance). In the remaining industry, Chemicals, the number of acquisitions made is not different between IPO and mature firms. The within-industry difference in acquisition intensity between IPO and mature firms appears to arise more from differences in cash financed acquisitions than from stock financed acquisitions. In 10 of the 12 industry groups, IPO firms make more cash financed acquisitions than mature firms (at the 10% level of significance), but make more stock financed acquisitions in only 4 industries. It is noteworthy that in no industry do mature firms make more acquisitions than IPO firms, either using stock or using cash.

Looking at acquisition volume instead of the number of acquisitions portrays a similar picture. Panel B of Table 5 shows that in all 12 Fama-French industry groups, IPO firms engage in more acquisition activity relative to their market values than mature public firms. The difference in acquisition volumes between IPO and public firms is significant for all 12 industries at the 10% level and for 11 industries at the 5% levels. Once again, this difference appears to arise predominantly because IPO firms engage in much more cash financed M&A than mature firms. In 11 of the 12 industries, IPO firms engage in significantly more cash financed M&A volume than mature public firms. Stock financed M&A volumes are higher for IPO firms in 7 of the 12 industries at the 10% level of significance.

Overall, these results suggest that IPO firms are more acquisitive than mature firms both in terms of the number of acquisitions and the volume of acquisitions they undertake, despite the greater concentration of IPO firms in M&A active industries. If sectoral acquisition opportunities were the only reason why IPO firms go public and make acquisitions, one would not expect to see meaningful differences between the acquisition intensity of IPO firms and mature firms within an industry. The within-industry comparison also shows that the difference in cash financed acquisitions between IPO and mature firms is more pronounced than the difference in stock financed acquisitions. A potential explanation is that industry-level overvaluation might lead both IPO and mature firms to engage in more stock financed M&A, leading to smaller differences in acquisition patterns between these two groups of firms.

4. Multivariate Analysis of post-IPO Acquisition Activity

We estimate separate regressions for the volume of cash financed acquisitions and the volume of stock financed acquisitions. Acquisition volumes are normalized by the market value of the firm at the time of the IPO. We estimate cross-sectional regressions for five different time periods, each denoted by $0t$, where year 0 corresponds to the IPO year and t ranges from 1 to 4 years after the IPO.

4.1. Primary and Control Variables

Our primary variables of interest are as follows. *Industry Acquisition Intensity* is the total volume of acquisitions within an industry normalized by the total market value of all the firms in a given industry. We use the 48 Fama and French (1997) industry groupings to assign IPO firms to industries. We calculate this variable for each time horizon considered in the regression models. If industry-level M&A opportunities are a primary motive for IPOs, we expect this variable to be positively related to post-IPO M&A volumes.

4.1.1. Variables related to capital infusion

Primary IPO Proceeds is the capital raised at the IPO from the sale of primary shares. Under the capital infusion motive, we expect primary IPO proceeds to be positively related to cash financed acquisitions since going public provides a war chest of cash to pursue subsequent cash financed acquisitions. This variable is also expected to be positively related to R&D and CAPEX if capital infusion motives are important for IPOs.

Primary SEO Capital is the total primary equity capital raised in SEOs from year 0 to year t following the IPO, normalized by firm value at the time of the IPO. One of the motives for an IPO can be to create access to public equity markets to raise funds for subsequent cash financed acquisitions. If capital infusion motive can drive the IPO decision because of the prospect of later SEOs that can be used to pay for cash financed deals, we expect that the volume of post-IPO cash financed acquisitions should be positively related to the amount of primary equity capital raised in SEOs. Similar reasoning suggests that *Primary SEO Capital* should be positively related to R&D and CAPEX if capital infusion motives are important. Capital infusion motives do not offer a prediction regarding the effect of this variable on stock financed acquisitions.

4.1.2. *Variables related to acquisition currency*

IPO Underpricing is the price run-up on the first trading day after the IPO, defined as the difference between the first day closing price and the offer price divided by the offer price. If acquisition currency motives are important in IPOs, we expect underpricing to be positively related to stock financed acquisitions since IPO underpricing is positively correlated with overvaluation of the stock, as shown by Purnanandam and Swaminathan (2004).

FF Alpha is the intercept estimated from the Fama-French three-factor model which measures the firm's abnormal return from year 0 to year t . Since *IPO Underpricing* is likely to be more reflective of overvaluation around the IPO, we use *FF Alpha* as longer-term measure of overvaluation based on the post-IPO trading performance of the stock. This variable is expected to be positively correlated with stock financed acquisitions in later years if acquisition currency motives are important. It is worth noting that the abnormal stock price performance could be positively related to cash financed acquisitions as well. An IPO firm with a well-performing stock may engage in cash financed acquisitions by raising capital in an SEO and using the proceeds for cash financed acquisitions. However, stock financed acquisitions may have the advantage of removing the risk associated with SEO transactions and may take less time to complete than cash financed acquisitions.

4.1.3. *Variables related to ex-ante uncertainty resolution*

Offer Price Revision is calculated as the absolute value of the difference between the offer price and the midpoint of the initial filing range normalized by the midpoint of the initial filing range. As proposed by Lowry, Officer and Schwert (2009) and Hsieh, Lyandres and Zhdanov (2007), this variable reflects the ex-ante uncertainty about the true value of an IPO firm. Under the valuation uncertainty motive, the resolution of this uncertainty through an IPO allows firms and outsiders to observe their true

value. This benefit is larger for firms with greater ex-ante uncertainty and allows them to conduct more M&A activity. Thus, we expect this variable to be positively related to both cash and stock financed M&A for IPO firms.

IPO Cost is calculated as the IPO spread divided by the share overhang, which is defined as the ratio of shares retained by non-selling shareholders to shares sold in an IPO, following Chen and Ritter (2000). The arguments in Hsieh, Lyandres and Zhdanov (2007) suggest that firms with high *IPO Cost* will engage in M&A sooner than firms with low *IPO Cost*. This timing differential is expected to hold for both cash and stock financed M&A.

Debt Capital is the amount of total debt capital raised from year 0 to year t , normalized by firm value. We expect debt capital to be positively related to the cash financed acquisitions since an IPO may improve a firm's ability to borrow and conduct debt financed acquisitions by reducing the uncertainty about the firm's true value.

4.1.4. Control variables

Secondary IPO Proceeds is the capital raised at the IPO from the sale of secondary shares, normalized by firm value at the time of the IPO. *VC Backed* is an indicator variable which takes the value of 1 if the IPO firm is VC-backed and 0 if the IPO firm is not VC-backed. *Carveout* is an indicator variable which takes the value of 1 if the IPO is a carve-out and 0 if the IPO is a new company IPO. We lack a clear prediction for this variable. On one hand, the acquisition currency motives ought to be less important for carveouts since the parent has the ability to issue stock prior to the IPO. However, sectoral mispricing for the carved entity may provide windows of opportunity for issuing overvalued stock that are unavailable to the parent. Finally, the regression models include year dummies.

4.2. Determinants of Cash Financed Acquisition Activity

The first five columns in Table 6 present the regressions for cash financed M&A activity. The results support the importance of capital infusion motives. The volume of cash financed acquisitions made within the first one, two, three and four years after the IPO is positively correlated with *Primary IPO Proceeds* at the 1% significance level. Unlike primary shares offered, the proceeds from secondary shares are unrelated to cash financed acquisition volumes, confirming the role of capital infusion in explaining cash acquisition activity. The amount of primary equity capital raised subsequent to the IPO is also positively correlated with the amount of cash financed acquisitions over horizons ranging from one

year to four years after the IPO at the 1% significance level. This suggests that the ability to raise acquisition capital in SEOs subsequent to the IPO is an important element of the going public decision.

