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SPIKY VENTURE CAPITAL

The Geography of Venture Capital Investment by Metro and Zip Code

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The Geography of Venture Capital Investment by Metro and Zip Code

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Executive Summary

Venture capital investment drives both innovation and high-tech companies, but it remains exclusive to just a handful of regions in the United States.

This report uses detailed data from Thomson Reuters to examine the geography of venture capital investment in the United States.

Its main findings are as follows.

- The top 50 metros account for 97 percent of all venture capital investment; the top 20 account for nearly 90 percent and the top 10 account more than three-quarters of all venture capital investment nationwide.

- The San Francisco Bay Area is the leading center for venture capital with $13.5 billion in investment, more than a third of all venture capital investment in the United States.

- San Francisco tops Silicon Valley with $8.5 billion in investment, 25 percent of the national total. In comparison, San Jose attracts $4.9 billion, roughly 15 percent.

- Venture capital investment is concentrated in three broad clusters which account for more than 80 percent of all investment: the San Francisco Bay Area, which spans San Francisco, San Jose, and several smaller metros; the Boston-New York-Washington, D.C. Corridor; and Southern California, spanning Los Angeles, San Diego, Santa Barbara, and Orange County.
- Venture capital investment is even more concentrated across neighborhoods or zip codes. The top 50 zip codes account for nearly half of all venture capital investment; the top 20 just under a third, and just the top 10 over a fifth of all nationwide venture capital investment. Less than 4 percent of all zip codes receive venture capital investment.
- Venture capital investment flows not just to metros with more high-tech industry, science and tech workers, and higher rates of innovation; it is also associated with metros that are larger, denser, more affluent, more open and diverse, and with greater concentrations of talent.
- Venture capital investment is also associated with higher housing prices, greater levels of wage inequality, and economic segregation, which itself is associated with larger, more affluent, knowledge-based metros, but not with greater levels of income inequality.

The geography of venture capital investment is both a product and a reflection of the increasingly spiky nature of America's knowledge-based, innovation-driven, and talent-oriented economic landscape.

Introduction

Venture capital is a key driver of both innovation and high-tech start-ups. Early research found venture capital to be largely concentrated in Silicon Valley and along the Route 128 corridor around Boston, with smaller concentrations in tech hubs like Seattle, and North Carolina's Research Triangle.[1] More recent research has documented the rise of urban startup hubs like New York City and a shift in venture investment from the suburbs of Silicon Valley to nearby San Francisco's urban districts.[2] A long line of research, from Albert Marshall and Jane Jacobs to Edward Glaeser and Michael Porter, has noted the concentration of innovative activity in geographic clusters.[3]

Despite its importance to both technological innovation and regional economic development, research on the geography of venture capital has been hampered by access to data. Most of the available data on the location and geography of venture capital investment is highly aggregated and assigned to geographies that do not sync with standard Census definitions of metro areas, making systematic research difficult and statistical research on the actors associated with it all but impossible.

This report overcomes those limitations by utilizing detailed data from Thomson Reuters to examine the geography of venture capital investment in the United States. These data provide granular information on the location of venture capital investments by metro and zip code.

The rest of the report is organized as follows. We begin by examining the geography of venture capital across U.S. metros. We do this first on an absolute basis and then on a per capita basis to control for population size. We then chart the leading zip codes for venture capital investment. Finally, we examine the key economic, demographic, and social factors associated with venture capital investment. The conclusion summarizes our key findings. It is the fourth installment of a larger and ongoing Martin Prosperity Institute research project on the new geography of venture capital and start-up activity.[4]

Venture Capital Investment by Metro

We begin by mapping the geography of venture capital investment across the United States (*Exhibit 1*).

The biggest dots are on the coasts in Bay Area metros like San Francisco and San Jose on the West Coast, and along the Boston-New York-Washington Corridor on the East Coast. There are also relatively large clusters of venture capital investment in Los Angeles and Southern California; the Pacific Northwest; and Texas, from Austin and Dallas to Houston. There are also smaller centers in and around Chicago, Atlanta, the North Carolina Research Triangle, Miami and South Florida, Minneapolis-St. Paul, and Denver-Boulder.

Exhibit 2 lists the top 20 metros for venture capital investment. San Francisco tops the list with $8.5 billion in venture capital investment, roughly a quarter of the national total. Nearby San Jose, in the heart of Silicon Valley, is second

