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Rise of the Startup City: The Changing Geography of the Venture Capital Financed Innovation

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Rise of the Startup City:
The Changing Geography of the Venture Capital Financed Innovation

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Abstract: The prevailing geographic model for high-technology industrial organization has been the "nerdistan," a sprawling, car-oriented suburb organized around office parks, of which Silicon Valley is the prototypical example. This seems to contradict a basic insight of urban theory, which associates dense urban centers with higher levels of innovation, entrepreneurship and creativity. Our research examines the geography of recent venture capital finance startups in the United States across metros and within a subset of them by neighborhood and finds compelling evidence that the model is changing. Venture capital investments are clustering in larger, denser urban centers with high levels of human capital, like San Francisco and Lower Manhattan, as well as in walkable suburbs. We suggest that the suburban model might have been an historical aberration, and that innovation, creativity, and entrepreneurship are realigning in the same urban centers that traditionally fostered them.

Keywords: Venture capital; investments; start-ups; cities; suburbs

JEL codes: G20; F65; O31; R00

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Introduction

Innovation and creativity have long been the province of cities and urban areas. Adam Smith long ago pointed to the tendency of new innovations and entrepreneurial enterprises to arise in urban areas, where the division of labor was more pronounced and the market was larger.[1] While they were not principally concerned with urbanism per se, Marx[2] noted the concentration of the most advanced and revolutionary modes of production in large urban centers of Europe and the United States, while Schumpeter[3] called attention to the role of leading edge entrepreneurs, also concentrated in large urban centers, in unleashing the "gales of creative destruction" that would create new industries and transform established ones. Alfred Marshall identified the basic clustering of economic activity referred to as "agglomeration" as the underlying source of innovation, entrepreneurship, and economic development.[4] Jane Jacobs later famously outlined the role of cities in attracting and harnessing a diverse range of creative talent and spurring new innovative enterprises.[5]

But, during 1970s, 1980s and 1990s, innovation in everything from semiconductors, computing and software to robotics and biotech came to be seen as largely something that happened in suburban outposts like California's Silicon Valley home of Intel, Apple, Google, and Facebook; the Route 128 corridor outside Boston, Microsoft's vast headquarters in suburban Seattle; the cluster of high tech enterprise in suburban Austin, and in the North Carolina Research Triangle. Researchers docmented the post-war shift of population, business, and economic activity from the urban center to the suburbs, the rise of so-called edge cities of industry and technology at the suburban periphery, and identified the clustering of high technology enterprise and venture capital in Silicon Valley and other suburban "nerdistans."[6]

The urban center was seen either as the proverbial "hole in the donut" that business was fleeing or as a locus for bohemian artistic or musical creativity and certainly not a center for leading edge startups, venture capital investment, or startup activity. Richard Florida andMartin Kenney's early studies of venture capital in the 1980s documented the clustering of venture capital financed startups in suburban Silicon Valley and the Route 128 areas in California and charted the flow of capital from urban New York and Chicago to these suburban technology clusters.[7]

Something of a back to the city shift has occurred over the past decade or so. Numerous studies have documented the shift in population, especially more highly educated people, back to cities. Alan Ehrenhalt has dubbed this "the great inversion" – the movement of talent and jobs from the suburbs back to the city.[8] Several studies have begun to trace the increasingly urban locations of startups in urban areas of New York, San Francisco, London, and other cities and to note the migration or "urban shift" in startup activity from sprawling, car-oriented suburbs to denser urban locations.[9]

But, there is an even bigger reason to expect a shift in venture capital and startup activity back to urban centers. Virtually the entire modern literature on urban economics – from Jane Jacobs and Robert Lucas to Edward Glaeser and Richard Florida - highlights the role of clustering, density, and diversity of the sort found in cities as key drivers of innovation.[10] Dense urban areas are more productive.[11] They are where highly skilled talent is drawn both to be around other talented people and to enjoy abundant amenities.[12] They are the centers of the kinds social and industrial diversity needed to power creativity and innovation. They give rise to and facilitate the overlapping knowledge and professional networks through which

knowledge and ideas spread. [13] They are the places where people from diverse backgrounds can find one another and combine their talents.[14] They are literally defined by their speed of connections and faster urban metabolisms.[15] More than any other social or economic organism, cities are incubators for new ideas, new innovations and new enterprises.[16] In a recent review of the broad literature on urbanism and innovation, economists Gerald Carlino and William Kerr write that: "three-quarters of the U.S. population resided in metropolitan areas. By contrast, 92 percent of patents were granted to residents of metropolitan areas, and virtually all VC investments were made into major cities."[17]

Much of the literature on the urbanization of high tech startups has been anecdotal or descriptive in character, often focusing on a single metro. Our research seeks to fill that gap by providing an empirical examination of the emerging economic geography of venture capital investment. It summarizes our research on the geography of venture capital investment and startup activity at three geographic scales: (1) across U.S. metros, (2) between U.S. urban centers and suburbs, and (3) across global cities. To do so, we use unique data from Thompson Reuters, the National Venture Capital Association and Dow Jones.[18]

The remainder of the paper is organized as follows. The first part of examines the geography of venture capital investment and startup activity across U.S. metros. We map overall levels of venture capital investment, and venture capital investment on a per capita basis to control for the places with large populations. We then explore the key economic and demographic factors that are associated with venture capital investment, also looking at the association between venture capital investment and inequality, which has become a more pressing question of late. The second part examines the distribution of venture capital

investment and startup activity between cities and suburbs. The third part looks at the venture capital investment globally, charting the geography of venture investment across global cities. We summarize and discuss our key findings in the conclusion.

Mapping Venture Capital and Startup Activity across the United States

Figure 1 charts the geography of venture capital investment across the entire US. Exhibit 1 shows the dollar volume of venture capital for the 20 leading metros. The data here, provided by the National Venture Capital Association, include figures on the total number of venture capital deals, the number of companies receiving venture investment, and the dollar value of those investments by metro areas for the year 2012. While these data do not conform exactly to established metro definitions, we matched them to 134 U.S. metros.

