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The Decline in Venture-backed IPOs: Implications for Capital Recovery

Susan Chaplinsky^a and Swasti Gupta-Mukherjee^b

The decline in initial public offerings (IPOs) has raised concerns about the vitality of the venture capital industry. We examine capital recovery in the VC industry using returns for 1,215 M&A and 1,401 IPO exits from U.S. based venture-backed companies during 1985 to 2008. We find that mean and median returns for IPO exits are significantly higher than M&A exits, with the median M&A exit having a negative return. A decomposition of returns into its fundamental components – investor stakes, capital allocated to portfolio companies (money-in), and capital recovered from portfolio companies (money-out) – shows that returns are five times more sensitive to money-in than money-out, with more disciplined capital allocation being especially important for generating high M&A returns. In all market conditions, IPOs have average exit returns in excess of 125% whereas M&A returns are lower and exhibit more variation. Taken together, the results suggest that it is more difficult to achieve outsized returns from M&A than IPO exits. For the industry as a whole, the dollars realized from M&A exits do not keep pace with their growth as a proportion of total exits over time. Increasing numbers of exits must be produced to recover the total capital at risk, suggesting that industry concerns about a decline in IPO exits and their likely higher capital recovery are well-founded.

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1. Introduction

The performance of venture capitalists (VCs) depends critically on the capital recovered from exits of portfolio companies, which occur primarily through initial public offerings (IPOs), or sales or acquisitions (hereafter referred to as “M&A exits”).¹ Over the period 1985 to 2008, the number of M&A exits has exceeded the number of IPO exits in 21 of 24 years – with the gap widening markedly since 2001. The lack of IPO exits has become a source of growing concern, leading many observers to openly ask whether the VC model is broken and question the viability of the venture industry – at least at its present scale.² Others have suggested these concerns are exaggerated in an industry prone to ups and downs. The vitality of the VC industry, which has traditionally been an important source of growth and innovation, has broad implications for the overall health of the economy. At the center of this debate is the belief that the returns from M&A exits are decidedly inferior to the returns from IPO exits, and that they fail to produce sufficient capital recovery to justify the highly risky nature of investments in this industry. The main goal of this chapter is to inform this debate by estimating and analyzing the returns to M&A and IPO exits, paying particular attention to the role M&A exits play in capital recovery.

Several recent studies analyze the returns to private equity investments (e.g., Cochrane, 2005; Kaplan and Schoar, 2005; Ljungdqvist and Richardson, 2003; Phalippou and Gottschalg, 2009; Korteweg and Sorensen, 2010; Sensoy and Robinson, 2011; and Harris, Jenkinson, and Kaplan, 2012). These studies primarily focus on the overall risk and return characteristics of venture investments

¹ For a general reference on venture capital, see Gompers and Lerner (1999).

² See for example Kedrosky (2009), Kaplan and Lerner (2010), <http://venturebeat.com/2008/11/12/the-vc-model-is-broken/>, and <http://blogs.wsj.com/venturecapital/2009/02/06/the-slow-quiet-death-of-venture-firms/>

relative to public equity markets and typically do not differentiate between the returns earned from IPO and M&A exits. Other studies that analyze M&A exits either use the number of such exits as an indicator of successful performance or treat the exit as an “event.” Although this approach provides insight into the frequency and nature of M&A exits compared to IPOs, it does not yield an estimate of the capital recovered from exits.³ In general, academics and practitioners alike have placed more emphasis on the wealth creation of IPOs with a limited understanding of the role that M&A exits have. As IPO exits have decreased in frequency as the primary avenue of exit, however, it raises the question to what degree M&A exits can substitute in terms of capital recovery.

In contrast to previous studies, we focus on the differences in returns between M&A and IPO exits to directly address the concerns surrounding the form of exit. We calculate portfolio company returns for 1,401 IPO exits and 1,215 M&A exits from U.S. venture-backed companies that occur over 1985 to 2008, primarily using postmoney valuation data from *Venture Economics*. Using these exit returns, we provide insight on several important questions relevant to the issue of capital recovery in the VC industry:

1. How do the distributional properties of returns differ between IPO and M&A exits?
2. How do the fundamental components of exit returns, the amount of money invested, VC equity stakes, and the amount of money received from exits, differentially affect the returns to IPO and M&A exits?
3. What does the decreased incidence of IPO exits over time imply for industry-wide capital recovery?

With respect to the first question, we find for the overall sample, that the mean company-level return from IPO exits is 209.5 percent and the median return is 108.8 percent. By comparison, the

³ Studies that treat exits as an event frequently examine the choice of an IPO or M&A exit. Brau, Francis, and Kohers (2003), Poulsen and Stegemoller (2008), and Ball, Chiu, and Smith (2011) examine the exit choice and find that, relative to acquisitions, IPOs are more likely to occur under favorable market conditions, when firms have strong growth opportunities, or when firms are capital constrained.

mean return for M&A exits is 99.5 percent and the median return is -32.1 percent. The substantially lower returns for M&A exits are consistent with the concerns expressed by industry observers and prior academic work which has viewed IPOs as the primary vehicle of VC wealth creation. Consistent with Cochrane (2005), there is also a wide dispersion in the returns. For the lowest quintile of returns, both IPO and M&A exits have mean and median returns on the order of -90 percent. The lowest two quintiles of exit returns (40 percent of the sample) result in average losses of around 40 percent to 90 percent of the capital invested by VCs. Contrary to previous research that treats an exit as a sign of success, these results show that an exit itself is not necessarily a reliable indicator of success. Within the highest quintile of returns, M&A exits have mean returns of 719.4 percent (median=764.6 percent) while IPO exits have a mean return of 633.2 percent (median=601.1 percent). Therefore, contrary to general perceptions, the best M&A exits compare favorably to the best IPO exits. In the parlance of baseball analogies often used to describe exits, both M&A and IPO exits are capable of producing "home runs" and both can result in "strike outs."

Although both forms of exit exhibit wide return dispersion, it is the frequency of returns in the lowest and highest return quintiles that differs most markedly by type of exit. Only 8 percent of the IPO returns fall in the lowest return quintile compared to 25 percent that fall in the highest return quintile. Therefore, as IPOs decline, it substantially diminishes the cushion that VCs have to cover the losses on investments that do not pay off. The upshot is that this reduces VCs' margin for error – they cannot afford to make as many mistakes in their investment decisions – compared to periods where IPOs were more plentiful.

When returns are decomposed into their fundamental components, we find, in circumstances where both exits achieve similarly high exit valuations, that the highest M&A returns are generated with approximately half the capital invested on average compared to the highest IPO returns.. Consistent with this, regression analysis indicates that the returns to both M&A and IPO exits are five times more sensitive to money-in than money-out, with the magnitude of the effect being larger for

M&A returns. These findings highlight the importance of discipline in capital allocation as a driver of higher returns, especially for M&A exits. Therefore, as IPO exits become less frequent, an implication is that VCs must become more disciplined in their allocation of capital, which likely affects the kind of investments they choose to undertake.

Finally, we examine the capital recovery of the VC industry as a whole. For investments in portfolio companies made prior to and including 1998, investments which should be largely exited by 2008, the industry Total Cumulative Value to Paid-In Capital (TVPI) multiple averages 3.2.⁴ For the investments made in the years from 1999 to 2008, assuming unrealized investments are exited at cost, TVPI averages 1.6. To put the results in perspective, assuming five years between entry and exit (and no interim cash flows), a TVPI of 3.0 (1.5) equates to a gross return on investment of 24.6 percent (8.4 percent) per annum, suggesting a marked fall-off in latter period industry returns. Moreover, in all years roughly 50 percent of the total dollars recovered in the industry arise from M&A exits, but prior to 1999, M&A exits represented 44 percent of total exits and in the years thereafter this percentage increases to 71 percent. Hence, the dollars realized from M&A exits have not kept pace with their rise as a proportion of total exits, suggesting that VCs must produce increasingly greater numbers of exits to return the total dollars allocated to portfolio companies.