We find mixed support for the valuation uncertainty motive for cash financed acquisitions. Consistent with the predictions of the model developed by Hsieh, Lyandres and Zhdanov (2007), *Offer Price Revision* is positively related to cash acquisitions conducted over the years 0-1 and 0-2 horizons. However, *IPO Cost* is unrelated to cash acquisition volumes in any interval, contrary to their prediction that firms with higher costs of going public are likely to make more acquisitions in the earlier years. We also find that the volume of cash financed acquisitions is strongly and positively correlated with the volume of debt capital raised within one, two, three and four years after the IPO. This result suggests that going public may enhance a firm's ability to undertake debt financed acquisitions by improving its ability to borrow. This finding is consistent with the evidence in Pagano, Panetta and Zingales (1998) who document that firms going public experience an improvement in their ability to borrow through a reduction in the cost of bank credit after the IPO. An IPO may increase debt capacity by lowering valuation uncertainty, thereby strengthening the firm's bargaining position vis-a-vis its lenders. Hence, in a broader sense, IPOs may facilitate M&A by resolving uncertainty about firm value, which allows the firm to undertake cash acquisitions financed by issuing debt.

A surprising result is that cash financed acquisition volumes are not positively associated with industry M&A activity. In fact, over the year 0-4 interval, the coefficient on *Industry Acquisition Intensity* is negative and statistically significant. This suggests that the earlier discussed link between IPO firm and industry M&A activity is driven by stock financed transactions. We turn to this issue next.

4.3. *Determinants of Stock Financed Acquisition Activity*

The last five columns of Table 6 present regressions analysis for the volume of stock financed acquisitions. In contrast to the evidence from cash financed acquisitions, *Industry Acquisition Intensity* is a positive and significant determinant of stock financed M&A volume in the IPO year and in the years 0-4 interval. This suggests that industry level M&A opportunities are a meaningful motive for IPO firms only for stock financed transactions.

We find that firms with a higher degree of *IPO Underpricing* conduct more stock financed acquisitions after the IPO. The level of underpricing is a positive determinant of stock financed acquisitions at the 1% level within the first year and at the 5% level within the first two years after the IPO. This effect of *IPO Underpricing* in stock financed acquisitions is in sharp contrast to the results for cash financed acquisitions where *IPO Underpricing* is essentially insignificant. This finding is supportive

of the acquisition currency motive where firms go public to exploit acquisition opportunities when their equity is overvalued.

Models of IPOs, such as Rock (1986), predict that underpricing is positively related to valuation uncertainty and this prediction has received empirical support (see, for example, Ritter (1984)). Hence, the importance of underpricing in stock financed acquisitions could also be viewed as being consistent with a role for uncertainty resolution. However, under the uncertainty view, underpricing should also be positively related to cash financed acquisitions because the benefit of an IPO emanates from establishing a public market valuation, irrespective of how the acquisition is financed. However, underpricing is insignificant in explaining cash financed acquisitions, suggesting that its role in explaining stock financed acquisitions is more supportive of acquisition currency motives.

IPO Underpricing loses significance for the longer windows that extend to year 2 and beyond. This likely occurs because overvaluation around the time of the IPO is unlikely to be a significant driver of M&A activity in later years. However, overvaluation appears to continue to play an important role for stock financed M&A. Columns 8 and 9 show that *FF Alpha* is positive and significant in regressions for stock acquisitions in the years 0-2 and years 0-3 windows. This evidence on overvaluation is supportive of the acquisition currency motive.

The evidence from stock financed acquisitions also provides some support for valuation uncertainty motives. *Offer Price Revision* is positively correlated with the volume of stock financed acquisitions in the first two and four year periods after the IPO. That this variable is significant in explaining both cash and stock financed M&A volumes is consistent with the prediction of the valuation uncertainty motive where the benefit of resolving ex-ante uncertainty arises irrespective of the form of consideration.

A potential concern with the results on *Offer Price Revision* is that it is highly correlated with the level of underpricing as shown by Hanley (1993) and Bradley and Jordan (2002). To understand whether the offer price revision is simply another measure of underpricing, we examine whether the two variables affect M&A volumes in an identical manner. In untabulated tests, we run separate regressions with either the offer price revision or underpricing. In these tests we find that underpricing is significantly related to stock financed acquisition volumes only, but that offer price revision is significant in explaining both cash and stock financed acquisition volumes. This suggests that offer price revision plays a different role than underpricing in explaining acquisition volumes. Its significance in explaining both cash and stock financed acquisition activity is consistent with the predictions by Hsieh, Lyandres and Zhdanov (2007).

We also find that *IPO Cost* is not related to the volume of stock financed acquisitions in year 0 and years 0-1, but that it is significant and positively related to stock transactions over the longer horizons. This result is at odds with the prediction in Hsieh, Lyandres and Zhdanov (2007) that firms incurring higher costs of going public engage in more acquisitions immediately after the IPO to outweigh their larger IPO costs. Combined with the insignificant role of *IPO Cost* in explaining cash financed M&A activity, we interpret our results as lacking support for this specific prediction in Hsieh et. al. (2007).

4.4. *Discussion of hot IPO and M&A markets*

To understand the extent to which our results might be driven by the intense IPO activity during the internet boom, we re-estimate all our results excluding IPOs conducted during the January 1999 to March 2000 timeframe that Schultz and Zaman (2001) identify as the internet bubble period. Our data show that 14% of our sample IPOs and 13% of acquisitions (with 23% of all stock financed acquisitions) occur during this fifteen month period, highlighting significant concentration of both IPO and M&A activity during the internet boom. Yet, we find that all the results described earlier hold when this period is excluded from the analysis. IPO firms continue to be prolific acquirers post-IPO, outpacing their M&A activity in the pre-IPO period and that of mature firms within their industry in the post-IPO period. All of the cross-sectional results on cash and stock financed M&A volumes continue to hold outside of the internet boom period. We do not tabulate these results for brevity.

We also explore if our results are driven by periods of high M&A activity. We identify periods of an industry merger wave following Harford (2005) who defines an industry as experiencing an M&A wave if the number of acquisitions over two years exceeds the 95th percentile of the simulated probability distribution based on the past ten years of M&A activity. We consider an IPO firm to be an “in-wave” IPO if an M&A wave occurs in that industry in any of the five post-IPO years we study. Our sample is roughly evenly split between in-wave and out-wave IPOs. As is to be expected, in-wave IPOs conduct more acquisitions than out-wave IPOs. We do not however, find that our results are driven by in-wave IPOs. Even out-wave IPO firms spend as much on acquisitions as they do on R&D and CAPEX and their acquisition volumes exceed those of mature firms within their industries. Inspection of our regression models show similar results for in-wave and out-wave periods for cash financed acquisitions, but the results on underpricing in stock financed acquisitions appear to be stronger for in-wave periods, possibly because overvaluation-driven acquisitions are more prevalent during a merger wave.

4.5. *Determinants of post-IPO R&D and CAPEX*

To obtain a complete picture of the growth pattern of IPO firms, we also estimate the determinants of R&D and CAPEX for IPO firms in Table 7. We find that the amount of primary capital raised at the IPO is positively related to R&D and CAPEX of IPO firms in the years immediately after the IPO, but not over longer horizons. This suggests that cash infusion motives have a longer lasting effect on M&A activities than they do for organic growth.