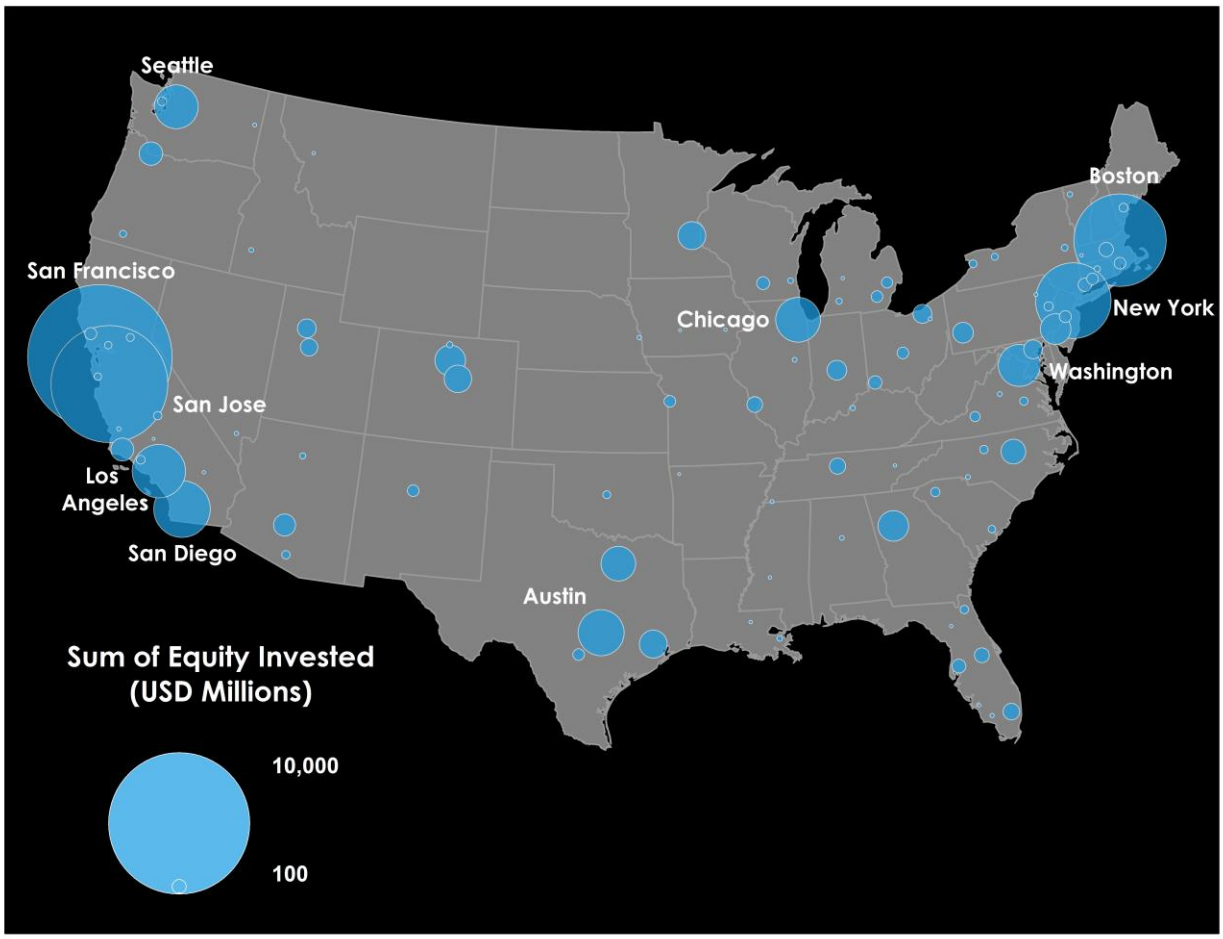


Figure 1: Venture Capital Investment across US Metros

Several patterns stand out. The first is just how dominant the San Francisco Bay Area is. It attracted more than $11 billion in venture investment in 2011, more than 4 in 10 of all venture capital dollars invested that year.

It also is suggestive of a shift in venture capital investment toward more urbanize centers. San Francisco itself actually tops Silicon Valley as venture investment center, attracting almost $7 billion, nearly a quarter of the national total, compared to Silicon Valley with its $4 billion in venture capital investment roughly 15 percent.

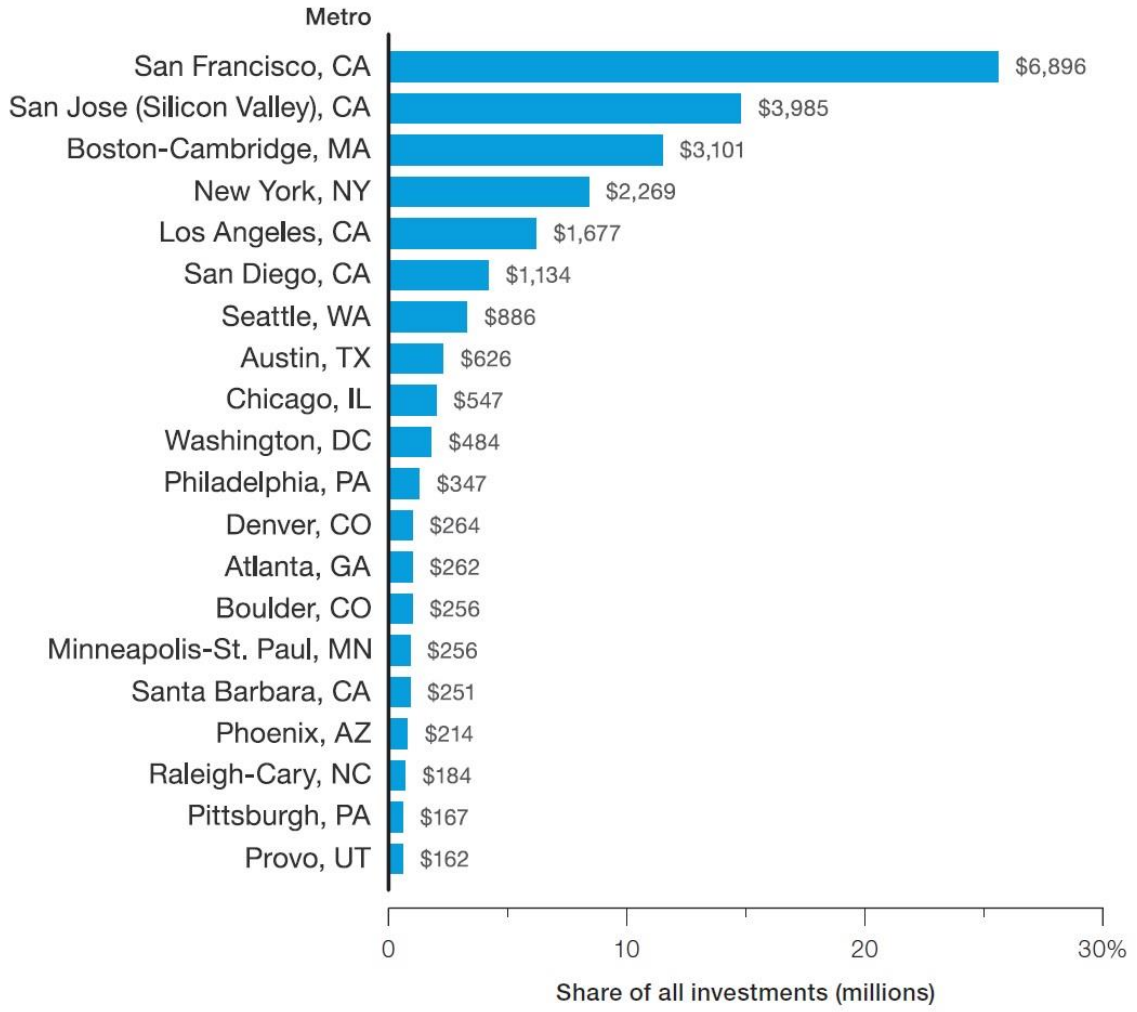
Venture capital investment is also clustered along the Boston-New York-Washington (BosWash) corridor on the East Coast that ranks as the second major center for venture capital investment. The Greater Boston metro area here is the top center for venture capital investment, attracting over $3 billion.

But, New York has emerged a substantial center for venture capital as well, attracting more than $2 billion in venture investment. This is quite a contrast to Florida and Kenney's studies from the 1980s that identified little venture capital investment in New York, but instead found New York to be a major exporter of venture capital to Silicon Valley and the Route 128 areas outside Boston.

Washington, DC is the tenth largest venture capital destination, with almost $500 million. Philadelphia is 11th in terms of venture capital investments, with roughly $350 million in investments. Together, the BosWash corridor accounts for $6.2 billion in venture capital investment, 23 percent of the national total.

The broad Southern California region, from Los Angeles to San Diego and including Orange County in between, the third major metropolitan center for venture capital investment. Los Angeles is the fifth ranked overall in terms of venture investment, with $1.7 billion. San Diego is sixth, with $1.1 billion, while Santa Barbara is 16th with roughly $250 million. Altogether, Southern California accounts for $3 billion in venture capital investment – more than 11 percent of the national total.

Table 1: Venture Capital Investment by Metro Area



Outside of these three regions, a relatively small number of metropolitan areas, are centers of venture capital investment. These include: Seattle, with $886 million, Austin with $626 million, Chicago with $547 million, Denver and nearby Boulder with $264 million and $256 million respectively, Atlanta ($262 million), Minneapolis-St. Paul ($256 million), and Phoenix ($214 million). Additionally, there are eleven metros with more than $100 million in venture capital investment: Raleigh-Cary, Pittsburgh, Provo and its neighbor Salt Lake City, Cleveland, Houston, Detroit, Baltimore, Dallas, Portland, and Santa Rosa.

Venture Capital and Startup Activity Per Capita

Of course, larger metros are likely to have larger levels of investment simply by virtue of their size. To control for population size, we examine venture capital investment on a per capita basis (per 100,000 people).

Figure 2 maps venture capital investment per 100,000 people and Table 2 shows the top twenty metros on this metric.