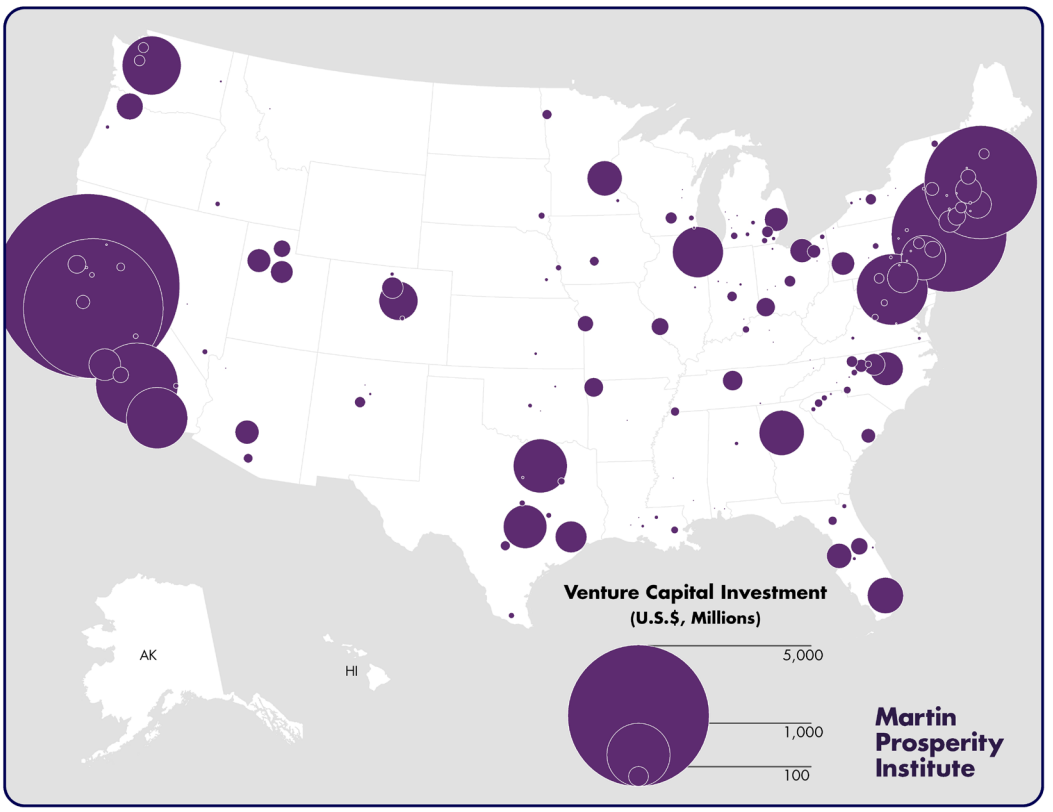


Exhibit 1: Venture Capital Investment in the United States

Rank	Metro	Share of U.S. Total
1	San Francisco, CA	25.26%
2	San Jose (Silicon Valley), CA	14.51%
3	New York, NY	9.95%
4	Boston-Cambridge, MA	9.54%
5	Los Angeles, CA	5.06%
6	Washington, DC	3.78%
7	San Diego, CA	2.82%
8	Seattle, WA	2.61%
9	Dallas, TX	2.19%
10	Chicago, IL	1.94%
11	Atlanta, GA	1.53%
12	Philadelphia, PA	1.48%
13	Austin, TX	1.42%
14	Denver, CO	1.13%
15	Miami, FL	0.98%
16	Minneapolis-St. Paul, MN	0.92%
17	Raleigh-Cary, NC	0.84%
18	Houston, TX	0.75%
19	Santa Barbara, CA	0.75%
20	Baltimore, MD	0.71%

*In millions of U.S. dollars

Exhibit 2: Top 20 Metros for Venture Capital Investment in the United States

with $4.9 billion in venture capital investment, about 15 percent of the total. New York is third with $3.3 billion, 10 percent, Boston is fourth with $3.2 billion, Los Angeles is fifth with $1.7 billion, roughly 5 percent, and Washington, D.C. is sixth with $1.3 billion. San Diego, Seattle, Dallas, and Chicago round out the top 10, while Atlanta, Philadelphia, Austin, Denver, Miami, Minneapolis-St. Paul, Raleigh, Houston, Santa Barbara, and Baltimore complete the top 20.

Venture capital investment is highly concentrated across the United States. The top 50 metros account for 97.2 percent; the top 20 account for 88.2 percent; and just the top 10 account for 77.6 percent of venture capital investment nationwide.

Investment is concentrated in three main clusters across the United States. The San Francisco Bay Area — which includes San Francisco, San Jose, and several smaller metros — accounts for

over 40 percent (40.2 percent) of the national total. The Boston-New York-Washington Corridor accounts for more than a quarter of investment (27.8 percent). Spanning Los Angeles, San Diego, Santa Barbara, and Oxnard, the Southern California cluster accounts for another 8.8 percent. Together, these three clusters comprise roughly three-quarters of all U.S. venture capital investment.

Venture Capital Investment per Capita

Of course, large metros are likely to have more venture capital investment simply because of their bigger size. We control for this by looking at venture capital based on the size of the local population.

The map below (*Exhibit 3*) charts the geography of venture capital investment per capita. Many of the country's top metros for venture capital — San Jose, San Francisco, and Boston — remain important hubs. But now smaller metro areas grow in prominence.

Exhibit 4 lists the top 20 metros for venture capital investment when controlling for population. Now San Jose ($2,534) supplants San Francisco ($1,875) as the top metro for venture investment. Boston is third ($683).

But now the list gets more interesting, with smaller places moving up considerably. Santa Barbara ($574) jumps all the way from 19th