Taken together, the picture that emerges from our findings is one in which it is more difficult to achieve outsized returns from M&A exits than IPO exits. High M&A returns, which occur with less frequency, require VCs to exercise greater discipline in capital allocation while achieving superior exit valuations.⁵ The recovery rates from M&A exits have not kept pace with their growth in

⁴ Total Cumulative Value to Paid-In Capital (TVPI), also known as the investment ratio, is the sum of the value of realized investments (or cumulative distributed capital) and the value of unrealized investments at cost divided by paid-in capital.

⁵ The findings broadly support Bayar and Chemmanur's (2009) theoretical model of the M&A versus IPO exit decision, which predicts that the average valuation of firms going public will be greater than the average valuation of firms being acquired because the firms going public consist of a mix of firms with and without

occurrence in recent years, necessitating increasing numbers of exits to recover the total capital at risk. While this poses an obvious threat to financial returns, it understates the burden VCs face by ignoring the costs of finding, monitoring, and otherwise managing these investments. In sum, our findings support the concerns for capital recovery following from the decline in IPO exits, and if M&A exits continue as the principal form of exit, VCs will face a large challenge adapting to this new market reality.

2. Sample characteristics

The primary source of data on venture capital investments is Thomson Financial's *Venture Economics* (VE) database. We identify the U.S.-based portfolio companies with reported investments from venture capital firms and that had exits during the period 1985 to 2008. Our sample consists of all U.S. companies with VC investments having exits either via (1) mergers or acquisitions or (2) initial public offerings. In addition, in order to calculate returns, we require that the deals have a reported deal value and exit date. The deal values for M&A exits are collected from VE when available. The M&A exits which are missing deal values in VE may either be transactions where the deal value was not disclosed or was disclosed but missing from the database. To fill in values for the latter case, we search Thomson Financial's *SDC Platinum Mergers and Acquisitions (M&A)* database for companies identified as having M&A exits but missing deal values in VE. We are able to fill in approximately 400 M&A missing deal values from SDC's *M&A* database.⁶

The resulting sample is shown in Table 1. There are 1,447 VC-backed companies that had an IPO exit and 3,171 VC-backed companies that had an M&A exit over the period 1985 to 2008. One observes in Table 1 an increased incidence of M&A exits over the sample period. Focusing on the

sustainable businesses (i.e., firm with an ability to survive against product market competition), whereas only firms with unsustainable businesses are acquired.

⁶ For further information on the sample construction and additional steps taken to ensure its completeness and accuracy, see Chaplinsky and Gupta-Mukherjee (2012).

number of exits, one observes that the number of M&A exits is greater than the number of IPO exits in 21 of the 24 years, and M&A exits as a proportion of total exits have increased over time. In Table 1, the mean M&A deal value of \$274 million, is comparable to the mean IPO offer size of \$292 million, although the median M&A deal value is less than half the median IPO offer size. While IPOs were the focus of most commentary in the “hot” 1999-2000 period, the mean M&A deal values in that period, like IPO offer sizes, are among the highest in our sample. The mean M&A deal value of \$758 million in 1999 is by far the highest in a given year, with \$438 million in 2000 a distant second.

Several reasons have been advanced for the decrease in IPO exits. Since 2002, analysts have attributed part of the increase in M&A exits to a greater reluctance of companies to go public following the passage of the Sarbanes-Oxley Act. Since Sarbanes-Oxley was prompted by some of the excesses of the “Dotcom” era IPOs, investors appear to have become less willing to invest in riskier, negative cash flow companies, and the minimum size necessary to bring a firm public may have increased, seemingly making IPO exits harder to achieve. Alan Patricof, managing director of Greycroft Partners elaborates on these changes:

“The bubble finally burst in 2001 and virtually overnight the IPO market dried up as the public realized that in many cases “the emperor had no clothes.” The collapse of the Internet bubble only served to compound the problem as public interest in IPOs dwindled to a trickle as their losses increased. Then, in 2002, in the wake of the Enron, WorldCom and Tyco debacles, the government intervened with the passage of the Sarbanes-Oxley Act, which imposed tougher rules on corporations. This only added further to the cost of an IPO in terms of legal and accounting requirements for both the issuer and underwriter. The sum and substance of all of these developments is that the minimum economic level to bring a company public today is at least a \$50 million offering at a \$250 million market value.” Excerpted from Patricof (2009)

Related to this, entrepreneurs may have less desire to head public companies or may be willing to settle for lower returns (McGee, 2007). Recognizing the concern posed by the decline in IPOs to the vitality of the U.S. economy, the Jumpstart Our Business Startup (JOBS) Act was signed into law in the U.S. in April 2012 allowing for a more gradual phase-in of certain disclosure and independent

audit requirements mandated by Sarbanes-Oxley. The intent of the act was to promote more young companies to go public.

Others point to more macro factors and suggest that many of the industries that were in their infancy in the mid-90s have matured and that continued investment in these sectors has lower growth potential. Some of the earlier VC-backed companies (e.g., Cisco, Intel) have grown to become frequent acquirers of portfolio companies themselves and more large public companies have looked to acquire VC-backed companies to build their R&D portfolios. Finally, there has been a sharp rise in the total dollars allocated to private equity, such that there may be more companies funded with less potential to go public.

2.1 Estimation of exit returns

The sample used to estimate returns is a subset of the overall sample shown in Table 1. To estimate returns we require that the companies have postmoney round valuations for consecutive rounds of financing. A total of 1,401 IPO exits and 1,215 M&A exits have sufficient postmoney valuation data to calculate returns.⁷ We first calculate VC equity stakes for a portfolio company using the postmoney round values. The VC method of valuation posits a simple relationship between the pre-money (PRE) and postmoney values (POST) of a portfolio company for each round of investment (I) by VCs. We assume before the first round investment that founders of the firm hold 100% of the equity ownership. For each round ‘j’, the fraction of ownership sold to VCs (F) is measured as $F_j = I_j \div POST_j$.⁸ Each round of subsequent investment to the first round results in a larger cumulative share of the company

⁷ The number of M&A and IPO exits is comparable to Korteweg and Sorenson (2010) which computes round-to-round returns using postmoney data from *Sand Hill Econometrics*.

⁸ For example, consider a company which exited after two rounds of financing. Assume that the fraction of equity stakes acquired by VCs in the first round is 30 percent and in the second round is 20 percent. The aggregate VC stakes at exit (accounting for dilution) will be calculated as $VC\%_T = 30\% \times (1 - 20\%) + 20\% = 44\%$.⁸ The venture capital method of valuation is a widely used method of valuation by practitioners. See Smith and Smith (2004) for a discussion of the method.

being sold to VCs, as the first round investors' stakes are diluted by additional equity sold to the subsequent round investors. To capture this effect, we calculate the total percentage ownership stake sold to VCs ($VC\%_T$) for each portfolio company that exits at time T after N financing rounds in the following manner:

$$VC\%_T = \sum_{j=1}^N [F_j \times (1-F_{j+1}) \times \dots \times (1-F_N)]$$

Using the VE data, we then estimate the equity stake at exit held by VC firm ' i ', $VC\%_i$, based on the proportional capital invested in a company as follows:

$VC\%_i = (\text{Total amount invested in company by VC firm } i \div \text{Total amount invested in company by all VC firms}) \times (VC\%_T)$, where $VC\%_T$ is the aggregate equity stake held by all VCs at exit.