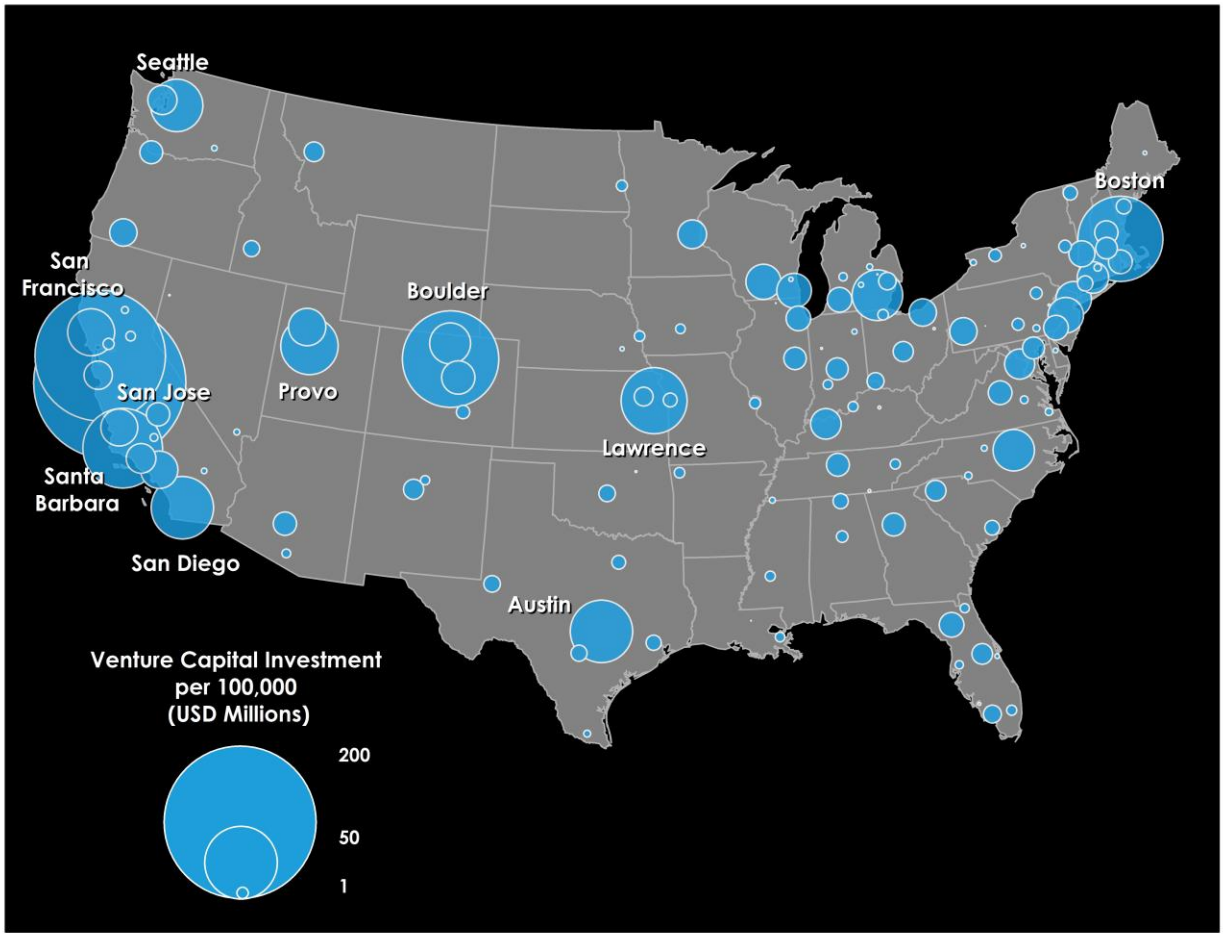
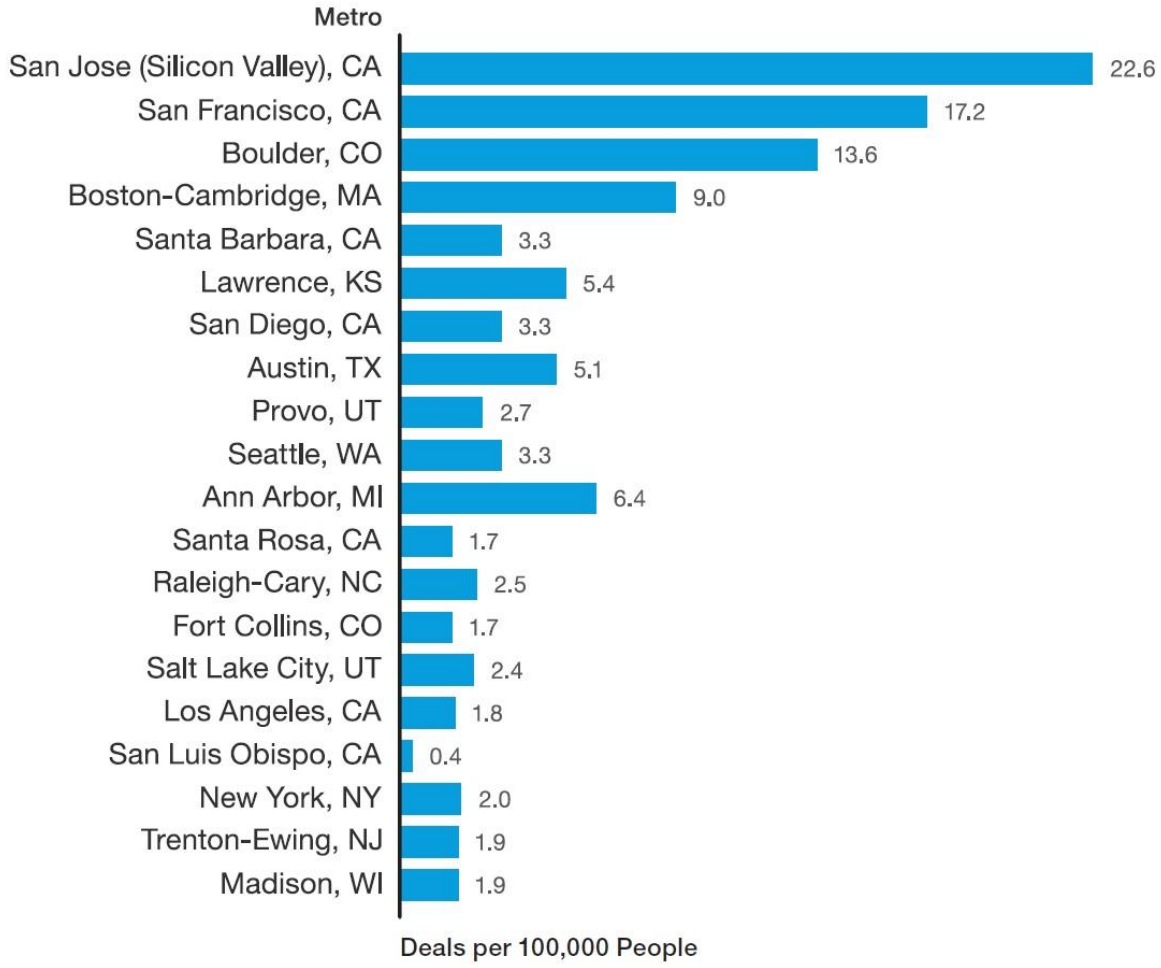


Figure 2: Venture Capital Investment per 100,000 people

Now the picture changes somewhat. At the very top, the Bay Area metros of San Jose and San Francisco continue to lead. Larger metros like Boston, Seattle, San Diego, and even New York, are also all among the top twenty regions in venture investment per capita. But now smaller places, especially college towns, come into the picture.

Table 2: Top 20 Metros for Venture Capital Investment per 100,000 people



Indeed, the most striking findings of our per capita analysis of venture capital investment is the performance of college towns. These are not only those in larger metros like Austin, or Raleigh-Cary in the North Carolina Research Triangle. Smaller college towns like

Boulder, Ann Arbor, and Lawrence, Kansas, are strong performers when we consider venture capital investment on a per capita basis.

Factors That Are Associated with Venture Capital Investment

But what factors are associated with venture capital investment across metros?

To get at this we performed a basic correlation analysis of the economic, demographic, and social factors that are associated with venture capital investment across metros. Our analysis covers 130 metros that received venture capital investment, including all 51 metros with over one million people, and 35 with between 500,000 and one million people. We used a partial correlation analysis to control for population size. As usual, we note that correlation does not employ causation and points only to associations between variables. (Descriptions and data sources for the key variables are provided in the appendix). Table 3 summarizes the key results.