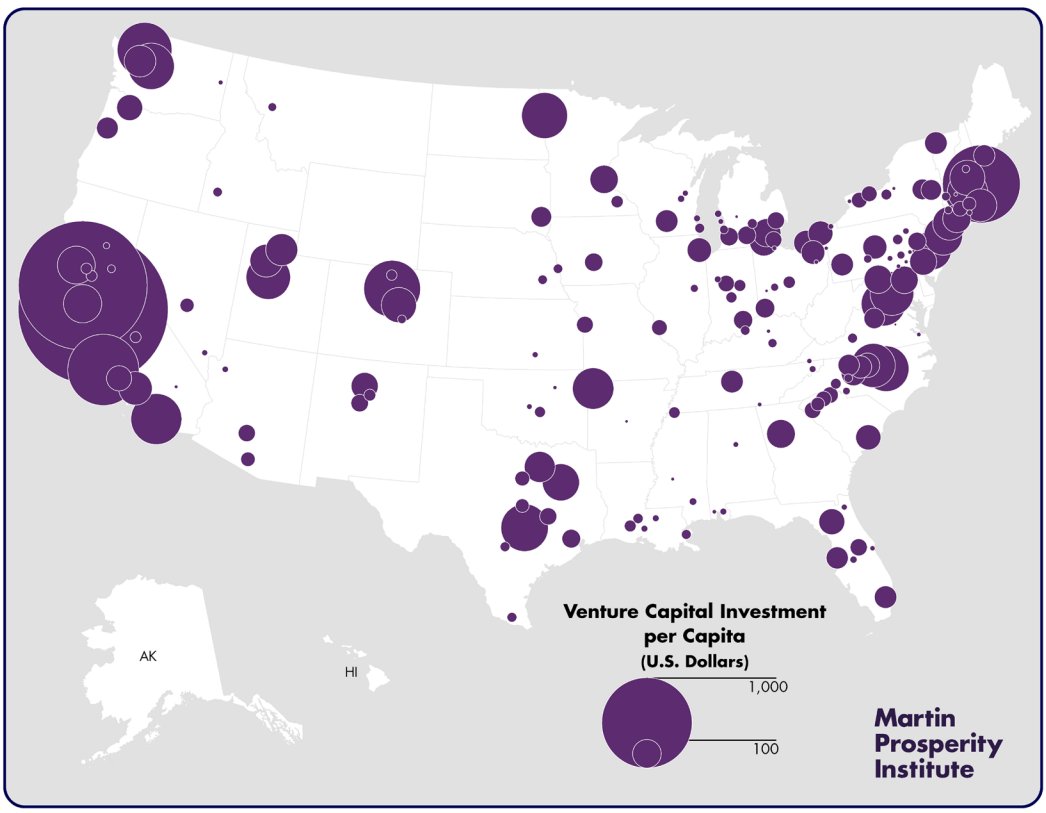


Exhibit 3: Venture Capital Investment in the United States per Capita

to fourth, with Boulder fifth and Oak Harbor, Washington, outside Seattle, sixth.

The remainder of the top 20 are a mix of tech hubs like San Diego, Austin, Seattle and Raleigh and Durham in the North Carolina Research Triangle, large metros like Washington, D.C. and New York — which fell from third on total investment to 19th on investment per capita — and smaller places like Grand Forks, North Dakota, Culpeper, Virginia, Fayetteville, Arkansas, and Worcester, Massachusetts.

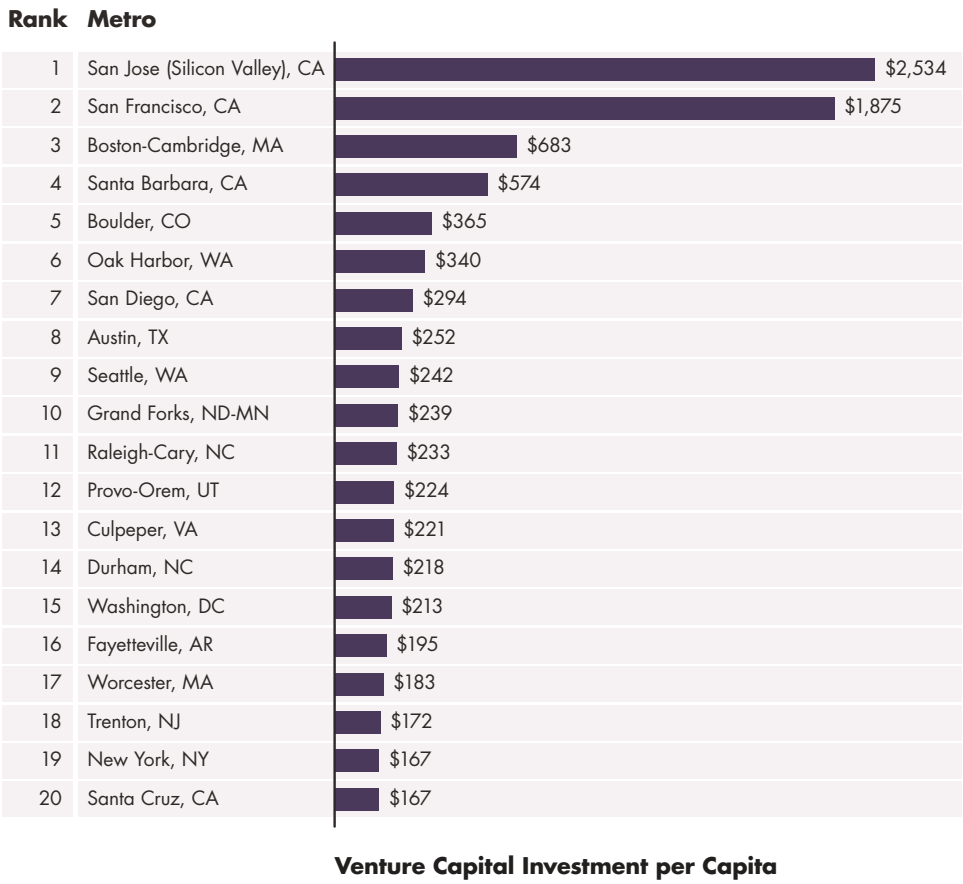


Exhibit 4: Top 20 Metros by Venture Capital Investment in the United States per Capita

Venture Capital Investment by Zip Code

We now turn to venture capital investment by zip code. Venture capital is highly clustered and concentrated in a small number of zip codes as the map below (*Exhibit 5*) shows.

There are large clusters in the San Francisco Bay Area, the Boston-New York-Washington Corridor, Central and Northern Texas, and Southern California. There are smaller, but still notable clusters in the Pacific Northwest, Denver and Boulder, Salt Lake City and Provo, the North Carolina Research Triangle, Southern Florida, Chicago, Detroit-Ann Arbor, and Cleveland in the Midwest.

