

Entrepreneurship in Silicon Valley During the Boom and Bust

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for



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Purpose

The purpose of this study is to understand the impact of tight labor markets on the high-tech industry and its effect on entrepreneurship in Silicon Valley during the boom and bust. This report uses a new measure of entrepreneurial activity to study entrepreneurship from 1996 to 2005 in Silicon Valley known as "The Kauffman Index of Entrepreneurial Activity" (KIEA). This new measure captures the rate of business creation at the individual owner level.

Economic expansion in the late 1990s generated many opportunities for business creation and productivity growth, which has been mostly linked with investment in information and communication technologies. Regions with large concentration of high-tech industries in the San Francisco, San Jose, and especially the Silicon Valley area, placed emphasis on the role of startups and entrepreneurship. This period was set apart by swiftly rising stock prices, lucrative stock options, venture capital deals, initial public offerings, and tight labor markets. Consequently, it is unclear whether this was a period of heightened entrepreneurship or one in which returns to working in firms discouraged entrepreneurship.

This paper investigates the effects of tight labor markets on entrepreneurship activity in the Silicon Valley compared to California and the United States.

Overall Findings

The study finds that entrepreneurship rates in Silicon Valley were higher than in the rest of the United States during the expansion period of the late 1990s. During this time period, entrepreneurship rates increased in the Silicon Valley while the national rate remained constant. The study

points out that entrepreneurship was higher after the dot com bust in Silicon Valley than during the boom period.

The findings indicate that demographic characteristics of the population and economic conditions are important at least in terms of potentially creating high rates of entrepreneurship. Silicon Valley entrepreneurship rates as a whole appear to have been suppressed by the extremely tight labor markets during this period.

Highlights

- High-tech industries appear to be important in contributing to high rates of entrepreneurship in Silicon Valley, but entrepreneurship in other industries comprises the bulk of total entrepreneurship in the area.
- The rest of California and several large metropolitan statistical areas had higher rates of entrepreneurship than Silicon Valley during the late 1990s.
- Controlling for differences in demographic characteristics, previous employment status, and industry concentrations, Silicon Valley had higher rates of entrepreneurship than the rest of the United States during the late 1990s.
- Residents of Silicon Valley are more likely to be immigrants and more highly educated than the rest of the United States, but are less likely to own homes and be unemployed, all of which are important determinants of business creation.
- Controlling for changes in demographic characteristics, unemployment, and industry composition, entrepreneurship rates in Silicon Valley increased by 0.034 percentage points from the late 1990s to the post-boom period relative to the trend in the U.S. entrepreneurship rate.

Data Sources

Entrepreneurship rates are estimated using micro-data matched monthly files from the Current Population Survey (CPS) for the time period 1996–2005. The mid to late 1990s period has been chosen and defined as the economic boom period, and early 2000s to 2005 has been defined as the post-boom period.

Entrepreneurship rate is defined in this study as the percent of the population of non-business owners that start a business each month. This survey is conducted by the U.S. Bureau of the Census and the U.S. Bureau of Labor Statistics, and is representative of the U.S. population. Matching the monthly files allows for all new business owners both incorporated and unincorporated as well as those who are employers or non-employers to be captured. To estimate the entrepreneurship rate, all observations with allocated labor force status, class of worker, and hours worked variables are excluded from the sample.

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Executive Summary

Silicon Valley during the late 1990s has been heralded as a place and time of rampant entrepreneurship. Undoubtedly the economic expansion of the late 1990s created many opportunities for business creation, but the opportunity cost of starting a business was also extremely high during this period. The unemployment rate was falling rapidly, wage and salary earnings were rising, employees were increasingly likely to receive stock options and signing bonuses, and investing in the stock market paid substantial returns. This study provides the first evidence on whether entrepreneurship was relatively high during the late 1990s in Silicon Valley from nationally representative data on all new business owners. Entrepreneurship rates are estimated using microdata from matched monthly files from the Current Population Survey (CPS). The new dynamic measure of entrepreneurship captures business formation at the individual owner level for all types of businesses, including incorporated, unincorporated, employer and non-employer firms. Previous estimates of business formation primarily rely on data for employer firms.

The main findings from the analysis of entrepreneurship in Silicon Valley using the matched CPS data are:

1. Entrepreneurship rates were higher in Silicon Valley than the rest of the United States during the period from January 1996 to February 2000, but the difference was not large. An average of 0.31 percent of the adult population (or 310 out of 100,000 adults) created a new business each month in Silicon Valley. The U.S. entrepreneurship rate was 0.29 percent or 290 out of 100,000 adults during this period.
2. The rest of California and several large MSAs had higher rates of entrepreneurship than Silicon Valley during the late 1990s.

3. High-tech industries appear to be important in contributing to high rates on entrepreneurship in Silicon Valley, but entrepreneurship in other industries comprises the bulk of total entrepreneurship in the area.
4. Residents of Silicon Valley are more likely to be immigrants and highly educated than the rest of the United States, but are less likely to own homes and be unemployed, all of which are important determinants of business creation.
5. Controlling for differences in demographic characteristics, previous employment status and industry concentrations, Silicon Valley had higher rates of entrepreneurship than the rest of the United States during the late 1990s. The difference in adjusted entrepreneurship rates was 0.045 percentage points, which is larger than the difference in unadjusted entrepreneurship rates of 0.02 percentage points.
6. Entrepreneurship rates in Silicon Valley increased from 0.31 percent in the period of strong economic growth in the late 1990s to 0.35 percent in the post-boom period of the early to mid 2000s.
7. Entrepreneurship rates in the United States were constant over this period and there was a downward trend in entrepreneurship in the rest of California.
8. Controlling for changes in demographic characteristics, unemployment and industry composition, entrepreneurship rates in Silicon Valley increased by 0.034 percentage points from the late 1990s to the post-boom period relative to the trend in the U.S. entrepreneurship rate.

1. Introduction

The acceleration of productivity growth in the United States in the late 1990s appears to have been connected with greater investment in information and communication technologies (ICT) (Autor, et al., 1998; Brynjolfsson and Hitt, 2000; Council of Economic Advisers, 2001). It is also now well known that the sectors of the economy that have invested the most in information technology experienced some of the largest productivity gains during the 1990s and that the application of information technologies has stimulated remarkable improvements in production processes in many sectors of the economy. Silicon Valley, California played a major role in the expansion of ICTs in the 1990s. The large concentration of hi-tech industries in the corridor between San Francisco and San Jose is well known, and much emphasis was placed on the role of entrepreneurs and startups, especially in hi-tech industries and regions such as Silicon Valley in contributing to economic growth in the 1990s.

The period of the late 1990s was characterized by a frenzied state of rapidly rising stock prices, lucrative stock options, Initial Public Offering (IPOs), venture capital deals and tight labor markets. The NASDAQ rose from 1,059 on January 2, 1996 to 5,049 on March 10, 2000. Unemployment reached a low of 1.7 percent in December 2000 in Silicon Valley and 4.7 percent in January 2001 in California. The late 1990s were also characterized by a marked increase in the use of computers and the Internet by individuals and firms. The media dubbed it the "dot com" boom. There was the impression that everyone was or planned to be an entrepreneur and involved in some type of startup.¹

Although there was the perception that entrepreneurship was extremely high during the late 1990s, especially in hi-tech locations such as Silicon Valley, and the rest of California there

is no evidence in the literature from nationally representative data supporting this claim. The economic expansion of the 1990s undoubtedly created many opportunities for entrepreneurship and startups, but there also existed several factors that may have suppressed entrepreneurship and business creation during this period. The late 1990s represented a period in which the unemployment rate was falling rapidly, wage and salary earnings were rising, stock options and signing bonuses were becoming commonplace, and investing in the stock market paid substantial returns. Therefore, it is ambiguous as to whether this was a period of heightened entrepreneurship or one in which entrepreneurship was low because the returns to working at firms were very attractive.

In this report, a new measure of entrepreneurial activity is used to study entrepreneurship from 1996 to 2005 in Silicon Valley.² Entrepreneurship rates are estimated using microdata from matched monthly files from the Current Population Survey (CPS). The matched data allow for the creation of a measure of entrepreneurship that captures the rate of business formation at the individual owner level. The common measures of business ownership rates based on the non-matched, cross-sectional CPS data do not capture the dynamic nature implied when defining entrepreneurship. All new business owners are captured including those who own incorporated or unincorporated businesses, and those who are employers or non-employers. This is a major advantage over other recent measures of entrepreneurial activity or firm formation that focus on employer firm births (see Advanced Research Technologies, LLC, 2005 for example). Non-employer firms represent 75 percent of all firms (U.S. Small Business Administration 2001,

¹ See "Understanding Silicon Valley: The Anatomy of an Entrepreneurial Region" Kenney 2000, "The Silicon Valley Edge: A Habitat for Innovation and Entrepreneurship" Lee, et al. 2000, and "The Soul of a New Economy," New York Times, December 29, 1997 for a few examples.

² National and state-level measures have been reported as the Kauffman Index of Entrepreneurial Activity (Fairlie 2006a, 2006b).

Headd 2005) and a significant number of new employer firms start as non-employer firms (Davis, et. al. 2006).

The matched CPS data provide the first estimates of entrepreneurship rates at the individual-level in Silicon Valley. The detailed demographic information available in the CPS also allows for an empirical analysis of the determinants of entrepreneurship. Entrepreneurship rates in Silicon Valley are compared to rates in the rest of California, United States, and other large metropolitan areas during the late 1990s. The full sample size of the matched CPS is more than 8 million observations from 1996 to 2005 allowing for geographical analyses and national comparisons. Entrepreneurship rates are also estimated for the post-boom period and are estimated with controls for demographic and other characteristics. Three key questions are addressed in the analysis.

- Was entrepreneurship higher in Silicon Valley than other parts of the United States in the economic expansion of the late 1990s? The rapidly growing economy may have created many opportunities for startups, but wage and salary earnings and the opportunity cost of capital were also rising rapidly.
- Silicon Valley has a highly educated population and large concentration of immigrants, which are both associated with entrepreneurship. Were entrepreneurship rates higher in Silicon Valley than the rest of the United States after controlling for differences in demographic characteristics, previous employment status and industries?
- Did the downturn of the early 2000s reverse an upward trend in entrepreneurship or did it increase entrepreneurship in Silicon Valley? Was entrepreneurship suppressed in Silicon Valley in the late 1990s relative to the rest of the country because of the unusually tight labor market?