While this method can underestimate the stake of an individual VC firm who continues to invest in subsequent rounds, it provides a reasonable estimate of the total ownership accumulated by all VCs in a portfolio company. The total VC stake accumulated through the last round of investment is then multiplied by the disclosed transaction value for M&A exits or the pre-IPO market value of equity for IPO exits to estimate the capital received by VCs upon exit. The returns VCs realize on investment in a given portfolio company is calculated by the form of exit as follows:

$$\text{Return(M\&A)} = [(VC\%_T \times \text{Disclosed Transaction Value}) \div \text{Total Amount Invested}] - 1$$

$$\text{Return(IPO)} = [(VC\%_T \times \text{IPO Offer Price} \times \text{Pre-IPO Shares Outstanding}) \div \text{Total Amount Invested}] - 1$$

Our return construct is similar to the widely used investment multiple (TVPI), in which a zero percent return indicates break even in terms of capital recovery (i.e., the exit returns the capital invested in the portfolio company). These returns are more representative of gross returns in that they are not net of fees and carry, although invested capital is after fees in early years. Following Cochrane (2005), we use the offer price in calculating IPO returns to abstract from the issue of underpricing,

which has been the subject of extensive discussion elsewhere in the literature. Several empirical studies document that VCs typically sell their stakes following the end of lock-up period at positive returns on average, suggesting our estimates of IPO returns are conservative.⁹

Our empirical analyses differ from prior studies in that we do not examine aggregate VC fund returns but focus the returns to individual investments that have had an M&A or IPO exit. Due to our focus on exits, the selection bias created by VCs being more likely to disclose good news is likely mitigated in our study. However, selection bias can still arise from the fact that investors are required by law to disclose the exit value of all IPOs but are only required to report the transaction values for a subset of M&A exits. Transaction values must be disclosed to the U.S. Securities and Exchange Commission (SEC) if a private company is purchased by a publicly listed firm and depending on the form of payment and year of sale it represents more than 10 percent to 20 percent of its assets (Rodrigues and Stegemoller, 2007). Since this threshold is not met by all sales, and we also include sales to private acquirers who are not subject to mandatory disclosure requirements, it is likely that our sample of M&A exits is biased toward those with higher disclosed transaction values. Since the concern with M&A exits is that they have lower returns on average than IPO exits, the exclusion of M&A with disclosed transaction values likely biases the returns to M&A exits upward.

In Table 2, we report the equity stakes that VCs accumulate by round of investment as derived from the postmoney round valuations data. A first round investor in a portfolio company that eventually exits via an M&A has a 29.5 percent equity stake on average compared to a 24.9 percent equity stake for a first round investor in an IPO exit. As expected, as the number of rounds increases, the total percentage of equity sold to VCs increases, so that after five rounds of investment VCs hold approximately 75.1 percent of the equity in M&A exits and 73.2 percent of the equity in IPO exits.¹⁰

⁹ Bradley, et al. (2001) find for VC backed IPOs that the average stock price increases 27.34% 90 days after the offer date, and increases 29.40% 180 days after the offer date, the most frequently employed lock up period.

¹⁰ A key question is the accuracy of the equity stakes estimated from VE data. We have no means to check the accuracy of M&A equity stakes but we check the IPO equity stakes against the stakes reported in IPO S-1 filings

In Table 3, we provide descriptive statistics on VC investments for the overall sample and by industry groups, with the portfolio companies classified into the six broad industry major groups used by VE. For the overall sample, a typical exit occurs after approximately five rounds of investment in which 7.4 VC firms participate. The round amount averages close to \$14 million and the average total dollars invested per company is \$56.5 million. There is a good representation of exits in all industry groups with the largest number of exits (1,100) occurring in the computer-related industry. Due to long lead times for development, the biotech and medical/health/life sciences have the highest number of rounds and also the highest average VC equity stakes at exit.

3. How do the distributional properties of returns differ between IPO and M&A exits?

In Table 4, we report portfolio company returns for the sample of 1,401 IPO exits and 1,215 M&A exits. In panel A, for equally-weighted returns in the overall sample, the mean return for IPO exits is 209.5 percent and the median return is 108.8 percent. By comparison, the mean return for M&A exits is 99.5 percent and the median return is -32.1 percent. The large differences observed between the mean and median returns are consistent with Cochrane's (2005) finding that venture capital returns exhibit a high degree of positive skewness. The mean company-level return to IPO exits is significantly higher than the mean return to M&A exits, with the difference significant at the 1 percent level, supporting the view that M&A exits have inferior returns to IPOs. Exit returns do not account for the time value of money when, in principle, a 50 percent return achieved in five years is superior to

for sample firms from 1995, where the data on EDGAR become more generally available. For the matched sample of 4,194 VC firm-company level stakes, the average VC equity stake from S-1 filings is 15% (median=12%) compared to an average equity stake of 12% (median=9%) computed from the postmoney valuation data. There is no statistically significant difference in the stakes estimated from the S-1 filings and postmoney valuations. Consequently, the additional steps taken to check the accuracy of the VC equity stakes strengthen the use of the postmoney valuation data as a means to estimate equity stakes.

a 50 percent return achieved in 10 years.¹¹ To account for the time to exit, we also compute an annualized return (r) derived from the relationship $(1+Ret) = (1+r)^t$, where Ret is the company-level exit return and t is the number of years to exit. The average annual return for IPO exits of 61.8 percent is significantly higher than the average annual return of 26.9 percent for M&A exits. Hence, the results for annualized returns that adjust for the time to exit are consistent with exit returns.

In unreported results, we also compute an adjusted return that measures performance relative to other VC exits (M&A and IPO) that occur in the same industry and in the same calendar quarter as the company return. Because portfolio companies that exit in the same industry and under similar market conditions could have similar risk exposures, this adjusted return could be viewed as a risk-adjusted comparison of returns. We do not, however, attempt to explicitly measure the systematic risk of an investment (i.e., calculate betas) due to the illiquid nature of VC investments and inability to observe interim market valuations of the investments. The mean adjusted returns for IPO exits is 30 percent, and the mean adjusted return for M&A exits is -34.5 percent, a difference which is significant at the 1 percent level.¹² Having shown that the main findings hold after accounting for the time to exit and risk, in our subsequent analyses we rely on exit returns because they provide the most intuitive interpretation of capital recovery.¹³

To examine the dispersion of returns, we pool the overall sample of company-level returns and sort them into quintiles. Quintile 1 (Q1) contains the companies with lowest exit returns and Quintile

¹¹ We do not compute an internal rate of return (IRR) because of missing interim round data and because it does not provide as intuitive a measure of capital recovery.

¹² As an additional approach to risk adjustment, we calculated the Sharpe Ratios for M&A and IPO exits. This is equivalent to comparing a portfolio containing the universe of venture-backed M&A exits in our sample with the portfolio of IPO exits based on the risk-return trade-off reflected in each form of exit. The Sharpe Ratio is defined as the expected return of an asset minus the risk free rate, divided by the standard deviation of returns. Using realized returns and their standard deviations, the M&A and IPO exit portfolios have Sharpe Ratios of 0.33 and 0.71, respectively. This is consistent with our findings of inferior capital recovery from M&A relative to IPO exits.

¹³ The subsequent results are not sensitive to whether returns are measured using company-level returns, annualized returns, or adjusted returns.

5 (Q5) contains the companies with the highest exit returns. There is a wide dispersion of returns observed for both types of exits. Both M&A and IPOs ranked in the lowest quintile of pooled returns have mean and median returns on the order of -90 percent. Given that VCs lose 40 percent to 90 percent of the capital invested on average in the bottom 40 percent of our sample of exits, it suggests that using the occurrence of an exit as an indication of success potentially leads to significant overstatement of VC performance. For the highest quintile of returns, M&A exits have mean returns of 719.4 percent (median= 764.6 percent) while IPO exits have a mean return of 633.2 percent (median= 601.1 percent). The distribution of returns illustrates that the best M&A exits compare favorably to the best IPO exits and the worst IPO and M&A exits fail (by a wide margin) to return the full amount of capital invested. The frequency of returns in the lowest and highest return quintiles however differs markedly by type of exit. M&A exits account for 78.2 percent of exits in the lowest return quintile compared to only 33.8 percent in the highest return quintile. Thus, the evidence so far lends support to the concerns surrounding the decline in IPOs owing to the lower capital recovery from M&A exits.

In panel B of Table 4, we repeat the analyses in panel A but factor in the size of investments by computing the returns on a value-weighted basis. For the value-weighted exit portfolio returns, the weights are computed using the total amount invested in the company with weights for each quintile portfolio scaled to sum to one. Ideally, ex-ante measures of weights should be used to compute future value-weighted performance of investments but such weights are not possible given data limitations. Information about an investment is likely to be revealed during intermediate rounds before the final exit, leading VCs observing better intermediate performance to increase their stakes or capital invested in the company. Although exit valuations which are also a driver of returns likely still remain uncertain, this may lead to an ex-post overweighting of the higher returns in our value-weighting framework. However, there is no reason to believe this effect differs between M&A and IPO exits.