Similar to the results on cash financed M&A, *Primary SEO Capital* has a positive and significant effect on R&D and CAPEX over all windows beyond the IPO year. This result confirms the findings in Kim and Weisbach (2008). In contrast to the evidence on cash M&A, however, proceeds from debt issuance have no explanatory power for R&D and CAPEX beyond the IPO year and are in fact, negatively related in the IPO year. Thus, the importance of uncertainty resolution in creating debt capacity appears to be restricted to M&A transactions.

Interestingly, underpricing is unrelated to R&D and CAPEX outlays. Given our earlier results that underpricing is positively related to stock financed acquisition volumes, this suggests that IPO firms experiencing a large run-up at the IPO prefer growth through acquisitions by using their valuable acquisition currency. This could be because it is easier and quicker to exploit an overvalued currency by acquiring other firms than it is to identify and invest in internal projects or because frictions such as lock-up restrictions prevent firms from conducting SEOs to raise cash for future organic initiatives.

Finally, an IPO firm's R&D and CAPEX is negatively correlated with the amount of acquisition activity in its industry for all the time periods after the IPO at the 1% level. Given that this variable is positively correlated with stock financed acquisition volume in the IPO year, a firm's acquisition activity and its R&D and CAPEX may be substitute paths for growing a company. We also find that among the control variables, VC backing appears to be positively related to CAPEX and R&D.

5. **Acquisitions and Insider Ownership Dilution**

There has been a recent interest in understanding how the ownership structure of firms evolves over time. Helwege, Pirinsky and Stulz (2007) show that insider ownership of U.S. firms drops steadily after they go public. They find that firms with better stock market performance and a more liquid stock experience larger decreases in insider ownership and become more widely held. There are two channels through which insider ownership can fall – through sales of shares by insiders and through issuance of new shares. Helwege, Pirinsky and Stulz (2007) argue that insider ownership in the U.S. drops for IPO

firms mainly because of insider selling, whereas the increase in the number of shares outstanding is a less important effect. They further argue that when the number of shares outstanding increases, this is primarily due to the exercise of options and warrants, private equity placements, and conversion of equity securities. Their findings for U.S. firms are in sharp contrast to results in Franks, Mayer and Rossi (2008) who show that shares issued to pay for mergers and acquisitions play an important role in explaining the ownership dilution of U.K. firms.

Given the importance of M&A activity by IPO firms, we examine whether acquisitions play a role in explaining ownership dynamics of IPO firms in the U.S. Our procedure for calculating insider ownership closely follows Helwege, Pirinsky and Stulz (2007). Like them, we obtain data on insider ownership from the October volumes of Compact Disclosure and use CRSP for data on returns, share volume and the number of shares outstanding for our sample of IPO firms. Using Compact Disclosure data from 1989 to 2001, we are able to obtain ownership data for 553 of 964 firms in our sample that went public between 1989 and 2001.

Table 8 reports the evolution of insider ownership of IPO firms over time. Panel A shows the mean and the median percentage of shares owned by insiders for the sample. As a result of acquisitions and delistings, the sample size drops from 553 to 230 by the end of year 4. The mean (median) level of insider ownership drops from 25.7% (18.2%) to 18.6% (7.8%) in the first five years after the IPO.

Panels B and C divide the sample firms according to their acquisition intensity. High acquisition activity firms (those whose normalized acquisition volumes exceed the sample median) see a drop in mean (median) insider ownership from 27.1% (24.6%) to 17.9% (8.4%) in the first five years after the IPO. The reductions in both the mean and median insider ownership levels are statistically significant at the 1% level. However, for low acquisition activity firms, we observe a smaller decrease from 24.5% to 19.3% in the mean, the difference being merely significant at the 10% level, and the change in the median insider ownership level is insignificant. Thus, IPO firms that are more voracious acquirers experience a greater reduction in insider ownership. It is important to note that both cash and stock financed acquisitions can lead to a drop in insider ownership because the number of outstanding shares will increase if SEOs are used to raise capital for cash acquisitions, or if shares are issued for stock acquisitions.

We examine these results on the impact of the M&A activity on a newly public firm's ownership dilution in more detail using a multivariate framework. We closely follow the regression specifications in Helwege, Pirinsky and Stulz (2007), and supplement them to include cash and stock financed acquisition

volumes as additional explanatory variables. Since cash financed acquisitions lead to ownership dilution only if they are financed by cash raised at an SEO, we use the volume of cash financed acquisitions as an explanatory variable only if there is an SEO issue six months before or six months after the announcement of a cash acquisition. The first five columns in Table 9 show probit model estimates of the probability of a drop in the percentage of shares owned by insiders of 5% or more, with *Cash Acquisition Volume* and *Stock Acquisition Volume* variables added to the specification in Helwege, Pirinsky and Stulz (2007). In order to analyze the changes in insider ownership of different magnitudes, we also run probit models for a drop in insider ownership of 1% or more and OLS regression models where the drop in insider ownership is the dependent variable. In all three models that we employ, the first four columns in Table 9 show the estimates for a change in insider ownership from one year to the next after the IPO, and the fifth column shows estimates for all available firm-years pooled.

The results presented in Table 9 confirm the main findings in Helwege, Pirinsky and Stulz (2007). Specifically, we find that firms with higher stock returns and higher stock liquidity as proxied by greater share turnover are more likely to experience a drop in insider ownership of 5% or more. More importantly, however, we find that both stock and cash financed acquisition volumes are positively related to the dilution in insider ownership. The coefficient of cash financed acquisitions is positive and significant at the 1% level in the pooled probit model for a drop in insider ownership of 5% or more. The results of the other two pooled models also show that the volume of cash financed acquisitions after the IPO is a significant determinant of insider ownership dilution over time. The coefficient of stock financed acquisition volume is positive and statistically significant at the 10% level in the pooled probit model for a drop in insider ownership of 5% or more. We obtain the same result for a drop in insider ownership of 1% or more. The coefficient of stock financed acquisitions has the right sign in the OLS regression as well, but is not significant.

Overall, our results on the insider ownership dilution of newly public firms are similar to those in Franks, Mayer and Rossi (2008), who show that the number of shares issued for acquisition financing is positively related to the ownership dilution of U.K. firms. Thus, adding the acquisition activity to the Helwege, Pirinsky and Stulz (2007) framework illustrates that the M&A activity of IPO firms is an important determinant of ownership structure evolution in the U.S. as well.

6. Conclusions

We examine the acquisition activity of newly public firms. Our results show that acquisitions play a central role in the growth of IPO firms. The M&A activity of these firms increases substantially

from their pre-IPO levels and outpaces the acquisition volumes of mature firms. The elevated M&A volumes partly reflect the tendency of IPOs to cluster in M&A intensive industries, but industry level M&A volumes do not fully explain the acquisition appetite of IPO firms.

We evaluate three motives for the post-IPO activity of newly public firms. IPOs appear to facilitate M&A both by providing an infusion of capital as well as providing ongoing access to capital markets. We find that IPO firms acquire other firms early on after the IPO by using the primary capital raised at the IPO. In addition, they use their access to public equity markets to finance their acquisition activity. Improved access to credit markets appears to be also important as the volume of debt capital raised is strongly correlated with cash financed M&A volumes. Thus, the initial capital raised as well as the ongoing access to public equity and debt markets are significant factors underlying M&A activity of these firms.

Our findings also lend support to the view that an IPO creates an acquisition currency which facilitates the subsequent M&A activity. We find that IPO firms with overvalued stock conduct more stock financed acquisitions. We also find some support for the view that IPOs improve the ability of firms to conduct M&A by resolving some of the ex-ante uncertainty regarding valuation facing privately held firms.