2. A Simple Model of the Entrepreneurial Decision

A theoretical analysis of the choice to become self-employed has generally been based upon the relative earnings that a worker could obtain there in comparison with his or her earnings at a wage and salary job. The classic model by Evans and Jovanovic (1989) relies upon a

framework where an individual can obtain the following income, Y^W , from the wage and salary sector: $Y^W = w + rA$, where w is the wage earned in the market, r is the interest rate, and A represents the consumer's assets. Earnings in the self-employment sector, Y^{SE} , are defined as: $Y^{SE} = \theta f(k)\varepsilon + r(A-k)$, where θ is entrepreneurial ability, $f(\cdot)$ is a production function whose only input is capital, ε is a random component to the production process, and k is the amount of capital purchased by the worker. Thus, the decision depends on a comparison of potential income from wage and salary work and investing wealth with potential income from self-employment and investing the remaining wealth after using it for startup capital.

This simple theoretical model provides several insights that are useful for thinking about entrepreneurship in the late 1990s and subsequent downturn in Silicon Valley, California, and the rest of the United States. First, the boom of the 1990s provided strong consumer and firm demand for products and services provided by startups, thus increasing entrepreneurial earnings, Y^{SE} . Although economic growth may have improved the returns to entrepreneurship nationally, Silicon Valley entrepreneurs may have gained even more because of the especially strong local economic conditions during this period.

Second, the increased use of the personal computer and Internet in the late 1990s may have also altered the production function, and the rapidly falling price of technology may have decreased the price of startup capital. Previous research indicates that personal computers are useful for most small businesses. Estimates from the 1998 Survey of Small Business Finances indicate that more than 75 percent of small businesses used computers (Bitler, Robb and Wolken 2001, and Bitler 2002), and estimates from the 2000 Computer and Internet Usage Supplement (CIUS) to the Current Population Survey (CPS) indicate high rates of computer ownership among self-employed business owners (U.S. Small Business Administration 2003). Small- and

medium-sized businesses are also found to make relatively large investments in computers and communication equipment (Buckley and Montes 2002) and 25 to 45 percent of total capital expenditures are for computers among relatively young employer firms (Haltiwanger 2004).³

There is also direct evidence that access to personal computer increases entrepreneurship. Using matched data from the 1997-2001 Computer and Internet Usage Supplements to subsequent Outgoing Rotation Group files from the Current Population Survey, Fairlie (2004, 2005) finds that individuals who had access to a home computer are substantially more likely to become an entrepreneur over the following 12-15 months. Estimates from probit and bivariate probit regressions also provide evidence of a strong positive relationship between computer ownership and entrepreneurship among women and some evidence of a positive relationship for men. Home computers may make it easier for a potential entrepreneur to create an experimental business plan, obtain information about tax codes and legal regulations, learn about specific industries, and research competition. Further, the skills acquired from owning a home computer, such as familiarity with using spreadsheets, word processing and database programs, may be valuable for creating and managing a business, and specific computer skills, such as programming, graphics design, and hardware knowledge, may be especially valuable for creating firms in hi-tech industries.⁴ Finally, the personal computer, especially through use of the Internet, may substantially lower marketing, investment and operating costs.

On the other hand, earnings, and more generally, compensation in the wage/salary sector were increasing very rapidly during this period resulting in a higher w , which in turn decreased

³ Large investments in computer equipment, however, may only occur after the initial stages of business formation. Investments in computers per employee increase rapidly with firm size (Buckley and Montes 2002), and computer investment as a share of total capital expenditures increases rapidly with firm age, at least through the first five years (Haltiwanger 2004).

the probability of becoming an entrepreneur. Figure 1 displays average annual earnings in the San Francisco/San Jose metropolitan area, California, and the United States. In the San Francisco/San Jose area, mean earnings rose from \$45,000 to more than \$65,000, which was far higher than mean earnings in California or the United States. The unemployment rate also dropped rapidly over this period of time (see Figure 2).⁵ The unemployment rate in San Francisco/San Jose fell to a remarkable low of 1.7 percent in December 2000. Overall, the late 1990s were a period when the returns to the wage/salary sector were at unprecedented levels.⁶

Another factor creating downward pressure on entrepreneurship was the opportunity cost of capital, r . The returns to investing in the stock market were extremely high during this time period. Figure 3 displays the returns to investing in a few different assets over the 1996 to 2004 period. Investing \$10,000 in the NASDAQ in 1995 would have returned \$45,000 from 1996 to 2000, and investing \$10,000 in the SP 500 would have returned nearly \$22,000. Of course, investing in a less risky asset would have paid smaller returns, but many investors were placing a lot of money in the stock market at this point in time, and investing this money in a startup meant missing out on those returns.

The booming stock market, however, also increased personal wealth, A . In the presence of liquidity constraints, higher levels of wealth may have made it easier for entrepreneurs to find the required startup capital to launch new ventures. Startup capital may have been much easier

⁴ Estimates from the Survey of Small Business Finances indicate that the four most common uses of computers in small businesses are for administrative purposes, bookkeeping, email and managing inventory (Bitler 2002).

⁵ Interestingly, however, in a series of cross-sectional analyses of firm births using BITS data across labor markets, Acs and Armington (2005) generally find that the firm births are not associated with the local unemployment rate.

⁶ There is also evidence of high levels of job mobility among hi-tech workers in Silicon Valley suggesting a dynamic labor market (i.e. Fallick, Fleishman and Rebitzer 2003). On the other hand, high levels of job mobility might also result in a higher chance of starting a business.

to find during the late 1990s, especially in hi-tech areas such as Silicon Valley.⁷ Figure 4 displays the number of venture capital deals made in the United States over time. The number of deals rose from less than 500 per quarter in 1995 to more than 2,000 per quarter in the early 2000s.

Although the late 1990s in Silicon Valley, California, and the rest of the United States may have provided many opportunities for entrepreneurship, the increasing returns to entrepreneurship may have been offset by increasing returns to working for a firm and investing money. In the end, there is no clear theoretical prediction regarding whether the boom of the 1990s was a time of heightened entrepreneurship, and the question requires an empirical exploration.

3. Data

Although research on entrepreneurship is growing rapidly, there are very few national datasets that provide information on recent trends in entrepreneurship. Using matched data from the 1996-2005 Current Population Surveys (CPS), I created a new measure of entrepreneurship. National and state-level estimates are reported in Fairlie (2006a, 2006b) as the "The Kauffman Index of Entrepreneurial Activity (KIEA)." The new measure of entrepreneurship captures the rate of business creation at the individual owner level. The underlying datasets that are used to create the entrepreneurship measure are the basic monthly files to the Current Population Survey (CPS). By linking the CPS files over time, longitudinal data can be created, which allows for the examination of business creations. These surveys, conducted monthly by the U.S. Bureau of the

⁷ Zhang (2006) provides evidence that startups have more access to venture capital in Silicon Valley than startups in other parts of the country. Strong network ties in Silicon Valley may have also increased access to financial capital. See Shane and Cable (2002) for evidence on the impact of network ties on financing of new firms.

Census and the U.S. Bureau of Labor Statistics, are representative of the entire U.S. population and contain observations for more than 130,000 people. Combining the 1996 to 2005 monthly data creates a sample size of more than 8 million adult observations.

Households in the CPS are interviewed each month over a 4-month period. Eight months later they are re-interviewed in each month of a second 4-month period. Thus, individuals who are interviewed in January, February, March, and April of one year are interviewed again in January, February, March, and April of the following year. The rotation pattern of the CPS, thus allows for matching information on individuals monthly for 75% of all respondents to each survey. To match these data, I use the household and individual identifiers provided by the CPS. I also follow Madrian and Lefgren (2000) suggestion of removing false matches by comparing race, sex and age codes from the two months. All non-unique matches are also removed from the dataset. Finally, the datasets provided by the BLS are checked extensively for coding errors and other problems.

Monthly match rates are generally between 94 and 96 percent, and false positive rates are very low. The main reason for non-matching is when someone moves. Therefore, a somewhat non-random sample (mainly geographic movers) will be lost due to the matching routine. For month-to-month matches this does not appear to create a serious problem, however, because the observable characteristics of the original sample and the matched sample are very similar. For most characteristics the matched CPS sample and the full CPS are very similar. Immigrants, Latinos and young adults are slightly underrepresented and the self-employed are slightly overrepresented in the matched CPS sample compared to the full CPS. These differences reflect higher and lower mobility rates, respectively. See Fairlie (2005) for more details on matching.

MEASURING ENTREPRENEURSHIP

Potential measures of the number of entrepreneurs are readily available from several nationally representative government datasets. For example, the Economic Census: Survey of Minority-Owned and Female-Owned Business Enterprises provides estimates of the number of small businesses every 5 years, and the CPS and Census of Population provide estimates of the number of self-employed business owners annually and every decade, respectively. Typical measures of business ownership based on these data, however, do not capture the dynamic nature that is generally implied when defining entrepreneurship. Therefore, a measure of flows into business ownership may be preferable for measuring entrepreneurship.⁸

One approach is to use matched CPS data over time to create a time series of entrepreneurship rates. All business owners are captured in the CPS microdata including those who own incorporated or unincorporated business, and those who are employers or non-employers. These estimates improve on published estimates from the same source by the U.S. Bureau of Labor Statistics. Regularly published estimates from the BLS, such as those reported in *Employment and Earnings*, do not include incorporated business owners, which represent roughly one third of all business owners and a growing share of all business owners. To estimate the entrepreneurship rate, I first identify all individuals who do not own a business as their main job in the first survey month. By matching CPS files, I then identify whether they own a business as their main job with 15 or more usual hours worked in the following survey month. The entrepreneurship rate is thus defined as the percent of the population of non-business owners that start a business each month.

⁸ The Total Entrepreneurial Activity (TEA) index used in the Global Entrepreneurship Monitor captures individuals who are involved in either the startup phase or managing a business that is less than 42 months old (Reynolds, Bygrave and Autio 2003).

To identify whether they are business owners in each month I use information on their main job defined as the one with the most hours worked.

Thus, individuals who start side businesses will not be counted if they are working more hours on a wage and salary job.

To estimate the entrepreneurship rate, all observations with allocated labor force status, class of worker, and hours worked variables are excluded from the sample. Missing values for variables in the CPS are allocated or imputed by using several procedures including hot deck procedures and information from previous survey months. These allocation procedures may have a large effect on estimates of transitions in employment characteristics over time such as the entrepreneurship rate defined here because allocations are likely to increase the likelihood of changes. Indeed, the removal of these allocated or imputed observations results in much lower rates of entrepreneurship. For example, the national entrepreneurship rate from 1996 to 2005 with allocated observations is 0.37 compared to 0.29 percent without allocated observations (see Fairlie 2006a for more details). The entrepreneurship rate including allocated observations is nearly 10 times the entrepreneurship rate excluding allocated observations (2.64 percent compared to 0.29 percent). Because of these apparently inflated rates of entrepreneurship for allocated observations they are removed from the sample.