Table 3: Correlation Analysis Results for Venture Capital Investment

Variable	Correlation
Innovation (patents)	.43**
High Tech Industry	.70**
Wages	.60**
Income per capita	.50**
College Grads	.50**
Creative Class	.50**
Science and Tech Occupations	.44**
Business and Management	.52**
Arts, Culture and Media Occupations	.47**
Meds and Eds Occupations	-0.13
Foreign-Born	.46**
Gay	.46**
Population-Weighted Density	.55**
Density	.38**

Bike to Work	.19*
Drive Alone to Work	-.45**
Housing Costs	.54**
Income inequality (Gini coefficient)	.15
Wage inequality	.55**

Innovation and High Tech Industry: Venture capitalists have long been said that dollars follow the quality of deals. It is not surprising then, that we find venture capital investment is correlated with two key indicators of high tech activity: innovation measured as patents per capita and even more strongly with the clustering of high tech firms and industry.[19]

Wages and Income: Venture capital investment is also closely correlated with average wages and per capita incomes. This relationship likely goes both ways, and also reflects the greater concentration of tech industry in venture capital intensive metros.

Talent: Venture investment tracks the broader geography of talent. It is correlated with the percentage of adults who are college grads, as well as the percentage of the labor force holding knowledge-work jobs in the creative class (those spanning science and technology, management, the professions, and arts, media, and entertainment).[20] Venture capital can be seen as being drawn to the deep talent pools that are found in great cities and around research universities and college towns.

More than just generally being associated with talent broadly, venture capital is associated with specific clusters of creative class occupations. Unsurprisingly, venture capital is associated most closely with concentrations of science and technology workers. However, venture capital investment is also closely associated with business and management

occupations. Venture capitalists have pointed out time and time again that a solid management team is as important to a startup's business success, if not more so, than having a cutting-edge technology.

Venture capital investment is also correlated with arts, media, and entertainment occupations. This likely reflects the increasing importance of content and of user-friendly design to startups. Steve Jobs, for instance, credited his arts and design background and training as the key to his success in creating market-defining products from the Macintosh to the iPhone and iPad. Apple's continuing success reflects the synergies that arise from the integration of the scientific and technical with arts and design, business management, and marketing creativity and skill. As Fred Wilson, a prominent venture capitalist, said in a recent interview, a new generation of tech talent views itself as creative artists as much as engineers or entrepreneurs.[21] As such, the rich cultural environment of urban centers exerts an increased draw on startup activity and venture capital.

Many politicians and local economic development officials suggests that the educational 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 employment and venture capital investment. This is in line with other research that finds that eds and meds do not play a direct role in urban and regional development.[22]

Openness and Diversity: Venture capital investment is also associated with the relative diversity and openness of metros. This is in line with numerous studies that have documented the large share of foreign-born engineers in high technology fields. Indeed, immigrants make up

a considerable share of the founders of high tech startups.[23] Our analysis finds venture capital to be positively correlated with the share of adults who are foreign-born.

The association between venture capital and the gay and lesbian share of the population is also positive. This likely not because gays and lesbians launch more high tech enterprises than others, but rather that high tech startups are more likely to be created in places that are open to new ideas and accepting of different kinds of people. As Gates and Florida have shown, locations that welcome gays are also likely to have an underlying openness that extends to innovation and risk.[24]

Density versus Sprawl: Urbanists have long argued that dense urban areas promote physical proximity, face-to-face contact and serendipitous encounters that spur innovation and the formation of new business enterprises.[25] We find a positive association between venture capital and between density (measured as people per square mile) and an even closer one between it and population-weighted density that more accurately reflects density in and around the urban core.

Similarly to its relationship to density, venture capital investment is related to differences in the way people commute to work. It is negatively associated with the share of commuters who drive to works alone that is a proxy indicator of suburban sprawl. Conversely, it is positively, though less strongly, associated with the share of commuters who bike to work – a proxy for densities of the sort that are found in big cities, walkable suburbs, and college towns.

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

metros. All in all, these analyses point to the spikiness of venture capital and startup activity across the United States. Denser, more talent-driven, and more diverse metro attract greater levels of venture investment.

Housing Costs and Inequality: 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.[26] This situation has manifested in controversy and protests over the private bus services that Google and other companies use to shuttle tech workers from their residences in San Francisco to offices in Silicon Valley.[27]

We looked at the correlations between venture capital investment and both housing costs and inequality.

First off, venture capital investment is closely correlated with housing costs. Of course it is also the case that housing costs are more expensive in regions with higher levels of high-tech industry, because 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 county. Prior studies, including our own, have documented the connection between high technology and housing costs.[28]

When it comes to inequality the picture is mixed. 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. We find no statistically significant association between

venture capital investment and income inequality (as measured by the Gini coefficient. But we find a close connection between venture capital investment and wage inequality.

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.[29]

Venture Capital and Startup Activity in Cities versus Suburbs

We now examine the micro-geography of venture capital investment, tracing it across cities and suburbs. To do so, we use zip code level data provided by Dow Jones for 2011 to map venture capital investment across four of the most established venture capital and high tech centers: the San Francisco Bay Area, New York, Boston, and Los Angeles.[30]

The San Francisco Bay Area

Silicon Valley has been thought of as the nation and the world's leading center for venture capital financed high technology for decades. But our analysis highlights the increasing role of the more urban areas of San Francisco.

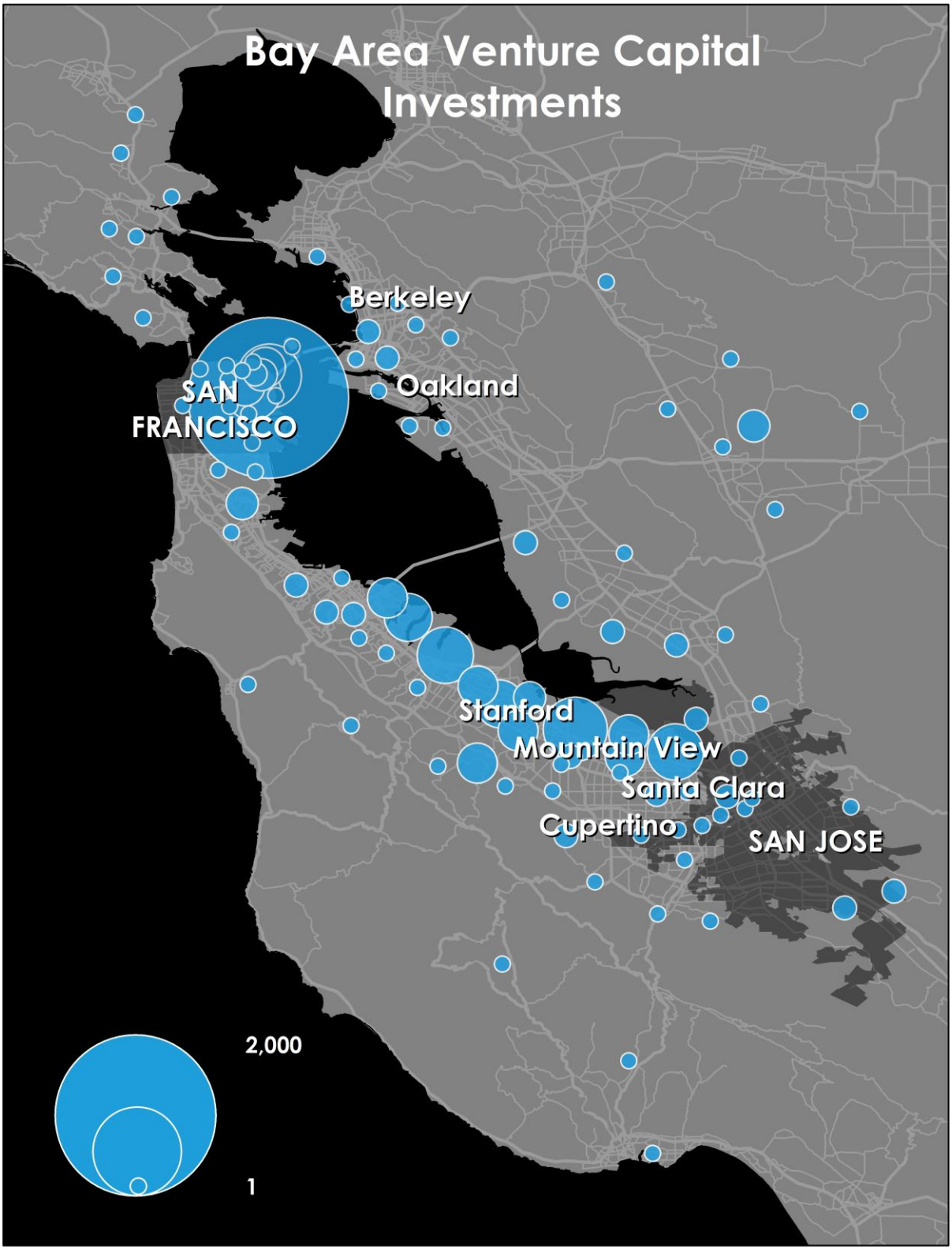


Figure 3: Bay Area Venture Capital Map

Figure 3 maps venture capital investment across the San Francisco Bay Area, including both Silicon Valley and San Francisco. It shows clear clusters of venture capital investment in and around downtown San Francisco as well as in Silicon Valley. The biggest dots by far, which indicate the greatest volume and concentration of venture capital investment, appear to be in and around the center of San Francisco. Venture investment has also spread up and down the Peninsula, filling in the cities that stretch between San Jose and San Francisco proper.