On a value-weighted basis, the mean company-level return for M&A exits is 168.0 percent compared to 148.6 percent for IPO exits, a difference in returns that is significant at the 10 percent level. For M&A exits, the increase in the value-weighted mean return relative to its equally-weighted mean return (99.5 percent) suggests that VCs invest more in companies that achieve relatively higher returns. By contrast, the lower value-weighted mean return for IPOs relative to its equally-weighted mean return suggests VCs invest more in portfolio companies with the relatively lower returns. This implies that VCs earn higher returns on their bigger “bets” on M&A. These results underscore an important finding – higher M&A returns occur in circumstances where VCs have made more judicious use of capital compared to IPOs and made relatively larger bets among the companies with M&A exits that pay off in relatively higher returns. The wide disparity between the value-weighted returns and equally-weighted returns from M&A exits suggests certain conditions (perhaps more disciplined capital allocation or selectivity) are associated with achieving outsized returns from M&A. Additionally, the disparity suggests that healthy capital recovery in M&A may be concentrated in relatively fewer (albeit larger) investments.

4. How do the fundamental components of returns differ between IPO and M&A exits?

In an attempt to understand the factors that drive returns – especially extreme returns where substantial capital is lost or gained – in Table 5 we decompose the pooled quintile returns reported in Table 4 into the three fundamental components of returns: the VC stakes, the capital allocated to portfolio companies (money-in), and the money received from exits from portfolio companies (money-out). Money-out for M&A exits is measured by the disclosed transaction value and for IPO exits it is the (IPO offer price \times pre-IPO shares outstanding). Each of these components reflects, to varying degrees, a choice that VCs make with respect to their management of investments in portfolio companies. All else equal, it is expected that higher returns should be associated with larger VC stakes, less money-in, and more money-out.

Across the quintiles of returns in Table 5, money-in falls and VC stakes and money-out increases from Quintile 1 (Q1=lowest returns) to Quintile 5 (Q5=highest returns) for both M&A and IPO exits. We measure the change in these fundamentals for extreme quintiles with the Q5 Avg/Q1 Avg variable reported in the last column, which is the ratio of the average values of the fundamentals in the highest and lowest return quintiles. Of the three fundamentals, money-out exhibits the largest variation between Q1 and Q5, and the differences in exit value are much more pronounced for M&A exits than IPO exits. In Q1, M&A exits have a \$22.6 million exit value on average compared to \$532.6 million in Q5, a 23.6 times increase from Q1 to Q5, versus IPOs which have an \$100.8 million exit value in Q1 and \$616.7 million in Q5, a 6.1 times increase from Q1 to Q5. With respect to money-in, in every quintile M&A exits have less capital allocated on average than IPOs exits, perhaps reflecting the fact that VCs do not have to develop a company to the same point to achieve an M&A exit compared to an IPO exit (see Bayar and Chemmanur, 2009). However, within the Q1 and Q5 quintiles there are important differences in money-in between M&A and IPO exits. In the lowest return quintile, M&A exits have 2.8 times fewer dollars in capital allocated than IPO exits but the lower capital allocation is not sufficient to offset their 4.5 times lower exit value. In other words, even though VCs have allocated far less capital to M&A exits in Q1, it still results in poor returns because of the inability to deliver good exit valuation.¹⁴ In the highest return quintile, M&A exits have an average \$19.9 million in capital allocated, 2.2 times fewer dollars than IPO exits and the fewest dollars of all categories, and these investments achieve roughly the same exit value as IPOs in Q5. This suggests that outsized M&A returns which provide the greatest capital recovery to VCs are associated with both more disciplined capital allocation and excellent exit valuation. This is an important finding

¹⁴ VC stakes are also lower in each quintile for M&A exits and show less variation across quintiles than IPO exits. The lowest IPO returns are associated with an average 28.4% stake compared to a 46.2% stake for M&A returns. The lower stakes might suggest that VCs exert better selectivity in these IPOs by limiting their exposure through smaller stakes but an alternative explanation is that the VCs end up with lower stakes while investing relatively large amounts of capital because these investments were made in circumstances where entrepreneurs had greater bargaining power.

because it suggests that VCs must couple strong selection ability at the outset of an investment with strong valuation at the end to duplicate the type of capital recovery more frequently associated with IPOs. As M&A exits become more prevalent, unless VCs can adapt to these conditions, it suggests that the breathing room that IPO exits provide for failed investments will increasingly constrain VCs ability to recover from mistakes (i.e., investments that do not pay off).

The evidence in Table 5 suggests that the fundamentals may have a differential impact on the returns to M&A and IPO exits. To examine this issue further, in Table 6 we estimate separate OLS regressions of the M&A and IPO exit returns using the return fundamentals as independent variables.¹⁵ The regressions include year and industry fixed effects to control for potential differences in the fundamentals across time and industries.¹⁶ As returns are calculated from the fundamentals, it is a mathematical artifact that the coefficients of the fundamentals will be significant. Our focus is on the relative magnitude of the coefficients between M&A and IPO exits in the regression setting which allows for an analysis of the marginal effects of variables holding all others constant. In model (4), the most inclusive specification, there is relatively little variation in the magnitude of the respective coefficients of VC stakes between the two forms of exits. Exit returns exhibit nearly five times greater sensitivity to money-in than money-out for both M&A and IPO exits. That is, for M&A exits, the coefficient of money-in (-1.27) is approximately five times the size of the coefficient of money-out (0.27) and a similar pattern holds for IPOs. On a relative basis, the large magnitude of the coefficient for money-in for M&A exits suggest that more disciplined capital allocation has a more pronounced impact on returns than for IPOs. That is, a 1 percent decrease in money-in will increase M&A (IPO) returns by 1.27 percent (0.5 percent) and 1 percent increase in money-out will increase M&A (IPO)

¹⁵ This regression framework is a case of a “composite dependent variable” (i.e., exit return) regressed on its components (i.e., VC stakes, money-in, and money-out).

¹⁶ The qualitative regression results remain unchanged if time and industry fixed effects are excluded.

returns by 0.27 percent (0.11 percent). Therefore, while the capital allocated to portfolio companies is an important driver of returns for both forms of exit, M&A returns are especially sensitive to it.

4.1 Components of exit returns in calendar time

To provide a sense of the flows of money in calendar time, in Figure 1 and 2 we plot the annual money-in and money-out from M&A and IPO exits in relation to the year-end value of the NASDAQ market index. Both figures show a high degree of sensitivity to aggregate stock market performance. In Figure 1, companies that eventually had M&A exits receive the greatest inflows of money in 1999 and 2000, and those that had IPO exits received the greatest inflows of money in 2000 and 2001. In Figure 2, the largest amounts of money-out for both M&A and IPO exits occur in 1999 and 2000, which coincides with the peak of the NASDAQ market valuation.

One observes in Figures 1 and 2 the pronounced influence of the Dotcom years (i.e., 1998 – 2000) on capital recovery in the industry. If we aggregate the money-in and money-out across all quintiles in Table 5 and calculate realization ratios (unreported), we find for the overall sample, the realization ratio for M&A exits is $3.39\times$ and for IPO exits it is $4.42\times$. If we exclude the exits from the Dotcom years the realization ratio for M&A exits drops to $2.21\times$, a 35 percent decline, and for IPOs it drops to $3.54\times$, a 20 percent decline. Much of the concern about the viability of the VC industry stems from the fall-off in IPOs since the Dotcom collapse. However, in actuality the loss of those years has resulted in a larger drop off in the capital recovered from M&A exits than IPOs. Because M&A exits have increased in frequency since that time, it underscores why highly disciplined capital allocation is essential to the achievement of high returns.

5. What does the decreased incidence of IPO exits over time imply for industry-wide capital recovery?

To this point our study has focused on the returns to IPO and M&A exits and some of the factors that affect these returns. We now turn to the important question of what the pattern of returns implies for

the industry as a whole. Increasingly, the lack of exits and the prospect of lower returns have led many market observers to question the viability of the venture industry, an issue with broad implications for economic growth. This issue can be informed by an analysis of the capital recovery associated with M&A and IPO exits and how these recovery rates have varied over time.