COMPARISON TO EMPLOYER FIRM BIRTHS

A measure of business starts that has been used in the literature is employer firm births from the Statistics of U.S. Businesses (SUSB) created by the U.S. Bureau of the Census have been reported by the Small Business Administration, Office of Advocacy (see www.sba.gov/advo/research/data.html). Reports presenting results for detailed geographical

areas have been published recently, such as Advanced Research Technologies, LLC (2005) report to the U.S. Small Business Administration (SBA) and Burton (2005). The exclusion of non-employer firms, however, is likely to lead to a substantial undercount of the rate of entrepreneurship because non-employer firms represent 75 percent of all firms (U.S. Small Business Administration 2001, Headd 2005) and a significant number of new employer firms start as non-employer firms (Davis, et. al. 2006). Nevertheless, it is useful to compare these estimates to the number of entrepreneurs from the CPS.

The Appendix reports estimates of employer firm births by state from the SUSB and state-level estimates of the number of entrepreneurs per month and year from the CPS for the latest years available.⁹ The two sets of estimates are not directly comparable for many reasons including that the CPS is a person-level measure and the SUSB is a business-level measure, the KIEA captures monthly entry rates, which cannot be easily annualized, and the years of coverage are different. Estimates from the CPS indicate that there were 464,000 new entrepreneurs per month in the United States in 2005. Annualizing this monthly rate of business creation provides an estimate of 5.5 million new entrepreneurs over the year. This estimate, however, is likely to misrepresent business creation over the year because an individual can start a business in one month, stop that business, then start another business in a different month and be counted twice in the annual measure. Thus, the annualized measure likely overstates the level of individual business creation from the beginning to the end of the year. The total number of employer firm births based on SUSB data is 734,225 for the entire United States. The ratio of the number of employer firm births to entrepreneurs is 13 percent. Although it is difficult to measure, a large

⁹ State level estimates are only available for total establishment births which include both new establishments in original locations (new firm births) and new establishments in secondary locations. In 2002-03, there were 612,296 new establishments in original locations and 121,929 new establishments in secondary locations in the United States.

percentage of new businesses clearly do not have employees. The new employer firm to entrepreneur ratio generally ranges from 10 to 17 percent across states.

4. Trends in Entrepreneurship

NATIONAL ENTREPRENEURSHIP FROM 1996 TO 2005

To set the stage for examining entrepreneurship in Silicon Valley, national rates of entrepreneurship rates are first presented. Figure 5 reports estimates of U.S. entrepreneurship rates from 1996 to 2005. The average rate of entrepreneurship over the entire period was 0.29 percent. Thus, an average of 0.29 percent of the adult population or 290 out of 100,000 adults created a new business each month. Approximately 464,000 people created new businesses per month during the past decade. The rate of business creation was generally between 0.27 and 0.32 percent over the period. There does not appear to be a strong trend in the U.S. entrepreneurship rate in the late 1990s.

ENTREPRENEURSHIP IN SILICON VALLEY

As noted above, there is no evidence in the previous literature from a large, nationally representative dataset on patterns of entrepreneurship in Silicon Valley. Figure 6 and Table 1 report estimates of entrepreneurship rates for Silicon Valley, the San Jose MSA, the rest of California, California and the United States from the matched CPS data. Estimates are reported for January 1996 to February 2000, which is defined as the economic boom period, and from March 2000 to December 2005, which is defined as the post-boom period. The cutoff between time periods coincides with the highest point that the NASDAQ reached, which was on March 10, 2000.

Entrepreneurship rates were only slightly higher in Silicon Valley than the national average during the boom period of the late 1990s. From January 1996 to February 2000, the entrepreneurship rate in Silicon Valley was 0.31 percent compared to 0.29 percent in the United States. Interestingly, entrepreneurship rates were higher in the rest of California than in Silicon Valley during this period. The entrepreneurship rate was 0.37 percent in the rest of California, which was substantially higher than the U.S. rate.¹⁰ Focusing on the center of Silicon Valley by examining the San Jose MSA, entrepreneurship rates were lower at 0.25 percent, but this estimate is not very precise because of smaller sample sizes. I follow the convention of defining Silicon Valley as including the San Jose, San Francisco and Oakland MSAs (Fallick, Fleischman and Rebitzer 2003).

Another interesting pattern that emerges from the data is that Silicon Valley has a higher entrepreneurship rate in the six years after the peak of the NASDAQ than during the economic boom of the late 1990s. The entrepreneurship rate increased from 0.31 percent to 0.35 percent. The entrepreneurship rate in Silicon Valley was also considerably higher than the national rate during this period. These findings are consistent with the hypothesis that Silicon Valley is an entrepreneurial region, but inconsistent with the common perception that the late 1990s were a period of unbridled entrepreneurship in Silicon Valley. The returns to wage and salary work in Silicon Valley may have dampened the number of individuals creating new businesses. Interestingly, entrepreneurship rates in Silicon Valley were similar to rates in California as a whole during the post-boom period.

¹⁰ Interestingly, California is typically ranked fairly low in terms of regulations and other policies affecting entrepreneurship (see Forbes 2006 and Small Business & Entrepreneurship Council 2005 for example).

An examination of entrepreneurship rates by year confirms the previous results (Figure 7). Entrepreneurship rates in Silicon Valley were higher than national rates in most years during the economic boom. During the post boom period, entrepreneurship rates were higher in all but one year. Although Silicon Valley entrepreneurship rate estimates vary from year to year partly because of relatively small annual sample sizes and imprecise estimates, the trends clearly indicate higher rates of entrepreneurship in the post boom period in Silicon Valley.

5. Entrepreneurship in Silicon Valley in the Late 1990s

Estimates from the CPS indicate that entrepreneurship rates were higher in Silicon Valley than the rest of the country during the late 1990s. In this section, I further investigate the finding of a relatively high rate of entrepreneurship in Silicon Valley during the strong economic growth period of the late 1990s. Following this analysis, I examine entrepreneurship rates in the post-boom period. The first question to address is how does Silicon Valley compare to other large MSAs around the country in terms of rates of business creation during the late 1990s?

COMPARISON TO OTHER MSAS

Recent estimates of entrepreneurial activity indicate large regional differences in the United States (Advanced Research Technologies 2005). Interestingly, San Francisco and San Jose, however, are not the cities with the highest levels of entrepreneurial activity. The average rate of new employer firm births per 1,000 labor force from 1990 to 2001 was 3.554 in San Jose and 3.963 in San Francisco placing these cities at the 125th and 74th ranked cities out of 394 cities in the United States. The highest ranked cities were Glenwood Springs, CO, Cape Coral, FL, and Bend, OR. These estimates of entrepreneurial activity, however, do not include non-

employer startups, which may be especially important in hi-tech areas, and cover the entire 1990s. Estimates from the CPS may reveal different regional patterns because they include all small firms with and without employees.

To focus on the late 1990s, entrepreneurship rates are estimated for the largest MSAs in the United States by combining data from January 1996 to February 2000. By combining years, more precise estimates of entrepreneurship rates by MSAs can be estimated and more MSAs can be reported. Table 2 reports estimates for the 60 largest MSAs for this period. In the boom period of the late 1990s, the entrepreneurship rate in Silicon Valley was in the top half of the distribution of the largest MSAs in the United States. However, there were many large MSAs that had considerably higher entrepreneurship rates than Silicon Valley, although two of these were in California (Los Angeles and San Diego). Denver had the highest entrepreneurship rate at 0.45 percent. Providence, Raleigh, Indianapolis, Miami and Tampa also had entrepreneurship rates above 0.4 percent in addition to Los Angeles and San Diego. Entrepreneurship rates in Silicon Valley were more comparable to Seattle, New York, Houston and Atlanta. They were much higher than some MSAs such as Chicago, Boston, Detroit and Philadelphia.

The comparison across MSAs reveals that Silicon Valley did not have one of the highest rates of entrepreneurship during the late 1990s. In fact, many large MSAs had higher rates during this period, which is consistent with the returns to the wage and salary sector in Silicon Valley being high during this period.

INDUSTRY COMPOSITION

The industrial structure of Silicon Valley is different than other parts of the country. Using the CPS estimates on entrepreneurship it is useful to compare the industry structure of new

businesses. Table 3 reports estimates of major industry categories for new entrepreneurs for the period from January 1996 to February 2000. Entrepreneurs in Silicon Valley were disproportionately located in Services and underrepresented in Other industries (Agriculture, Transportation and Utilities, and Public Administration). Silicon Valley entrepreneurs were roughly similarly likely to be located in Construction and Trade.

As expected, a larger percentage of entrepreneurs are in the information industry in Silicon Valley than in the United States.¹¹ This industry includes software publishing and data processing. But, some caution is warranted in placing too much emphasis on this comparison because of small sample sizes and changes in industry codes over time in the CPS. Some hi-tech industries are also included in other industries (e.g. Computer systems design and related services is included in Services). Overall, hi-tech entrepreneurship may be important in contributing to higher rates of entrepreneurship in Silicon Valley, but entrepreneurship in other industries comprises the bulk of total entrepreneurship in this area. Some of these new businesses are in the important support services industries for hi-tech (Lee, et al. 2000).

The construction industry has the highest rate of business creation of all major industries reported in Table 3. The entrepreneurship rate is more than three times higher in construction than the rate for all industries in the United States. Trends in entrepreneurship rates in construction may overly influence trends in the total entrepreneurship rate. In particular, if new construction was relatively slow in Silicon Valley because of constraints on development due to stringent building regulations and lack of available land then the inclusion of the construction industry could reduce estimated differences between Silicon Valley and other parts of the country. Table 3 reports estimates of entrepreneurship rates removing construction. The

¹¹ See Goldfarb, Kirsch and Pfarrer (2005) for an analysis of unique dataset of dot.com startups from 1998-2002.

entrepreneurship rate in Silicon Valley drops by roughly the same amount as the U.S. rate. The entrepreneurship rate in Silicon Valley remains higher than the U.S. rate, but the difference is only large in the post economic boom period. Furthermore, entrepreneurship was substantially higher in Silicon Valley in the post boom period than during the late 1990s even after excluding construction. Thus, the removal of business starts in construction does not affect the relative patterns of entrepreneurship.