Overall, our results suggest that the desire to make acquisitions is an important factor behind the IPO decision and acquisitions play a substantial role in the growth of newly public firms. We also find that subsequent equity and debt issuance is closely linked to post-IPO acquisition activity. Therefore, our findings illustrate that the IPO decision, subsequent equity and debt offerings, and acquisition activity are all closely linked. An interesting avenue for future research would be to consider the impact of the M&A activity for the operating and stock market performance of IPO firms.

Our findings on the importance of M&A for IPO firms have broader implications for the evolution of ownership structure of IPO firms as well. We find that the acquisition activity of IPO firms plays an important role in explaining the reduction in insider ownership, in addition to stock market performance and liquidity as documented by Helwege, Pirinsky and Stulz (2007). Our analysis shows that IPO firms with a higher amount of acquisition activity are more likely to experience a sizeable drop in insider ownership than IPO firms with a lower amount of acquisition activity.

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Table 1
Descriptive Statistics for IPO Firms

Descriptive statistics on IPO firms that went public between 1985 and 2004. The sample includes all IPO firms with IPO proceeds greater than \$100 million in 2004 dollars (or greater than \$57 million in 1985 dollars), for which Compustat data is available. Underpricing is the difference between the first day closing price and the offer price, as a percentage of the offer price.

IPO Year	Number of IPOs	Average IPO Proceeds (nominal \$mm)	Average IPO Proceeds (\$mm in 1985)	Average Percentage Underpricing	Average Percentage of Secondary Shares	Percentage of IPOs Issuing Any Secondary Shares	Percentage of Carve-outs
1985	25	\$163.58	\$163.58	3.59%	20.15%	36.00%	28.00%
1986	50	173.96	172.07	4.73	22.51	38.00	14.00
1987	36	171.30	162.25	6.96	21.63	36.11	19.44
1988	21	121.84	110.51	2.37	6.39	23.81	19.05
1989	19	173.84	150.68	-0.29	39.66	57.89	15.79
1990	12	160.46	131.08	11.27	43.00	50.00	33.33
1991	42	178.84	141.75	12.75	20.15	50.00	9.52
1992	65	190.55	146.77	7.53	25.61	49.23	13.85
1993	119	204.84	153.56	5.45	19.78	35.29	13.45
1994	70	195.48	142.72	3.58	16.34	27.14	7.14
1995	56	215.00	153.09	19.85	21.85	44.64	5.36
1996	108	211.85	146.00	17.40	17.93	41.67	11.11
1997	103	226.30	153.34	11.72	18.46	35.92	5.83
1998	64	375.14	250.17	20.69	17.39	35.94	12.50
1999	140	301.67	195.92	86.06	9.28	23.57	12.14
2000	127	328.91	206.61	75.89	2.77	8.66	10.24
2001	39	648.39	401.07	11.35	10.50	20.51	20.51
2002	41	417.36	252.17	7.70	21.24	43.90	19.51
2003	45	251.95	149.42	12.32	24.67	53.33	4.44
2004	113	345.80	198.61	13.20	18.47	37.17	6.19
1985-2004	1295	\$265.45	\$180.70	25.29%	17.08%	34.21%	11.58%

Table 2
Post-IPO Acquisition Activity and R&D and CAPEX

Panel A presents summary statistics about the post-IPO acquisition activity of our sample of IPO firms. Missing acquisition deal values, whose percentage is reported here, are replaced by zero. Panel B reports the mean and the median (given in parentheses) acquisition amounts and the total R&D and CAPEX of these IPO firms in million dollars over the period from year 0 (the IPO year) to year t with $t = 0, 1, 2, 3, 4$ denoting the number of years after the IPO. The dollar values are given in 1985 dollars. The p-values for Wilcoxon signed-rank tests between the acquisition amount and R&D and CAPEX are provided. Panels C and D report the total acquisition amounts and R&D and CAPEX normalized by IPO proceeds and by the market value of the firm as of the IPO date, respectively.

Panel A: Acquisition Activity of IPO Firms Over Time					
	Year 0	Years 0-1	Years 0-2	Years 0-3	Years 0-4
Total number of IPO firms	1295	1276	1219	1093	902
Number of IPO firms making at least one acquisition	395	698	793	782	695
Percentage of IPO firms making at least one acquisition	30.5	54.7	65.1	71.5	77.1
Total number of acquisitions by IPO firms	846	2185	3118	3662	3747
Mean number of acquisitions per IPO firm	0.65	1.71	2.56	3.35	4.15
Median number of acquisitions per IPO firm	0	1	1	2	2
Percentage of acquisitions with missing deal value	38.7	38.3	39.8	39.6	38.4
Number of IPO firms being acquired	0	16	27	49	57
Percentage of IPO firms being acquired	0	1.2	2.1	3.8	4.4
Panel B: Acquisition Amounts and R&D and CAPEX (in \$mm)					
	Year 0	Years 0-1	Years 0-2	Years 0-3	Years 0-4
Acquisition amount	43.02 (0.00)	119.89 (0.00)	203.29 (5.74)	283.94 (18.98)	393.99 (36.65)
R&D and CAPEX	53.76 (13.36)	115.79 (30.41)	187.44 (49.78)	272.95 (70.79)	324.93 (91.72)
p-value for signed rank test	0.0001	0.0001	0.0001	0.0001	0.0001
Panel C: Acquisition Amounts and R&D and CAPEX as a Percentage of IPO Proceeds					
	Year 0	Years 0-1	Years 0-2	Years 0-3	Years 0-4
Acquisition amount	25.10 (0.00)	78.92 (0.00)	132.21 (5.56)	179.44 (15.03)	245.74 (34.56)
R&D and CAPEX	30.04 (13.15)	65.30 (29.97)	106.54 (47.18)	153.44 (66.51)	197.30 (89.68)
p-value for signed rank test	0.0001	0.0001	0.0001	0.0001	0.0001
Panel D: Acquisition Amounts and R&D and CAPEX as a Percentage of Market Value of Assets					
	Year 0	Years 0-1	Years 0-2	Years 0-3	Years 0-4
Acquisition amount	7.27 (0.00)	14.29 (0.00)	20.72 (0.79)	29.62 (2.47)	40.46 (5.16)
R&D and CAPEX	4.73 (2.18)	9.74 (4.90)	14.91 (7.76)	20.76 (11.31)	26.53 (15.43)
p-value for signed rank test	0.0001	0.0001	0.0001	0.0001	0.0005

Table 3
Comparison of pre- and post-IPO Acquisition Activity

Comparison of the acquisition activity of the IPO firms within five years before and within five years after they go public, for all targets (public and private) and for public targets only. Panel A presents summary statistics about the pre- and post-IPO acquisition activity of the sample firms. Missing acquisition deal values, whose percentage is reported here, are replaced by zero. Panel B reports mean and the median (in parentheses) total acquisition volumes over the two five-year periods as a percentage of their market value as of the IPO date. Panel B also reports the z-statistic of Wilcoxon-Mann-Whitney test for comparison of the pre- and post-IPO period. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Panel A: Summary Statistics				
	All Targets		Public Targets	
	5-yr period before IPO	5-yr period after IPO	5-yr period before IPO	5-yr period after IPO
Total number of firms	1295	1295	1295	1295
Number of firms making at least one acquisition	250	954	181	719
Percentage of firms making at least one acquisition	19.31	73.67	13.98	55.52
Total number of acquisitions	561	4714	327	2079
Mean number of acquisitions per firm	0.43	3.64	0.25	1.61
Median number of acquisitions per firm	0	2	0	1
Percentage of acquisitions with missing deal value	51.52	38.91	39.76	28.57
Panel B: Acquisition Amounts as Percentage of Market Value of Assets				
	All Targets		Public Targets	
	5-yr period before IPO	5-yr period after IPO	5-yr period before IPO	5-yr period after IPO
Total acquisition amount	25.69 (1.11)	45.61 (11.40)	24.52 (0)	33.02 (3.05)
z-statistic	9.89***		5.79***	