In Table 7, we assess the total capital recovered by the venture industry using an approach based on portfolio company start years. Start year is defined as the year in which the first round of VC investment is made in a portfolio company.¹⁷ For all companies started in a particular year (regardless of whether they were exited or not), we accumulate the total paid-in capital from the first round of investment through exit.¹⁸ Capital is subsequently recovered from M&A or IPO exits (realized investments) and potentially from investments that have yet to be exited (unrealized investments). In the VE database, unrealized investments are designated as “active” investments. In this analysis we assume that active investments have the potential to be recovered at cost (i.e., the capital recovered is equal to the capital allocated). To be considered an active investment, a portfolio company must have received at least one round of investment within the last five years as of December 2008. Unrealized investments therefore exclude investments referred to in the industry as the “living dead” or active investments deemed in reality to have little chance of exit. Because of the prior five-year investment requirement, this adjustment only affects companies started before 2003. Our analysis includes the paid-in capital for these investments and assumes zero recovery for them. This adjustment is reasonable in light of VCs’ reluctance to write-down or write-off investments.¹⁹

In Table 7, we report two summary numbers of the industry’s capital recovery over 1985-2008. In column (5), we compute the ratio of the value of realized exits (or cumulative distributed

¹⁷ We use the term “start year” to distinguish it from birth or founding year. Firms can have a birth or founding date which falls before their first round of VC funding.

¹⁸ Paid-in capital includes investments in portfolio companies that are classified as defunct or bankrupt as reported in VE.

¹⁹ See for example “Private Equity Valuation Survey Results,” Foster Center for Entrepreneurship and Private Equity, Tuck School of Business, Dartmouth College, May 2003.

capital) to paid-in capital, referred to as the DPI Multiple. Since this multiple is based on actual realizations, the DPI provides a lower bound on industry performance. In column (6), we report the TVPI Multiple which is the ratio of the value of realized exits and unrealized investments at cost to paid-in capital. To the extent that the unrealized investments are exited at less (more) than cost, our numbers will be biased upwards (downwards) in terms of capital recovery. Since the bulk of unrealized investment falls in the post-2003 period, barring a near term rebound from the precipitous market declines of 2007 and 2008, our estimates could represent an upper bound on capital recovery.

Given the long horizon of venture investments, with fund lives typically on the order of 10 years, the most accurate performance assessments from TVPI and DPI can be made for investments in companies which by 2008 should be fully exited, i.e., those with start years before 1999 (1998 and before), as seen by the closeness of the totals in column (3) and column (4). As VCs would hope to begin exiting after the end of the investment period (typically five years), some qualified judgment can be formed for the investments in companies started before 2005. We report the multiples for 2005 to 2008, but with the caution that 87 percent of the paid-in capital invested in those years is still unrealized, leaving the ultimate judgment of the performance in those years to the future.

In general, the results for the DPI and TVPI do little to alleviate the concerns about industry returns. For the start years before 1999, the TVPI averages 3.2 (DPI=3.1) compared to an average TVPI of 1.6 (DPI=1.2) for the start years 1999 to 2004. To offer a more intuitive perspective on the performance embedded in the multiple, we convert the TVPI into an annual return based on the average years from entry to exit. Assuming five years between entry and exit and no interim cash flows, a TVPI of 3.2 (1.6) translates into a 26.2 percent (9.9 percent) return per annum. Because we have not excluded the fees (typically 2-3 percent) or carried interest (typically 20 percent) paid to VCs, these estimates represent the gross returns on venture investment. Given the greater risk associated with the development of young companies and estimated betas reported in previous studies that range

from 2 to 3, gross returns on the order of 10 percent in the post-1998 period do not suggest a high degree of outperformance for the industry on a risk adjusted basis.²⁰

Prior studies have shown there is a strong consistency of returns among the top VCs (Kaplan and Schoar, 2005) and it is generally believed that they generate the lion's share of returns. To see if the trend observed for the entire industry applies to top performing VCs, we rank the VCs into quartiles based on their number of rounds in the five years before a start year (not reported). We then recalculate the TVPI and DPI for investments made in portfolio companies in which at least one upper quartile VC participated. For the years 1985 to 1998, the average TVPI for portfolio companies of upper quartile VCs is 3.9 (DPI=3.8) and the TVPI declines to 2.0 (DPI=1.5) for the years 1999 to 2004. Similar to the pattern observed for the universe of VC investments, exits by more reputable VCs also experience a substantial decline in performance after 1998.

In the final four columns of Table 7, we examine the recovery of capital from M&A exits. For the years 1985 to 1998, on average 50.6 percent of realizations come through M&A exits and the recovery rates are little changed if the start years through 2004 are included (49.0 percent). In all years, roughly 50 percent of capital is recovered through M&A exits, and consequently, they are an important mechanism by which capital is recovered in the industry.

While the recovery from M&A exits is substantial, the chief issue of concern is whether the recovery rates are sufficient to recoup the investment in the industry. To judge the adequacy of the recovery rates from M&A exits, we must have a benchmark for expected recovery rates. Under the assumption of random occurrence of the forms of exits, the null hypothesis is that the recovery rates from M&A exits should be proportional to their percentage occurrence in a given year. In column (9), the percentage occurrence of M&A exits (number of M&A exits divided by total number of exits in a

²⁰ For example, Cochrane (2005) estimates an average beta on venture capital investments of 1.7 and Korteweg and Sorensen (2010) estimate betas that range from 2.6 to 3.2.

given start year) generally increases over the course of the sample period, which is consistent with the earlier evidence shown in Table 1. The recovery rates from M&A exits in column (10) typically lag the percentage occurrence of M&A exits in column (9). For example, for start years 1985 to 1998, on average 44.0 percent of exits are M&A exits and the their recovery rate in this period is 50.3 percent, exceeding proportional expectations. For the start years 1999 to 2004, on average 68.7 percent of exits are M&A exits, but the recovery rate in this period of 49.0 percent falls below proportional expectations. As this lag in M&A recovery rates has grown, a greater number of exits are required to recoup the total investment in portfolio companies. While this has negative consequences for industry returns, our calculations also do not factor in the greater costs of due diligence, monitoring, and other effort that go into producing a greater number of exits that realize proportionally fewer dollars in return. Thus the overall evidence in Table 7 validates concerns about low capital recovery rates from M&A exits and the decline in IPO exits..

6. Conclusion

The decline in IPO exits from venture capital has raised concerns about how the lower returns from M&A exits can sustain the industry. To date, although the returns from exits can shed light on how the form of exit affects the recovery of capital, no study has examined returns from IPO and M&A exits in venture capital investments. We examine the returns from 1,401 IPO exits and 1,215 M&A exits of U.S. venture-backed companies over the period 1985 to 2008. The use of exit returns is an important departure from earlier studies which have mainly focused on the overall performance of private equity and VC funds relative to public equity markets, and have not addressed the issue of capital recovery by type of VC exit.

Overall, the average return to IPO exits is significantly higher than the average return to M&A exits. This finding is robust to alternative measures of returns that account for the time to exit and the risk of the investments. The properties of returns reveal substantial variation in the distribution of

both M&A and IPO exit returns. The highest M&A returns are comparable to the highest IPO returns but 40 percent of exits fail to recover the full amount of capital invested in the portfolio company, with M&A exits accounting for a disproportionately larger share of these. The large number of investments with negative returns questions the reliability of the number of exits as a gauge of successful VC performance used in previous studies.

When we examine the industry recovery rates by portfolio company start years, we find that the realization rates from M&A exits are below their occurrence as a proportion of total exits. Because the frequency of M&A exits has increased since 1999, it suggests that greater numbers of M&A exits are required to recover the total dollars invested in portfolio companies. While this has an overall effect of dampening industry returns, it is worrisome also because greater numbers of exits requires additional costs of due diligence, monitoring, and other effort that are not factored into our return calculations.

The venture industry is often described as a “hit driven” business. High returns are the means by which substantial amounts of capital are returned to investors and this capital provides a margin for error that enables VCs to take risks, knowing that while a number of companies may fail, a few may achieve great success. When we consider the totality of the evidence, outsized returns for M&A exits are simply harder to achieve in sufficient numbers to produce the kind of returns investors seek from this asset class. High M&A returns require VCs to have more discipline in capital allocation, while achieving good exit market valuations, which in turn requires VCs to have greater skill in managing all stages of their investments. By contrast, high IPO returns are more a function of market timing and having companies ready when the “window is open.” Consequently, our evidence supports concerns about the viability of the venture capital industry and suggests that, if IPOs continue to be scarce and M&A exits are the predominant form of exit, VCs will face a large challenge adapting to this new market reality.