COMPARISON TO EMPLOYER FIRM BIRTHS

A measure of business starts that has been used in the literature is employer firm births from the Statistics of U.S. Businesses (SUSB) created by the U.S. Bureau of the Census have been reported by the Small Business Administration, Office of Advocacy (see www.sba.gov/advo/research/data.html). As noted above, these data include only employer firms, which represent roughly 25 percent of all firms. Although estimates of employer firm births are not directly comparable to estimates of the number of entrepreneurs, it is useful to compare trends in the two measures.

Focusing on California in the late 1990s and post-boom period, Table 5 reports estimates of the number of employer firm births and the number of entrepreneurs from 1996 to 2003. The most recent estimates available on firm births are from 2002-03 and estimates are not available for metropolitan areas in the late 1990s. Entrepreneurship rates decreased from the late 1990s to this shortened post-boom period for both California and the United States. In California, the number of new employer businesses per year increased and in the United States the number of entrepreneurs and new employer businesses per year increased slightly. The differences are relatively small and suggest that the two measures show roughly similar trends.

CONTROLLING FOR DEMOGRAPHIC CHARACTERISTICS

Higher rates of entrepreneurship in Silicon Valley than the rest of the United States during the late 1990s may be partly due to who lives in the area. For example, Silicon Valley has a large concentration of immigrants and entrepreneurship rates are higher among immigrants than the native-born (Fairlie 2005). Thus, the higher rate of entrepreneurship in Silicon Valley may simply be due to the large concentration of immigrants or differences in other demographic characteristics of the population instead of a purely regional effect. The importance of immigrants to Silicon Valley has been noted in the previous literature (Saxenian 1999, 2000). To investigate this issue further, I compare the demographic characteristics of Silicon Valley residents to individuals in the United States and examine the entrepreneurship rates of these groups.

Table 6 reports estimates of a few demographic characteristics for Silicon Valley and the United States. Nearly 30 percent of adults living in Silicon Valley are immigrants compared to 12 percent of the U.S. adult population. Related to this comparison, Silicon Valley has larger concentrations of Latinos and Asians, but a smaller concentration of blacks than the United States. Another major difference between Silicon Valley and the rest of the United States is the education level of the population. In Silicon Valley, 38.6 percent of the adult population has a college or graduate degree compared to the 24.7 percent in the United States. Average family income levels are also higher in Silicon Valley than the rest of the United States. Potentially working in the opposite direction, Silicon Valley residents are less likely to own homes than the U.S. population, which may be due to inflated housing prices during this period. For other reported characteristics, Silicon Valley residents and the U.S. population do not differ substantially.

AN EMPIRICAL MODEL OF ENTREPRENEURSHIP: IDENTIFYING THE DETERMINANTS OF ENTREPRENEURSHIP

To control for differences between Silicon Valley and the rest of the United States in these and other factors, multivariate regressions for entrepreneurship are estimated. These regressions are useful for first identifying the determinants of entrepreneurship. These determinants can be explored by using the detailed demographic and employment information available in the CPS. The effects of gender, race/ethnicity, nativity, age, education, marital status, employment status, region, urban status, and home ownership on the probability of entrepreneurship are examined. The inclusion of these variables controls for geographical differences in demographic and employment characteristics and changes over time in these characteristics. Although estimates of entrepreneurship rates have been created from the CPS, the determinants of entrepreneurship at the micro level have not been explored using the underlying data. Furthermore, a large amount of literature explores the regional characteristics associated with firm formation, but these studies do not have information on the characteristics of individual firms and focus on employer firm formation. Industrial density and restructuring, population growth and density, income growth, unemployment, R&D, average education, and availability of financing have been found to be correlated with regional rates of employer firm creation (Armington and Acs 2002, Advanced Research Technologies, LLC 2005, Acs and Armington 2005). Some of these factors, however, may not be exogenous determinants of entrepreneurship (Armington and Acs 2002).

Table 7 reports marginal effects estimates from several probit regressions for the probability of entrepreneurship.¹² The base specification is reported in the first column. The estimates indicate that women are less likely to become entrepreneurs. African-Americans, Latinos, Native Americans and Asians are also less likely to start businesses, all else equal.¹³ Immigrants, however, are more likely than the native-born to start businesses. Immigrants have entrepreneurship rates that are 0.063 percentage points higher than U.S. born rates, which is 21 percent higher than the average rate of entrepreneurship. Entrepreneurship increases with age and married people are more likely to start businesses.

The probability of entrepreneurship increases with education. For each reported education level, entrepreneurship rates are higher. The left out category is less than high school. The general and specific knowledge and skills acquired through formal education may be useful for starting a business. The owner's level of education may also serve as a proxy for his/her overall ability or as a positive signal to potential customers, lenders or other businesses making it easier to start a business.

The relationship between family income and starting a business in the following month is not clear. Individuals with family incomes of less than \$25,000 have the highest rates of business creation, but individuals with family incomes of more than \$75,000 have the second highest rate of business creation. In contrast to these results, home owners are more likely to enter self-employment.¹⁴ In the presence of liquidity constraints, the ability of owners to borrow

¹² Marginal effects are estimated using the coefficient estimates and the full sample distribution. They provide an estimate of the effect of a 1 unit change in the explanatory variable on the probability of entrepreneurship.

¹³ These patterns are consistent with low rates of minority business ownership except for Asians who are found to have higher rates of business ownership (Fairlie 2006).

¹⁴ Previous studies find that home prices, home ownership and property restitution increase the likelihood of business creation and self-employment (Fairlie 2004, Black, de Meza and Jeffreys 1996, Johansson 2000, and Earle and Sakova 2000).

against the value of their home, such as home equity loans, may make it easier to finance new business ventures.

Finally, the unemployed and those not in the labor force are more likely than wage and salary workers to start businesses in the following month. The unemployed and individuals not in the labor force may face different incentives for entrepreneurship, especially if they are job losers. More specifically, they have a lower opportunity cost of starting a business because of the lost returns to tenure and experience on their jobs.

For many of these determinants of entrepreneurship, Silicon Valley differs from the rest of the United States. As noted above, Silicon Valley has a larger concentration of immigrants and has a more educated population than the rest of the United States. Both of these factors increase entrepreneurship, which could explain why Silicon Valley has a higher rate of entrepreneurship. On the other hand, only 6.3 percent of Silicon Valley residents were unemployed, compared to 7.3 percent of the U.S. population during the late 1990s. Given that the unemployed are more likely to start businesses, this could dampen measured rates of entrepreneurship in Silicon Valley. In the end, the higher rate of entrepreneurship may just be due to higher rates among the demographic groups concentrated in Silicon Valley instead of there being a true geographical effect. Specification 2 adds dummy variables for Silicon Valley and the rest of California to investigate this question.

Estimates indicate that Silicon Valley has a higher rate of entrepreneurship than the U.S. total after controlling for demographic characteristics. The coefficient estimate implies that entrepreneurship in Silicon Valley was 0.05 percentage points higher than the rest of the country. The raw difference in the data was 0.03 percentage points indicating that the demographic characteristics and previous employment status of Silicon Valley were less favorable overall for

entrepreneurship, and even in spite of this, Silicon Valley has a higher rate of entrepreneurship than the rest of the country.

Interestingly, the rest of California also has a higher rate of entrepreneurship than the United States. The difference after controlling for individual characteristics is smaller than that found in the raw data, but remains large. Part of the reason that the rest of California was more entrepreneurial than the United States was because of the characteristics of its population, but this explains a relatively small part of the difference.

As shown earlier, Silicon Valley has a high concentration of entrepreneurship in the information industry. If entrepreneurship rates are higher on average in the industries that are concentrated in Silicon Valley then these industry concentrations could partly explain why entrepreneurship rates are higher overall in Silicon Valley. This appears to only represent a small part of the story, however. After controlling for industries in Column 3, the Silicon Valley coefficient declines to 0.00045. Although it is smaller than the previous specification it is still considerable larger than the raw difference. Thus, the higher rate of entrepreneurship in Silicon Valley is not due to demographic characteristics (immigrant, education, etc...), previous employment status (unemployment and not in the labor force), or industry structure (high concentration in information). There is an unobserved geographical component to it.

In the final specification reported in Table 7, I include a linear time trend interacted with Silicon Valley dummy variable. The goal is to determine whether as the 1990s progressed the entrepreneurship rate in Silicon Valley increased relative to the national average. The coefficient estimate on the trend variable is very small and insignificant suggesting that the entrepreneurship rate in Silicon Valley did not increase relative to the national rate over the late 1990s. Instead, Silicon Valley had a higher and essentially constantly higher rate of entrepreneurship during the

entire period. The main or constant Silicon Valley coefficient indicates that the entrepreneurship rate was 0.045 percentage points higher than the rest of the United States.

In contrast to this result, the rest of California experienced rising entrepreneurship rates over the late 1990s period relative to the national rate. Each additional year after 1996 increased the relative rate of entrepreneurship by 0.008 percentage points. Thus, the coefficient estimates imply that the rest of California had an entrepreneurship rate that was 0.047 percentage points higher than the nation in 1996 and an entrepreneurship rate that was 0.071 percentage points higher than the nation by 1999.

REMOVING RURAL LOCATIONS

As a robustness check, I remove all rural locations from the data. A comparison of Silicon Valley to rural areas in the rest of the United States may not be appropriate. The determinants of entrepreneurship in rural areas may also differ from the determinants in more urban areas. Table 8 reports estimates. The coefficients are not sensitive to the exclusion of these observations, which represent 22.4 percent of the full sample. The exclusion of individuals living in rural areas from the regressions results in slightly smaller coefficients on the Silicon Valley dummy variable. The coefficients, however, remain large, positive and statistically significant indicating higher rates of entrepreneurship than the nation as a whole. The coefficients drop more for the other California dummy variable, but also remain large and statistically significant. Thus, the estimates for the comparison to the rest of the United States are not sensitive to the inclusion of rural areas.

6. Entrepreneurship in Silicon Valley in the Post-Boom Period

Was entrepreneurship higher in the late 1990s in Silicon Valley than in the period following the economic boom? How does this comparison change after controlling for trends in entrepreneurship in the rest of the United States and changes in demographic characteristics? These questions are explored next.

Returning to the estimates displayed in Figure 6, entrepreneurship rates in Silicon Valley increased from the late 1990s to the early 2000s. The entrepreneurship rate in Silicon Valley was 0.31 percent in the January 1996 to February 2000 period and rose to 0.35 percent in the March 2000 to December 2005 period. In contrast, the entrepreneurship rate in the United States remained at 0.29 percent over the two periods. Even with the major macroeconomic changes that occurred over this period the national rate of entrepreneurship remained constant. Another interesting trend was that entrepreneurship rates declined from 0.37 percent to 0.35 percent in the rest of California. The result of this downward trend for the rest of California and the upward trend in Silicon Valley was that the two rates converged in the post-boom period. The relative trends suggest that entrepreneurship may have been suppressed in Silicon Valley relative to the United States and the rest of California during the period of strong economic growth in the late 1990s as hypothesized.