Table 4
Comparison of post-IPO Acquisition Activity and R&D and CAPEX between IPO Sub-Samples

Comparison of the post-IPO acquisition activity and R&D and CAPEX for IPO sub-samples based on industry acquisition intensity, normalized primary IPO proceeds, and IPO underpricing. High (low) acquisition intensive industries are those industries which have a total acquisition volume (normalized by industry size) above (below) the median volume of the 48 Fama-French industries. The total post-IPO acquisition amounts and R&D and CAPEX by each IPO firm are calculated over time and then normalized by the market value of the firm at the time of the IPO. The subsample comparison for industry acquisition intensity is based on the sum of cash and stock financed acquisitions, the comparison for primary IPO proceeds is based on cash financed acquisitions, and the comparison for IPO underpricing is based on stock financed acquisitions. The rows ACQ and R&D+CAPEX in Panels A and B report the means of the calculated percentages for acquisitions and R&D and CAPEX, respectively. Panel C reports the z-statistics of Wilcoxon-Mann-Whitney test for comparison of the above-median group and the below-median group, for both the acquisition amounts and R&D and CAPEX over the period from year 0 (the IPO year) to year t with $t = 0, 1, 2, 3, 4$ denoting the number of years after the IPO. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Panel A															
	High Acquisition Intensive Industries					Normalized Primary IPO Proceeds $\geq$ Median of Normalized Primary IPO Proceeds					IPO Underpricing $\geq$ Median IPO Underpricing				
	Yr 0	Yr 0-1	Yr 0-2	Yr 0-3	Yr 0-4	Yr 0	Yr 0-1	Yr 0-2	Yr 0-3	Yr 0-4	Yr 0	Yr 0-1	Yr 0-2	Yr 0-3	Yr 0-4
Number of Firms	786	782	720	640	517	648	638	610	547	451	646	636	608	546	450
ACQ	10.68	20.18	28.16	40.78	48.17	11.16	17.76	24.81	34.36	47.50	1.40	4.86	8.10	10.35	13.91
R&D+CAPEX	4.00	9.13	13.57	18.05	24.04	6.05	11.64	16.98	22.63	28.77	4.60	9.92	14.84	20.52	24.85
Panel B															
	Low Acquisition Intensive Industries					Normalized Primary IPO Proceeds $<$ Median of Normalized Primary IPO Proceeds					IPO Underpricing $<$ Median IPO Underpricing				
	Yr 0	Yr 0-1	Yr 0-2	Yr 0-3	Yr 0-4	Yr 0	Yr 0-1	Yr 0-2	Yr 0-3	Yr 0-4	Yr 0	Yr 0-1	Yr 0-2	Yr 0-3	Yr 0-4
Number of Firms	505	490	495	451	383	647	638	609	546	451	649	640	611	547	452
ACQ	2.03	4.99	10.06	13.90	30.28	1.47	4.15	6.34	7.53	10.74	0.51	1.81	2.19	6.98	8.78
R&D+CAPEX	5.93	10.81	17.03	24.84	30.16	3.44	7.79	12.77	18.84	24.19	4.88	9.56	14.97	21.00	28.23
Panel C															
	Firms in High Acquisition Intensive Industries versus Firms in Low Acquisition Intensive Industries					Firms with High Normalized Primary IPO Proceeds versus Firms with Low Normalized Primary IPO Proceeds					Firms with High IPO Underpricing versus Firms with Low IPO Underpricing				
	Yr 0	Yr 0-1	Yr 0-2	Yr 0-3	Yr 0-4	Yr 0	Yr 0-1	Yr 0-2	Yr 0-3	Yr 0-4	Yr 0	Yr 0-1	Yr 0-2	Yr 0-3	Yr 0-4
z-statistic for ACQ	2.63***	6.33***	5.41***	5.82***	6.12***	1.45	2.63***	3.02***	3.96***	3.34***	4.09***	6.82***	7.40***	6.67***	6.19***
z-statistic for R&D+CAPEX	-5.27***	-4.78***	-4.77***	-5.18***	-4.83***	1.37	0.44	-0.08	-0.95	-0.55	1.07	2.90***	2.49***	2.14**	0.83

Table 5
Comparison of the Acquisition Activity of our Sample of IPO Firms with that of Mature Firms

Comparison of the acquisition activity over a five-year period for our sample of IPO firms to that of mature firms, which are defined as firms that have gone public at least five years ago and which have a market capitalization greater than \$100 million (in 2004 dollars) at the beginning of the five-year period. We classify firms across the 12 Fama-French industries. For each industry and for each year from 1985 to 2004, we calculate the total number and the total volume of acquisitions conducted by each IPO firm (or by each mature firm) over the next five years, where the total volume is normalized by the market value of the firm at the beginning of the five-year period. Then, we pool all the 20 years of firm data for each industry and calculate the mean number of acquisitions and the mean normalized acquisition amounts in each Fama-French industry to obtain a measure of the acquisition activity of an average IPO firm (or of an average mature firm) in that industry. Panel A reports the results for the number of acquisitions, and Panel B reports the acquisition volume results. Each panel first presents results for all (cash or stock financed) acquisitions, and then results for cash financed acquisitions only and stock financed acquisitions only. The z-statistics for the Wilcoxon-Mann-Whitney test are reported to compare the two groups of firms. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Panel A: Comparison of the Number of Acquisitions by IPO Firms and by Mature Firms												
Cash and Stock Financed Acquisitions												
Industry	Consumer NonDurables	Consumer Durables	Manufacturing	Energy	Chemicals	Business Equipment	Telecom	Utilities	Wholesale & Retail	Healthcare	Finance	Other
IPO firms	2.79	3.05	2.95	2.83	2.19	3.48	4.07	5.86	3.40	2.55	4.08	4.51
Mature firms	2.41	2.11	2.44	1.69	2.69	3.12	1.64	0.78	1.87	2.11	1.67	1.73
z-statistic	1.91*	1.74*	2.35**	3.46***	1.36	5.73***	9.99***	5.54***	4.14***	2.18**	12.49***	10.00***
Cash Financed Acquisitions												
Industry	Consumer NonDurables	Consumer Durables	Manufacturing	Energy	Chemicals	Business Equipment	Telecom	Utilities	Wholesale & Retail	Healthcare	Finance	Other
IPO firms	2.69	3.00	2.74	2.52	2.07	2.44	3.42	5.43	3.09	2.19	3.83	3.82
Mature firms	2.21	1.97	2.28	1.47	2.56	2.61	1.38	0.66	1.69	1.83	1.20	1.51
z-statistic	2.12**	1.90*	1.95**	3.33***	1.29	2.87***	9.03***	5.31***	3.70***	1.55	14.35***	9.38***
Stock Financed Acquisitions												
Industry	Consumer NonDurables	Consumer Durables	Manufacturing	Energy	Chemicals	Business Equipment	Telecom	Utilities	Wholesale & Retail	Healthcare	Finance	Other
IPO firms	0.10	0.05	0.22	0.31	0.11	1.04	0.64	0.43	0.31	0.36	0.24	0.69
Mature firms	0.20	0.13	0.16	0.22	0.14	0.50	0.26	0.12	0.18	0.27	0.47	0.21
z-statistic	-0.87	-0.87	1.58	1.22	-0.47	7.51***	6.34***	1.89*	1.54	0.89	-1.55	7.57***