Table 4: Leading Cities for Venture Capital Investment in the Bay Area

Rank	City	Investment (millions)	Share of Bay Area Venture Capital Investment
1	San Francisco	$4,390	32.6%
2	Palo Alto	$1,291	9.6%
3	Redwood City	$1,064	7.9%
4	Mountain View	$918	6.8%
5	Sunnyvale	$800	5.9%
6	Santa Clara	$733	5.4%
7	San Jose	$688	5.1%
8	San Mateo	$307	2.3%
9	Fremont	$299	2.2%
10	Pleasanton	$284	2.1%

Table 4 shows the ten leading cities for venture capital investment in the Bay Area. This too suggests the urban concentration of investment in the region. The city of San Francisco is far and away the leading location for venture investment in the region, taking in $4.4 billion, roughly a third of the region's total and 16 percent of all venture investment nationally. Venture capital investment in the Silicon Valley suburbs is far more dispersed. Palo Alto, home to Stanford University, was the second leading center for venture capital investment in the Bay Area, with $1.3 billion, 10 percent of the region's total. Other leading centers for venture

capital and startup activity include Redwood City ($1.1 billion), Mountain View ($918 million), Sunnyvale ($800 million), Santa Clara ($733 million), and San Jose ($688 million).

Table 5: Bay Area's Leading Venture Capital Zip Codes

Rank	Zip Code	Neighborhood and Features	City	Investment (millions)
1	94107	Portero Hill, South Beach, South Park	San Francisco	$1,886
2	94105	Rincon Hill, Embarcadero South	San Francisco	$693
3	94043	Suburban Mountain View, including Google headquarters	Mountain View	$660
4	94063	Centennial, Stambaugh Heller, Redwood Village, Friendly Acres	Redwood City	$575
5	94103	South of Market	San Francisco	$555
6	95054	Suburban Santa Clara, north	Santa Clara	$548
7	94065	Redwood Shores	Redwood City	$433
8	94301	Crescent Park, University South, Old Palo Alto	Palo Alto	$414
9	94085	North-central Sunnyvale	Sunnyvale	$390
10	94089	North Sunnyvale, including Lakewood, Lockheed Martin headquarters	Sunnyvale	$378

Table 5 shows the ten leading zip codes for venture capital investment in the Bay Area. Both of the leading zip codes are urban districts that include large parts of San Francisco's waterfront, running south from the central financial district. San Francisco's urban South of Market district is fifth. The third leading zip code is in suburban Mountain View and encompasses Google's large corporate campus. Other leading zip codes are located in suburban Redwood City, Mountain View, and Sunnyvale, as well as Palo Alto, a denser, more walkable city, with a vibrant downtown of restaurants and shops surrounding Stanford University.

Together, the leading zip codes for venture investment include a mix of urban and suburban tech centers.

Rather than competing within one another, these locations tend to complement each other. On one side, the tech districts of San Francisco and the walkable areas of Palo Alto provide the density where new urban startups can be expected to thrive. On the other, suburban nerdistans provide the larger footprints that established companies like Apple, Facebook, Google, and others require, as is the case with Mountain View. The close connection between the urban and suburban forms of tech investment are reflected in the shuttle buses large tech companies have long run between their campuses and downtown San Francisco, where many tech workers prefer to live. Overall the region has shown an ability to adapt to the shifting geography of high tech venture investment, which mirrors its longstanding ability to adapt to technological shifts.[31] Instead of being challenged by the urban tech shift, the Bay Area has benefited from it to consolidate its position as the world's leading center for venture capital investment and startup activity.

Boston and Cambridge

Route 128 outside Boston was for decades seen to be America's second leading venture capital center, with companies such as Digital Equipment Corporation, Data General, Thermo Electron, and a number of others spread out in suburban nerdistan fashion. But our analysis again suggests this pattern has changed with increasing levels of investment in more urban locations.

Figure 4 maps venture investment across the greater Boston region, including the center city, Route 128 suburbs, and the walkable suburb of Cambridge where both MIT and Harvard are located. Though investment extends far out into the suburbs, there is a substantial concentration around the urban core, especially in downtown Boston and in Cambridge near MIT. Boston's startup hubs follow major transit routes, especially the MBTA's Red Line, with key clusters in neighborhoods around its stations.

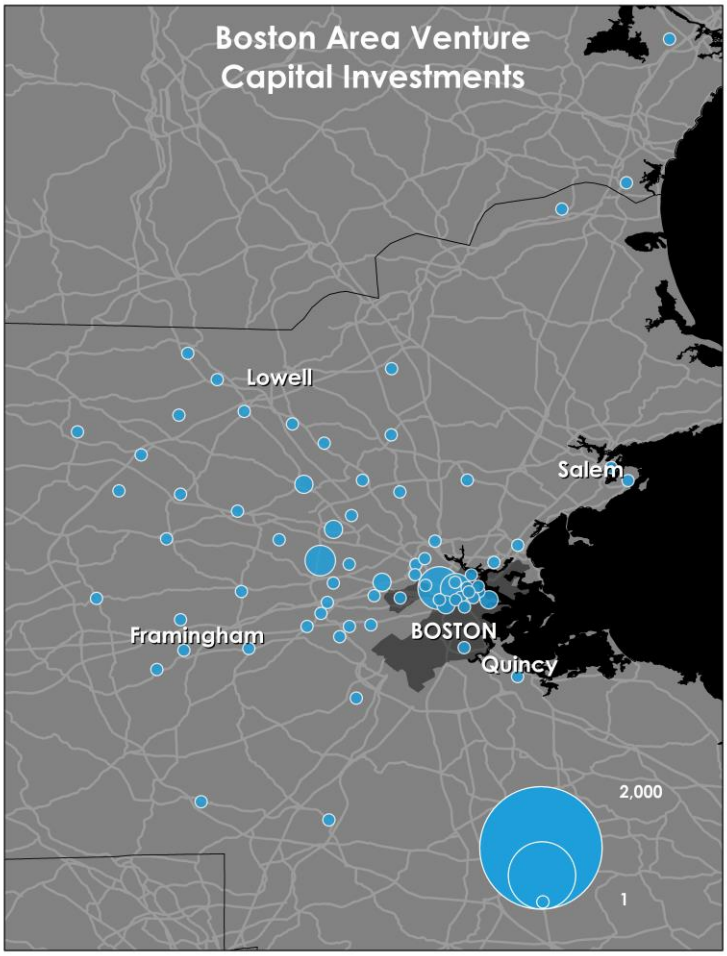


Figure 4: Boston Venture Capital Map

Cambridge has emerged as the region's number one jurisdiction for venture capital. It alone has attracted $1.1 billion in venture investment, roughly a third of the region's total, four

percent of the national total. Boston is next, with $660 million, 20 percent of the region's total, followed by Waltham ($468 million) and Newton ($168 million) on the outskirts of the region. Together, Boston and Cambridge accounted for more than half of the region's total venture investment.

Table 6: Greater Boston's Leading Venture Capital Zip Codes

Rank	Zip Code	Neighborhood	City	Investment (millions)
1	02139	Central and Kendall Squares, MIT	Cambridge	$530
2	02451	Suburban Waltham	Waltham	$389
3	02142	Kendall Square, MIT north of Mass. Ave.	Cambridge	$384
4	02115	Back Bay	Boston	$166
5	02210	Waterfront: Seaport District, Fort Point Channel	Boston	$152
6	01730	Suburban Bedford	Bedford	$133
7	02421	Suburban Lexington	Lexington	$127
8	02472	Watertown, East Watertown	Watertown	$114
9	02116	Back Bay, Copley Square	Boston	$81
10	02141	Lechmere Square, East Cambridge	Cambridge	$76.7

Table 6 lists the top ten zip codes for venture investment in Greater Boston. Two Cambridge zip codes around MIT in Kendall and Central Squares account for roughly $900 million in venture capital investment, almost a third of the region's total. Downtown Boston accounts for three of the top ten zip codes, spanning Back Bay, Copley Square, and the Seaport District. Another leading zip code is located in East Watertown, an older industrial community that abuts Cambridge. Only three of the top ten zip codes are in the nerdistans of Route 128, one each in Waltham, one Bedford, and Lexington.

