

On the Lifecycle Dynamics of Venture-Capital- and Non-Venture-Capital-Financed Firms

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Abstract

We use a new data set that tracks U.S. firms from their birth over two decades, as collected by the U.S. Census Bureau, to examine the life cycle dynamics of VC- and non-VC financed firms, and to shed light on VC incentives. We first ask to which firm-level and market-level characteristics VC responds. We find that VC responds to public market signals by backing more new firms in sectors with greater IPO activity, but the proportion of VC- to non-VC-financed firms created in those sectors remains stable, suggesting it is not VCs that primarily drive new firm creation in response to IPO activity. On the firm level, we find that venture capitalists disproportionately invest in firms that have no commercial sales, but which exhibit high levels of initial investment. Further, VC-financed firms are larger than non-VC-financed firms, as measured by employment, sales and assets, at every point along the lifecycle, suggesting that scale of investment and production is an important criterion in VC financing. We investigate VC- and non-VC-financed firm life cycle dynamics in more detail by matching each firm that gets VC at the time of funding with a non-VC financed firm on 4 dimensions (size, age, industry, geography). After receiving VC, VC-financed firms exhibit larger levels of investment in employment and assets relative to the matched non-VC-financed firms, but do not exhibit larger levels of sales. VC-financed firms eventually exhibit larger levels of sales but are no more profitable than the non-VC-financed firms before they are exited. These results again speak to the importance of scale in VC financing and suggest VC is ‘patient’ money. To examine this conjecture more closely, we also analyze failed firms. Here the results are nuanced – VC is patient in the first five years with lower levels of failure rates, but the longer term probability of failure is higher. We do not find evidence that these results are being driven by VC failures being disguised as acquisitions or different thresholds for failure of VC and non-VC financed firms.

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I. Introduction

The venture capital (VC) industry has been growing at a very fast pace for the last twenty years. In 1980 the total amount of money newly invested by venture capitalists in the U.S. was estimated at \$610 million. By 1990 this figure had already increased to \$2.3 billion and in 1998 it reached \$21.4 billion. While the numbers increased still further during the late 1990s and 2000, in 2005 the amount invested by venture capitalists was around \$22.6 billion, slightly higher than the 1998 level of \$21.4 billion. Clearly, VC is growing as a significant source of financing for start ups, yet many questions about VC as an institution, which types of firms it finances and the life cycle dynamics of VC financed firms, remain.

A major difficulty in conducting such research is obtaining data on the companies that could potentially use VC but do not. In this paper we use a new panel data set collected by the U.S. Census Bureau that tracks firms from their birth over more than two decades to address a number of questions related to the role of VC in new firm creation.

How quantitatively important is VC in new firm creation? From our data we see that a statement on the quantitative importance of VC depends critically on the measure used. From the point of view of new firm foundings, VC is close to irrelevant. VC-financed firms are an extremely small percentage of all new firms created – averaging 0.1% over our 20 year sample period of 1981 to 2001 and increasing to 0.2% in the late 1990s. If instead of focusing on the number of firms that get VC backing, we focus on other measures we get a different picture of the importance of VC in new firm creation and in the economy as a whole. Consider the amount of employment generated by VC backed firms. When we measure the amount of employment generated by VC backed firms we find that it accounts for nearly 10% of employment in the US in the late 1990s and early 2000s, steadily rising from about 5% in the 1980s. Hence when measured by employment, and other size measures, VC and the companies it finances are quantitatively sizable.

Given these numbers, understanding VC financing and the dynamics of the firms getting VC funding is important. Since our Census Bureau data allows us large sample identification of both firms that receive VC financing as well as firms that do not receive VC financing we are able to take a first step towards characterizing and quantifying the differences between VC-financed and non-VC-financed firms to shed light on some of the outstanding questions about the

role of VC in new firm creation. In particular, we ask to what firm-level and market-wide characteristics venture capitalists respond in choosing to make their investments. Do VCs disproportionately back firms with proven success? Or are VCs looking for firms with ideas that need large initial investment and eventual large scale? How far do VCs respond to market-wide characteristics in investing in new firm creation e.g., by responding to windows of opportunities such as the increased IPO activity? What are the eventual differences in outcome for firms that receive VC financing as compared to those who are not? How do VC financed firms that fail compare to non-VC financed firms that fail? Or are acquired? Are the criteria or thresholds used by investors in these two sets of firms significantly different? The answers to these and related questions can help us better understand the life cycle dynamics of firms that receive VC financing and shed light on the underlying incentives of venture capitalists.

We begin by examining which kinds of firms receive VC over our sample period. Our results support the notion that VCs invest in firms with ideas with no immediate sales, but with large investments in assets and employment. We find that firms born with no commercial sales are disproportionately financed by VC. In fact, over 50% of new firms in the latter part of our sample which received VC financing were started without any commercial revenues. Moreover, most of these firms received VC before they realized commercial revenues. This is true in “high-tech” industries, such as biotech and computers, and in “low-tech” industries such as retail and wholesale trade. VC-financed firms are also likely to have larger investments in place in terms of assets and employees once they receive VC financing. This is consistent with the notion that VCs invest in projects at the idea stage, or at least projects that require higher levels of investment, even though sales of the product are yet to occur.

We also examine new firm creation in response to market signals through IPO activity. Exit by IPOs is very attractive to venture capitalists. Many have argued that VC and investment banks fuelled a disproportionate number of new firms in sectors with “hot” IPO opportunities, in the hope of early cashing out. We examine new firm creation as a function of the IPO activity in the sector. Interestingly, we find that while there is a larger number of new firm creation in response to increased IPO activity, the proportion of VC-financed firms in these sectors does not change significantly. Thus, it is not just venture capitalists who follow the trend of what seems attractive to the public markets, but entrepreneurs in general, both those getting VC and those who do not, seem to respond to perceived windows of opportunities in similar ways. One could

view this as economy wide signals being interpreted in much the same way by different constituents interested in start-ups, as opposed to VCs driving waves of new firm creation in nascent industries with windows of opportunities.

A related question is whether venture capitalists fund companies based on the actual or potential scale of the firms or its underlying projects. We find that at every stage of the firm's life cycle – at birth, at the time of VC financing, and beyond, VC-financed firms persistently tend to be an order of magnitude larger than non-VC-financed firms, as measured by employment, revenues and assets. This finding is consistent with the notion that potential firm scale and not just scope is an important criterion for VC financing.

Perhaps surprisingly, we also find that VC-financed firms are less likely to fail than non-VC-financed firms. One characterization of venture capitalists often found in anecdotal evidence is that they encourage the development of the one or two very high growth firms in their portfolio, i.e., the potential EBays and Googles, and care little about the rest of their portfolio. Some argue that venture capitalists are quick to shut down companies; others suggest that venture capital is patient money and venture capitalists recognize the option value in their investments and exert effort to ensure companies do not close down. The statistics we report suggest the latter explanation is perhaps more prevalent in the data. However, we need to be careful in interpreting these results because there are differences in the firms that get venture capital and those that do not. Hence our next step is to match each VC-financed firm to a non-VC-financed firm at the time of getting VC funding based on four characteristics. These characteristics are age of the firm, 4-digit SIC code, geographical region, same employment size. We then re-examine the relation between VC financing and firm size and failure for a set of firms that are observationally similar at the time at which one of them gets VC funding and the other does not.

We observe an interesting pattern when we compare the matched sample of VC firms to non-VC firms. Prior to receiving funding VC-financed firms do not look very different than non-VC financed firms. However, after receiving VC, VC-financed firms have larger levels of investment in employment relative to non-VC financed firms, but do not depict a larger level of sales in the first five years after getting VC funding. After that time period VC-financed firms start showing a higher level of sales but see little difference in profitability before they fail or are

exited via acquisition or IPO. These results suggest that the key firm characteristic on which VCs focus is its scale or potential for scale.

Again, we need to be careful in interpretation because it is important to look at firms that survive in conjunction with firms that do not. One possibility that might explain these results is the surviving firms might simply reflect the dynamics of VC firm failure, if smaller firms are shut down early, this might account for finding that the surviving firms are the larger ones. We also re-examine the failure dynamics of VC-financed firms relative to non-VC-financed firms in our matched sample. The questions here are whether VC is “patient” money, or whether they are quicker to shut down firms. Related to this is the question whether the threshold for firm survival is more stringent for VC financed firms. Finally, it is possible that VCs show lower failure rates simply because some failures are disguised as acquisitions. We examine these possibilities in the data by looking at the failure dynamics and comparing VC to non-VC financed firms at the time of failure.

We find that the failure dynamics are somewhat nuanced. We find that VC is “patient” at least in the first five years, the probability of a VC financed firm failing is much lower than a non-VC financed firm, but the longer term probability of a VC financed firm failing is actually higher. We also find that as compared to the matched sample, VC-financed firms are significantly larger when they fail, but are not very different in terms of profitability at the time of failure. We also examine if VC financed firms differ significantly from non-VC financed firms at the time that they are acquired. We find there is no significant difference in terms of any significant parameters such as size as measured by employment or sales, or profitability. Hence it would not appear that VC failures are being camouflaged as acquisitions. These results are consistent with VCs caring about scale for firms that they invest in, both for those that survive as well as those that fail. These results also suggest that VCs do not seem to have a higher threshold for firm survival than for non-VC financed firms.

The rest of the paper is structured as follows. Section II describes our data. Section III characterizes our samples of VC and non-VC-financed firms. Section IV examines the relation between VC financing, firm size, profitability and failure rates in the one-to-one matched sample of VC- and non-VC-financed firms. Section V examines the differences between VC- and non-VC-financed firms at exit. Section VII concludes.

II. Data

We begin by describing the U.S. Census Bureau panel data we employ to track firms from their birth. We then discuss how we identify VC-financed firms in the data by linking an external data set that contains information on U.S. VC deals. Finally, we describe the additional Census Bureau datasets we merge to the main panel dataset to obtain additional information on firm sales and profitability.

A. The Longitudinal Business Database

The Longitudinal Business Database (LBD) is a panel data set that tracks the set of U.S. employer business establishments from 1975 to the present. The version of the LBD we use ends in 2001. We begin our analysis in 1981 rather than 1975 because VC activity in the U.S. did not take place on a widespread basis until the 1980s. Moreover, a sample period of 1981 to 2001 allows us to examine three seven-year firm birth cohorts.

The LBD is a business-establishment-level data set. A business establishment is part of a firm and is defined by having a particular geographic location. For example, a law firm with an office in Boston and an office in New York would have two business establishments. Likewise, a manufacturing firm with three plants, two in Illinois and one in Wisconsin, would have three business establishments. Firms may be single-establishment firms or multi-establishment firms and the number of establishments comprising a firm may change over time. The business establishments included in the LBD must each have at least one employee who is paid a wage on which payroll taxes are paid to the U.S. government.