Panel B: Comparison of the Acquisition Volume as a Percentage of MVA by IPO Firms and by Mature Firms

Cash and Stock Financed Acquisitions												
Industry	Consumer NonDurables	Consumer Durables	Manufacturing	Energy	Chemicals	Business Equipment	Telecom	Utilities	Wholesale & Retail	Healthcare	Finance	Other
IPO firms	14.84	13.86	13.83	33.40	18.30	21.65	38.73	43.91	14.60	14.12	51.07	24.10
Mature firms	9.74	8.80	10.17	14.95	7.60	15.90	15.72	4.66	6.84	11.30	5.32	9.17
z-statistic	2.13**	1.74*	2.98***	3.88***	2.48***	6.04***	10.50***	6.15***	3.74***	2.90***	10.55***	10.32***
Cash Financed Acquisitions												
Industry	Consumer NonDurables	Consumer Durables	Manufacturing	Energy	Chemicals	Business Equipment	Telecom	Utilities	Wholesale & Retail	Healthcare	Finance	Other
IPO firms	10.16	13.86	9.60	25.22	11.86	5.60	23.75	41.39	8.04	9.42	43.03	13.75
Mature firms	6.77	7.18	7.42	9.55	5.82	6.10	8.63	3.48	4.41	5.48	3.09	5.52
z-statistic	2.16**	2.06**	2.37**	3.75***	2.32**	1.61	8.94***	6.11***	3.34***	2.73***	12.90***	9.56***
Stock Financed Acquisitions												
Industry	Consumer NonDurables	Consumer Durables	Manufacturing	Energy	Chemicals	Business Equipment	Telecom	Utilities	Wholesale & Retail	Healthcare	Finance	Other
IPO firms	4.67	0.00	4.23	8.19	6.44	16.05	14.99	2.52	6.56	4.70	8.04	10.35
Mature firms	2.97	1.62	2.74	5.40	1.78	9.80	7.09	1.18	2.44	5.82	2.24	3.66
z-statistic	-0.22	-1.44	1.63*	0.84	-0.17	7.07***	6.92***	1.97**	1.69*	0.64	2.99***	7.21***

Table 6
Regressions of Cash and Stock Financed Acquisitions by IPO Firms

This table shows the results of regression models where the dependent variable is the total volume of cash (or stock) financed acquisitions over the period from year 0 (the IPO year) to year t , with $t = 1, 2, 3, 4$ denoting the number of years after the IPO, normalized by the market value of the firm at the time of the IPO (MVA_{IPO}). *Industry Acq Intensity* _{$0t$} is the total amount of industry acquisition activity from year 0 to year t normalized by the total market value of the firms in the industry, *Primary IPO Proceeds* (*Secondary IPO Proceeds*) is the capital raised at the IPO from the sale of primary (secondary) shares normalized by MVA_{IPO} , *Primary SEO Capital* _{$0t$} is the amount of total primary equity capital raised in seasoned equity offerings from year 0 to year t normalized by MVA_{IPO} , *IPO Underpricing* is the price run-up in the first trading day after the IPO defined as the difference between the first day closing price and the offer price given as a percentage of the offer price, *FF Alpha* _{$0t$} is the intercept estimated from the Fama and French three factor model which measures the firm's abnormal return from year 0 to year t , *Offer Price Revision* is the difference between the offer price and the midpoint of the initial filing range normalized by the midpoint of the initial filing range, *IPO Cost* is the ratio of the IPO spread to the share overhang, defined as the ratio of shares retained by non-selling shareholders to shares sold in an IPO, *Debt Capital* _{$0t$} is the amount of total debt capital raised from year 0 to year t normalized by MVA_{IPO} , *Carve-out* is an indicator variable which takes the value of 1 if the IPO is a carve-out, and *VC-Backed* is an indicator variable which takes the value of 1 if the IPO firm is VC-backed. The regressions also include a constant term and year dummies which are not reported. For each independent variable, the first row reports its estimated coefficient and the second row the corresponding t-statistic. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

	Cash Financed Acquisitions					Stock Financed Acquisitions				
	Year 0	Years 0-1	Years 0-2	Years 0-3	Years 0-4	Year 0	Years 0-1	Years 0-2	Years 0-3	Years 0-4
Industry Acq Intensity	0.29 1.41	0.22 1.40	-0.07 -0.60	-0.23 -1.88*	-0.59 -5.27***	0.16 2.62***	0.12 1.41	0.09 1.03	0.15 1.53	0.16 1.83*
Primary IPO Proceeds	0.06 5.14***	0.11 6.76***	0.4 21.19***	0.47 19.50***	1.48 25.37***	0.00 0.63	-0.00 -0.11	-0.01 -0.38	-0.02 -1.03	-0.14 -2.97***
Secondary IPO Proceeds	0.11 1.41	0.08 0.72	0.19 1.49	0.09 0.51	0.25 1.09	-0.01 -0.21	-0.02 -0.39	-0.04 -0.46	-0.09 -0.59	-0.11 -0.58
Primary SEO Capital	0.86 2.49***	0.37 3.35***	0.50 6.87***	0.02 0.33	0.75 8.39***	-0.05 -0.44	0.07 1.16	0.06 1.06	0.22 3.71***	0.19 2.73***
IPO Underpricing	-0.02 -1.1	-0.03 -1.34	-0.03 -0.88	-0.02 -0.48	0.03 0.7	0.04 6.71***	0.03 2.44**	0.01 0.27	-0.00 -0.08	-0.02 -0.43
FF Alpha	-0.01 -0.29	-0.23 -1.24	0.17 0.56	0.05 0.12	0.53 0.95	-0.01 -2.67***	0.14 1.35	0.53 2.43**	0.76 2.14**	0.51 1.17
Offer Price Revision	0.04 0.91	0.10 1.71*	0.13 1.94**	0.10 1.11	0.08 0.66	0.00 0.02	0.00 0.11	0.10 1.95**	0.11 1.48	0.15 1.70*
IPO Cost	-0.00 -0.20	-0.00 -0.13	-0.01 -0.89	-0.00 -0.03	-0.01 -0.61	-0.00 -0.54	-0.00 -0.58	0.01 3.20***	0.01 1.87*	0.03 3.14***
Debt Capital	4.44 135.78***	4.29 100.30***	3.65 73.85***	3.44 55.51***	1.38 11.44***	-0.01 -0.87	0.00 0.06	0.01 0.23	0.06 1.09	0.28 2.98***
Carve-out indicator	-0.01 -0.26	-0.00 -0.05	-0.02 -0.39	-0.04 -0.77	-0.06 -0.82	0.00 0.38	0.03 1.46	0.02 0.70	0.04 0.90	0.05 1.01
VC-Backed indicator	-0.01 -0.34	-0.03 -1.33	-0.05 -1.75*	-0.05 -1.29	-0.14 -2.44**	-0.00 -0.17	0.02 1.50	0.06 2.61***	0.05 1.42	0.05 1.10
Adjusted R ²	0.98	0.97	0.96	0.94	0.94	0.12	0.03	0.05	0.04	0.07
Sample Size	898	974	928	829	676	898	974	928	829	676