Exhibit 6 lists the top 20 zip codes for venture investment. The top two zip codes are both in downtown San Francisco — South of Market/Mission District (94103) and Rincon Hill (94105) — each with about a billion dollars in investment. Palo Alto (94301) is third and Potrero Hill/Dogpatch/South Beach (94107) in

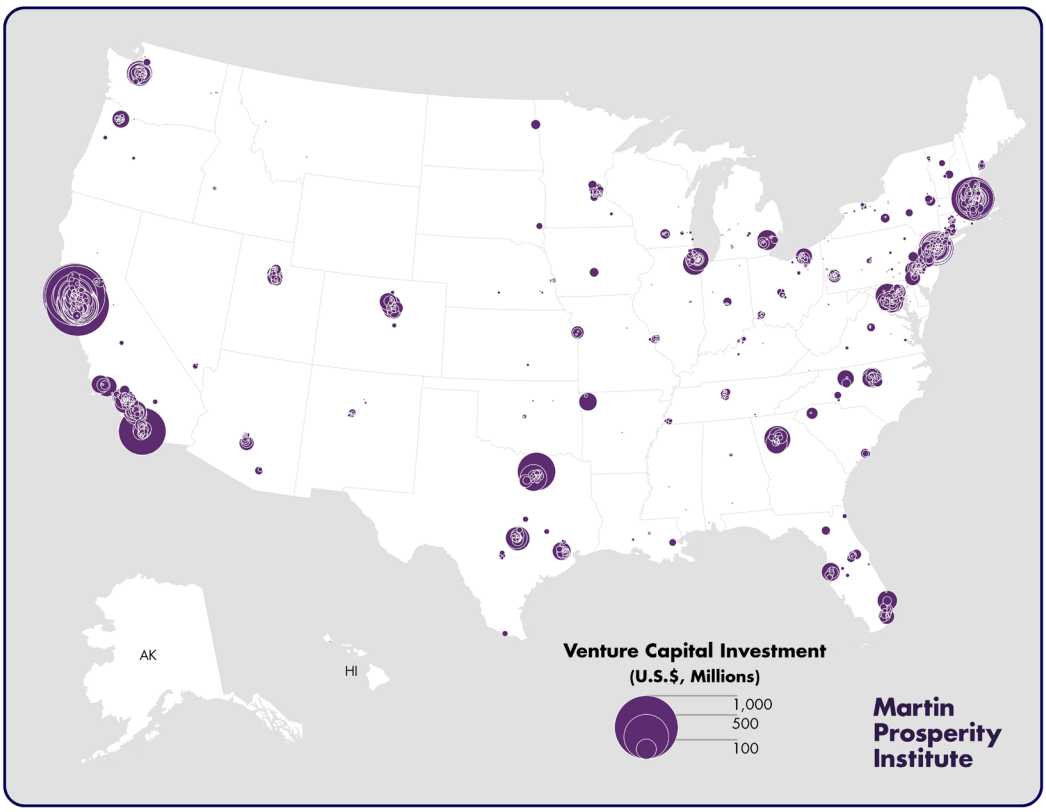


Exhibit 5: Venture Capital Investment in the United States by Zip Code

downtown San Francisco is fourth. Sorrento Valley in San Diego (92121) and South San Francisco (94080) are fifth and sixth, and Waltham, outside Boston (02451), is seventh. San Francisco's Financial District (94104), Silicon Valley's Menlo Park (94025), and Mountain View (94043) round out the top 10.

Fifteen of the top 20 zip codes are in California, with 14 of the top 20 located in the San Francisco Bay Area. Nine are located in the San Francisco metro, with five of those located in the city's downtown. Another five are in Silicon Valley.

The top 20 also includes four zip codes along the Boston-New York-Washington Corridor. Three of these are in greater Boston — two in Cambridge, around MIT (02139 and 02142), and one in suburban Waltham (02451). The fourth

Rank	Zip Code	Neighborhood	Metro	Venture Capital Investment*	Share of U.S. Venture Capital
1	94103	South of Market/Mission District	San Francisco	$1,057	3.20%
2	94105	Rincon Hill	San Francisco	$1,004	3.04%
3	94301	Palo Alto	San Jose	$998	3.02%
4	94107	Potrero Hill/Dogpatch/ South Beach	San Francisco	$885	2.68%
5	92121	Sorrento Valley	San Diego	$568	1.72%
6	94080	South San Francisco	San Francisco	$501	1.52%
7	2451	Waltham	Boston-Cambridge	$484	1.46%
8	94104	Financial District	San Francisco	$481	1.45%
9	94025	Menlo Park	San Francisco	$426	1.29%
10	94043	Mountain View	San Jose	$402	1.22%
11	94041	Old Mountain View	San Jose	$392	1.19%
12	94063	Redwood City	San Francisco	$378	1.14%
13	2139	Cambridge/MIT	Boston-Cambridge	$377	1.14%
14	94065	Redwood Shores	San Francisco	$369	1.12%
15	75034	Frisco	Dallas	$368	1.11%
16	94085	Sunnyvale	San Jose	$351	1.06%
17	2142	MIT	Boston-Cambridge	$320	0.97%
18	95054	Santa Clara	San Jose	$313	0.95%
19	10012	Soho/NYU	New York	$310	0.94%
20	94111	Financial District/Embarcadero	San Francisco	$306	0.93%

*In millions of U.S. dollars

Exhibit 6: Top 20 Zip Codes for Venture Capital Investment

is in New York City's SoHo surrounding NYU (10012). The one remaining zip code is in Frisco, Texas (75034), a Dallas suburb.

Venture capital is highly concentrated at the zip code level. The top 50 zip codes account for nearly half (48.8 percent) of all venture capital investment; the top 20 nearly a third (31.1 percent) and the top 10 roughly a fifth (20.6 percent) of all nationwide venture capital investment. Less than 4 percent (3.2 percent) of United States zip codes (1,338 of 41,987) receive venture capital investment.