The LBD is formed by linking business establishment information across the annual waves of the Standard Statistical Establishment List (SSEL). The SSEL is list of business establishments in the U.S. maintained by the U.S. Census Bureau that is updated on an annual basis. The SSEL contains data from U.S. government administrative records, such as tax returns, and is augmented with data from Census surveys and data sets. Business establishments are linked using numerical identifiers as well as the names and addresses of establishments. For a more detailed description of how the LBD is formed see Jarmin and Miranda (2002). The LBD contains information on establishment-level employment, payroll, industry, location, and organizational form, i.e., whether an establishment is a corporation, sole proprietorship,

partnership or other type of organization. Because the LBD is a panel, one can also observe the years an establishment enters and exits the LBD.

We are interested in understanding the relation between firm-level characteristics and VC financing. We therefore aggregate business establishment payroll and employment data for multi-establishment firms by adding together the employment and payroll information for all of the establishments of a firm. We identify the industry and geography of multi-establishment firms as the modal industry and geography of the firm's business establishments. We classify a firm as failing or shutting down when all of its establishments exit the LBD. Thus a firm which has two business establishments will only be classified as shutting down if both of its establishments exit the LBD. Because we track firms by age in our analysis, we drop a firm from our panel if all establishments of the firm are acquired by another firm because when this happens the firm has now been subsumed by another firm, usually of a different age, and becomes a different entity. However, it is important to note that if a firm is acquired and dropped from our panel we do not classify the firm as having shut down.

We augment the information in the LBD with firm-level sales and assets information taken from the SSEL. Both firm-level sales and assets information are only available in the SSEL starting in 1995. Sales information is missing for about one third of the firms in the LBD from 1995 to 2001. Assets information is missing when sales information is missing, since they are both taken from tax returns. In addition, assets information is only available for corporations since this information is only taken from tax returns for corporations.

The LBD enables us to study new firms created between 1981 and 2001 and, in particular, to study differences in outcomes between those firms that receive VC financing and those that do not. The LBD is an improvement on existing data sets for such a study along several dimensions. First, the LBD allows us to observe newly created firms at the time they hire their first employee. Most newly created firms are privately held and there are no commercially available databases, such as Compustat, that enable researchers to observe firms at this precise point in their lifecycles. Information on privately held firms in the U.S. comes primarily from U.S. government data sources. Second, the LBD allows us to examine firms over time, which allows tests of the impact of VC on dynamic firm outcomes. Some government databases on privately held firms, such as the Survey of Small Business Finances or the Economic Censuses, do not allow a dynamic panel study of firms because they sample a different set of firms in each

cross-sectional survey. Third, the LBD allows an examination of a panel of firms in all industry sectors. Prior to the formation of the LBD, the existing Census establishment-level data set was the Longitudinal Research Database (LRD), which tracked a stratified random sample of manufacturing establishments over time.¹ Since many VC-financed firms are in non-manufacturing sectors, being able to examine all industries in our study is important if we would like to make general statements about the importance of VC in new firm creation.

B. Identifying VC-financed Firms in the LBD

We next turn to a description of how we identify VC-financed firms in the LBD. We take a June 2005 extract of VentureXpert, a database maintained by Thomson Financial which contains information on both venture capital investment firms and the companies in which they invest. VentureXpert contains information on which firms receive VC financing, from whom, and when. The database contains information on the firms' names, their primary locations, and the venture capitalists who invest in them, how much they invest and when. Comprehensive coverage of the U.S. VC industry by VentureXpert begins in the early 1980s. We include in our extract any VC-financed firm located in the U.S. and whose first round of financing is classified as either "Startup/Seed," "Early Stage," "Expansion," and "Later Stage." We exclude companies whose first round of financing is recorded as "Buyout/Acquisition," "Other," and "Unknown." We also exclude companies that are missing name or address information. These selection criteria leave us with a sample of 21,702 companies whose years of first VC financing range from 1948 to 2005.

We link our VentureXpert sample to the LBD using firm names and addresses. Our matching algorithm begins with the set of establishments in the LBD in 2001 and works backwards through the LBD in time for each successive matching attempt. We begin by trying to match our VentureXpert firms to LBD business establishments by using the full company name and address, i.e., city, state and zip code. If a firm in VentureXpert matches to multiple establishments in the LBD, we use the match which has the smallest difference between the first

¹ Another government firm-level longitudinal database which covers all industry sectors is the merged annual cross-sections of the Statistics of Income Corporate Tax Files used in Zarutskie (2006). This database has the advantage that it contains firm-level balance sheet and income statement information; however, this database is a rolling stratified random sample, meaning firms can exit the panel before they actually die and less readily available to external researchers and so we opt to study the LBD, instead, since we will examine the impact of VC financing on firm exit rates.

LBD year and the VentureXpert founding date, or the first VC financing date if VentureXpert does not report the firm's founding date.² Once an LBD establishment is matched to a firm in our VentureXpert sample, that establishment is classified as VC-financed in all years it remains in the LBD, and the firm it comprises is also classified as VC-financed.

After matching on full name and address from 2001 to 1975, we then match on full name and partial address, i.e., state and zip code only, then state and city only, then state only, again eliminating multiple matches by using the match with the smallest difference between the first LBD year the VentureXpert founding year of first year of VC financing. We then match on partial name, i.e., a substring of the full name of the first N characters, and full address and then partial name and partial address, again eliminating multiple matches by using the match with the smallest difference between the first LBD year and the VentureXpert founding year or first VC financing year.

Our matching algorithm yields 16,109 matches, for a raw match rate of $16,109/21,702 = 74\%$. Because we do not restrict our sample of VentureXpert companies based on founding year or the date of first VC financing, there are likely some companies that should not be matched to the LBD if these companies either were shut down prior to 1975 or do not appear in the LBD until after 2001. Because we cannot identify these companies precisely, i.e. because VentureXpert does not tell us when these companies begin or stop reporting positive employment or payroll, we can only guess at the number of such companies in VentureXpert. It is likely that companies in VentureXpert not matched to the LBD reported as being founded in 2001 or later are not in the LBD over our sample period. Out of our 5,593 unmatched companies in VentureXpert about 23% meet these criteria. This gives us a revised estimated match rate of about 80%. Given the propensity for non-standardized spellings of words and occasional misspellings that appear in administrative records data, and according to Census Bureau researchers who regularly engage in name in address matching with Census micro-datasets, this match rate is very good and about as high as what other researchers using these datasets have been able to attain. Further, our non-matched VentureXpert firms are randomly distributed over time and industries, which suggests that any misclassification of firms in the LBD as non-VC-financed is random, thus adding classical measurement error to our VC-financed firm indicator variables. Classical measurement error in an independent variable will attenuate estimated

² The founding date is missing in about 25% of our sample of VentureXpert firms.

coefficients, thus working against finding any significant differences between characteristics of VC-financed and non-VC-financed firms in our analysis.

C. Obtaining Additional Information on Sales and Profitability

We obtain additional information on firm sales, or total value of shipments, as collected by the Census Bureau in its Economic Censuses and Longitudinal Research Database by merging these datasets to the LBD.

C.1. Economic Censuses of Services, Retail Trade and Wholesale Trade

The Economic Censuses of Services, Retail Trade and Wholesale Trade collect information from all firms with at least one business establishment every five years. We merge the 1982, 1987, 1992 and 1997 waves to the LBD and thus get five-year snapshots of sales for firms in the services, retail trade and wholesale trade industries. The Economic Censuses of Construction and Transportation and Utilities do not collect a sales variable.

The sales variable in the Economic Census waves is a measure of the “total value of goods produced” of a business establishment in a particular year and may not match exactly the cash revenues to the firm in that year. The sales number in the Economic Census waves is an estimate of the value of goods produced by the establishment, whether or not cash was received for those goods in that year. As a result, very few business establishments report zero sales in the Economic Census waves since they all produce something whether or not it is actually ever sold for cash. Thus, when tax return revenues are zero, the Economic Census sales value will be positive but very low. The correlation between Economic Census sales and tax return revenues which we obtain from the SSEL is very high at around 0.9.

The Economic Censuses of Services, Retail Trade and Wholesale Trade do collect information on firm operating costs or capital expenditures. We use payroll information from the LBD to generate rough measures of firm profitability for firms in the services, retail trade and wholesale industries by taking the difference of sales and payroll and dividing by sales.

C.2. The Longitudinal Research Database for Manufacturing

For firms in the manufacturing industries, we are able to obtain information on sales as well as information on operating costs and capital expenditures. In addition to collecting this

data in the five-year Economic Census of Manufactures waves, the Census Bureau also collects this information for a stratified random sample of manufacturing firms every year as part of its Annual Survey of Manufactures. The 1982, 1987, 1992, and 1997 Economic Census of Manufactures waves combined with the Annual Survey of Manufactures in the non-Census years make of the Longitudinal Research Database (LRD). We merge the LRD to the LBD which allows us to generate more precise measures of firm income and profitability for firms in the manufacturing industries. In particular, we form an income variable, defined as sales minus payroll minus costs of materials and parts minus capital expenditures minus rental payments. We divide the income variable by sales to generate return on sales as our firm profitability measure.

III. Which Firms Receive VC Financing?

We now turn to an examination of the differences in the set of VC- and non-VC-financed firms in the LBD over time. While we have some sense that VC-financed firms are concentrated in certain “high-tech” industries from surveys such as Moneytree and aggregate statistics reported by the National Venture Capital Association, it is unclear how the industry composition of newly created firms that receive VC financing compares to the industry composition over time of newly created firms that do not receive VC financing. Moreover, there are no published statistics on how the scale and failure rates of VC-financed firms compares to that of non-VC-financed firms over the lifecycle.

A. VC Financing by Industry

Table I presents industry counts of the set of VC- and non-VC-financed firms in the LBD born between 1981 and 2001. We start our sample period in 1981, rather than 1975, since the number of VC-financed firms that enter the LBD prior to 1981 is much smaller than in later years, partly because VC investing activity did not become prevalent until 1980 after the revocation of ERISA’s prudent man rule and partly because VentureXpert’s coverage of the VC industry increases starting in the early 1980s. Industry counts are reported for each of three firm birth cohorts. In addition, we report industry counts for the subsample of firms that enter the LBD between 1995 and 2001 that have zero commercial revenues reported on their tax returns in their first year.

There are many industries, defined by 4-digit SIC codes, that have very few or zero VC-financed firms being created in a particular year. In the rest of Section III we will focus on the set of industries in which the percentage of newly created firms over our sample period that are VC-financed is at least 1.5%. We label these industries as “VC Industries” and the other industries as “Non-VC Industries”.³ Table I reports industry counts by and within “VC Industries” and “Non-VC Industries”. The overall proportion of newly created firms that are VC-financed across industries is very small – less than 0.2% over our entire sample period.

The vast majority of newly created firms are in the non-VC industries and are not VC-financed. Moreover, the percentage breakdown of these non-VC-financed firms across industry sectors is relatively stable across all three birth cohorts, with the majority of new non-VC-financed firms being either service or retail trade firms. Within the VC industries, however, the breakdown of non-VC-financed firms varies substantially across industry segments over our sample period. Both VC-financed and non-VC-financed new firms in the VC industries follow the same trend in industry composition over our sample period, which suggests that venture capitalists disproportionately back growing industry segments in the high-tech industries but these fast growing industries also see an influx of non-VC-financed firms simultaneously.