New York

New York's rise as a center of venture capital has been unparalleled. When Florida and Kenney first began their venture capital studies in the 1980s, they found virtually no venture capital investment in New York City.[32] Though the city housed a number of major investment funds, most of that investment flowed to the suburban tech clusters of Silicon Valley and Route 128.

Today, New York is the third largest center for venture capital-backed startups. Of this, nearly 80 percent, $2.4 billion, was invested in the city itself. According to one recent report, nearly 500 new startups received funding in New York City between 2007 and 2011.[33]

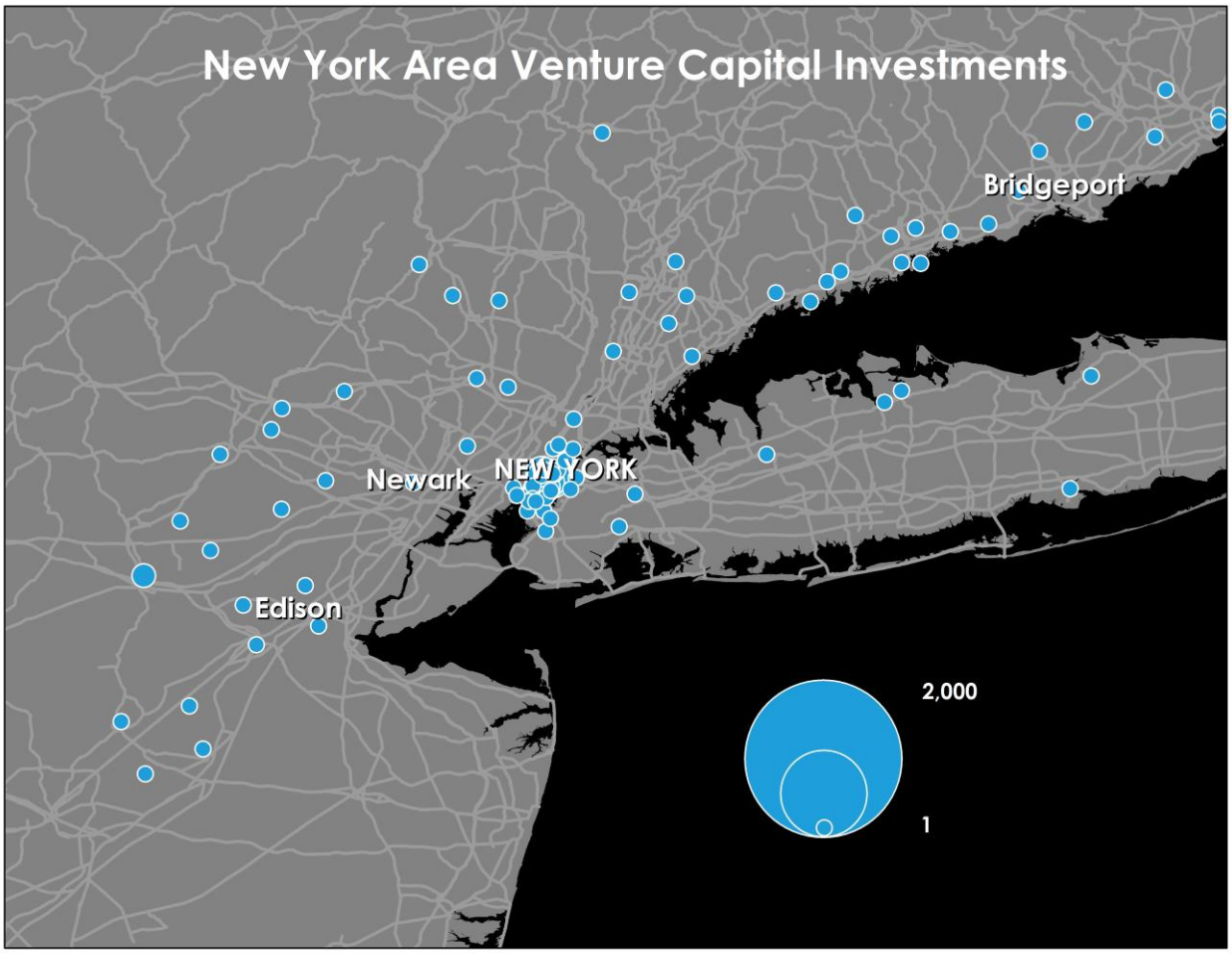


Figure 5: New York Venture Capital Map

Figure 5 maps venture capital investments across Greater New York. Though investment crosses the entire tri-state area, significant clusters exist in and around lower Manhattan, from Midtown south through Chelsea (home to Google's office in the old Port Authority Building), down through the Village, Soho, and Tribeca, and across into nearby section of Brooklyn.

Table 7: New York's Leading Venture Capital Zip Codes

Rank	Zip Code	Neighborhood	City	Investment (millions)
1	10016	Murray Hill, NYU School of Medicine	New York	$357
2	10010	Gramercy Park	New York	$275
3	10012	SoHo, Nolita, NYU	New York	$251
4	10003	Gramercy Park, Union Square, NYU, NoHo	New York	$217
5	10018	Bryant Park, Garment District, Hell's Kitchen	New York	$210
6	10011	Chelsea, West Village	New York	$161
7	10013	Tribeca, Chinatown	New York	$145
8	10001	Chelsea, Koreatown, Penn Station	New York	$136
9	08807	Suburban Bridgewater	Bridgewater, NJ	$121
10	10014	West Village	New York	$80

This urban orientation of venture capital investment in Greater New York comes through in Table 7, which lists the region's ten leading zip codes for venture capital investment. All but one of the top 10 are located in midtown or lower Manhattan, spanning Murray Hill, Gramercy Park, Bryant Park, Chelsea, SoHo, Nolita, and the West Village.

Los Angeles

Los Angeles is known for its stretched-out, automotive-oriented geography. A decade ago, a Brookings report on Southern California's sprawl noted that well-paying jobs in the high

tech sector had concentrated in “mature, high amenity suburbs” like Irvine.[34] That pattern, however, has clearly begun to change and venture capital investment in the region also has taken on something of an urban orientation.

Figure 6 maps venture capital investments in the region including the city, its suburbs and Orange County. Nearly half a billion ($472 million) in venture capital investment, roughly 20 percent of the region’s total, was invested in the city of Los Angeles itself. Relatively dense Santa Monica, particularly its mixed-use, walkable urban core, was close behind, with over $400 million in venture investment, or percent of the region’s total. Together, these two places accounted for nearly $900 million in venture investment, nearly four in ten of the region’s venture capital dollars.