Table 7
Regressions of R&D and CAPEX by IPO Firms

This table shows the results of regression models where the dependent variable is R&D and CAPEX over the period from year 0 (the IPO year) to year t , with $t = 1, 2, 3, 4$ denoting the number of years after the IPO, normalized by the market value of the firm at the time of the IPO (MVA_{IPO}). *Industry Acq Intensity_{0t}* is the total amount of industry acquisition activity from year 0 to year t normalized by the total market value of the firms in the industry, *Primary IPO Proceeds* (*Secondary IPO Proceeds*) is the capital raised at the IPO from the sale of primary (secondary) shares normalized by MVA_{IPO} , *Primary SEO Capital_{0t}* is the amount of total primary equity capital raised in seasoned equity offerings from year 0 to year t normalized by MVA_{IPO} , *IPO Underpricing* is the price run-up in the first trading day after the IPO defined as the difference between the first day closing price and the offer price given as a percentage of the offer price, *FF Alpha_{0t}* is the intercept estimated from the Fama and French three factor model which measures the firm's abnormal return from year 0 to year t , *Offer Price Revision* is the difference between the offer price and the midpoint of the initial filing range normalized by the midpoint of the initial filing range, *IPO Cost* is the ratio of the IPO spread to the share overhang, defined as the ratio of shares retained by non-selling shareholders to shares sold in an IPO, *Debt Capital_{0t}* is the amount of total debt capital raised from year 0 to year t normalized by MVA_{IPO} , *Carve-out* is an indicator variable which takes the value of 1 if the IPO is a carve-out, and *VC-Backed* is an indicator variable which takes the value of 1 if the IPO firm is VC-backed. The regressions also include a constant term and year dummies which are not reported. For each independent variable, the first row reports its estimated coefficient and the second row the corresponding t-statistic. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

	Year 0	Years 0-1	Years 0-2	Years 0-3	Years 0-4
Industry Acq Intensity	-0.08 -1.04	-0.22 -3.29***	-0.24 -3.23***	-0.23 -2.77***	-0.36 -3.96***
Primary IPO Proceeds	0.02 3.26***	0.01 1.72*	-0.00 -0.36	-0.01 -0.38	-0.06 -1.25
Secondary IPO Proceeds	0.01 0.32	0.07 1.45	0.12 1.54	0.19 1.43	0.43 2.16**
Primary SEO Capital	-0.06 -0.5	0.16 3.38***	0.21 4.85***	0.20 4.13***	0.27 3.88***
IPO Underpricing	-0.01 -0.81	-0.01 -1.06	-0.02 -1.22	-0.02 -0.81	-0.03 -0.75
FF Alpha	-0.01 -1.64*	-0.02 -0.24	0.03 0.17	0.16 0.54	0.84 1.91*
Offer Price Revision	-0.01 -0.37	-0.01 -0.43	-0.01 -0.19	-0.05 -0.76	-0.07 -0.74
IPO Cost	-0.00 -0.29	0.00 0.69	0.00 0.39	0.00 0.22	0.00 1.15
Debt Capital	-0.04 -2.91***	-0.03 -1.36	0.01 0.40	0.01 0.17	0.11 1.16
Carve-out indicator	0.01 1.27	0.01 0.70	0.02 0.85	0.03 0.87	0.02 0.28
VC-Backed indicator	0.02 2.43**	0.04 3.46***	0.07 3.83***	0.10 3.56***	0.12 2.67***
Adjusted R ²	0.07	0.07	0.05	0.04	0.06
Sample Size	847	950	908	812	661

Table 8
Evolution of Insider Ownership of IPO Firms over Time

Mean and median of the percentage of shares owned by insiders of our sample of IPO firms, who are defined as officers and directors of the firm. Year t with $t=1,2,3,4$ corresponds to the number of years after the IPO. Panel A reports the statistics for all IPO firms, and Panel B and Panel C report statistics for IPO firms with normalized total acquisition volumes above and below the sample median of IPO firms, respectively. The t-statistics for comparison of means of the percentage of shares owned by insiders one year after the IPO and four years after the IPO and the corresponding z-statistics of Wilcoxon-Mann-Whitney test are reported for IPO firms with high acquisition activity in Panel B and for IPO firms with low acquisition activity in Panel C. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Panel A: All IPO Firms			
Year	Number of Firms	Mean	Median
1	553	25.73	18.23
2	416	22.38	12.58
3	283	19.63	8.91
4	230	18.57	7.75
Panel B: IPO Firms with High Acquisition Activity			
Year	Number of Firms	Mean	Median
1	255	27.12	24.58
2	223	22.71	15.15
3	147	20.51	11.61
4	123	17.90	8.43
t-statistic	-3.97***		
z-statistic	-3.27***		
Panel C: IPO Firms with Low Acquisition Activity			
Year	Number of Firms	Mean	Median
1	298	24.54	12.55
2	193	21.99	9.81
3	136	18.68	6.54
4	107	19.33	6.85
t-statistic	-1.80*		
z-statistic	-0.53		

Table 9
Factors Affecting the Change in Ownership of IPO Firms

Estimates of the probability of a drop in insider ownership where the dependent variable takes a value of 1 if there is a drop in the percentage of shares owned by insiders of 5% or more (or of 1% or more) in a given year. This table also reports estimates of OLS regressions of a drop in the percentage of shares held by insiders. *Insider Ownership* is the percentage of shares owned by insiders at the beginning of the year, *Cash Acq Volume* is the total volume of cash financed acquisitions accompanied by an SEO six months before or six months after the announcement of the acquisition, *Stock Acq Volume* is the total volume of stock financed acquisitions, *CAPEX* is capital expenditures, *R&D* is research and development expenditures, *Total Assets* is the logarithm of the book value of assets, *Stock Turnover* is the average turnover of the firm's stocks computed by dividing the average monthly volume by the float (number of shares outstanding minus number of shares held by insiders), *Lagged Firm Return/Firm Return* is the annual stock return of the firm, *Lagged Industry Return/Industry Return* is the annual value-weighted industry return, *Lagged Market Return/Market Return* is the annual value-weighted market return, *BTM* is the book to market equity ratio of the firm, *Carve-out* is an indicator variable which takes the value of 1 if the IPO is a carve-out, *VC-Backed* is an indicator variable which takes the value of 1 if the IPO firm is VC-backed, *PPE* is property, plant and equipment, *Free Cash Flow* is free cash flow defined as EBITDA, *Leverage* is total liabilities, and *Dividend* is an indicator variable which takes the value of 1 if the firm has paid a dividend. All explanatory variables refer to the previous year, except for *Firm Return*, *Industry Return* and *Market Return* which are contemporaneous returns. The variables with dollar values (except for *Total Assets*) are normalized by the book value of assets. Columns named Firm-Yrs Pooled show the estimates for all available firm-years from the IPO until the end of the five-year horizon. The regressions include a constant term which is not reported. For each independent variable, the first row reports its estimated coefficient and the second row the corresponding z-statistic for the probit models and the corresponding t-statistic for the OLS models. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