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Table 1
Venture capital exits via M&A and IPO (1985-2008)

This table reports statistics for exits from U.S. venture-backed companies via (1) mergers, acquisitions, or leveraged buyouts (LBO), reported broadly as M&A, and (2) initial public offerings (IPOs) with exit dates during 1985 to 2005. M&A exits included are those with disclosed deal values. The effective date of M&A deals and IPO offer date are used as exit dates. The primary data source is Thomson Financial's *Venture Economics*.

Year	Total Exits	Total M&A Exits	Total IPO Exits	% of Exits as M&A	Mean M&A Deal Value (\$MM)	Median M&A Deal Value (\$MM)	Mean IPO Offer Size (\$MM)	Median IPO Offer Size (\$MM)
1985	6	4	2	66.7	70.5	85.0	21.3	21.3
1986	8	4	4	50.0	53.7	54.3	44.5	27.0
1987	13	8	5	61.5	106.8	22.0	81.2	50.4
1988	20	16	4	80.0	98.7	59.5	67.8	81.8
1989	23	20	3	87.0	103.6	36.9	105.5	123.2
1990	21	13	8	61.9	49.6	13.8	75.4	77.3
1991	33	14	19	42.4	83.9	54.5	79.9	63.7
1992	99	71	28	71.7	76.5	16.9	80.9	69.6
1993	133	86	47	64.7	98.8	35.0	87.9	53.8
1994	123	92	31	74.8	99.4	34.6	81.2	60.0
1995	222	116	106	52.3	148.4	63.9	100.5	80.6
1996	315	149	166	47.3	205.1	65.0	128.0	79.2
1997	330	220	110	66.7	309.0	70.7	149.2	83.4
1998	313	239	74	76.4	394.1	73.1	246.1	148.1
1999	517	275	242	53.2	758.0	109.9	424.8	278.8
2000	540	327	213	60.6	438.1	136.1	433.2	177.3
2001	284	249	35	87.7	147.0	33.5	356.3	253.3
2002	226	198	28	87.6	136.8	35.5	254.7	167.0
2003	166	136	30	81.9	126.8	50.0	233.6	187.0
2004	286	194	92	67.8	143.6	50.0	515.5	197.3
2005	269	214	55	79.6	185.5	81.3	283.0	194.6
2006	271	212	59	78.2	233.3	75.0	345.6	209.9
2007	279	201	78	72.0	337.0	135.0	485.4	276.8
2008	121	113	8	93.4	201.8	86.1	386.8	204.0
Total	4,618	3,171	1,447	68.7	274.4	70.0	292.3	147.9

Table 2
Equity stakes in venture-backed portfolio companies

The table reports the equity stakes in U.S. venture-backed portfolio companies that have an M&A or IPO exit over the period 1985 to 2008. The equity stakes are computed using the postmoney round valuations from *Venture Economics*. The average percentage of equity held by VCs is reported following each round of investment. Years to exit is reported as the average years between the first date of VC investment and exit date.

Round Number	Overall		M&A		IPO	
	N	% VC Stakes	N	% VC Stakes	N	% VC Stakes
1	2,615	27.0	1,215	29.5	1,401	24.9
2	1,817	43.3	789	47.2	1,029	40.2
3	1,260	58.0	481	60.8	779	56.3
4	782	67.2	255	68.8	527	66.4
5	429	73.7	121	75.1	308	73.2
6	219	76.0	58	76.4	161	75.9
7	91	81.4	22	86.1	69	79.9
>7	71	81.7	15	96.7	56	77.7
Total Rounds	7,284		2,956		4,330	
Years to Exit	2,615	4.5	1,215	4.9	1,401	4.2

Table 3
Descriptive statistics: Portfolio companies with exits via IPO or M&A

The table reports descriptive statistics for U.S. venture-backed portfolio companies that had M&A or IPO exits during 1985-2008. Mean values are reported for the overall sample along with means across the six industry major classifications used by *Venture Economics*. # Rounds is the number of rounds of financing received by the company. # Firms invested in company is the number of venture capital firms that invested in the company. Round amt (\$MM) is the average amount invested per round. Total amt invested (\$MM) is the total known amount invested in the company. VC stakes at exit (%) is the total equity stake held by venture capitalists calculated using disclosed postmoney valuations, accounting for dilution of stakes after each round of financing.

	Overall	Biotech	Communications/ Media	Computer Related	Medical/Health/Life Sciences	Non-High Tech	Semiconductors/ Other Electrical
# Rounds	4.8	5.8	4.9	4.5	5.4	3.9	5.0
# Firms invested in company	7.4	9.1	8.4	7.1	7.9	4.6	8.3
Round amt (\$MM)	13.7	11.4	17.5	10.5	11.5	24.3	13.8
Total amt invested (\$MM)	56.5	63.0	78.9	42.5	53.2	74.5	50.4
VC stakes at exit (%)	54.2	62.3	55.3	52.4	61.4	45.5	52.9
No. of Companies	2,616	226	477	1,100	337	295	181

Table 4
Returns from venture-backed portfolio companies (1985-2008)

The table reports mean and median returns and returns sorted into quintiles for the sample of venture-backed M&A and IPO exits. Statistics reported are for the sample of M&A and IPO exits and for exits that fall within each quintile group. In Panel A, equally-weighted exit portfolio returns are computed as the mean return from each type of exit. Annualized return (r) is derived from $(1+Ret) = (1+r)^t$, where Ret is the company-level exit return and t is the number of years to exit. In Panel B, value-weighted exit portfolio returns are reported where weights are computed using the total amount invested in the company with the weights for each portfolio reported scaled to add up to one. The data are winsorized by excluding the top and bottom 5% of the returns for each type of exit. ***, **, * indicates statistical significance at the 1%, 5%, and 10% level respectively.

<i>Panel A: Portfolio company returns (Equally-weighted)</i>							
		(Lowest Return)			(Highest Return)		
		Overall	Pooled Q1	Pooled Q2	Pooled Q3	Pooled Q4	Pooled Q5
<i>Company-level return</i>							
% Returns M&A	Mean	99.5	-87.7	-42.0	45.8	204.5	719.4
	Median	-32.1	-89.6	-43.0	40.6	188.9	764.6
% Returns IPO	Mean	209.5	-85.8	-35.1	53.5	205.8	633.2
	Median	108.8	-86.7	-35.9	51.6	195.9	601.1
Difference in Mean (IPO-M&A)		110.0***					
	(p-value)	(0.00)					
Difference in Median (IPO-M&A)		140.9***					
	(p-value)	(0.00)					
<i>Annualized return</i>							
% Returns M&A	Mean	26.9	-47.8	-11.4	8.3	37.8	282.2
	Median	-7.2	-41.5	-11.2	7.8	35.6	181.9
% Returns IPO	Mean	61.8	-47.3	-10.4	9.3	39.4	237.1
	Median	21.6	-40.8	-9.7	8.7	36.7	159.3
Difference in Mean (IPO-M&A)		34.9***					
	(p-value)	(0.00)					
Difference in Median (IPO-M&A)		28.8***					
	(p-value)	(0.00)					

Table 4 (continued)**Returns from Venture-backed Portfolio Companies (1986-2008)**

<i>Panel B: Portfolio company returns (Value-weighted)</i>						
		(Lowest Return)		(Highest Return)		
	Overall	Pooled Q1	Pooled Q2	Pooled Q3	Pooled Q4	Pooled Q5
<i>Company-level return</i>						
% Returns M&A	Mean	168.0	-88.7	-41.8	42.1	199.0
% Returns IPO	Mean	148.7	-89.6	-36.0	51.8	203.1
Difference in Mean (IPO-M&A)		-19.3*				
	(p-value)	(0.06)				
<i>Annualized return</i>						
% Returns M&A	Mean	33.3	-46.2	-10.4	12.4	27.7
% Returns IPO	Mean	33.6	-56.5	-7.8	11.0	40.2
Difference in Mean (IPO-M&A)		0.3				
	(p-value)	(0.41)				
No. Exits		2,616	524	523	523	523
% M&A		46.4%	78.2%	55.6%	32.7%	31.7%
No. M&A		1,215	410	291	171	166
No. IPO		1,401	114	232	352	346

Table 5
Decomposition of returns into fundamental factors

This table reports the averages for the three fundamental factors used to compute exits returns. Observations include portfolio companies with M&A or IPO exits. The pool of company-level returns in the panel dataset is sorted into quintiles. Averages of the fundamentals are reported for the M&A and IPO exits within each quintile group. *Q5 Avg/Q1 Avg* is the ratio of average values in the highest return quintile (Q5) and the lowest return quintile (Q1). *IPO Avg/M&A Avg* is the ratio of averages values for IPOs and for M&A within each quintile group.