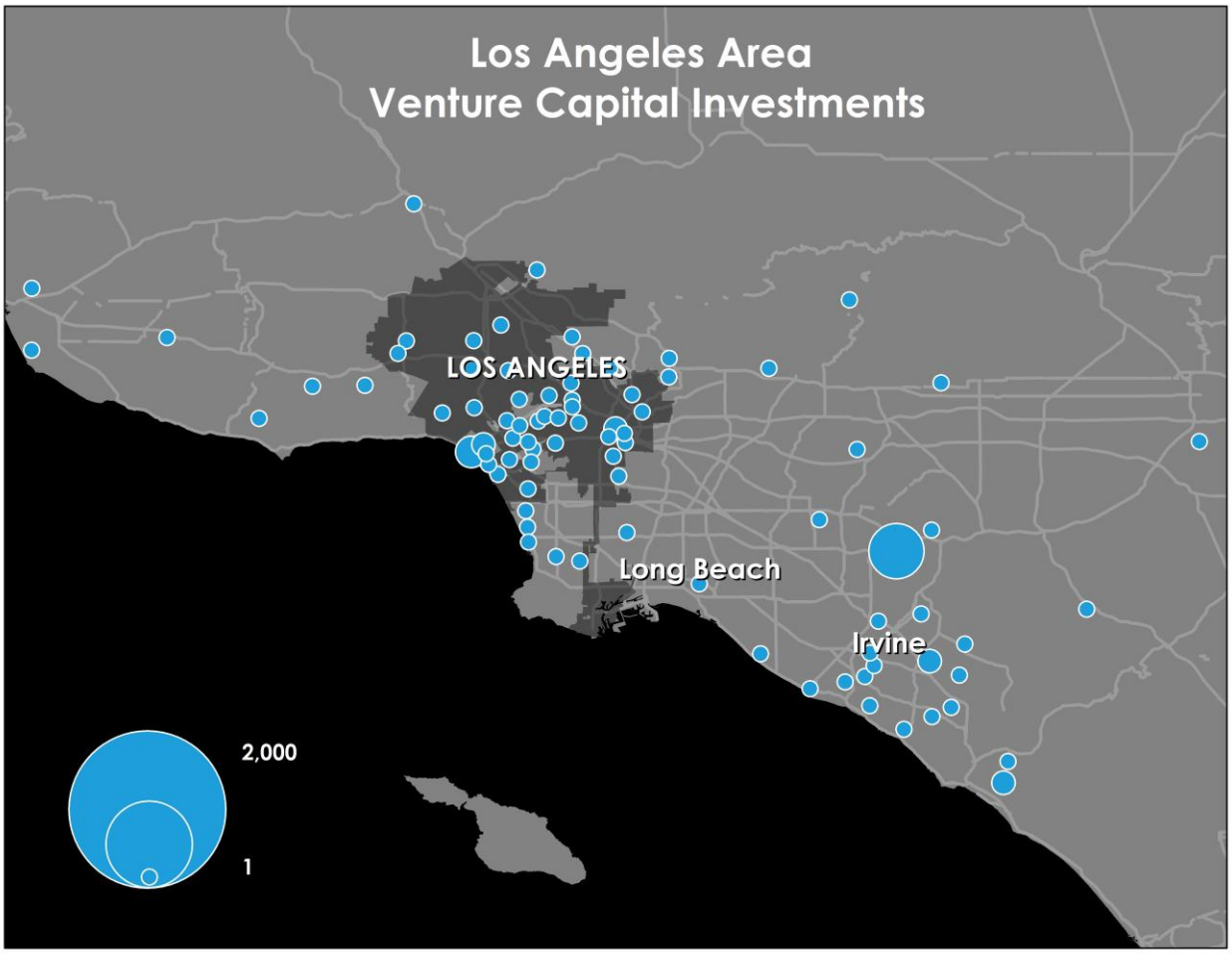


Figure 1: Los Angeles Venture Capital Map

Table 8 shows the region's ten leading zip codes for venture capital investment. Urban areas make up half of these ten leading zip codes. The top ranked zip code is East Anaheim in northern Orange County. An office-park heavy area of Irvine is third on the list. However, several far more urban zips also rank highly. Two downtown Santa Monica zip codes, which include the iconic Santa Monica Pier and the Pico District, rank second and sixth, attracting $400 million in combined venture investment. Downtown LA and Bunker Hill rank fifth, drawing in $125 million in venture capital. Zip codes in the Westwood Area around UCLA and Hollywood are eighth and ninth, taking in a combined $147 million in venture capital.

Table 8: LA's Leading Venture Capital Zip Codes

Rank	Zip Code	Neighborhood and Features	City	Investment (millions)
1	92807	East Anaheim/Anaheim Hills	Anaheim (OC)	$531
2	90401	Downtown Santa Monica, including the pier	Santa Monica	$286
3	92618	Irvine Spectrum Center, Irvine Tech and Research Centers	Irvine (OC)	$154
4	91522	Warner Bros. Studios	Burbank	$128
5	90071	Downtown, Bunker Hill	Los Angeles	$125
6	90404	Midtown Santa Monica, Pico District	Santa Monica	$114
7	92673	Northern San Clemente	San Clemente (OC)	$113
8	90024	Westwood, UCLA	Los Angeles	$76
9	90028	Hollywood	Los Angeles	$71
10	92656	Suburban Aliso Viejo	Aliso Viejo (OC)	$70

Mark Suster, a venture capitalist, has explained the urban shift in startup activity and venture capital by pointing out the amenities available to tech workers there. "In LA, companies used to be concentrated near Pasadena or in the San Fernando Valley," he wrote on his blog. "These days it's Santa Monica and Venice. Not exactly 'urban' in the way you think of SF or NY but certainly relative to the suburban communities of LA and t a minimum it's where young people want to live/hang out."[35]

The Urbanization of Venture Capital and Startup Activity

We now extend our analysis of the urbanization of venture capital and startup activity, examining the distribution of venture capital investments across three types of places: (1) major center cities, (2) walkable suburbs, and (3) other suburbs. We define walkable suburbs

based on Christopher Leinberger's detailed research on the subject.[36] We do this for eleven major metro areas: Boston-Cambridge, New York, Los Angeles, San Diego, Seattle, Austin, Chicago, Dallas, and Philadelphia and two combined regions: the San Francisco Bay Area (San Francisco and San Jose) and Washington, DC-Baltimore. These metros account for almost three quarters of U.S. venture capital activity. These data were also provided by Dow Jones and are for 2011.

Figure 7 shows the main results of our analysis, listing the share of investment going to center cities, walkable suburbs, and other places.

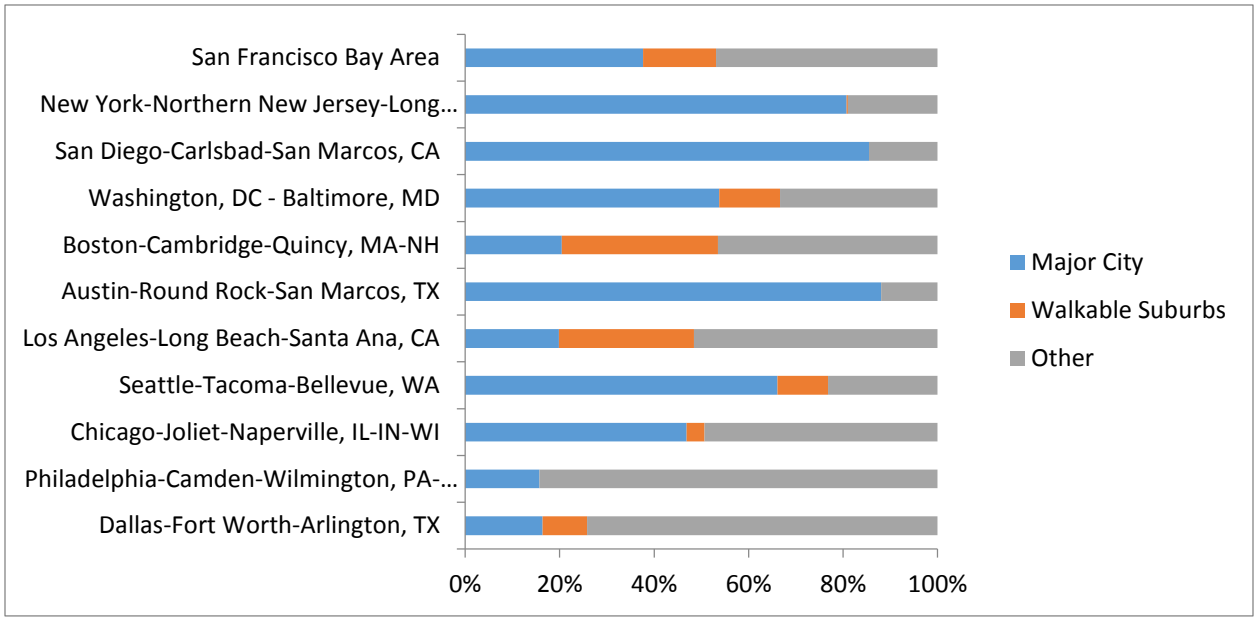


Figure 7: Venture Capital in Center Cities, Walkable Suburbs, and Other Places

The center or main city accounts for more than half of all venture investment in 7 of the 13 regions in our analysis. The center city accounts for more than 80 percent of venture capital investment in New York, Austin, and San Diego. In Seattle, it accounts for two-thirds. It makes up roughly half in Greater Washington, D.C., and Baltimore. In Chicago, it accounts for nearly half, 46.5 percent. Conversely, in 5 regions, the center city accounts for 20 percent or less of

venture capital investment – Greater Boston (20.4 percent), Greater Los Angeles (19.8 percent), Dallas (16.4 percent), Philadelphia (15.7 percent) and San Jose (13.8 percent).