An almost equal number of VC-financed firms fall into the non-VC industries as fall in the VC industries in all three birth cohorts. Venture capitalists back firms in “non-high-tech” industry segments in equal proportion to those in “high-tech” industry segments. However, when we compare the industry segment composition of VC-financed firms within the non-VC-industries it looks very different from the relatively stable composition we noted for non-VC-financed firms in the non-VC industries.

The last rows in both panels of Table I report the numbers and industry composition of firms born without any tax return revenues in the 1995-2001 cohort. Over 50% of new firms in the VC industries that receive VC financing are started without any commercial revenues. This percentage is a bit lower for VC-financed firms in the non-VC industries at 40%. Only about 10% of new non-VC-financed firms in the VC industries are started without any commercial

³ Specifically, we define the VC industries to include the “Computer” industries (SIC codes 3571, 3572, 3575, 3577, 3578, 7371, 7372, 7373, 7374, 7375, 7376), the “Telecom” industries (SIC codes 3661, 3663, 3669, 4813, 4822, 4832, 4833, 4841, 4899), the “Biotech” industries (SIC codes 2833, 2834, 2835, 2836, 8731, 8734), and “Other”

revenues, with the percentage again lower for non-VC-financed firms in the non-VC industries at around 6%. Thus, venture capitalists disproportionately back firms that do not have any commercial sales in their first year of life. In particular, at least in the 1995-2001 birth cohort for which we have revenues data, venture capitalists back zero revenue firms disproportionately in both the “high-tech” VC industries. These figures suggest that a number of the firms venture capitalists back develop new products, even in the non-VC industries. Thus, a large percentage of the time variation in industry composition of new VC-financed firms within the non-VC industries is likely due in part to new product ideas in non-high-tech industries.

B. VC Financing and Firm Size

We have already seen that venture capitalists disproportionately back firms that are born without any commercial revenues in both “high-tech” and “low-tech” industries. Is it the case that VC-financed firms are larger or smaller than non-VC-financed firms, and does the ordering depend on firm age and the size measure used? Moreover, how does the entire size distribution for VC-financed firms compare to the size distribution for non-VC-financed firms over time and by firm age? Characterizing the relative sizes of VC- and non-VC-financed firms will help us understand what the scale criteria are for VC investment.

Figures 1a, 1b, and 1c depict the average employment by firm age for both VC- and non-VC-financed firms in the 1995-2001, 1988-1994 and 1981-1987 birth cohorts, respectively, for firms in the VC industries. Our results are qualitatively similar for the non-VC-industries, and focusing on the VC industries gives us larger VC-financed firm samples relative to our non-VC-financed firm samples. We also report “center” statistics for employment. The “center” statistic is the average of employment between the 45th and 55th percentiles of employment for VC- or non-VC-financed firms at a particular age in a particular birth cohort. The center statistic is our approximation of the median of firm employment since confidentiality agreements restrict us from reporting the actual medians in our size distributions.

There are two major facts that emerge from Figures 1a, 1b, and 1c. First, VC-financed firms are larger than non-VC-financed firms, as measured by total employment, at the average and center of the employment distribution at each age. This is true for all three firm birth

high-tech industries including high tech electronic devices (SIC codes 3672, 3674, 3675, 3677, 3678, 3679, 3841, 3842, 3843, 3844, 3845).

cohorts. This suggests that actual or potential scale of investment in employment is an important criterion in how venture capitalists choose which firms to finance. Second, the size differential, both on average and at the center of the employment distribution, between VC- and non-VC-financed firms widens as firms age, suggesting that not only are VC-financed firms larger than non-VC-financed firms but they also grow faster, at least in terms of employment.

In unreported analysis, we see that VC-financed firms are on average larger in terms of tax return revenues and assets than non-VC-financed firms at all ages. Moreover, by age three the center of the VC-financed firm revenues distribution is above the center of the non-VC-financed sales distribution, reflecting the fact that the VC-financed firms that began with zero sales now have positive sales, and, moreover, these positive sales are larger in magnitude than the center of the non-VC-financed firm sales distribution. Thus, although venture capitalists disproportionately back firms that begin life with no commercial revenues, these firms eventually produce and sell at a much larger scale than non-VC-financed firms. This suggests that not only is scale of investment in employees and assets an important feature of VC-financed firms vis-à-vis non-VC-financed firms, but scale of production and output in the form of sales is also an important feature. The evidence presented here suggests that venture capitalists look for firms that have a large scale potential. Moreover, this large scale potential is correlated with firms that are in high growth industries and which exhibit high initial investment despite having no commercial sales at the beginning of their lives.

C. VC Financing and IPO Activity

Many have argued that VC and investment banks fuelled a disproportionate number of new firms in sectors with “hot” IPO opportunities, in the hope of early cashing out. To examine this question, we collect information from SDC’s Global New Issues database on the number of IPOs that occurred in each of our sub-VC industries – computers, biotech, telecom and other – over our sample period. We then regress the number of new firms created in each of these four sub-sectors in each year of our LBD sample period on two lags of IPO activity in that sector. OLS regressions as well as Poisson regression are reported in the first four columns of Table II. For each regression we estimate one specification with just the lagged IPO activity and another which adds in industry dummies. The estimation results tell us that new firm creation responds

strongly to public market signals in the form of increased IPO activity over the previous two years. In particular, for each additional IPO in an industrial sector that occurred one year ago, about 51 new firms are created in that sector the following year, and for each additional IPO that occurred in an industrial sector two years ago, about 35 new firms are created in that sector two years later.

Of course these regressions simply tell us that new firm creation in the VC sub-industry segments respond to IPO signals. Thus, we next estimate regressions of the percentage of VC-financed new firms created in each of the VC sub-industries as a function of lagged IPO activity and industry dummies. We estimate OLS regressions both using the raw percentage of new firms created that are VC-financed as the dependent variable and using the log odds ratio of the percentage of new firms created that are VC-financed as the dependent variable. The results are reported in the last four columns of Table II.

Examining these results we see that the percentage of VC-financed firms created in response to lagged IPO activity in a particular industry does increase when we include industry dummies in the regressions, however the magnitude is extremely small. For each additional IPO in an industrial segment that occurred one year ago, taking out the average percentage of newly created firms that are VC-financed in that industry segment, the increase in the percentage of new firms created in response that are VC-backed rise by 0.007 percentage points. The coefficient on IPO activity two years ago is statistically insignificant from zero in the regressions. Thus, the percentage of newly created firms that are VC-financed remains fairly stable in response to lagged IPO activity.

The results presented here do not support the popular view that VCs are the primary drivers of new firm creation in sectors where large IPO activity occurs. Rather our results suggest both entrepreneurs and venture capitalists respond to public market IPO activity signals or windows of opportunity in a similar fashion.

D. VC Financing and Firm Failure

Finally, we analyze whether VC-financed firms have different survival rates than non-VC-financed firms. One characterization of venture capitalists often found in anecdotal evidence is that they to encourage the development of the one or two very high growth firms in their portfolio, i.e., the potential EBays and Googles, and care little about the rest of their portfolio.

Some argue that venture capitalists are quick to shut down companies; others suggest that venture capital is patient money and venture capitalists recognize the option value in their investments and exert effort to ensure companies do not close down.

Table III presents mortality tables, or cumulative exit rates, for our set of VC- and non-VC-financed firms for each of the three birth cohorts. We calculate the total percentage of firms in a particular cohort that have exited the LBD, or failed, after a particular number of years. For example, for firms in the 1995-2001 birth cohort, 13.5% of non-VC-financed firms failed after one year and 25.6% failed after one or two years. Thus, the percentage of non-VC-financed firms that failed after two years, but not after one year was 25.6-13.5 or 12.1%.

The main fact that emerges from Table III is that there are enormous differences in failure rates between VC- and non-VC-financed firms, especially in the first five years of firms' lives. The cumulative exit rate of non-VC-financed firms by the end of year five is between 35% and 40%, depending on the cohort, and for VC-financed firms it is only between 11% and 15%, depending on the cohort. After year five, the difference in the marginal failure rate between VC-financed and non-VC-financed firms declines dramatically; for each successive year the probability of exiting, conditional on surviving to age five is about the same for both VC- and non-VC-financed firms and continues to decline as firms age. This suggests that VCs make the biggest difference in the early years of firms' lifecycles or at least select firms in which to invest that are much less likely to fail early on, e.g., firms with better products or business ideas.

VC financing is strongly associated with a lower probability of firm failure. Thus, the larger VC-financed firm sizes relative to non-VC-financed firms are not being driven by higher failure rates of VC-financed firms relative to non-VC-financed firms, rather it seems that VC-financed firms on average dominate non-VC-financed firms both in terms of having higher growth rates and lower failure rates.

IV. Matching VC-Financed and Non-VC-Financed Firms by Size, Age, Industry and Region

One issue that can arise in the above analysis is that VC and non-VC backed firms may differ significantly even at the time of VC funding. Hence our next step is to match each VC-financed firm to a non-VC-financed firm at the time of getting VC funding based on four

characteristics. These characteristics are age of the firm, 4-digit SIC code, geographical region, same employment size. We then re-examine the relation between VC financing and firm size and failure for a set of firms that are observationally similar at the time at which one of them gets VC funding and the other does not. We examine if the life cycle dynamics between these observationally equivalent firms is significantly different or not and investigate some possible reasons.

A. Creating a Matched Sample of VC- and Non-VC-Financed Firms

We match each VC-financed firm in the LBD to a non-VC-financed firm that is in the same 4-digit SIC industry code, is the same age in the year the VC-financed firm first receives VC financing, is in the same geographical location and has the same number of employees at the time of VC financing. We obtain a one-to-one matched sample of 7,632 VC-financed firms and 7,632 non-VC-financed firms. The number of VC-financed firms in our matched sample is smaller than the total number of VC-financed firms in the LBD reported in Table I for two main reasons. First, some firms obtain VC financing in the year or two before they enter the LBD and some firms obtain VC financing after 2001, when the current version of the LBD ends. For these firms, we are unable to observe their employment in the year of VC financing and cannot match them to non-VC-financed firms based on this criterion. Second, for some VC-financed firms we cannot find an observationally equivalent non-VC-financed firm on all four dimensions – geography, age, industry and employment size. We exclude these non-matched VC-financed firms from our matched sample.

Table IV reports the characteristics of the matched sample on each of the four matching variables. About half of the sample is matched at age one, and one quarter is matched at age two. The rest are spread out along the age spectrum. Half of the firms are in “VC industry” SIC codes, defined as industries having at least 1.5% of new firms each year be VC-financed. Forty percent of the firms are located in California. About twelve percent each are in the New England, Mid Atlantic and South Atlantic census regions, for a total of thirty-six percent located on the east coast.⁴ The remaining firms are spread out in the interior of the U.S. Looking at

⁴ The nine Census region are defined as follows: New England (ME, VT, NH, MA, CT, RI), Mid-Atlantic (NY, PA, NJ), South Atlantic (DE, MD, WV, DC, VA, NC, SC, GA, FL), East North Central (WI, MI, IL, IN, OH), East South Central (KY, TN, MS, AL), West North Central (MN, IA, MO, ND, SD, NE, KS), West South Central (AR, OK, TX, LA), Mountain (MT, ID, WY, NV, UT, CO, AZ, NM) and Pacific (WA, OR, HI, AK).

employment size, we see that there is a lot more heterogeneity in the sizes of firms at matching than there is in their ages and geographies. The largest percentage, twenty-four, of firms have between eleven and twenty employees at matching. Between fifteen and seventeen percent of firms each fall into employment categories of 2-3, 4-6 and 7-10 at matching. Another eleven percent have between 21 and 30 employees at matching. There is then a tail of firms that have more than 30 employees at matching that trails off as employment numbers rise.