	(Lowest Return)				(Highest Return)	<i>Q5 Avg/ Q1 Avg</i>
	Pooled Q1	Pooled Q2	Pooled Q3	Pooled Q4	Pooled Q5	
<i>VC stakes (%)</i>						
M&A	46.2	50.5	53.3	55.2	57.7	1.2
IPO	28.4	52.8	55.4	61.6	65.6	2.3
IPO Avg/M&A Avg	0.6	1.0	1.1	1.1	1.1	
<i>Money-in (\$MM)</i>						
M&A	54.5	48.5	47.3	38.2	19.9	0.4
IPO	153.8	88.4	58.9	53.6	44.4	0.3
IPO Avg/M&A Avg	2.8	1.8	1.2	1.4	2.2	
<i>Money-out (\$MM)</i>						
M&A	22.6	78.2	139.8	207.0	532.6	23.6
IPO	100.8	138.3	169.6	267.8	616.7	6.1
IPO Avg/M&A Avg	4.5	1.8	1.2	1.3	1.2	
N	524	523	523	523	523	
No. M&A	410	291	171	166	177	
No. IPO	114	232	352	357	346	
% M&A (in quintile group)	78.2%	55.6%	32.7%	31.7%	33.8%	

Table 6
Regressions examining sensitivity of returns on fundamental factors

This table reports OLS regression estimates with exit returns as the dependent variable and the estimates are based on robust standard errors including year and industry fixed effects. t-statistics are reported in parentheses. Returns are winsorized by excluding the top and bottom 5% of the returns for each type of exit. ***, **, * denote significance at the 1%, 5% and 10% level, respectively. Panel B reports OLS regression estimates with returns as the dependent variable and the estimates are based on robust standard errors including year and industry fixed effects. t-statistics are reported in parentheses. Returns are winsorized by excluding the top and bottom 5% of the returns for each type of exit. ***, **, * denote significance at the 1%, 5% and 10% level, respectively. *VC stakes (%)* are the total stakes held by VCs at exit. *Money-in (\$MM)* is the total amount invested in the company. *Money-out (\$MM)* for M&As is the deal value or for IPOs the IPO offer price \times pre-IPO shares outstanding.

Fundamental Factors	(1)		(2)		(3)		(4)	
	M&A	IPO	M&A	IPO	M&A	IPO	M&A	IPO
<i>VC stakes (%)</i>	1.74*** (6.09)	1.99*** (7.93)					2.14*** (7.98)	2.18*** (8.36)
<i>Money-in (\$MM)</i>			-0.73*** (-4.46)	-0.39*** (-3.34)			-1.27*** (-6.26)	-0.50** (-2.54)
<i>Money-out (\$MM)</i>					0.24*** (5.50)	0.09*** (2.61)	0.27*** (5.30)	0.11** (2.45)
<i>Year Fixed Effects</i>	YES	YES	YES	YES	YES	YES	YES	YES
<i>Industry Fixed Effects</i>	YES	YES	YES	YES	YES	YES	YES	YES
Adj. R-squared	0.159	0.229	0.154	0.198	0.276	0.229	0.359	0.314
N	1,215	1,401	1,215	1,401	1,215	1,401	1,215	1,401

Table 7
Industry recovery of capital through M&A and IPO exits

This table reports the total industry capital recovery (in \$US billions) from investments by start year, defined as the year of the first round of VC investment in the portfolio company. *Paid-in capital* is the total capital allocated to all portfolio companies started in a given year from start to exit, or through 2008 if unexited. *Realized exits* are the total dollars recovered via M&A or IPO exits for companies started each year. *Unrealized Investments at Cost* is the carrying cost of active investments. To be active, a company must have had at least one round of investment within the last five years as of the end of the sample period. *Realized M&A exits* are the total dollars recovered via M&A exits only.

Start Year	Paid-In Capital	Unrealized Investments at Cost	Realized Exits	Total Capital Recovery	DPI Multiple	TVPI Multiple	Realized M&A Exits	M&A DPI Multiple	%(M&A/M&A+IPO)	%M&A Recovery
	(1)	(2)	(3)	(4) = (2) + (3)	(5) = (3) ÷ (1)	(6) = (4) ÷ (1)	(7)	(8) = (7) ÷ (1)	(9)	(10) = (7) ÷ (3)
1985	\$4.1	\$0.0	\$9.9	\$9.9	2.39	2.40	\$0.8	0.19	19.4%	7.8%
1986	\$5.0	\$0.1	\$12.5	\$12.5	2.50	2.51	\$5.3	1.06	27.4%	42.3%
1987	\$10.0	\$1.3	\$34.2	\$35.5	3.40	3.54	\$25.5	2.54	25.3%	74.5%
1988	\$7.0	\$0.1	\$17.6	\$17.7	2.52	2.54	\$6.9	0.99	35.4%	39.4%
1989	\$10.0	\$0.1	\$48.8	\$48.9	4.87	4.88	\$33.2	3.31	41.4%	68.0%
1990	\$6.0	\$0.1	\$15.8	\$15.9	2.65	2.67	\$6.0	1.01	41.0%	38.1%
1991	\$4.6	\$0.1	\$23.5	\$23.6	5.13	5.14	\$12.6	2.75	43.9%	53.7%
1992	\$8.3	\$0.3	\$27.9	\$28.2	3.36	3.40	\$16.0	1.92	40.9%	57.1%
1993	\$8.3	\$1.5	\$25.4	\$26.9	3.05	3.23	\$10.4	1.24	42.9%	40.8%
1994	\$13.4	\$0.8	\$38.5	\$39.3	2.87	2.93	\$13.7	1.02	51.5%	35.5%
1995	\$19.8	\$1.3	\$48.2	\$49.5	2.43	2.50	\$19.7	1.00	50.9%	41.0%
1996	\$37.2	\$6.1	\$113.9	\$120.0	3.06	3.23	\$52.4	1.41	60.3%	46.1%
1997	\$35.9	\$5.9	\$97.2	\$103.1	2.70	2.87	\$44.7	1.24	67.2%	46.0%
1998	\$57.8	\$11.3	\$153.7	\$164.9	2.66	2.85	\$90.2	1.56	68.5%	58.7%
1999	\$75.5	\$16.7	\$111.5	\$128.2	1.48	1.70	\$48.0	0.64	74.4%	43.1%
2000	\$72.5	\$22.4	\$65.5	\$87.9	0.90	1.21	\$37.7	0.52	83.0%	57.5%
2001	\$27.8	\$12.9	\$31.2	\$44.1	1.12	1.59	\$19.5	0.70	74.4%	62.4%
2002	\$32.4	\$13.6	\$35.5	\$49.1	1.09	1.51	\$12.2	0.38	58.1%	34.5%
2003	\$31.4	\$17.1	\$31.4	\$48.6	1.00	1.55	\$13.6	0.43	65.7%	43.2%
2004	\$31.5	\$22.4	\$42.1	\$64.5	1.34	2.04	\$24.6	0.78	56.5%	58.4%
2005	\$26.8	\$21.7	\$14.6	\$36.3	0.54	1.35	\$6.8	0.25	69.2%	46.4%
2006	\$39.6	\$36.0	\$11.2	\$47.2	0.28	1.19	\$4.6	0.12	76.3%	41.5%
2007	\$28.2	\$23.0	\$10.2	\$33.2	0.36	1.18	\$7.1	0.25	73.3%	69.6%
2008	\$19.4	\$18.5	\$1.3	\$19.8	0.06	1.02	\$0.7	0.03	75.0%	53.9%