Key Factors in the Geography of Venture Capital Investment

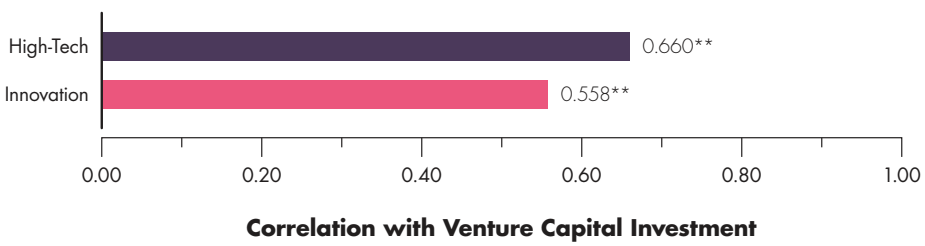
This section turns to the factors that help shape the geography of venture capital investment. To probe this, we ran a correlation analysis of the economic, demographic, and social factors that are associated with venture capital investment across metros. This analysis covers 153 of the 180 metros that receive venture capital investment, including all 52 metros with a population over one million people; 41 with a population between 500,000 and one million; 30 with a population between 250,000 and 500,000; and 30 with less than 250,000 people. Since bigger metros attract more venture capital on balance, we ran a partial correlation analysis that controls for metro population. The correlations cover the dollar amount of these venture capital investments. As usual, we emphasize that correlation does not equal causation. The results, summarized below, are in line with our previous analysis based on earlier and less comprehensive data (see the appendix for further detail).[5]

Innovation and High-Tech Industry

There is an old saying among venture capitalists that investments follow the quality of deals. Unsurprisingly then, we see venture capital to be positively associated with innovation, measured by patents (0.56) and especially the concentration of high-tech industry (0.66) (*Exhibit 7*).[6]

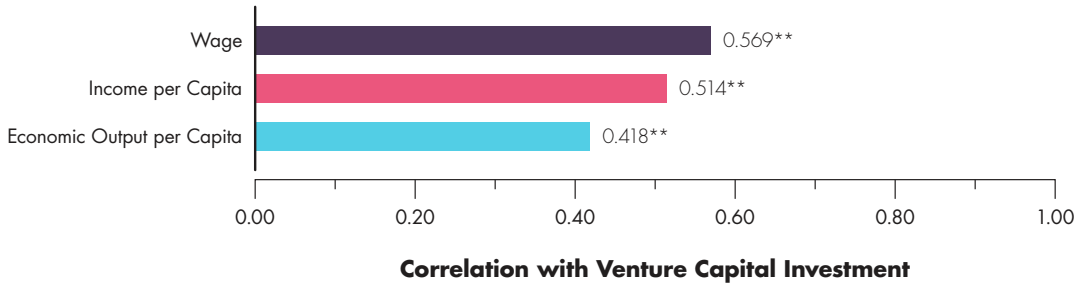
Wages and Income

Venture capital investment also flows to more affluent metros. It is positively associated with average wages levels (0.57), per capita income (0.51), and economic output per capita (0.42) (*Exhibit 8*). This relationship likely goes both ways and also likely reflects the greater concentration of high-tech industry in venture capital intensive metros.



Note: ** indicates significance at the 1 percent level, * at the 5 percent level.

Exhibit 7: High-Tech and Innovation Correlations

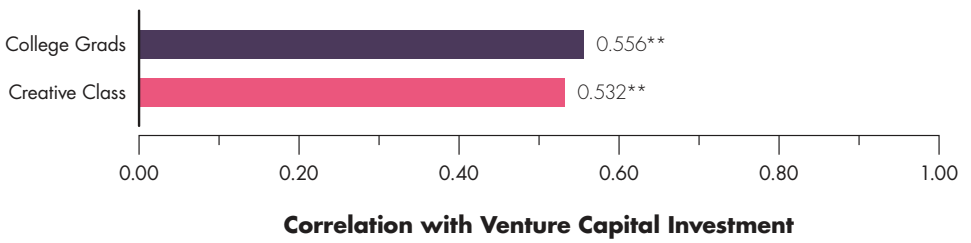


Note: ** indicates significance at the 1 percent level, * at the 5 percent level.

Exhibit 8: Wage, Income, and Economic Output Correlations

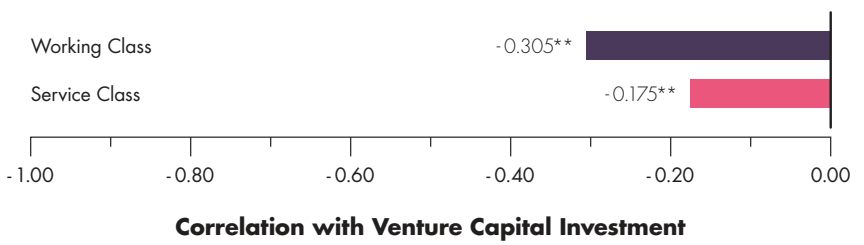
Talent

Venture investment tracks the geography of talent or human capital (*Exhibit 9*). It is correlated with the percentage of adults who are college grads (0.56) and the percentage of the labor force holding knowledge-work jobs in the creative class, which spans work in science and technology, management, the professions, and arts, media, and entertainment (0.53).[7] It makes intuitive sense that venture capital would be drawn to the deep talent pools that are found in great cities, and around research universities and college towns. Venture capital is negatively associated with the share of the workforce who are members of the blue-collar working class (-0.31) and the service class (-0.18), though these correlations are substantially more modest (*Exhibit 10*).



Note: ** indicates significance at the 1 percent level, * at the 5 percent level.

Exhibit 9: Talent Correlations



Note: ** indicates significance at the 1 percent level, * at the 5 percent level.

Exhibit 10: Working and Service Class Correlations

More interesting are the specific kinds or clusters of work that are associated with venture capital investment. Unsurprisingly, venture capital is most closely associated with concentrations of science and technology workers (0.47) (*Exhibit 11*). But, venture capital investment is even more closely associated with business and management occupations (0.54). Venture capitalists have pointed out time and time again that a solid management team is as important to a startup's success as cutting-edge technology.