	Probit Model for a Drop in Insider Ownership of 5% or more					Probit Model for a Drop in Insider Ownership of 1% or more					OLS Model for a Drop in Insider Ownership				
	Change Yr 0-1	Change Yr 1-2	Change Yr 2-3	Change Yr 3-4	Firm-Yrs Pooled	Change Yr 0-1	Change Yr 1-2	Change Yr 2-3	Change Yr 3-4	Firm-Yrs Pooled	Change Yr 0-1	Change Yr 1-2	Change Yr 2-3	Change Yr 3-4	Firm-Yrs Pooled
Insider Ownership	1.89 2.92***	3.05 6.67***	2.36 4.40***	2.49 4.00***	2.43 10.11***	2.24 3.54***	3.10 7.22***	1.59 3.52***	2.81 4.71***	2.29 10.20***	-0.48 -6.74***	-0.17 -6.97***	-0.14 -4.41***	-0.18 -4.41***	-0.24 -12.53***
Cash Acq Volume	2.38 0.74	3.99 2.45***	1.22 0.50	-53.38 -0.01	2.87 3.06***	0.49 0.16	3.92 2.30**	-0.90 -0.39	-58.92 -0.01	1.66 1.81*	-0.37 -1.47	-0.16 -2.04**	0.03 0.22	0.09 0.41	-0.19 -2.63***
Stock Acq Volume	0.09 0.66	0.50 1.88*	0.91 2.11**	-0.28 -0.36	0.27 1.68*	0.05 0.37	0.84 1.92*	1.44 1.96**	-1.04 -1.58	0.31 1.86*	-0.01 -1.06	-0.00 -0.10	-0.01 -0.27	0.02 0.45	-0.01 -1.07
CAPEX	-0.64 -0.41	0.82 0.79	0.30 0.17	2.92 1.16	0.72 1.13	-0.07 -0.04	0.62 0.62	-1.41 -0.88	-1.88 -0.79	-0.19 -0.31	0.35 2.10**	-0.06 -1.04	-0.02 -0.21	0.01 0.04	0.04 0.73
R&D	2.68 1.15	0.29 0.18	-0.96 -0.49	2.73 1.07	1.32 1.59	2.17 0.89	2.40 1.53	-1.41 -0.80	2.22 1.05	1.78 2.19**	0.01 0.03	-0.10 -1.09	-0.01 -0.10	-0.18 -1.02	-0.18 -2.57***
Total Assets	-0.17 -1.03	0.04 0.36	0.08 0.68	0.11 0.74	0.03 0.54	-0.06 -0.43	0.05 0.45	0.04 0.40	0.26 2.33**	0.06 1.23	-0.05 -3.23***	-0.01 -1.60	-0.01 -1.84*	-0.01 -1.46	-0.02 -4.22***
Stock Turnover	0.23 0.60	1.95 2.92***	2.46 2.49***	-1.23 -0.88	0.56 2.45***	-0.05 -0.28	1.12 1.75*	2.16 2.40**	0.61 0.52	0.32 1.40	0.01 0.55	-0.08 -2.87***	-0.09 -1.73*	-0.10 -1.11	-0.01 -1.54

Lagged Firm Return	0.00	0.72	-0.15	0.24	0.00	-0.00	0.67	-0.18	0.85	0.00	-0.00	-0.01	-0.01	-0.02	-0.00
	-0.24	3.56***	-0.83	1.53	-0.07	-0.49	3.43***	-1.04	3.50***	-0.31	2.555***	-1.075	-0.538	-1.950**	4.880***
Lagged Industry Return	-0.34	0.07	0.13	0.77	-0.11	0.43	0.69	-0.71	0.66	0.08	0.16	0.03	0.09	-0.06	0.07
	-0.59	0.11	0.16	0.79	-0.36	0.71	1.23	-1.00	0.81	0.30	2.26**	0.90	1.81*	-1.01	2.63***
Lagged Market Return	0.58	-1.57	0.29	-0.36	0.26	-0.81	-1.01	1.05	-0.68	0.44	-0.13	0.07	-0.06	0.00	-0.05
	0.36	-1.54	0.25	-0.26	0.50	-0.48	-1.05	1.10	-0.57	0.92	-0.71	1.24	-0.93	0.01	-1.13
Firm Return	0.13	-0.10	-0.08	0.06	-0.01	0.09	-0.02	0.21	0.05	0.09	-0.00	0.01	0.00	-0.01	-0.00
	0.96	-0.66	-0.87	0.26	-0.25	0.65	-0.17	1.81*	0.23	1.53	-0.16	0.65	0.64	-0.77	-0.28
Industry Return	0.11	0.18	-1.03	2.18	0.50	0.43	-0.02	-0.68	2.20	0.36	-0.14	-0.04	0.05	-0.12	-0.10
	0.21	0.37	-1.44	2.43**	1.97**	0.83	-0.03	-1.14	2.60***	1.51	-2.38**	-1.54	1.13	-2.04**	-4.84***
Market Return	0.38	-1.29	2.66	-0.18	-0.22	0.02	-0.73	0.84	-1.32	-0.10	0.18	0.12	-0.02	0.13	0.13
	0.30	-1.00	1.71*	-0.10	-0.38	0.02	-0.62	0.73	-0.94	-0.20	1.26	1.83*	-0.24	1.33	2.84***
BTM	-0.50	-0.01	0.13	0.22	-0.04	-0.47	-0.03	-0.07	0.21	-0.12	0.04	0.00	0.01	-0.01	0.01
	-1.57	-0.06	0.79	1.14	-0.53	-1.57	-0.21	-0.49	1.16	-1.82*	1.45	0.58	0.96	-0.57	1.16
Carve-out indicator	0.53	-0.77	0.26	-0.53	-0.22	0.35	-0.76	-0.51	-0.14	-0.39	-0.12	-0.00	0.01	-0.01	-0.01
	1.11	-1.62	0.73	-1.07	-1.13	0.74	-1.98**	-1.65*	-0.38	-2.33**	-2.15**	-0.17	0.45	-0.54	-0.76
VC-Backed indicator	0.56	0.60	-0.02	0.64	0.51	0.61	0.75	0.29	0.83	0.56	-0.06	-0.05	0.02	-0.01	-0.03
	1.78*	2.57***	-0.07	1.90*	4.09***	1.85*	3.31***	1.15	2.60***	4.75***	-1.72*	-3.72***	1.32	-0.36	-2.86***
PPE	-0.67	-0.40	-0.02	-0.43	-0.37	-1.03	-0.32	-0.11	0.04	-0.32	-0.01	-0.01	0.02	-0.02	-0.01
	-0.97	-1.04	-0.04	-0.78	-1.88*	-1.59	-0.91	-0.32	0.10	-1.88*	-0.12	-0.64	1.100	-0.777	-0.750
Free Cash Flow	1.02	-0.19	-0.23	-0.31	0.54	2.59	0.45	-0.44	-0.14	0.77	-0.14	-0.02	0.02	0.05	-0.07
	1.71*	-0.30	-0.29	-0.27	1.92**	2.64***	0.73	-0.65	-0.14	2.83***	-2.36**	-0.63	0.53	0.67	-2.95***
Leverage	-0.26	-0.06	0.80	-0.21	0.04	-0.62	-0.29	0.21	-0.35	-0.19	0.13	0.01	0.02	-0.02	0.02
	-0.48	-0.13	1.63*	-0.38	0.20	-1.20	-0.72	0.55	-0.84	-1.01	2.19**	0.24	0.73	-0.64	1.32
Dividend indicator	-0.06	-0.11	-0.02	-0.43	-0.13	-0.55	0.12	-0.02	-0.61	-0.16	-0.00	-0.03	0.01	-0.01	-0.01
	-0.13	-0.36	-0.06	-1.09	-0.81	-1.29	0.44	-0.06	-1.98**	-1.19	-0.05	-1.69*	0.82	-0.61	-0.80
Pseudo/Adjusted R ²	0.34	0.39	0.27	0.29	0.26	0.38	0.38	0.22	0.30	0.24	0.42	0.25	0.12	0.10	0.23
Sample Size	156	321	229	185	891	156	321	229	185	891	156	321	229	185	891