Another possibility, however, is that the increase in entrepreneurship in Silicon Valley between the two time periods is due to changes in demographic characteristics, unemployment and industry composition. The increase in unemployment over this period could be especially important in leading to a rise in total entrepreneurship rates. The unemployment rate in Silicon Valley rose from less than 2 percent in the beginning of 2001 to nearly 8 percent at its peak in the middle of 2003 (see Figure 2). The U.S. unemployment rate also rose over this period, but

the increase was much smaller. The U.S. unemployment rate did not become nearly as high as the unemployment rate in Silicon Valley in the early 2000s.

To investigate this question, I estimate probit regressions that include the full sample of observations from the beginning of 1996 to the end of 2005 and interactions with time periods (see Table 9). Specification 1 includes the basic set of controls for demographic characteristics. Entrepreneurship increased in Silicon Valley from the boom period to the post-boom period relative to changes in the national rate of entrepreneurship. The entrepreneurship rate in Silicon Valley increased by 0.028 percentage points after controlling for demographic characteristics and changes in the U.S. entrepreneurship rate. This estimated change is not substantially smaller than the actual change in the entrepreneurship rate of 0.04 percentage points. Entrepreneurship rates in the rest of California, in contrast, did not change much from the boom to post-boom periods after controlling for basic factors.

Specifications 2 and 3 include additional controls for previous employment status and industry, respectively. The inclusion of these controls has little effect on the coefficient estimates for the Silicon Valley post period. The entrepreneurship rate increased by 0.027 percentage points from the late 1990s to the post-boom period in Silicon Valley relative to the national rate. In a final robustness check of the results, I estimate a specification that includes linear time trends for Silicon Valley and the rest of California. The inclusion of these time trends variables will control for long-term trends in entrepreneurship in the two areas relative to the trends in entrepreneurship in the United States. A strong trend in entrepreneurship rates in Silicon Valley relative to the United States did not exist over this period. Instead, there appears to be an increase associated with the end of the late 1990s. The entrepreneurship rate increased in Silicon Valley by 0.031 percent from boom to post-boom periods.

These estimates clearly indicate that the entrepreneurship rates in Silicon Valley increased from the late 1990s to the early 2000s in actual levels and relative to the U.S. rate. This finding holds in the raw data and after including controls for changes in demographic characteristics, unemployment and industry composition. In the rest of California, entrepreneurship rates either declined or showed no sizeable change from the boom to post-boom periods.

7. Conclusions

The study provides the first estimates of entrepreneurship rates in Silicon Valley during the so-called "roaring 90s." Entrepreneurship rates have not been previously estimated for Silicon Valley during this period because of the lack of available data. Thus, the hypothesis that Silicon Valley was and is a place of a high level of entrepreneurial spirit has not been previously tested. A new measure of entrepreneurship is created by matching monthly Current Population Surveys (CPS) from 1996 to 2005. Estimates of business creation at the individual level capture all types of new businesses from non-employer to employer and unincorporated to incorporated businesses. Previous measures of business creation do not include non-employer firms which represent the majority of all businesses. The matched CPS data also provide detailed information on the demographic characteristics, previous employment status and industries of the owners, which represents an improvement over large, nationally representative business-level datasets that typically include very limited information on the characteristics of the entrepreneur.

Estimates from the CPS indicate that entrepreneurship rates were higher in Silicon Valley than the rest of the United States during the rapid economic expansion of the late 1990s. Entrepreneurship rates were higher in Silicon Valley during this period partly because of the

large concentration of immigrants and highly educated workers. The CPS estimates clearly indicate the importance of immigrants to entrepreneurship in Silicon Valley, which is consistent with findings from previous studies (Saxenian 1999, 2000). Even with these favorable demographic characteristics for entrepreneurship, overall entrepreneurship rates in Silicon Valley appear to have been suppressed by the exceptionally tight labor markets during this period. Specifically, unemployment rates were extremely low during the late 1990s dampening entrepreneurship rates. In the end, the entrepreneurship rate of 0.31 percent in Silicon Valley was not substantially higher than the entrepreneurship rate of 0.29 percent in the United States during the roaring 90s.

Interestingly, estimates from matched CPS data indicate that entrepreneurship rates increased from the boom period of the late 1990s to the early 2000s in Silicon Valley relative to the United States. The entrepreneurship rate in Silicon Valley increased by 0.04 percentage points from the late 1990s to the post-boom period, whereas the national rate remained constant. This is a new and surprising result. Entrepreneurship was higher after the dot com bust than in the roaring 90s in Silicon Valley. Although overall Silicon Valley may be an entrepreneurial location, the substantial returns to the labor market may have actually depressed business creation during the strong economic growth period of the late 1990s.

Many cities in the United States and around the world are trying to emulate the Silicon Valley experience. The findings from this analysis indicate that, at least in terms of potentially creating high rates of entrepreneurship, the demographic characteristics of the population and economic conditions are important. But, there is another component to Silicon Valley that is more difficult to measure -- the entire environment or "habitat" appears to be favorable for innovation and entrepreneurship (Lee, et al. 2000). A highly educated and mobile workforce, a

risk taking and failure tolerant culture, open business environment, location of top universities and research institutes, extensive support services, quality of life, and other characteristics of the area appear to contribute to the success of Silicon Valley (Lee, et al. 2000).

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Appendix

Comparison of Entrepreneurship Rates (2005) and Statistics of U.S. Businesses Employer Firm Births (2002-03) by State

State	Entrep. Index (2005)	Sample Size	Number of Entreps./ Month (2005)	Number of Entreps./ Year (2005)	Number of Employer Firm Births (2002-03)	Employer Firm Births / Entreps.
U.S. Total	0.29%	597,198	464,179	5,570,148	734,225	13.2%
Alabama	0.17%	7,431	4,464	53,569	9,563	17.9%
Alaska	0.40%	7,914	1,353	16,230	1,977	12.2%
Arizona	0.32%	7,849	9,755	117,057	14,311	12.2%
Arkansas	0.47%	6,819	7,103	85,238	6,532	7.7%
California	0.32%	46,674	61,348	736,176	91,419	12.4%
Colorado	0.53%	12,560	13,754	165,048	16,693	10.1%
Connecticut	0.27%	12,957	5,112	61,346	7,400	12.1%
D.C.	0.24%	6,886	716	8,592	1,626	29.5%
Delaware	0.16%	9,041	718	8,622	2,535	18.9%
Florida	0.28%	24,062	25,778	309,336	58,956	19.1%
Georgia	0.33%	12,025	16,127	193,524	23,958	12.4%
Hawaii	0.34%	8,702	2,214	26,564	2,927	11.0%
Idaho	0.47%	6,941	3,539	42,470	4,627	10.9%
Illinois	0.26%	18,917	17,754	213,048	28,426	13.3%
Indiana	0.29%	10,137	10,285	123,420	12,958	10.5%
Iowa	0.34%	10,997	5,526	66,309	6,815	10.3%
Kansas	0.25%	8,806	3,593	43,114	6,895	16.0%
Kentucky	0.18%	8,975	4,143	49,718	8,036	16.2%
Louisiana	0.32%	5,523	7,509	90,108	9,372	10.4%
Maine	0.36%	11,661	2,647	31,760	3,626	11.4%
Maryland	0.42%	12,251	12,149	145,788	12,979	8.9%
Massachusetts	0.23%	9,920	8,439	101,267	16,906	16.7%
Michigan	0.23%	15,680	12,652	151,824	21,185	14.0%
Minnesota	0.31%	14,202	8,939	107,264	13,864	12.9%
Mississippi	0.39%	5,704	5,985	71,819	5,869	8.2%
Missouri	0.19%	10,432	6,141	73,688	15,663	21.3%
Montana	0.49%	5,859	2,407	28,881	3,384	11.7%

(continued)

Appendix (continued)

State	Entrep. Index (2005)	Sample Size	Number of Entreps./ Month (2005)	Number of Entreps./ Year (2005)	Number of Employer Firm Births (2002-03)	Employer Firm Births / Entreps.
Nebraska	0.23%	9,104	2,142	25,703	4,376	17.0%
Nevada	0.35%	9,089	4,533	54,398	7,560	13.9%
New Hampshire	0.28%	12,500	2,089	25,074	3,460	13.8%
New Jersey	0.30%	12,293	13,970	167,640	23,779	14.2%
New Mexico	0.45%	5,874	4,620	55,443	4,444	8.0%
New York	0.28%	25,482	28,313	339,756	50,067	14.7%
North Carolina	0.23%	12,377	10,862	130,344	20,808	16.0%
North Dakota	0.32%	7,270	1,065	12,782	1,496	11.7%
Ohio	0.27%	17,895	17,339	208,068	22,439	10.8%
Oklahoma	0.41%	6,994	7,744	92,923	8,263	8.9%
Oregon	0.33%	8,047	6,435	77,221	10,689	13.8%
Pennsylvania	0.18%	19,104	12,032	144,384	24,912	17.3%
Rhode Island	0.24%	10,658	1,446	17,349	2,680	15.4%
South Carolina	0.25%	8,097	5,889	70,668	10,033	14.2%
South Dakota	0.31%	9,083	1,259	15,113	2,115	14.0%
Tennessee	0.23%	8,567	7,534	90,405	12,612	14.0%
Texas	0.35%	28,656	41,708	500,496	52,677	10.5%
Utah	0.38%	8,181	4,755	57,060	7,786	13.6%
Vermont	0.55%	8,602	1,892	22,702	1,888	8.3%
Virginia	0.22%	12,619	8,830	105,960	18,709	17.7%
Washington	0.23%	10,984	8,243	98,913	17,886	18.1%
West Virginia	0.17%	7,939	1,769	21,226	3,433	16.2%
Wisconsin	0.27%	11,558	8,286	99,436	11,726	11.8%
Wyoming	0.48%	7,300	1,274	15,286	1,885	12.3%

Notes: (1) Estimates for entrepreneurship rates calculated using matched data from the Current Population Survey. (2) The entrepreneurship index is the percent of non-self-employed individuals aged 20-64 who become self-employed business owners each month. Business formation is only defined for those working 15 or more hours per week in their new business. (3) All observations with allocated labor force status, class of worker, and hours worked variables are excluded. (4) Estimates of employer firm births are from the U.S. Census Bureau, Statistics of U.S. Businesses as reported by the Small Business Administration, Office of Advocacy.