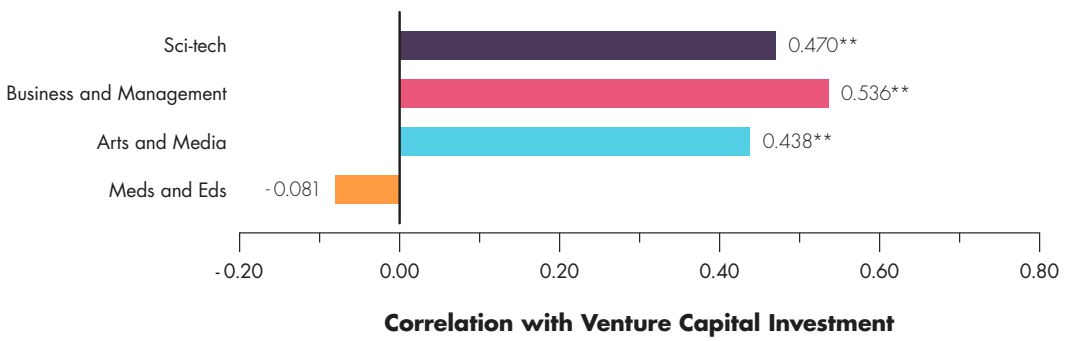
More surprising is the fact that venture capital investment is also closely correlated with arts, media, and entertainment occupations (0.44). This correlation is of roughly the same magnitude as the correlation for science and technology occupations. This finding likely reflects the increasing importance of content and user-friendly design to startups.

Many politicians and local economic development officials suggest that the higher-education and medical industries — so-called "eds and meds" — can play a key role in spurring high-tech development. However, our analysis finds little to no significant statistical associations between eds and meds occupations and venture capital investment. This is in line with other research that finds that a higher share of employment in eds and meds does not play a direct role in urban and regional development.[8]

Openness and Diversity

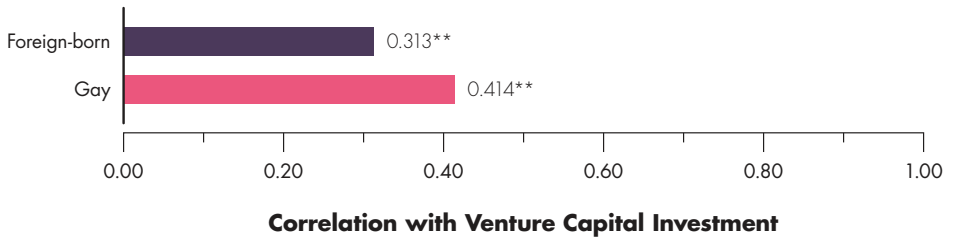
Venture capital investment is also associated with the relative diversity and openness of metros (*Exhibit 12*). This is in line with studies that have documented the large share of foreign-born engineers who work in high-technology fields or who are founders of high-tech startups.[9] Our analysis finds venture capital to be positively correlated with the share of adults who are foreign-born (0.31).

The association between venture capital investment and the gay and lesbian share of the population is also positive (0.41). It is of greater magnitude than the correlation for foreign-born. The reason for this is not that gay and lesbian people launch more high-tech enterprises than straight people. Rather, high-tech startups are more likely to be conceived and created in places that are open to new ideas and accepting of different kinds of people. As Gary Gates and Richard Florida have shown, locations that welcome gay people are also likely to have an underlying openness to innovation and risk that is attractive to entrepreneurs.[10]



Note: ** indicates significance at the 1 percent level, * at the 5 percent level.

Exhibit 11: Correlations for Occupations



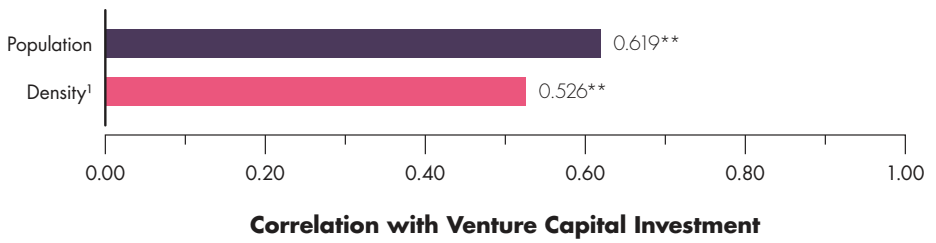
Note: ** indicates significance at the 1 percent level, * at the 5 percent level.

Exhibit 12: Foreign-born and Gay Correlations

Density versus Sprawl

Ever since Jane Jacobs, urbanists and economists have argued that dense urban areas promote physical proximity, leading to the kinds of serendipitous encounters that encourage information sharing, spurring innovation and the formation of new business enterprises.[11] Our analysis suggests that venture capital and start-up activity are associated with these characteristics of urban form and structure. We find a positive association between population (0.62) and venture capital investment (*Exhibit 13*). We find an even closer association between venture capital and a measure of population-weighted density (0.53) that more accurately reflects density in and around the urban core.[12]

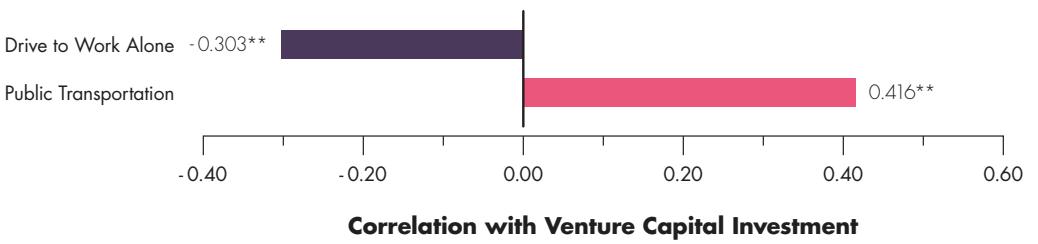
Venture capital investment is also related to differences in the way people commute to work. It is negatively associated with the share of commuters who drive to work alone (-0.30), a proxy indicator of suburban sprawl (*Exhibit 14*). Conversely, it is positively, though less strongly,



Note: ** indicates significance at the 1 percent level, * at the 5 percent level.