Thus, we have created a sample of VC- and non-VC-financed firms that look the same at the time the VC-financed firms first receive VC in terms of employment, age, industry and geography. We now turn to a re-examination of the relation between VC and firm size, profitability and exit to see how VC is related to these firm outcomes in a more stringently selected sample of firms.

B. Relation between VC Financing and Firm Size and Profitability

We first turn to an examination of firm size, measured in terms of employment and sales, and profitability.

B.1. Univariate Analysis

Figure 2a. plots average firm employment in “match time” or years around matching for the sample of matched VC-financed and non-VC-financed firms. Figure 2b plots average firm employment for the years in which we have sales data from the Economic Censuses and the LRD. Figure 2c plots average sales from the Economic Census and the LRD for the matched sample of VC-financed and non-VC-financed firms in match time. Focusing first on Figure 2a, we see that prior to VC financing, VC-financed and non-VC-financed firms have similar employment levels. By definition their employment levels are very similar at zero, the point of matching. For firms that are matched at ages greater than one, and whose averages make up the negative match time portion of Figure 2a, we see that in fact the non-VC-financed firms have slightly larger employment levels prior to matching. VC-financed firms grow slightly faster than non-VC-financed firms prior to receiving VC financing, when they receive at ages greater than one. This seems to indicate that VCs are looking for evidence of prior growth in the firms they back, though the growth is small with an increase in about 4 employees in the years prior to receiving VC financing. After VC financing, however, we see very rapid growth in the

employment of VC-financed firms relative to non-VC-financed firms. While VC-financed and non-VC-financed firms are matched at an average of 20 employees each, five years later VC-financed firms have on average just under 70 employees, while non-VC-financed firms have grown to only grown to just under 30 employees. Beyond five years after matching, or receiving VC financing in the case of VC-financed firms, we see greater employment growth by VC-financed firms relative to non-VC-financed firms, but the growth slows dramatically relative to the growth seen in the first five years after VC financing first occurs. Non-VC-financed firms do not “catch up” to VC-financed firms in these later years. They also continue to grow on average, but at a much slower rate than the VC-financed firms even in this later point in their lifecycles. Figure 2a suggests that non-VC-financed firms stay on average much smaller than VC-financed firms at all points along the lifecycle.

Turning to Figure 2b, we see a similar pattern as in Figure 2a. The average employment numbers are a bit noisier now because we are only observing five year snapshots for the services and trade industries. But again, we see that employment is similar for VC and non-VC financed firms prior to matching, but after VC financing major differences are observed as VC-financed firms grow much more quickly in hiring and particularly so in the first five years after receiving VC financing.

Turning to Figure 2c, we also see that VC-financed and non-VC-financed firms have similar levels of sales prior to matching. In fact non-VC-financed firms have on average slightly more sales than VC-financed firms prior to matching. Unlike the employment Figures in 2a and 2b, we do not observe more rapid sales growth of VC-financed firms relative to non-VC-financed firms prior to matching. Thus, if VCs are looking for evidence of firm growth prior to investing, they seem to be looking for investment in employment rather than an increase in production of the firm’s good. In the first several years after matching, VC-financed firms and non-VC-financed firms both experience increases in sales, but their sales growth is statistically indistinguishable. It is around five years after matching that we see VC-financed firms displaying much larger levels of sales relative to non-VC-financed firms. The picture that emerges from Figures 2a to 2c is one in which VC-financed and non-VC-financed firms look fairly similar prior to the VC-financed firms receiving VC financing. However, after receiving the financing, VC-financed firms grow rapidly in employment size, but their sales levels do not follow until about five years, just when employment growth is slowing for these firms. Non-VC-

financed firms, on the other hand, grow slightly over time, but they steadily increase in size, with employment growth keeping pace with sales growth for the most part.

Table V reports average firm employment, sales as well as profitability measures for the matched sample by time from matching. The first column of Table IX reports averages in the years prior to and including the match year, i.e. the year in which the VC-financed firm first gets VC financing. The second column reports averages in the five years following matching. The third column reports averages in the six to ten years following matching, and the last column reports averages for eleven years and more after matching. The first panel reports averages for all industries for which we have sales data; the second panel only reports averages for firms in the LRD for which we have more precise profitability measures.

Looking at average employment and sales in both panels, we see a similar story to that observed in Figure 2. Employment between non-VC-financed and VC-financed firms is not very different in magnitude prior to VC financing occurring; however, large investments in employment occur for VC-financed firms after matching relative to the non-VC-financed firms. Likewise, VC-financed and non-VC-financed firms have similar levels of sales prior to VC financing. In the first five years after VC financing, there is still no difference in the average sales of VC-financed and non-VC-financed firms. However, in years six and later, VC-financed firms exhibit much larger levels of sales relative to non-VC-financed firms.

Turning to the profitability measures, $(\text{Sales-Payroll})/\text{Sales}$ and Return on Sales (ROS), we see that once again prior to matching VC-financed and non-VC-financed firms display similar profitability. However, in the first five years after VC-financed firms receive VC financing, they become less profitable than non-VC-financed firms, consistent with their employment levels rising without an concomitant increase in sales. As firms age, VC-financed firms's profitability comes into line with that of non-VC-financed firms, but VC-financed firms are never on average more profitable than non-VC-financed firms. It is important to point out here that firms remain in our sample as long as they remain in the LBD and are not acquired or go public. Thus the averages of VC-backed firms that go public are not in Figure 2 or Table V. The figures in Table IX indicate that on average VC-backed firms are larger but no more profitable than non-VC-financed firms prior to their being exited by the venture capitalists.

B.2. Multivariate Analysis

While the univariate analysis is indicative it is useful to examine these results further in a multivariate setting. We now analyze the basic patterns uncovered in Figure 2 and Table V in a regression framework. For our matched sample we regress our firm size and profitability measures on a set of VC dummies which measure time from VC financing in five year intervals as in Table IX as well as dummies which measure time from matching in five year intervals for all firms. We also include a VC industry dummy, year dummies, match employment category dummies, age at matching and a constant term as covariates in each regression. The coefficients and t-statistics adjusted for clustering by firm are reported in Table VI. The first three specifications are estimated on all industries in the Census Waves for which we have sales information, i.e. services, trade and manufacturing. The last four specifications are estimated only on the manufacturing firms in the LRD.

Table VI shows that the patterns we observed in the previous sub-section hold in the more rigorous regression framework. In particular, prior to VC financing VC-financed firms have similar employment and sales sizes as well as similar profitability to non-VC-financed firms. In the first five years after VC financing, VC-financed firms become larger in terms of employment, however, their sales do not increase correspondingly, driving down their profitability relative to non-VC-financed firms. In years 6 to 10 after VC financing, VC-financed firms' sales levels surpass those of non-VC-financed firms, but their profitability is no different than that of non-VC-financed firms. The same is true in years greater than 10 following VC financing.

C. Relation between VC Financing and Firm Exit Rates

We have seen that VC-financed firms change massively in terms of size after VCs come on board. However, it is unclear to what extent these massive differences emerge because all VC-financed firms are growing more quickly, or perhaps because VCs shut down smaller firms more quickly relative to non-VC investors. Hence, we next turn to analysis of the failure dynamics in our matched sample of VC-financed and non-VC-financed firms.

C.1. Univariate Analysis

We first depict the exit rates of firms in our matched sample in mortality tables. Table VII reports cumulative exit percentages – failure, acquisition and IPO – in match time by birth cohort for VC- and non-VC-financed firms. We identify IPOs by merging firms in the LBD to SDC Global Platinum’s new issues database. We identify failures as firms that exit the LBD. We identify acquisitions as firms that become part of another firm and take on that other firm’s identity.

Looking at Table VII, we can immediately see that in all three cohorts, VC-financed firms are much less likely to fail than non-VC-financed firms. Likewise, VC-financed firms are more likely to be acquired and to go public than non-VC-financed firms. In the earlier two cohorts, five years after matching, about 30 percent of VC-financed firms have failed, whereas about 37 percent of non-VC-financed firms have failed. Ten years after matching, while the average failure rate has increased between VC- and non-VC-financed firms, the difference between them does not grow and in fact, shrinks slightly. However, due to much greater failure rates of non-VC-financed firms in the first five years after matching, the cumulative failure rate between VC- and non-VC-financed firms is still significantly different ten years after matching.

Thus, looking at Table VII, we see that even in our matched sample of firms, VC-financed firms are much less likely to fail, overall, than non-VC-financed firms. However, it appears the story is a bit more nuanced. After five years, it seems that the failure rate of VC-financed firms increases relative to that of surviving non-VC-financed firms. We turn to a more formal analysis below to test more rigorously for this pattern in the data.

C.2. Multivariate Analysis

We next model firm exit in probit models. For each exit event – failure, acquisition and IPO – we run a probit model on our matched sample of firms which includes the VC-time and Match-time dummies defined in Table VI. However, we exclude the dummies measuring time before matching, since we are only interested in measuring likelihood of exit after matching. (In fact, by construction, no firm can exit until it has been matched). We also include a VC industry dummy, year dummies, match employment categories, age at matching and a constant in each probit.

Table VIII reports the coefficients and z-statistics adjusted for clustering by firm for each of the three exit variables. We can see that the patterns observed in the mortality tables in Table

VII are born out in the probit estimations. In particular, VC-financed firms are much more likely to be acquired and to go public than non-VC-financed firms at all times. However, when it comes to failure, the story is more nuanced. In the first five years after VC financing, VC-financed firms are significantly less likely to fail than non-VC-financed firms. However, in years six and later following VC financing, any non-exited VC-financed firms is more likely to shut down than non-exited non-VC-financed firms. Thus, while VC-financed firms have a much greater chance of survival relative to non-VC-financed firms, if they do not reach an IPO or acquisitions exit six years after VC financing, their chance of survival relative to non-VC-financed firms which have managed to survive that long is much lower. Thus, it appears that VC is “patient” money, at least initially. In the first five years after investing, VC-financed firms are given a chance to grow with VCs rapidly growing firms in terms of employment relative to non-VC-financed firms. However, after this initial growth period, VC-financed firms have a much higher mortality rate, as well as exit rate via acquisition and IPO, relative to non-VC-financed firms. While VCs are initially patient (i.e., for five years), their patience fades in the later years of the investment, perhaps after the VCs have had a chance to observe whether their initial investments will bear fruit.