Figure 1
Annual Earnings

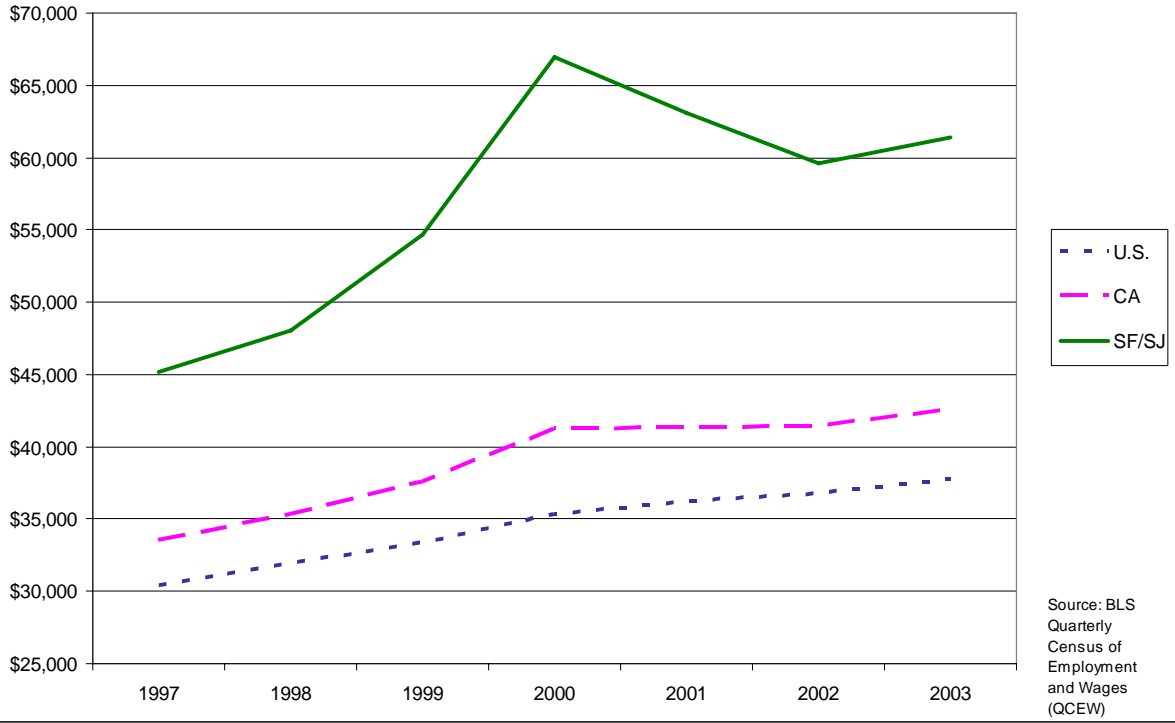


Figure 2
Unemployment Rates

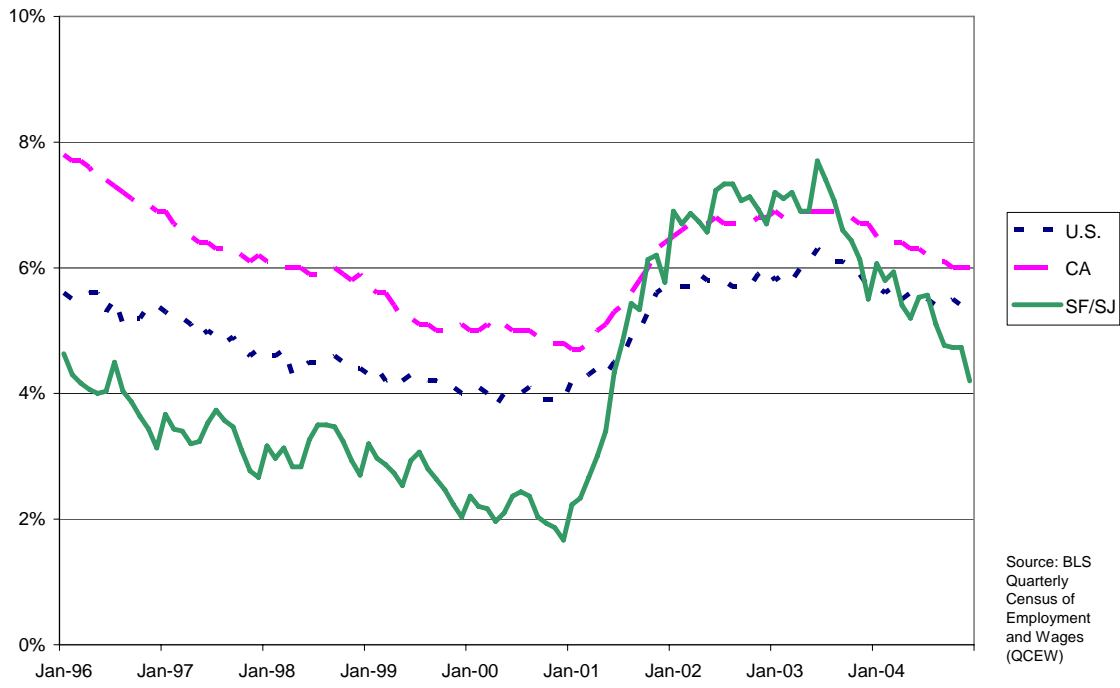


Figure 3
Returns to Investing \$10,000 in January 1995

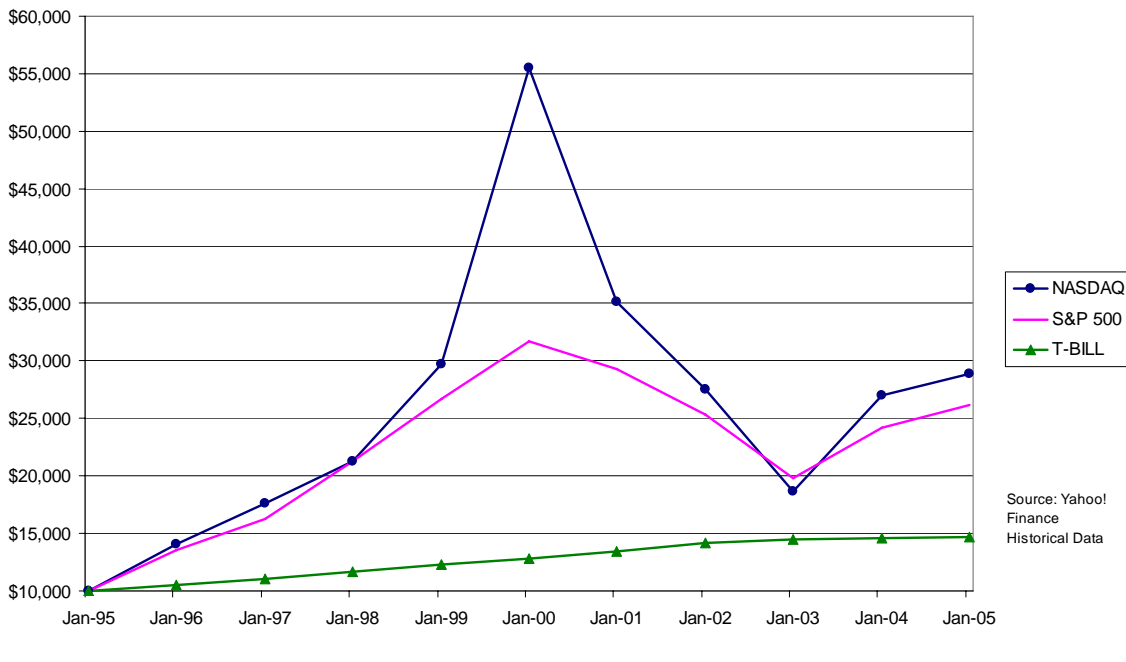
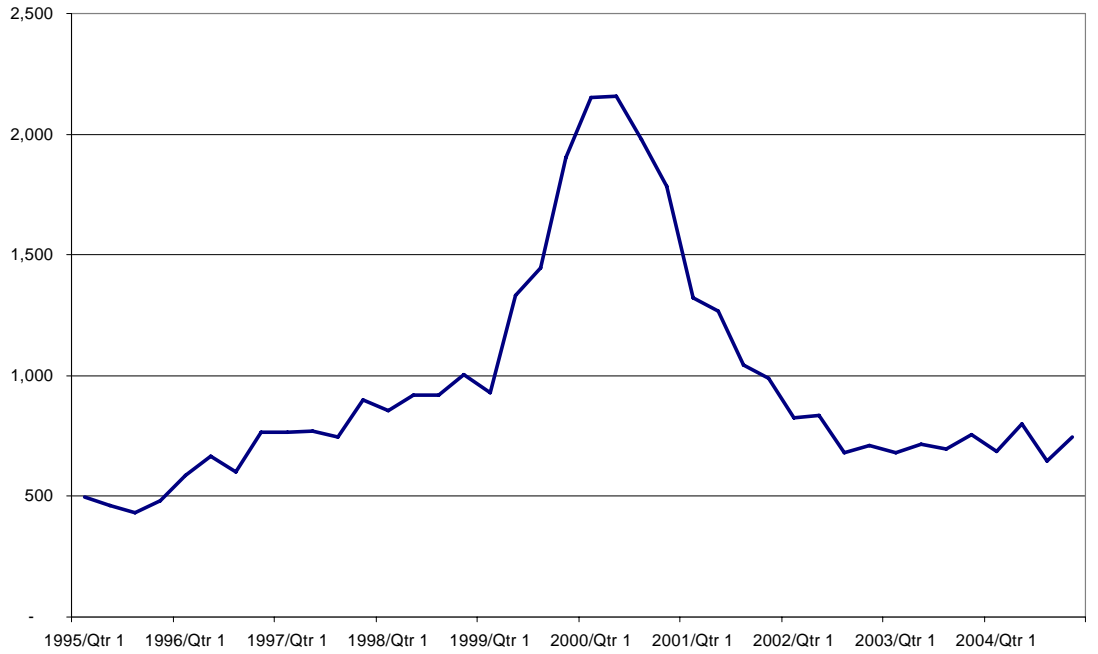


Figure 4
Venture Capital Deals



Source: PWC MoneyTree
Survey

Figure 5
U.S. Entrepreneurship Rates (1996-2005)