[1] Population-weighted

Exhibit 13: Population and Density Correlations



Note: ** indicates significance at the 1 percent level, * at the 5 percent level.

Exhibit 14: Commuting Correlations

associated with the share of commuters who use public transportation (0.42), a characteristic of large and dense metro areas.

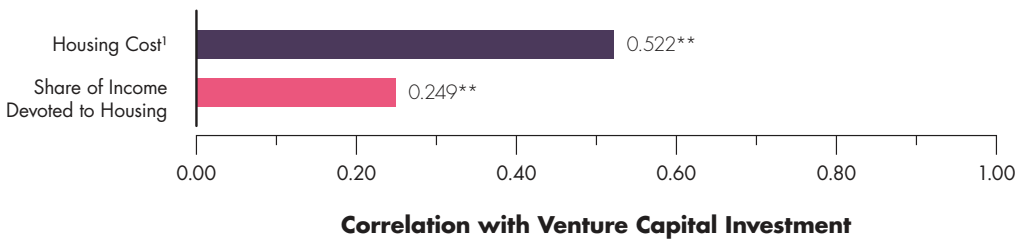
Together, these findings suggest that venture capital investment is drawn to denser, more compact and clustered metros and that investment is less likely to occur in more sprawling, car dependent metros.

Housing, Inequality, and Segregation

Concern has been raised, especially in San Francisco, about the effects of concentrations of venture capital-backed startups and high-tech workers on both rising housing costs and the growing economic gap between tech workers and everyone else. This situation has created controversy leading to protests over the private bus services that companies like Google use to shuttle tech workers from their San Francisco residences to offices in Silicon Valley.[13]

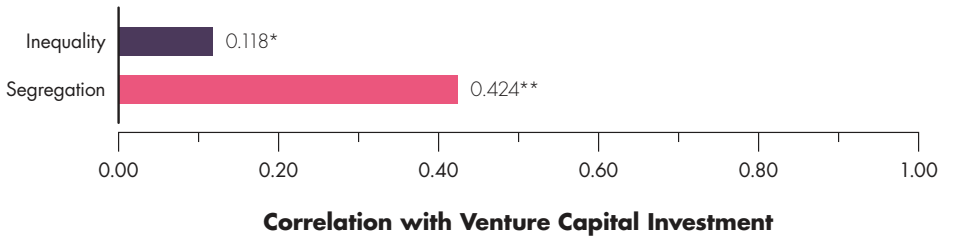
We looked at the correlations between venture capital investment and both housing costs and inequality. Venture capital investment is closely correlated with median monthly housing costs (0.52) (*Exhibit 15*). But housing costs are more expensive in regions with higher levels of high-tech industry, since these regions are more productive and thus have higher wages and incomes that bid up the price of housing. The San Francisco Bay Area, for example, has among the highest housing prices in the country. Prior studies, including our own, have documented the connection between high-technology and housing costs.[14] While venture capital is correlated with the share of income devoted to housing (0.25), the correlation is substantially less than the correlation to median housing costs.

Inequality has been growing across U.S. metros.[15] We looked at the correlations between venture capital and two types of inequality: wage inequality (measuring the wage gap between more highly paid knowledge, high-tech, and creative workers) and income inequality (measured by the Gini coefficient) (*Exhibit 16*). The results are mixed. There is a reasonably close connection between venture capital investment and wage inequality (0.49). We find a slightly positive and significant association between venture capital investment and income inequality (as measured by the Gini coefficient) (0.12). This is in line with our related research that finds the metro variation in wage inequality to be associated with denser, more affluent, knowledge-based, high-tech regions, while income inequality is more closely associated with poverty, race, and de-unionization. Venture capital is also closely correlated to a measure of overall economic segregation (0.42). This reflects the economic and class based segregation of tech-driven, knowledge-based metros.[16]



Note: ** indicates significance at the 1 percent level, * at the 5 percent level.
[1] Median Monthly

Exhibit 15: Housing Cost Correlations



Note: ** indicates significance at the 1 percent level, * at the 5 percent level.

Exhibit 16: Inequality and Segregation Correlations

Conclusion

This report examined the geography of venture capital investment in the United States. It is based on detailed, granular data from Thomson Reuters for both metro areas and neighborhoods or zip codes. Its key findings are as follows.

The geography of venture capital investment is extremely concentrated and spiky. The top 50 metros account for 97.2 percent of all venture capital investment; the top 20 account for nearly 90 percent and just the top 10 account more than three-quarters of all venture capital investment nationwide.

The San Francisco Bay Area is the leading center for venture capital with $13.5 billion in investment, more than a third of all venture capital investment in the United States. However, greater San Francisco tops Silicon Valley (San Jose) with $8.5 billion in investment, roughly a quarter of the national total compared to San Jose's $4.9 billion, roughly 15 percent. Greater New York ranks third with $3.3 billion, 10 percent. Boston is fourth with $3.2 billion, Los Angeles fifth with $1.7 billion and Washington, D.C. sixth with $1.3 billion.

Venture capital investment is concentrated in three broad clusters. The San Francisco Bay Area, which spans San Francisco, San Jose, and several smaller metros, accounts for over 40 percent. The Boston-New York-Washington Corridor accounts for more than a quarter. Spanning Los Angeles, San Diego, Santa Barbara, and Oxnard, the cluster in Southern California accounts for an additional nine percent. Together, these three clusters comprise roughly three-quarters of U.S. venture capital investment.

A similar spiky and uneven pattern of venture capital investment is evident at the zip code level. The top 50 zip codes account for nearly half of all venture capital investment; the top 20 nearly a third, and the top 10 roughly fifth of all nationwide venture capital investment. Venture capital investment is concentrated in less than 4 percent of all zip codes across the United States.