C.3. Firms Classified as VentureXpert Acquisitions and LBD Failures

Before turning to the final part of the analysis, we perform a robustness check to the probit analysis in Table VIII. VentureXpert classifies about 30 percent of the VC-financed firms in the LBD that exit the LBD (i.e. which fail according to our definition) as having been acquired. These firms exit the LBD which means they cease to operate in any of their old locations; however VentureXpert lists these firms as having been acquired. It is likely that just the assets of these VC-financed firms are acquired. In the analysis in Table VIII, we choose to classify these firms as failures, because even if the assets are being sold to another firm, the VC-financed firms ceases to operate in its old form. However, as a robustness check we re-classify these VC-financed firms as acquisitions instead of failures and re-estimate the probits. We find that VC-financed firms are still less likely to fail than non-VC-financed firms five years after receiving VC financing and are more likely to fail six years and later after VC financing, though the magnitudes of the differences in the later years is reduced, though is still statistically significant.

V. Do VC-Financed Firms have Different Survival Thresholds than Non-VC-Financed Firms?

We have seen in the previous section that VC-financed firms are initially more likely to survive, but then have much higher shut down rates relative to non-VC-financed firms as over time. Related to this is the question whether the threshold for firm survival is more stringent for VC financed firms. Do VCs simply wait to see if there is option value to be realized but then when they do shut down firms, have a much more stringent criterion for what it means to be a successful surviving firm relative to investors in non-VC-financed firms?

A. Failures

We examine whether VC-financed firms look different than non-VC-financed firms at failure. We report the average size and profitability of firms in the year they fail in Table IX. The first panel reports these numbers for all industries; the second panel reports for only the manufacturing firms in the LRD.

We see that VC-financed firms are on average larger than non-VC-financed firms when they fail, both in terms of employment and sales. However, they are not any more profitable. Thus, VCs do not appear to have higher survival thresholds in terms of profitability relative to investors in non-VC-financed firms. Rather, consistent with the growth results we reported earlier, VCs seem to grow all of their portfolio companies to a certain minimum level before deciding to shut down. This shut down decision does not seem to be based on observable profitability but rather on scale or perhaps some other unobservable variable.

B. Acquisitions and IPOs

Finally, it is possible that VCs show lower failure rates simply because some failures are disguised as acquisitions? To shed light on this question, we report average size and profitability of VC-financed and non-VC-financed firms at acquisition and IPO in Table X. We see that VC-financed and non-VC-financed firms look very similar at acquisition and IPO both in terms of size and profitability. This finding is robust to the alternative definition of VC-financed firm acquisition explored in Section IV.C.3. Thus, it does not appear that VCs are disguising failures as acquisitions and that the lower overall failure rates for VC-financed firms truly reflects a difference in failure rates between VC-financed and non-VC-financed firms.

VI. Conclusion

This paper is the first to our knowledge that uses limited access to Census data to assess the importance of VC in new firm creation. Using the universe of employer firms born over two decades across different industries and geographic areas, we are able to explore differences in VC and non-VC-financed firms in order address some important questions. Specifically, we ask what firm-level and market-wide characteristics do venture capitalists respond to in making their investments. We find that VC responds to public market signals by backing more new firms in sectors with greater IPO activity, but the proportion of VC- to non-VC-financed firms created in those sectors remains stable, suggesting it is not VCs that primarily drive new firm creation in response to IPO activity. On the firm level, we find that venture capitalists disproportionately invest in firms that have no commercial sales, but which exhibit high levels of initial investment. Further, VC-financed firms are larger than non-VC-financed firms, as measured by employment, sales and assets, at every point along the lifecycle, suggesting that scale of investment and production is an important criterion in VC financing. Finally, we examine whether VC-financed firms are more likely to be shut down relative to their non-VC-financed counterparts. We find, contrary to conventional wisdom that VCs concentrate solely on a few high growth companies to the neglect of other portfolio companies, that VC-financed firms actually have lower failure rates than non-VC-financed firms.

One issue that can arise in the above analysis is that VC and non-VC backed firms may differ significantly even at the time of VC funding. Hence our next step is to match each VC-financed firm to a non-VC-financed firm at the time of getting VC funding based on four characteristics. These characteristics are age of the firm, 4-digit SIC code, geographical region, same employment size. We then re-examine the relation between VC financing and firm size and failure for a set of firms that are observationally similar at the time at which one of them gets VC funding and the other does not. We examine if the life cycle dynamics between these observationally equivalent firms is significantly different or not and investigate some possible reasons.

After receiving VC, VC-financed firms exhibit larger levels of investment in employment and assets relative to the matched non-VC-financed firms, but do not exhibit larger levels of sales. VC-financed firms eventually exhibit larger levels of sales but their expenditures increase

correspondingly so that VC-financed firms are no more profitable than the non-VC-financed firms before they are exited. These results again speak to the importance of scale in VC financing and suggest VC is ‘patient’ money. Firm failure dynamics are more nuanced. VC is patient in the first five years with lower levels of failure rates, but the longer term probability of failure is higher. We do not find evidence that these results are being driven by VC failures being disguised as acquisitions or different thresholds for failure of VC and non-VC financed firms.

Our analysis of a large sample Census database that contains both VC- and non-VC-financed firms allows us to distill some fundamental facts on VC financing, its dynamics, and how it responds to firm level and market level characteristics. These aspects need to be taken into account in both future theoretical and empirical work that attempts to understand further why firms use VC, which firms venture capitalists choose to back, or how venture capitalists influence firms’ outcomes. Our findings also raise a number of future research questions. Are there differences in firms backed by different types of venture capitalists? While VC has had a positive effect on firms over the past two decades, have the ways that VC helps the performance of firms changed over time? If so, is this due to improved financial contracting or due to other interactive effects of VC?

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Figure 1. Employment by age and birth cohort for VC- and non-VC-financed firms in the VC industries. Center statistics are the averages of the variable between the 45th and 55th percentiles.

Figure 1a. Employment for VC and non-VC financed firms born between 1995 and 2001

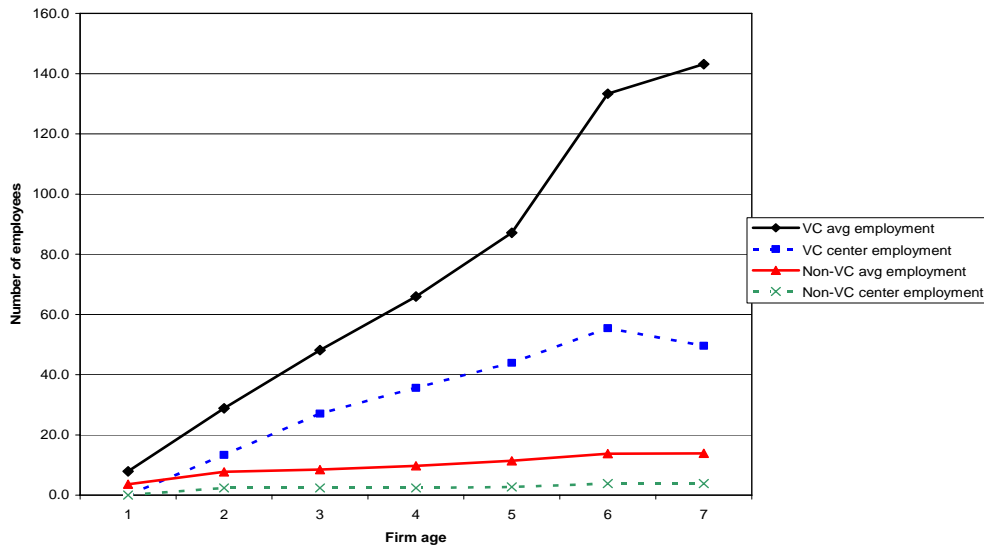


Figure 1b. Employment for VC and non-VC financed firms born between 1988 and 1994

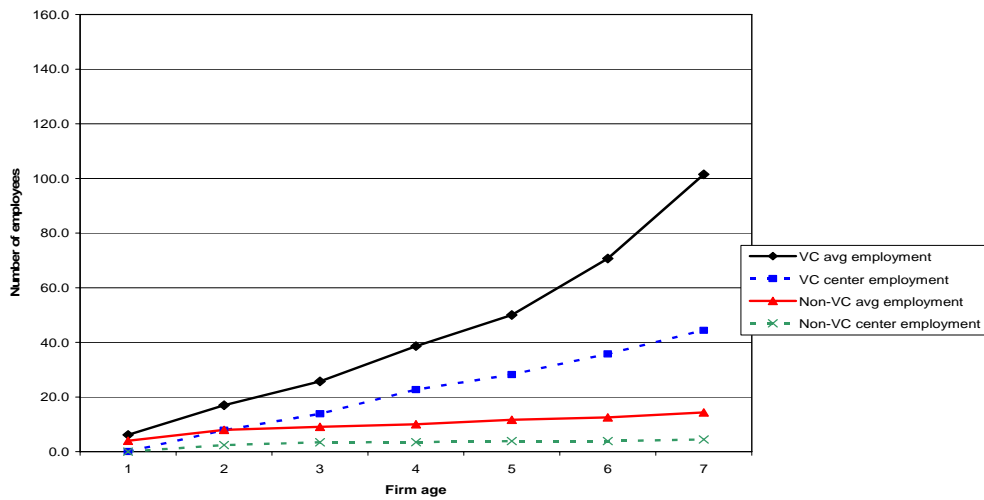


Figure 1c. Employment for VC and non-VC financed firms born between 1981 and 1987

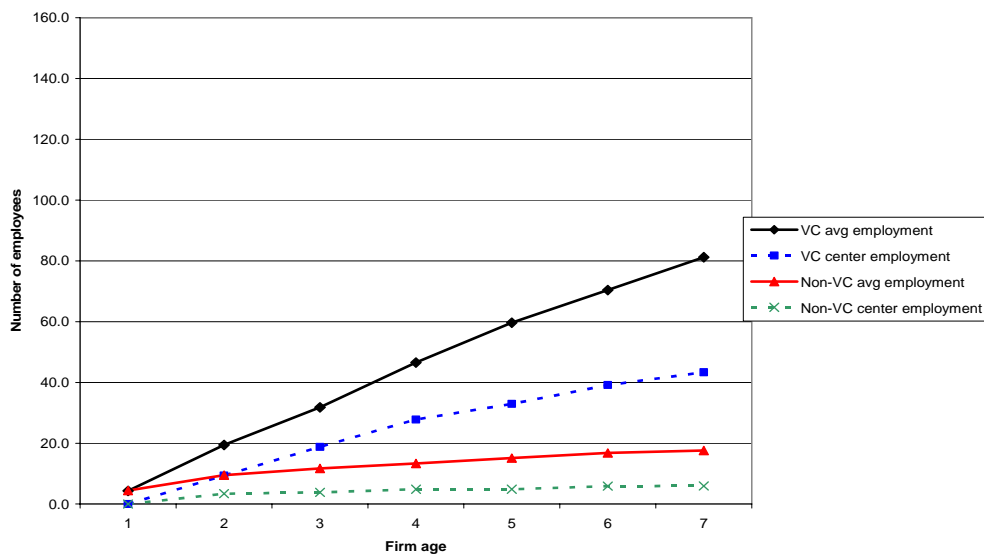


Figure 2. Average Employment and Sales for One-to-One Matched Sample

Figure 2.a. Average Employment of VC- and Non-VC-Financed Firms in One-to-One Matched Sample