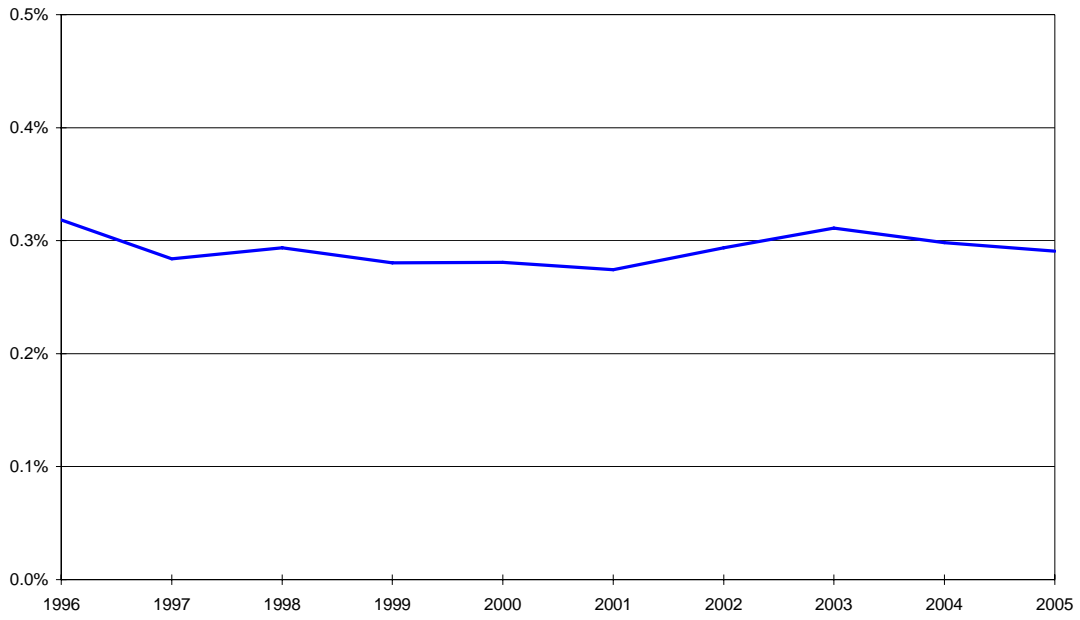


Figure 6
Entrepreneurship Rates by Geographical Area (1996-2005)

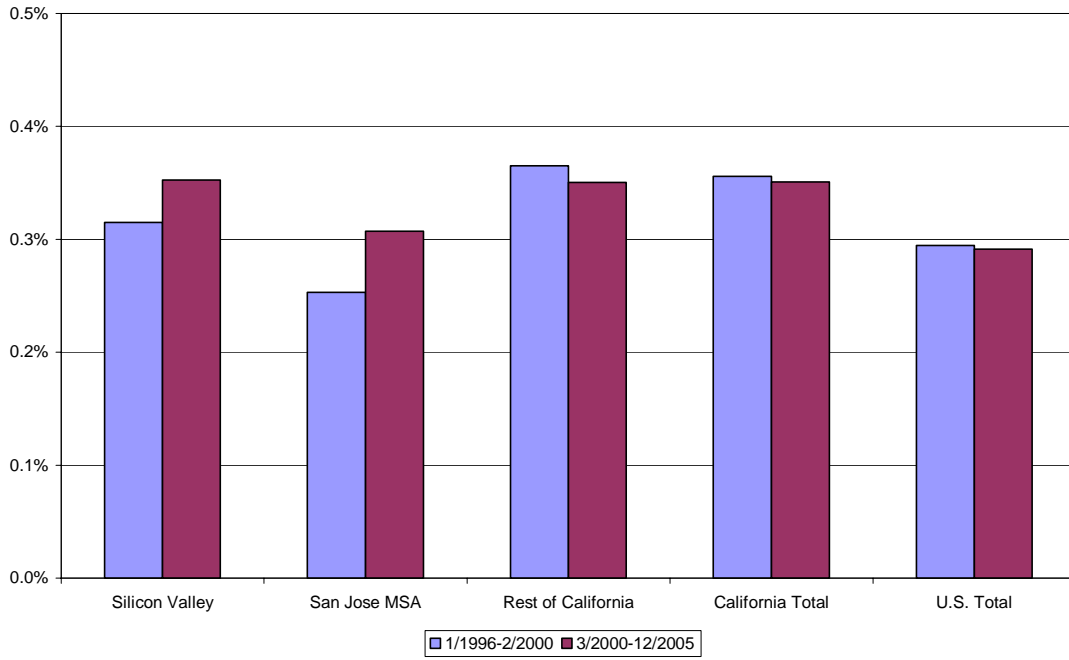


Figure 7
Entrepreneurship Rates by Geographical Area (1996-2005)

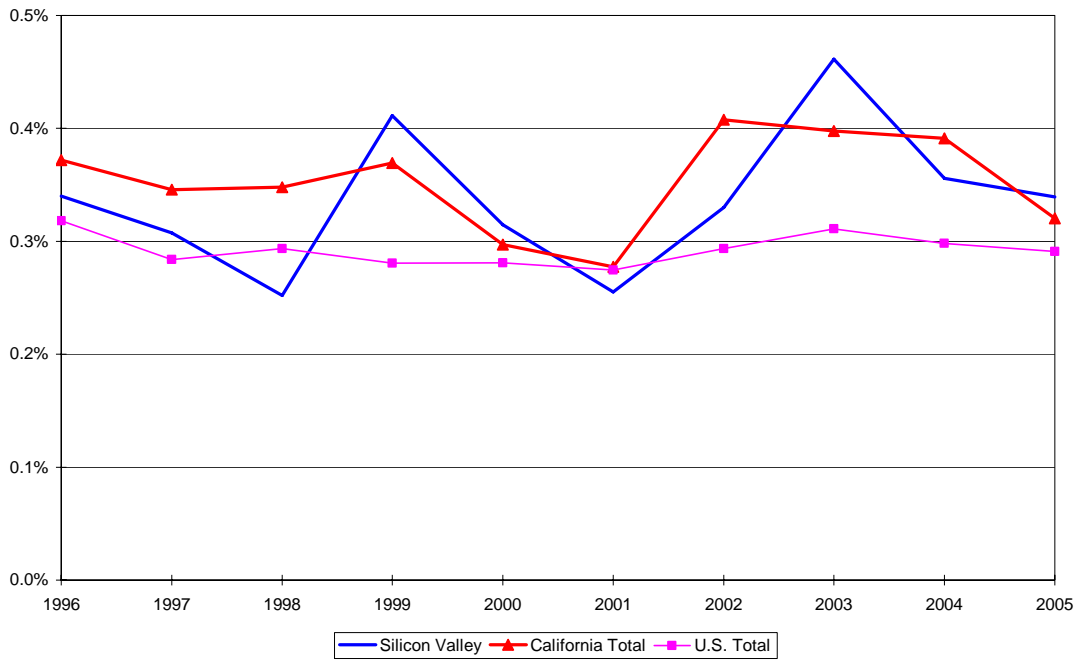


Table 1
 Entrepreneurship Rates by Geographical Area (1996-2005)

Year	Silicon Valley		San Jose MSA		Rest of California		California Total		U.S. Total	
	Entrep. Index	Sample Size	Entrep. Index	Sample Size	Entrep. Index	Sample Size	Entrep. Index	Sample Size	Entrep. Index	Sample Size
1/1996-2/2000	0.31%	29,158	0.25%	9,481	0.37%	155,091	0.36%	184,249	0.29%	2,223,833
3/2000-12/2005	0.35%	40,860	0.31%	12,981	0.35%	214,949	0.35%	255,809	0.29%	3,459,028

Notes: (1) Estimates calculated using matched data from the Current Population Survey. (2) The entrepreneurship index is the percent of non-self-employed individuals aged 20-64 who become self-employed business owners each month. Business formation is only defined for those working 15 or more hours per week in their new business. (3) All observations with allocated labor force status, class of worker, and hours worked variables are excluded. (4) Silicon Valley is defined as the San Jose, San Francisco and Oakland MSAs.

Table 2
Entrepreneurship Rates for the Largest MSAs (1996-2000)

MSA or PMSA	Entrep. Index	Sample Size
Denver, CO PMSA	0.46%	16,551
Los Angeles-Long Beach, CA PMSA	0.44%	73,787
San Diego, CA MSA	0.42%	12,757
Miami, FL PMSA	0.41%	14,541
Tampa-St. Petersburg-Clearwater, FL MSA	0.40%	15,153
Portland-Vancouver, OR-WA PMSA	0.39%	14,895
Orlando, FL MSA	0.39%	11,022
Phoenix-Mesa, AZ MSA	0.38%	21,033
Kansas City, MO-KS MSA	0.36%	13,579
New York, NY PMSA	0.34%	68,104
Seattle-Bellevue-Everett, WA PMSA	0.34%	12,470
Riverside-San Bernardino, CA PMSA	0.33%	12,794
Silicon Valley	0.31%	29,158
Atlanta, GA MSA	0.31%	20,559
Houston, TX PMSA	0.30%	23,694
Orange County, CA PMSA	0.29%	13,345
Fort Worth-Arlington, TX PMSA	0.28%	9,282
Minneapolis-St., Paul, MN-WI MSA	0.26%	19,242
Washington, DC-MD-VA-WV PMSA	0.26%	41,489
Nassau-Suffolk, NY PMSA	0.25%	20,705
Dallas, TX PMSA	0.24%	19,926
Chicago, IL PMSA	0.24%	67,879
Newark, NJ PMSA	0.23%	16,855
Boston, MA-NH PMSA	0.23%	28,888
Baltimore, MD PMSA	0.22%	12,538
St. Louis, MO-IL MSA	0.22%	14,818
Detroit, MI PMSA	0.19%	40,067
Philadelphia, PA-NJ PMSA	0.18%	41,643
Cleveland-Lorain-Elyria, OH PMSA	0.18%	20,530
Pittsburgh, PA MSA	0.17%	21,208

Notes: (1) Estimates calculated using the Current Population Survey. (2) The entrepreneurship index is the percent of non-self-employed individuals aged 20-64 who become self-employed business owners each month. Business formation is only defined for those working 15 or more hours per week in their new business. (3) Silicon Valley is defined as the San Jose, San Francisco and Oakland MSAs.