Our statistical analysis finds that the geography of venture capital investment flows not just to metros with more high-tech industry, science and tech workers, and higher rates of innovation. It is also associated with metros that are larger, denser, more affluent, more open and diverse, and with greater concentrations of talent. Venture capital investment is also associated with higher housing prices and greater levels of wage inequality and economic segregation, which itself is associated with larger, more affluent, knowledge-based metros, but not with greater levels of income inequality.

When all is said and done, the geography of venture capital investment is both a product and a reflection of the increasingly spiky nature of America's knowledge-based, innovation-driven, and talent-oriented economic landscape.

Appendix: Variables, Data and Methodology

This report is based on detailed data on venture capital from Thomson Reuters. It provides granular data on venture capital investments including the name of the recipient company, the total dollar value of the investment, the number of deals completed, the industry sector that received the investment, and geographic location information, including city and postal code.

We downloaded the data by address and location, including identifiers for metro area and zip code. The metro identifier was for the Metropolitan Statistical Area (MSA) or Primary Metropolitan Statistical Area (PMSA). We standardized this by converting them all to the current 2012 definition of Core Based Statistical Areas (CBSAs) using the MABLE/Geocorr2K geographic correspondence engine weighted by 2009 population.[17] (Venture investment in Charleston, SC was placed in Charleston-North Charleston, SC, Lexington-Fayetteville, KY was moved to Lexington, KY, and Phoenix, AZ to Phoenix-Mesa, AZ.) Using the attributed table of census Tiger-Line Shapefiles, the 2008 CBSAs were matched to the updated 2012 CBSAs by code and name. Though there are several instances of code or name changes, the geographies were verified and remain the same. The final analysis was done using venture capital data that fell within a 2012 CBSA. Micropolitan areas and San Juan, Puerto Rico were excluded from the analysis.

We ultimately identified 4,164 investments in 180 metros, nearly half (49.2 percent) of all 366 metro areas. We excluded one investment, a $2.1 billion dollar in investment in the established computer hardware company Dell which does not qualify as a conventional venture capital investment.[18]

On a more granular scale, we identified venture capital investments in 1,339 zip codes. This zip code data was assigned to Zip Code Tabulation Areas (ZCTAs). ZCTAs are a generalized representation of U.S. Postal Service zip code areas used by the U.S. census. In generalizing and aggregating zip code data, the census is able to convert a point-based data set (addresses) into a polygon data set (ZCTAs). This conversion was done with help from the Missouri Census Data Center's Zip to ZCTA cross walk 2010.[19]

After conversion, 1339 zip codes became 1302 Zip Code Tabulation Areas. This represents roughly 4 percent (3.9 percent) of all 33,144 zip code tabulation areas across the United States.

Totals by different geographies may vary as the Thomson Reuters data is subject to constant updates and varies by day to day download rates.

The population data used in our per capita analysis is from the U.S. Census Bureau's 2013 American Community Survey one year estimate, downloaded on December 15, 2014.

Correlation Analysis Variables

The following variables were used in the correlation analysis.

Innovation: This is measured as patents per capita based on data from the U.S. Patent and Trademark Office for the years 2005–2009.

High-Tech: This is an update of the original Techpole Index, a measure of high-tech industry concentration developed by Ross DeVol of the Milken Institute. It is a measure of high-tech concentration and is based on data from the 2010 County Business Patterns.

Wages: We measure average wages based on data from the Bureau of Labor Statistics (BLS) Occupational Employment Survey (OES) for 2010.

Income: This is per capita income based on data from the American Community Survey (ACS) for 2010.

Economic output per capita: This is based on Gross Regional Product per capita from United States Bureau of Economic Analysis (BEA) for 2010.

College Grads: This is the share of adults ages 25 and older with a Bachelor's degree and above and is from the 2010 ACS.

Creative Class: The creative class includes workers in computer and mathematical occupations, architecture and engineering, life, physical, and social sciences, education, training, and library work, arts, design, entertainment, sports, and media, management, business and financial operations, legal occupations, health-care practitioners and technical workers, and high-end sales and sales management. It is based on occupational categories from the BLS OES for 2010.

Working Class: The working class includes workers in manufacturing, construction and extraction, installation, maintenance and repair, production, transportation and material moving occupations based on the 2010 BLS OES.

Service Class: The service class includes workers in low-skill, low-wage jobs spanning food preparation and food-service-related occupations, building and grounds cleaning and maintenance, personal care and service, low-end sales, office and administrative support, community and social services, and protective services, based on the 2010 BLS OES.

Science and Tech Occupations: These include life, physical, and social sciences as well as architecture and engineering, based on the 2010 BLS OES.

Business and Management Occupations: These include management, business, and financial operations, again based on the 2010 BLS OES.

Arts, Culture, and Media Occupations: These include arts, design, entertainment, sports, and media occupations, based on the 2010 BLS OES.

Meds and Eds Occupations: These include education, training, and library, healthcare practitioners and technical occupations, again based on the 2010 BLS OES.

Foreign-Born: The share of the population who are foreign born, from the 2010 ACS.

Gay Index: This is measured as a location quotient of the concentration of gay and lesbian households. It is based on the 2005-2009 ACS as developed by Black et al.[20]

Population: This is metro population based on the 2010 ACS. A logged version is used for the correlation analysis.

Population-Weighted Density: This is weighted by population based on distance from City Hall and is based on data from the 2010 United States Census.

Drive Alone to Work: The share of the population that drives alone to work, based on data from the 2010 ACS.

Public Transportation: This is the share of the population that commutes to work by public transportation, again based on data from the 2010 ACS.

Housing Costs: We include two measures: median monthly housing costs and housing costs as a share of household income, both from the 2010 ACS.

Inequality: Income inequality is based on the conventional measure and is from the 2010 ACS. Wage Inequality is calculated based on the Theil index, an entropy measure that captures differences in wage between the three major occupational classes from the 2010 BLS OES.

Economic Segregation: It is a combination of income segregation, educational segregation, and occupational segregation measures developed by our Martin Prosperity Institute research team.[21]

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