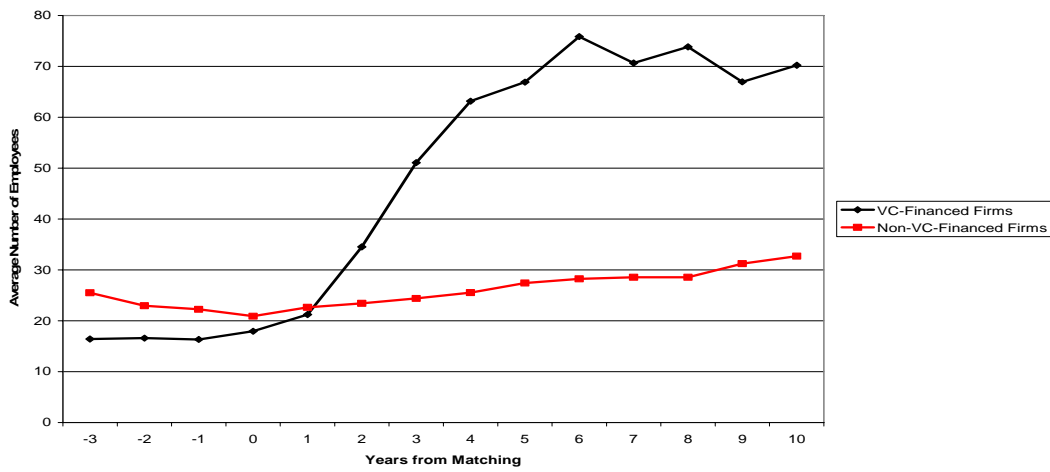


Figure 2.b. Average Employment of VC- and Non-VC-Financed Firms with Sales Data in One-to-One Matched Sample

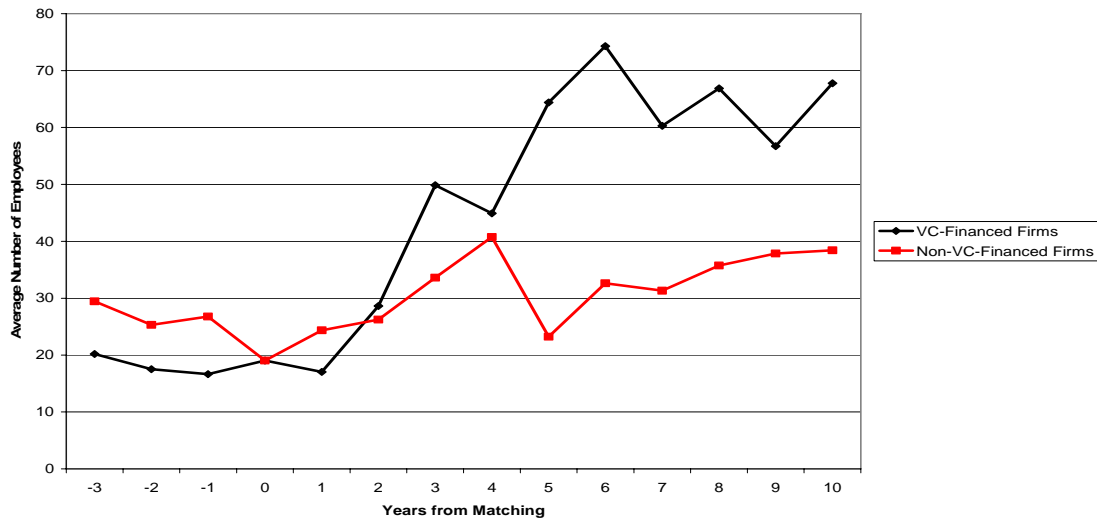


Figure 2.c. Average Sales of VC- and Non-VC-Financed Firms in One-to-One Matched Sample

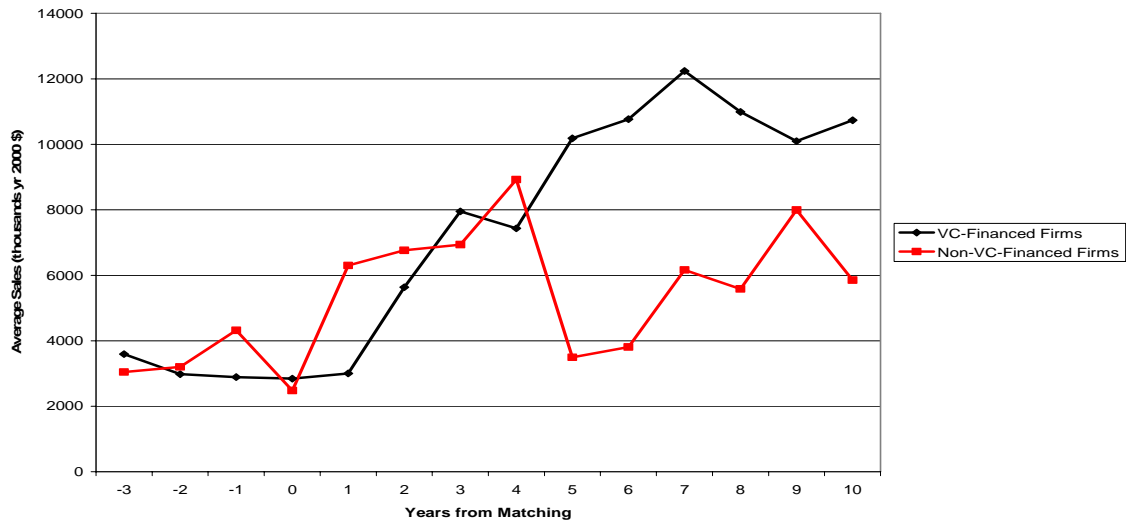


Table I. Industry Composition of VC- and Non-VC-Financed Firms Born between 1981 and 2001

The sample includes firms that enter the Longitudinal Business Database (LBD) between 1981 and 2001 with non-missing industry, organizational form and geography information. VC-financed firms are firms that can be matched to a portfolio company in VentureXpert according to the matching algorithm described in Section II.B, i.e. VC-financed firms are firms that receive VC financing at any point in time. VC industries are industries in which at least 1.5% of firms born in these industries between 1981 and 2001 are VC-financed. The VC industries include the "biotech" industries (SIC 2833, 2834, 2835, 2836, 8731, 8734), the "computer" industries (SIC 3571, 3572, 3575, 3577, 3578, 7371, 7372, 7373, 7374, 7375, 7376), the "telecom" industries (SIC 3661, 3663, 3669, 4813, 4822, 4832, 4833, 4841, 4899) and "other" VC industries (SIC 3672, 3674, 3675, 3677, 3678, 3679, 3841, 3842, 3843, 3844, 3845). Firm-level tax return revenue information is retrieved from the Standard Statistical Establishment List (SSEL) starting in 1995. Tax return revenue data is missing for one third of the non-VC-financed firms and for one quarter of VC-backed firms. The second row in each panel contains the set of firms that were born between 1995 and 2001 and that reported zero revenues on their tax returns in their first year.

Firms born between:	VC-Financed Firms											
	VC Industries					Non-VC Industries						
	Number Firms	% Biotech	% Computers	% Telecom	% Other	Number Firms	% Manu- facturing	% Whole- sale Trade	% Retail Trade	% Finance	% Services	% Other
1981 - 1987	1,070	13.2%	45.6%	12.0%	29.3%	1,663	30.2%	19.0%	7.8%	7.2%	29.0%	6.8%
1988 - 1994	1,252	23.0%	51.3%	8.3%	17.4%	1,549	15.7%	21.1%	9.1%	7.6%	39.3%	7.2%
1995 - 2001	3,384	14.8%	67.6%	9.8%	7.8%	3,947	9.7%	16.3%	11.4%	7.7%	48.2%	6.8%
1995-2001 with zero revenues	1,391	19.6%	60.1%	10.6%	9.6%	1,224	10.1%	19.0%	11.0%	6.9%	45.9%	7.3%

Firms born between:	Non-VC-Financed Firms											
	VC Industries					Non-VC Industries						
	Number Firms	% Biotech	% Computers	% Telecom	% Other	Number Firms	% Manu- facturing	% Whole- sale Trade	% Retail Trade	% Finance	% Services	% Other
1981 - 1987	40,884	6.1%	57.7%	21.1%	15.1%	3,706,018	5.3%	6.7%	25.4%	8.3%	34.6%	19.7%
1988 - 1994	55,136	12.1%	56.9%	19.7%	11.3%	4,065,370	4.9%	6.5%	21.9%	7.7%	33.0%	26.1%
1995 - 2001	106,299	8.4%	71.3%	15.0%	5.3%	4,222,705	4.3%	5.9%	21.4%	8.5%	37.1%	22.9%
1995-2001 with zero revenues	7,170	16.3%	65.4%	12.8%	5.5%	188,507	3.3%	4.8%	10.8%	28.1%	27.2%	25.9%

Table II. New Firm Creation in Response to IPO Activity

The sample consists of 80 observations which count the number of new firms in each VC sub-industry (i.e. biotech, computers, telecom and other) defined in Table I by year from 1982 to 2001. Each specification estimates the number of new firms created in each VC sub-industry or the percentage of new firms created that are VC financed as a function of the (lagged) number of IPOs in that sub-industry in each year as well as industry fixed effects. T-statistics corrected for heteroskedasticity and serial correlation are reported in parentheses. The first, third, and fourth set of specifications are OLS regressions. The second set of specifications are Poisson regressions estimated using maximum likelihood estimation.

	Number of new firms		Number of new firms		Percentage of new firms		Log odds ratio of percentage of	
	OLS		Poisson		that are VC financed		new firms that are VC financed	
IPOs in industry (-1)	51.02 (4.89)	39.42 (3.43)	0.011 (13.38)	0.006 (6.72)	0.002 (0.33)	0.007 (1.81)	0.002 (0.81)	0.003 (2.02)
IPOs in industry (-2)	35.49 (4.12)	26.39 (3.16)	0.008 (6.53)	0.004 (4.41)	-0.003 (-0.49)	0.001 (0.33)	0.000 (-0.16)	0.001 (0.37)
Biotech		815.06 (3.03)		0.176 (1.79)		0.650 (1.75)		0.181 (1.98)
Computer		3,640.56 (7.03)		1.576 (15.73)		-2.148 (-6.82)		-0.730 (-7.32)
Telecom		1,745.38 (6.57)		0.814 (12.23)		-2.611 (-8.11)		-1.069 (-8.55)
Constant	-785.82 (-2.66)	-1,544.56 (-4.27)	6.90 (63.91)	6.392 (132.43)	0.033 (10.51)	3.916 (11.40)	-3.605 (-28.51)	-3.288 (-31.87)
N	80	80	80	80	80	80	80	80
R-squared	0.673	0.830	0.643	0.906	0.002	0.682	0.005	0.705

Table III. Cumulative Failure Rates for Firms in VC Industries

The sample includes firms that enter the Longitudinal Business Database (LBD) between 1981 and 2001 with non-missing industry, location and organizational form information and that are in industries for which at least 1.5% of firms born between 1981 and 2001 are VC-financed ("VC Industry" SIC codes, defined in Table I). Each cell reports the cumulative percentage of firms in each cohort that fail (i.e. exit the LBD) in t years (t=1,2,...,10).