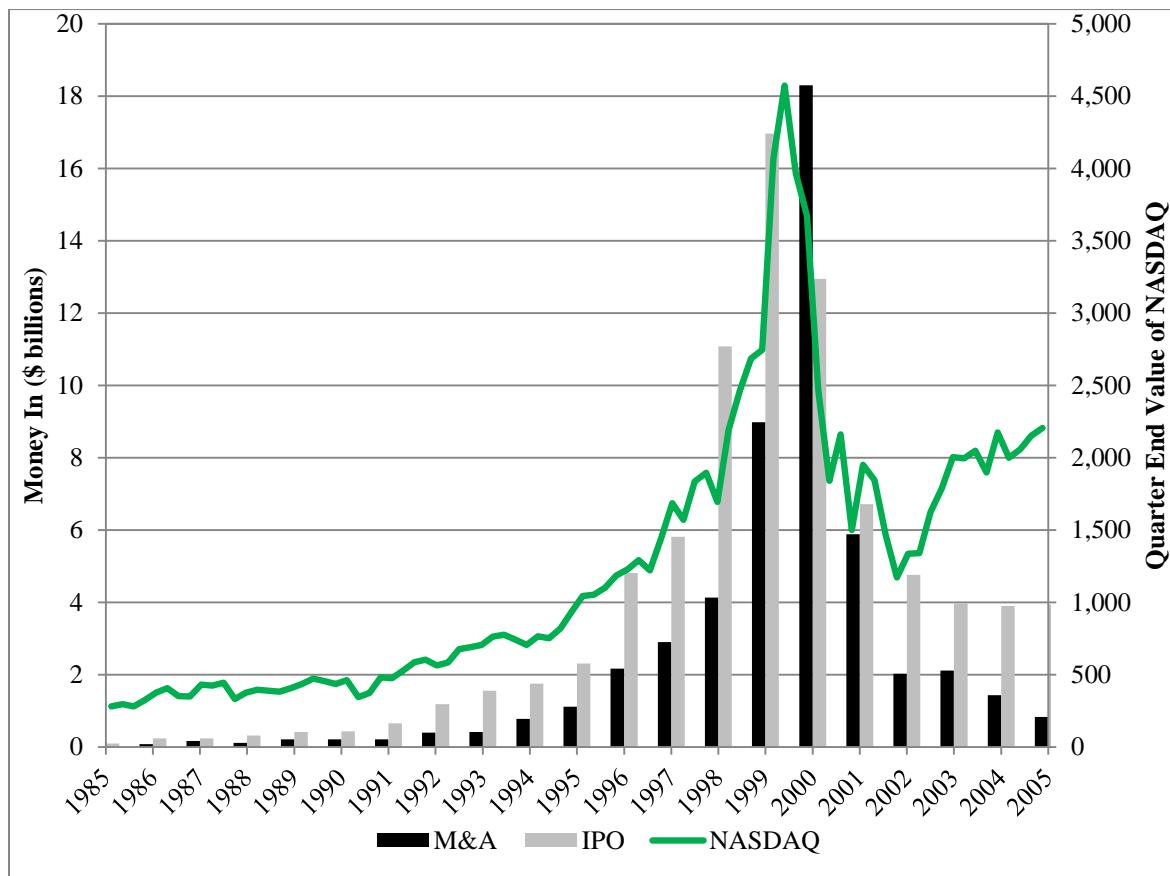


Figure 1. Total money invested (USD billions) in companies with M&A or IPO exits versus NASDAQ

The figure plots the money invested in portfolio companies that eventually result in M&A or IPO exits against the quarter-end level of the NASDAQ market index. Investment in a portfolio company begins in the year of the first round of VC investment; follow up rounds are placed in the year they occur. The years after 2005 are not shown because of the small number of exits per year.

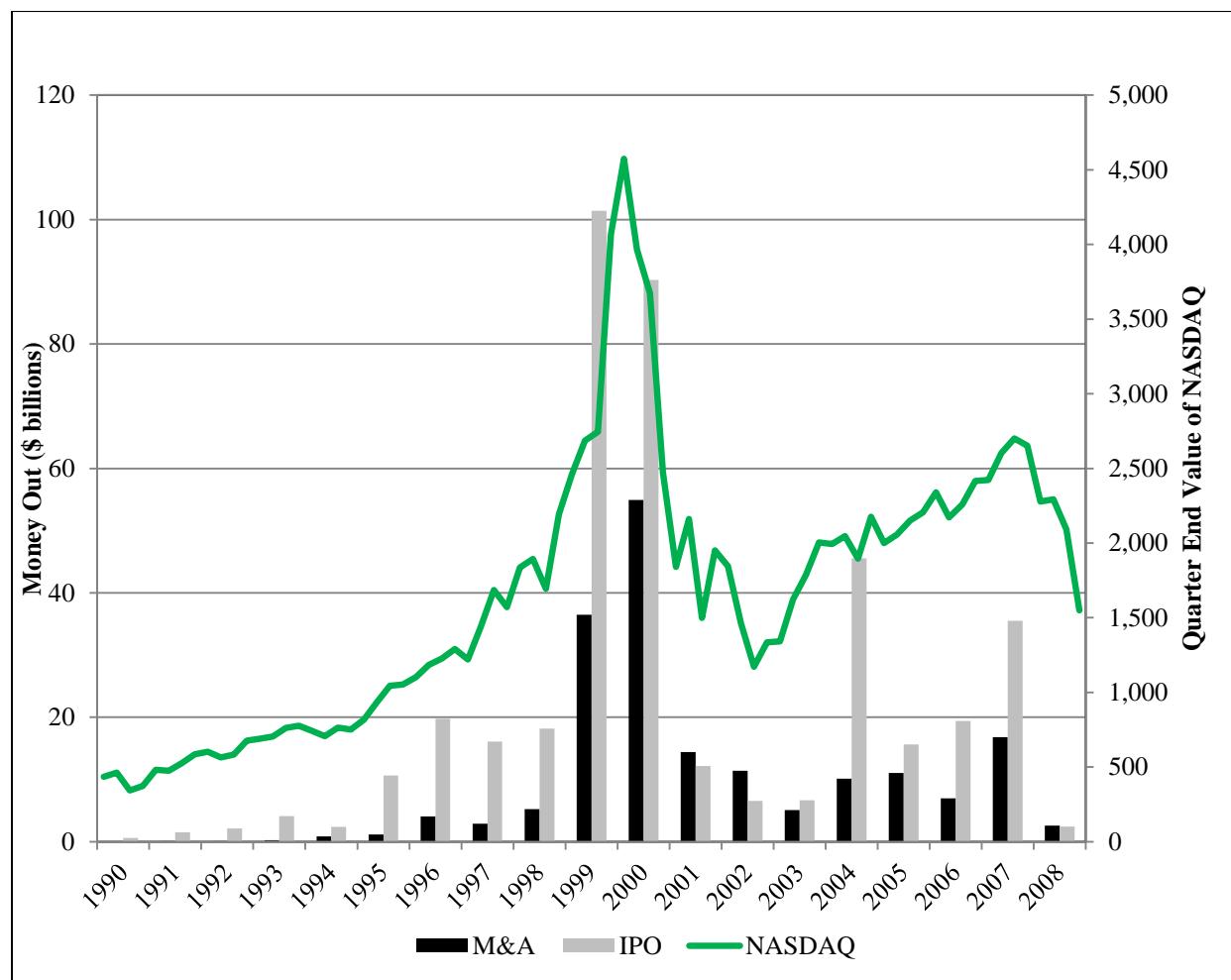


Figure. 2. Total money received (USD billions) from M&A and IPO exits versus NASDAQ

The figure plots the disclosed deal value for M&A exits and the pre-IPO market value of equity for IPO exits against the quarter-end level of the NASDAQ market index. The years before 1990 are not plotted because of the small number of exits per year.