Table 3
Entrepreneurship Rates by Industry (1996-2000)

Year	Silicon Valley				California Total				U.S. Total			
	Entrep. Index	Number of Entreps.	Percent of Total	Sample Size	Entrep. Index	Number of Entreps.	Percent of Total	Sample Size	Entrep. Index	Number of Entreps.	Percent of Total	Sample Size
None	0.00%	0	0.0%	5,706	0.01%	1,044	0.4%	43,901	0.01%	6,588	0.4%	472,768
Construction	1.03%	5,754	13.8%	1,204	1.11%	32,077	12.8%	7,176	1.01%	276,620	15.8%	100,871
Manufacturing	0.00%	0	0.0%	4,317	0.07%	6,196	2.5%	23,832	0.07%	57,886	3.3%	291,065
Trade	0.39%	5,397	12.9%	2,994	0.52%	40,597	16.2%	19,900	0.35%	233,891	13.4%	250,382
Information	0.72%	2,672	6.4%	817	0.81%	14,678	5.9%	5,157	0.44%	51,983	3.0%	43,309
Other Services	0.49%	26,237	62.8%	11,749	0.56%	143,950	57.5%	67,055	0.41%	910,244	52.1%	834,746
Other	0.16%	1,739	4.2%	2,371	0.18%	12,652	5.1%	17,228	0.36%	214,966	12.3%	230,692
All Industries	0.31%	41,798	100.0%	29,158	0.36%	250,151	100.0%	184,249	0.29%	1,745,590	100.0%	2,223,833

Notes: (1) Estimates calculated using matched data from the Current Population Survey. (2) The entrepreneurship index is the percent of non-self-employed individuals aged 20-64 who become self-employed business owners each month. Business formation is only defined for those working 15 or more hours per week in their new business. (3) All observations with allocated labor force status, class of worker, and hours worked variables are excluded. (4) Silicon Valley is defined as the San Jose, San Francisco and Oakland MSAs.

Table 4
 Entrepreneurship Rates by Geographical Area Excluding
 Construction (1996-2005)

Year	Silicon Valley		California Total		U.S. Total	
	Entrep. Index	Sample Size	Entrep. Index	Sample Size	Entrep. Index	Sample Size
1/1996-2/2000	0.28%	27,954	0.32%	177,073	0.26%	2,122,962
3/2000-12/2005	0.31%	39,126	0.31%	243,626	0.25%	3,281,590

Notes: (1) Estimates calculated using matched data from the Current Population Survey. (2) The entrepreneurship index is the percent of non-self-employed individuals aged 20-64 who become self-employed business owners each month. Business formation is only defined for those working 15 or more hours per week in their new business. (3) All observations with allocated labor force status, class of worker, and hours worked variables are excluded. (4) Silicon Valley is defined as the San Jose, San Francisco and Oakland MSAs.

Table 5
 Comparison of Number of Entrepreneurs and Employer Firm Births
 Current Population Survey (1996-2005) and Statistics of U.S. Businesses
 (1996-2003)

Year	California			U.S. Total		
	Entrep. Index	Entreps./ per Month	Empl. Firm Births per Year	Entrep. Index	Entreps./ per Month	Empl. Firm Births per Year
1996-00	0.36%	60,673	89,563	0.29%	419,067	741,070
2000-03	0.33%	60,676	93,573	0.28%	424,083	749,618
Change	-0.03%	0.0%	4.5%	-0.01%	1.2%	1.2%

Notes: (1) Entrepreneurship estimates are calculated from matched from the Current Population Survey. (2) The entrepreneurship index is the percent of non-self-employed individuals aged 20-64 who become self-employed business owners each month. Business formation is only defined for those working 15 or more hours per week in their new business. (3) All observations with allocated labor force status, class of worker, and hours worked variables are excluded. (4) Estimates of employer firm births are from the U.S. Census Bureau, Statistics of U.S. Businesses as reported by the Small Business Administration, Office of Advocacy.

Table 6
Demographic Characteristics of Silicon Valley and the United States
(1996-2000)

	Silicon Valley	United States
Female	51.5%	52.8%
Black	7.3%	12.5%
Latino	14.5%	10.4%
Native American	1.1%	0.9%
Asian	20.5%	3.9%
Immigrant	29.9%	12.3%
Age	39.3%	39.8%
Married	55.5%	61.1%
Previously married	14.0%	15.4%
High school graduate	20.2%	33.2%
Some college	32.0%	28.4%
College graduate	25.9%	17.1%
Graduate school	12.6%	7.5%
Family income: \$25,000-50,000	23.1%	29.3%
Family income: \$50,000-75,000	19.9%	18.7%
Family income: \$75,000 or more	31.1%	16.6%
Home owner	57.6%	68.4%
Sample Size	29,158	2,223,833

Notes: (1) Estimates calculated using matched data from the Current Population Survey. (2) Silicon Valley is defined as the San Jose, San Francisco and Oakland MSAs

Table 7
Probit Regressions for Entrepreneurship, CPS (1996-2000)

Explanatory Variables	(1)	(2)	(3)	(4)
Female	-0.00189 (0.00001)	-0.00189 (0.00001)	-0.00160 (0.00001)	-0.00160 (0.00001)
Black	-0.00150 (0.00001)	-0.00147 (0.00001)	-0.00128 (0.00001)	-0.00128 (0.00001)
Latino	-0.00054 (0.00001)	-0.00065 (0.00001)	-0.00061 (0.00001)	-0.00061 (0.00001)
Native American	-0.00061 (0.00002)	-0.00066 (0.00002)	-0.00067 (0.00002)	-0.00067 (0.00002)
Asian	-0.00126 (0.00001)	-0.00137 (0.00001)	-0.00124 (0.00001)	-0.00124 (0.00001)
Immigrant	0.00063 (0.00001)	0.00058 (0.00001)	0.00050 (0.00001)	0.00050 (0.00001)
Age (00s)	0.04826 (0.00015)	0.04790 (0.00015)	0.04762 (0.00015)	0.04763 (0.00015)
Age squared	-0.06426 (0.00018)	-0.06386 (0.00018)	-0.06262 (0.00018)	-0.06263 (0.00018)
Married	0.00059 (0.00001)	0.00061 (0.00001)	0.00060 (0.00001)	0.00060 (0.00001)
Previously married	0.00048 (0.00001)	0.00049 (0.00001)	0.00048 (0.00001)	0.00048 (0.00001)
High School graduate	0.00018 (0.00001)	0.00018 (0.00001)	0.00026 (0.00001)	0.00026 (0.00001)
Some college	0.00043 (0.00001)	0.00042 (0.00001)	0.00062 (0.00001)	0.00062 (0.00001)
College graduate	0.00049 (0.00001)	0.00049 (0.00001)	0.00085 (0.00001)	0.00085 (0.00001)
Graduate school	0.00064 (0.00001)	0.00065 (0.00001)	0.00120 (0.00001)	0.00120 (0.00001)
Family income: missing	0.00009 (0.00001)	0.00009 (0.00001)	0.00011 (0.00001)	0.00011 (0.00001)
Family income: \$25,000 to \$50,000	-0.00075 (0.00001)	-0.00075 (0.00001)	-0.00069 (0.00001)	-0.00069 (0.00001)
Family income: \$50,000 to \$75,000	-0.00119 (0.00001)	-0.00119 (0.00001)	-0.00108 (0.00001)	-0.00108 (0.00001)
Family income: \$75,000 or more	-0.00068 (0.00001)	-0.00070 (0.00001)	-0.00060 (0.00001)	-0.00060 (0.00001)

(continued)

Table 7 (Continued)

Explanatory Variables	(1)	(2)	(3)	(4)
Home owner	0.00005 (0.00001)	0.00008 (0.00001)	0.00014 (0.00001)	0.00014 (0.00001)
Unemployed	0.00368 (0.00001)	0.00366 (0.00001)	0.00339 (0.00001)	0.00339 (0.00001)
Not in the labor force	0.00372 (0.00001)	0.00372 (0.00001)	0.00153 (0.00001)	0.00153 (0.00001)
Silicon Valley		0.00051 (0.00002)	0.00045 (0.00002)	0.00045 (0.00003)
Other California		0.00060 (0.00001)	0.00060 (0.00001)	0.00047 (0.00001)
Silcon Valley Trend				0.00000 (0.00001)
Other California Trend				0.00008 (0.00001)
Industry controls	No	No	Yes	Yes
Mean of dependent variable	0.00295	0.00295	0.00295	0.00295
Log Likelihood value	-11393453	-11389870	-11263312	-11263212
Sample size	2,223,833	2,223,833	2,223,833	2,223,833

Notes: (1) The sample consists of individuals (ages 20-64) who do not own a business in the first survey month. (2) Additional controls include month, year and urban status dummies.

Table 8
 Probit Regressions for Entrepreneurship (Excluding Rural Areas), CPS (1996-2000)

Explanatory Variables	(1)	(2)	(3)	(4)
Silicon Valley		0.00047 (0.00001)	0.00041 (0.00001)	
Other California		0.00053 (0.00001)	0.00053 (0.00001)	
Industry controls	No	No	Yes	
Mean of dependent variable	0.00281	0.00281	0.00281	0.00281
Log Likelihood value	-11393453	-8910515	-8819394	0
Sample size	1,726,266	1,726,266	1,726,266	1,726,266

Notes: (1) The sample consists of individuals (ages 20-64) who do not own a business in the first survey month and who do not live in rural areas. (2) All specifications include controls for gender, race/ethnicity, nativity, age, marital status, education level, family income, home ownership, previous employment status, urban status, month effects and year effects.

Table 9
Probit Regressions for Entrepreneurship, CPS (1996-2005)

Explanatory Variables	(1)	(2)	(3)	(4)
Silicon Valley	0.00053 (0.00002)	0.00041 (0.00002)	0.00034 (0.00002)	0.00035 (0.00002)
Other California	0.00070 (0.00001)	0.00050 (0.00001)	0.00050 (0.00001)	0.00039 (0.00001)
Silicon Valley Post Period	0.00028 (0.00002)	0.00027 (0.00002)	0.00027 (0.00002)	0.00031 (0.00004)
Other California Post Period	-0.00002 (0.00001)	0.00004 (0.00001)	0.00003 (0.00001)	-0.00033 (0.00002)
Silicon Valley Trend				-0.00001 (0.00001)
Other California Trend				0.00007 (0.00000)
Unemployment controls	No	Yes	Yes	Yes
Industry controls	No	No	Yes	Yes
Mean of dependent variable	0.00293	0.00293	0.00293	0.00293
Log Likelihood value	-261,738	-245,776	-241,302	-241,298
Sample size	5,682,861	5,682,861	5,682,861	5,682,861

Notes: (1) The sample consists of individuals (ages 20-64) who do not own a business in the first survey month. (2) All specifications include controls for gender, race/ethnicity, nativity, age, marital status, education level, family income, urban status, month effects and year effects.