	Age									
	1	2	3	4	5	6	7	8	9	10
<i>Firms born between 1981 - 1987</i>										
VC-financed % fail	----	2.3%	4.5%	7.9%	11.2%	14.1%	17.1%	20.2%	23.6%	25.0%
non-VC-financed % fail	9.0%	19.6%	27.8%	34.2%	39.6%	44.5%	48.5%	51.8%	54.8%	57.7%
<i>Firms born between 1988 - 1994</i>										
VC-financed % fail	1.2%	2.8%	6.0%	9.4%	15.3%	21.4%	24.0%	26.4%	29.1%	30.7%
non-VC-financed % fail	8.6%	20.0%	28.8%	37.0%	44.0%	49.9%	54.2%	57.1%	59.2%	60.6%
<i>Firms born between 1995 - 2001</i>										
VC-financed % fail	2.1%	5.0%	8.2%	10.4%	11.2%	----	----	----	----	----
non-VC-financed % fail	13.5%	25.6%	32.4%	35.3%	36.5%	----	----	----	----	----

Table IV. Characteristics of One-to-One Matched Sample of VC- and Non-VC-Financed Firms

The sample includes VC-financed firms that enter the Longitudinal Business Database between 1981 and 2001, that first receive VC financing in the year they enter the LBD or in any subsequent year up to and including 2001 and that can be matched to a non-VC-financed firm that is of the same age as the VC-financed firm in the year in which the VC-financed firm first receives VC financing, that is in the same 4 digit SIC code as the VC-financed firm, that is in the same geographical region as the VC-financed firm and that has the same employment size as the VC-financed firm in the year the VC-financed firm first receives VC financing. Please see Section V.A. for a more detailed description of the matching process. The sample also includes the matched non-VC-financed firms. Age measures years the firm is in the LBD, i.e. age=n in the nth year a firm is in the LBD. VC industries are SIC codes in which at least 1.5% of firms born in them between 1981 and 2001 are VC-financed. VC industry SIC codes are listed in the caption of Table I. Please see footnote 3 for a description of the individual states comprising the geographical regions. The matched sample contains 7,632 VC-financed firms and 7,632 non-VC-financed firms.

	VC-Financed Firms		Non-VC-Financed Firms	
	Number	Percentage	Number	Percentage
<i>Age at Matching</i>				
1	3,587	47%	3,587	47%
2	1,794	24%	1,794	24%
3	835	11%	835	11%
4	457	6%	457	6%
5	286	4%	286	4%
6	165	2%	165	2%
7	139	2%	139	2%
8	80	1%	80	1%
9	69	1%	69	1%
10	46	1%	46	1%
>10	174	2%	174	2%
<i>VC Industry?</i>	3,560	47%	3,560	47%
<i>Number of Employees at Matching</i>				
2 - 3	1,264	17%	1,264	17%
4 - 6	1,159	15%	1,159	15%
7 - 10	1,266	17%	1,266	17%
11 - 20	1,854	24%	1,854	24%
21 - 30	812	11%	812	11%
31 - 50	681	9%	681	9%
51 - 70	205	3%	205	3%
71 - 100	148	2%	148	2%
101 - 300	218	3%	218	3%
> 300	25	0%	25	0%
<i>Geographical Region</i>				
California	3,062	40%	3,062	40%
New England	965	13%	965	13%
Mid Atlantic	920	12%	920	12%
South Atlantic	902	12%	902	12%
East North Central	395	5%	395	5%
East South Central	78	1%	78	1%
West North Central	219	3%	219	3%
West South Central	471	6%	471	6%
Mountain	358	5%	358	5%
Pacific Northwest	262	3%	262	3%

Table V. Average Firm Size and Profitability by Years from Matching for One-to-One Matched Sample of VC- and Non-VC-Financed Firms

The sample includes VC-financed firms that enter the Longitudinal Business Database between 1981 and 2001, that first receive VC financing in the year they enter the LBD or in any subsequent year up to and including 2001 and that can be matched to a non-VC-financed firm that is of the same age as the VC-financed firm in the year in which the VC-financed firm first receives VC financing, that is in the same 4 digit SIC code as the VC-financed firm, that is in the same geographical region as the VC-financed firm and that has the same employment size as the VC-financed firm in the year the VC-financed firm first receives VC financing. Please see Section IV.A. for a more detailed description of the matching process. The sample also includes the matched non-VC-financed firms. Firms are dropped from the sample when they are "exited", i.e. when they fail, are acquired or go public. Averages are reported by year from matching. T-statistics which test for double-sided difference in means between VC-financed and non-VC-financed firms are reported. Sales (total value of shipments) information is taken from the 1982, 1987, 1992, and 1997 waves of the Censuses of Services, Retail Trade and Wholesale Trade for firms in the services, retail trade and wholesale trade industries and from the Longitudinal Research Database (LRD) for firms in the manufacturing industries. LRD Income is total value of shipments minus payroll minus cost of materials minus capital expenditures minus rental payments. Return on sales (ROS) is income divided by total value of shipments.

	Years Prior to and Including Match Year	1-5 Years from Match Year	6-10 Years from Match Year	11 or More Years from Match Year
<i>All Industries</i>				
<i>Average Employment</i>				
VC-financed firms	16.46 (n=11,244)	39.78 (n=23,738)	72.56 (n=3,794)	81.95 (n=1,180)
non-VC-financed firms	21.81 (n=11,244)	23.98 (n=23,357)	29.41 (n=5,358)	39.24 (n=2,808)
t-statistic	-6.32	13.90	13.37	6.10
<i>Average Sales (thousands yr 2000 \$)</i>				
VC-financed firms	2,889.33 (n=1,963)	5815.80 (n=3,039)	11,000.63 (n=697)	16,545.93 (n=202)
non-VC-financed firms	3,158.82 (n=1,934)	6522.66 (n=2,959)	5,711.73 (n=891)	8,724.169 (n=416)
t-statistic	-0.86	-0.39	6.92	3.48
<i>Average (Sales-Payroll)/Sales</i>				
VC-financed firms	0.57 (n=1,963)	-0.15 (n=3,039)	0.59 (n=697)	0.57 (n=202)
non-VC-financed firms	0.58 (n=1,934)	0.59 (n=2,959)	0.64 (n=891)	0.55 (n=416)
t-statistic	-0.16	-1.63	-2.38	0.15
<i>LRD - Manufacturing Industries</i>				
<i>Average Employment</i>				
VC-financed firms	21.39 (n=233)	36.65 (n=715)	80.97 (n=234)	83.52 (n=52)
non-VC-financed firms	24.66 (n=225)	32.73 (n=608)	41.79 (n=252)	70.81 (n=144)
t-statistic	-0.66	0.43	4.91	0.63
<i>Average Sales (thousands yr 2000 \$)</i>				
VC-financed firms	3,588.92 (n=233)	7,428.64 (n=715)	13,240.96 (n=234)	13,610.15 (n=52)
non-VC-financed firms	2636.23 (n=225)	7,957.82 (n=608)	6,240.17 (n=252)	10,778.24 (n=144)
t-statistic	1.32	-0.12	5.63	0.88
<i>Average Income (thousands yr 2000 \$)</i>				
VC-financed firms	550.51 (n=233)	1,986.97 (n=715)	3,726.00 (n=234)	3,821.82 (n=52)
non-VC-financed firms	683.23 (n=225)	4,375.60 (n=608)	1,520.71 (n=252)	2,315.43 (n=144)
t-statistic	-0.67	-0.75	4.41	1.04
<i>Average ROS</i>				
VC-financed firms	0.29 (n=233)	0.12 (n=715)	0.22 (n=234)	0.08 (n=52)
non-VC-financed firms	0.28 (n=225)	0.28 (n=608)	0.22 (n=252)	0.20 (n=144)
t-statistic	0.73	-5.18	-0.19	-1.50

Table VI. Firm Size and Profitability Regressions for One-to-One Matched Sample of VC-Financed and Non-VC-Financed Firms

The sample includes VC-financed firms that enter the Longitudinal Business Database between 1981 and 2001, that first receive VC financing in the year they enter the LBD or in any subsequent year up to and including 2001 and that can be matched to a non-VC-financed firm that is of the same age as the VC-financed firm in the year in which the VC-financed firm first receives VC financing, that is in the same 4 digit SIC code as the VC-financed firm, that is in the same geographical region as the VC-financed firm and that has the same employment size as the VC-financed firm in the year the VC-financed firm first receives VC financing. Please see Section IV.A. for a more detailed description of the matching process. The sample also includes the matched non-VC-financed firms. Firms are dropped from the sample when they are "exited", i.e. when they fail, are acquired or go public. Sales information is taken from the 1982, 1987, 1992, and 1997 waves of the Censuses of Services, Retail Trade and Wholesale Trade for firms in the services, retail trade and wholesale trade industries and from the Longitudinal Research Database (LRD) for firms in the manufacturing industries. Income is sales minus payroll minus cost of materials minus capital expenditures minus rental payments. Return on sales (ROS) is income divided by sales. Coefficients and t-statistics (adjusted for clustering by firm) are reported for OLS regressions. Before VC is a dummy variable equal to one for VC-financed firms during the years prior to their being matched to a non-VC-financed firm. VC 1-5 is a dummy variable equal to one for VC-financed firms in years 1-5 following their being matched to a non-VC-financed firm. VC 6-10 is a dummy variable equal to one for VC-financed firms in years 6-10 following their being matched to a non-VC-financed firm. VC > 10 is a dummy variable equal to one for VC-financed firms in years >10 following their being matched to a non-VC-financed firm. Before Match is a dummy variable equal to one for all firms in the years prior to their being matched to a VC- or non-VC-financed counterpart. Match 1-5 is a dummy variable equal to one for all firms in years 1-5 following their being matched to a VC- or non-VC-financed counterpart. Match 6-10 is a dummy variable equal to one for all firms in years 6-10 following their being matched to a VC-financed or non-VC-financed counterpart. Also included in each regression, but not reported, are year dummies, an dummy for whether a firm is in a VC industry (defined in Table I), dummies for match employment category and a constant.

<i>Dependent Variable:</i>	Services, Retail Trade, Wholesale Trade and Manufacturing			Manufacturing (LRD only)			
	Employment	Sales (thousands yr 2000 \$)	<u>(Sales-Payroll)</u> Sales	Employment	Sales (thousands yr 2000 \$)	Income (thousanc yr 2000 \$)	ROS
Before VC	-5.44 (-3.31)	-513.67 (-1.27)	0.00 (0.07)	-1.76 (-0.31)	1,334.70 (1.21)	214.31 (0.46)	0.02 (1.28)
VC 1-5	15.78 (11.18)	-997.31 (-0.28)	-0.75 (-1.62)	-1.32 (-0.14)	-792.46 (-0.18)	-2,270.01 (-0.72)	-0.15 (-5.24)
VC 6-10	44.52 (7.68)	5,390.05 (5.31)	-0.10 (-1.15)	31.61 (-3.10)	7,123.18 (3.29)	2,708.25 (2.23)	-0.04 (-1.01)
VC >10	44.35 (2.65)	7301.55 (2.02)	0.03 (0.27)	9.21 (0.48)	2,386.69 (0.68)	1,461.79 (0.72)	-0.13 (-1.24)
Before Match	-30.67 (-4.37)	-5,381.32 (-2.37)	0.31 (1.24)	-51.02 (-4.72)	-6,184.20 (-2.18)	-311.41 (-0.17)	-0.04 (-0.82)
Match 1-5	-19.06 (-2.73)	388.32 (0.07)	0.03 (0.32)	-31.59 (-1.88)	670.25 (0.09)	3,747.32 (0.74)	-0.02 (-0.40)
Match 6-10	-8.74 (-1.53)	-1,068.18 (-0.52)	0.07 (0.83)	-23.73 (-2.66)	-1,898.38 (-0.83)	498.43 (0.34)	-0.05 (-1.02)
N	82,705	12,095	12,095	2,464	2,464	2,464	2,464
R2	0.12	0.02	0.00	0.10	0.02	0.01	0.09

Table VII. Cumulative Exit Rates for One-to-One Matched Sample of VC- and Non-VC-Financed Firms

The sample includes VC-financed firms that enter the Longitudinal Business Database between 1981 and 2001, that first receive VC financing in the year they enter the LBD or in any subsequent year up to and including 2001 and that can be matched to a non-VC-financed firm that is of the same age as the VC-financed firm in the year in which the VC-financed firm first receives VC financing, that is in the same 4 digit SIC code as the VC-financed firm, that is in the same geographical region as the VC-financed firm and that has the same employment size as the VC-financed firm in the year the VC-financed firm first receives VC financing. Please see Section IV.A. for a more detailed description of the matching process. The sample also includes the matched non-VC-financed firms. Cumulative percentages of firms that fail, are acquired or go public each year from a firm being matched to a VC-financed or non-VC-financed counterpart are reported. T-statistics for double-sided differences in means between cumulative exit percentage of VC- and non-VC-financed firms are reported.

	Years from Matching									
	1	2	3	4	5	6	7	8	9	10
<i>Firms born 1981-1987 (n=1,519 for VC-financed; n=1,519 for non-VC-financed)</i>										
VC-financed										
% fail	3.75	9.41	17.77	26.4	33.25	38.64	42.86	45.69	48.52	50.36
% acquired	----	----	----	----	6.12	----	----	----	----	10.27
% IPO	----	----	----	----	10.47	----	----	----	----	17.18
non-VC-financed										
% fail	8.43	19.68	28.7	34.5	39.89	45.16	48.52	51.81	54.25	56.88
% acquired	----	----	----	----	----	----	----	----	----	3.55
% IPO	----	----	----	----	----	----	----	----	----	----
t-statistic for % fail	----	----	----	----	-3.81	----	----	----	----	-3.61
t-statistic for % acquired	----	----	----	----	----	----	----	----	----	7.72
<i>Firms born between 1988-1994 (n=1,605 for VC-financed; n=1,605 for non-VC-financed)</i>										
VC-financed										
% fail	4.17	9.91	17.07	22.74	27.91	31.84	34.08	35.33	----	37.13
% acquired	----	----	----	----	6.23	----	----	----	----	7.73
% IPO	----	----	----	----	16.32	----	----	----	----	19.00
non-VC-financed										
% fail	9.1	17.82	25.55	32.34	36.95	40.87	43.74	45.3	----	46.85
% acquired	----	----	----	----	----	----	----	----	----	1.68
% IPO	----	----	----	----	----	----	----	----	----	----
t-statistic for % fail	----	----	----	----	-5.49	----	----	----	----	-5.60
t-statistic for % acquired	----	----	----	----	----	----	----	----	----	8.17
<i>Firms born between 1995-2001 (n=4,508 for VC-financed; n=4,508 for non-VC-financed)</i>										
VC-financed										
% fail	5.66	10.27	13.6	15.88	16.44	----	----	----	----	----
% acquired	----	----	----	----	1.91	----	----	----	----	----
% IPO	----	----	----	----	4.41	----	----	----	----	----
non-VC-financed										
% fail	10.18	19.25	22.58	24.71	25.62	----	----	----	----	----
% acquired	----	----	----	----	0.73	----	----	----	----	----
% IPO	----	----	----	----	----	----	----	----	----	----
t-statistic for % fail	----	----	----	----	-10.77	----	----	----	----	----
t-statistic for % acquired	----	----	----	----	4.90	----	----	----	----	----

Table VIII. Firm Exit Probits for One-to-One Matched Sample of VC-Financed and Non-VC-Financed Firms

The sample includes VC-financed firms that enter the Longitudinal Business Database between 1981 and 2001, that first receive VC financing in the year they enter the LBD or in any subsequent year up to and including 2001 and that can be matched to a non-VC-financed firm that is of the same age as the VC-financed firm in the year in which the VC-financed firm first receives VC financing, that is in the same 4 digit SIC code as the VC-financed firm, that is in the same geographical region as the VC-financed firm and that has the same employment size as the VC-financed firm in the year the VC-financed firm first receives VC financing. Only observations after matching are included in the sample since we are interested in measuring probability of exit from the time of VC financing. Please see Section IV.A. for a more detailed description of the matching process. The sample also includes the matched non-VC-financed firms. Coefficients, marginal probabilities at sample means and z-statistics adjusted for clustering by firm for probit models estimated using maximum likelihood are reported for five specifications. Marginal probabilities are reported in brackets and z-statistics are reported in parentheses. VC 1-5 is a dummy variable equal to one for VC-financed firms in years 1-5 following their being matched to a non-VC-financed firm. VC 6-10 is a dummy variable equal to one for VC-financed firms in years 6-10 following their being matched to a non-VC-financed firm. VC > 10 is a dummy variable equal to one for VC-financed firms in years >10 following their being matched to a non-VC-financed firm. Match 1-5 is a dummy variable equal to one for all firms in years 1-5 following their being matched to a VC- or non-VC-financed counterpart. Match 6-10 is a dummy variable equal to one for all firms in years 6-10 following their being matched to a VC-financed or non-VC-financed counterpart. Also included in each probit, but not reported, are year dummies, an dummy for whether a firm is in a VC industry (defined in Table I), dummies for match employment category and a constant.

<i>Exit type:</i>	$\text{Pr}(\text{Firm } i \text{ exits in year } t = 1) = \Phi(\mathbf{X}_{it}\mathbf{B} + e_{it})$		
	Fail	Acquired	IPO
VC 1-5	-0.21 (-13.02)	0.38 (8.60)	1.20 (17.13)
VC 6-10	0.15 (4.70)	0.84 (8.63)	1.36 (11.88)
VC >10	0.25 (4.15)	0.92 (6.37)	1.49 (5.16)
Match 1-5	0.13 (3.29)	0.06 (0.48)	0.28 (0.96)
Match 6-10	0.22 (4.93)	-0.05 (-0.32)	0.43 (1.43)
N	66,905	66,905	66,876
Pseudo-R2	0.03	0.12	0.17

Table IX. Comparing Failed VC-Financed and Non-VC-Financed Firms in One-to-One Matched Sample

The sample includes VC-financed firms that enter the Longitudinal Business Database between 1981 and 2001, that first receive VC financing in the year they enter the LBD or in any subsequent year up to and including 2001 and that can be matched to a non-VC-financed firm that is of the same age as the VC-financed firm in the year in which the VC-financed firm first receives VC financing, that is in the same 4 digit SIC code as the VC-financed firm, that is in the same geographical region as the VC-financed firm and that has the same employment size as the VC-financed firm in the year the VC-financed firm first receives VC financing. Please see Section IV.A. for a more detailed description of the matching process. The sample also includes the matched non-VC-financed firms. Sales information is taken from the 1982, 1987, 1992, and 1997 waves of the Censuses of Services, Retail Trade and Wholesale Trade for firms in the services, retail trade and wholesale trade industries and from the Longitudinal Research Database (LRD) for firms in the manufacturing industries. Income is sales minus payroll minus cost of materials minus capital expenditures minus rental payments. Return on sales (ROS) is income divided by sales. Reported t-statistics test for double-sided differences in the reported means.

Failures

<i>All Industries</i>	Number	Age at Exit	Employment at Exit	Number with Sales Data	Sales at Exit	<u>(Sales-Payroll)</u> Sales	
VC-financed firms	2,205	5.44	32.57	264	4,461.37	0.43	
non-VC-financed firms	2,909	4.78	17.16	402	1,433.60	0.70	
t-statistic		-6.61	-5.60		-6.91	1.66	
 <i>LRD - Manufacturing Industries</i>	 Number	 Age at Exit	 Employment at Exit	 Number with Sales Data	 Sales at Exit	 Income at Exit	 ROS at Exit
VC-financed firms	83	5.82	32.04	63	4,758.97	1,504.65	0.29
non-VC-financed firms	103	5.49	15.43	78	2,213.20	903.65	0.33
t-statistic		-0.61	-2.47		-2.59	-1.34	0.67

Table X. Comparing Acquired and IPOed VC-Financed and Non-VC-Financed Firms in One-to-One Matched Sample

The sample includes VC-financed firms that enter the Longitudinal Business Database between 1981 and 2001, that first receive VC financing in the year they enter the LBD or in any subsequent year up to and including 2001 and that can be matched to a non-VC-financed firm that is of the same age as the VC-financed firm in the year in which the VC-financed firm first receives VC financing, that is in the same 4 digit SIC code as the VC-financed firm, that is in the same geographical region as the VC-financed firm and that has the same employment size as the VC-financed firm in the year the VC-financed firm first receives VC financing. Please see Section IV.A. for a more detailed description of the matching process. The sample also includes the matched non-VC-financed firms. Sales information is taken from the 1982, 1987, 1992, and 1997 waves of the Censuses of Services, Retail Trade and Wholesale Trade for firms in the services, retail trade and wholesale trade industries and from the Longitudinal Research Database (LRD) for firms in the manufacturing industries. Reported t-statistics test for double-sided differences in the reported means.

<i>Acquisitions</i>						
<i>All Industries</i>	Number	Age at Exit	Employment at Exit	Number with Sales Data	Sales at Exit	<u>(Sales-Payroll)</u> Sales
VC-financed firms	377	5.92	134.33	65	25,309.38	-1.59
non-VC-financed firms	100	5.17	132.74	10	15,098.44	0.70
t-statistic		-1.66	-0.03		-0.42	0.42
<i>IPOs</i>						
<i>All Industries</i>	Number	Age at Exit	Employment at Exit	Number with Sales Data	Sales at Exit	<u>(Sales-Payroll)</u> Sales
VC-financed firms	744	5.34	81.44	-----	-----	-----
non-VC-financed firms	22	5.45	120.77	-----	-----	-----
t-statistic		0.18	1.07			