Walkable suburbs have many urban characteristics. They are denser, have mixed uses and are often closer and connected to the city center via transit. When we combine them with center cities, the urban orientation of venture capital investments becomes even more pronounced. When we add Cambridge and Boston together, the two places together account for more than half (53.5 percent) of venture investment in the region. Similarly, adding the walkable, mixed-use suburbs of Arlington, Alexandria, and Bethesda together with the center cities of Washington, D.C. and Baltimore brings the total to more than 60 percent of all venture capital investment. On the West Coast, Palo Alto and San Jose combine for nearly 40 percent of all venture capital investment in Silicon Valley. Santa Monica and Los Angeles combined account for 37 percent of that region's total venture investment.

While this urban shift in investment is indeed significant, not all metros across the US have experienced it. Suburban venture capital continues to predominate in two metros: Philadelphia and Dallas.[37]

Global Startup Cities

We now turn to venture capital investment across global cities. To get at this, we used data from Thompson Reuters to identify the leading metropolitan centers for venture capital investment worldwide.[38] We examined data from 2010-2013 and excluded individual deals over $200 million (which are too large to meet the criteria of venture capital) or anything below $5

million. Individual deals were then aggregated into metro regions using Thomson Reuter's listed 'company city' for each deal.

Figure 8 maps the leading venture capital cities around the world, while Table 9 lists the twenty leading global centers.

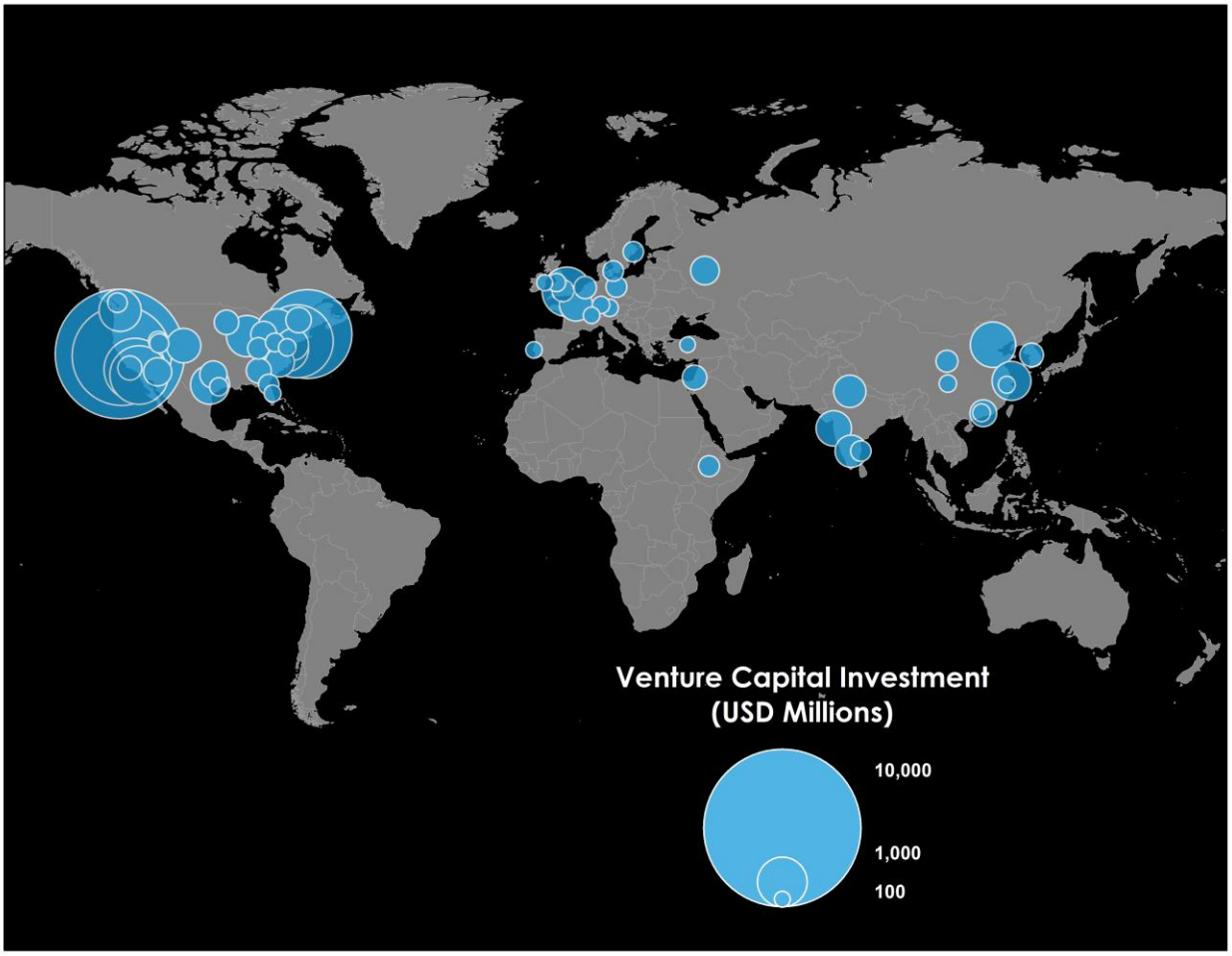


Figure 8: Global Venture Capital Centers

The big takeaways. Venture capital investment at the global level is concentrated in a relatively small number of global metropolitan areas. While the U.S. remains dominant, startup activity is spreading to global cities worldwide. The top six spots are taken by U.S. metros: San

Francisco with more than $6.7 billion, San Jose/Silicon Valley, with nearly $4 billion, Boston-Cambridge ($3.2 billion), New York, ($2.2 billion), Los Angeles ($1.6 billion), and San Diego ($1.4 billion). But a number of global metros also rank quite highly. London is 7th with over a billion in venture capital investment, Beijing is 9th with $832 million, Toronto 12th with $628 million, Shanghai 14th with $617 million, Mumbai 15th with $514 million, Paris 17th with $455 million, Bangalore 18th with $425 million, and Delhi 19th with $424 million.

Table 9: Top Twenty Global Cities for Venture Capital Investment

Metro Area	**Venture Capital Investment (Millions of USD)**	**Share of Total Global Investments**
San Francisco	$6,782	12.0%
San Jose/Silicon Valley	$3,982	7.0%
Boston-Cambridge	$3,197	5.6%
New York	$2,157	3.8%
Los Angeles	$1,560	2.8%
San Diego, CA	$1,388	2.5%
London	$1,001	1.8%
Washington, DC	$849	1.5%
Beijing	$832	1.5%
Seattle, WA	$727	1.3%
Chicago	$688	1.2%
Toronto	$628	1.1%
Austin	$626	1.1%
Shanghai	$617	1.1%
Mumbai	$514	0.9%
Denver	$490	0.9%
Paris	$455	0.8%
Bangalore	$425	0.8%
Delhi	$424	0.8%
Philadelphia	$413	0.7%

These data are also suggestive of the greater urban orientation in venture capital and startup activity. Outside the United States, venture capital activity is concentrated in large global cities like London, Paris, and Toronto in the West and Beijing, Shanghai, Mumbai, Bangalore, and Delhi in Asia.

Conclusion

This research has examined the geography of venture capital investment and startup activity across the United States and globally. It provides substantial evidence of the increasing urban orientation of venture capital investment and startup activity.[39] San Francisco has overtaken Silicon Valley as the world's leading center for venture investment. Venture capital investment in New York has risen from virtually nothing in the 1980s to nearly $3 billion, and is concentrated mainly in urban neighborhoods in lower Manhattan. Our correlation analysis showed the close positive association between density and venture capital investment on the one hand, and the negative association between venture capital and the share of commuters who drive to work alone, a measure of suburbanization and sprawl. Our maps showed the clustering of venture capital investment in urban centers. And we showed that venture capital investment is more highly concentered in center cities and walkable suburbs than conventional car-oriented suburbs and ex-urbs.

The rise of the startup city appears to be the result of several broad trends.

First and foremost is access to talent. Venture capitalists, entrepreneurs, and high tech workers are increasingly choosing to live in denser, livelier, and less car-dependent urban locations. Our correlation analysis shows a substantial association between venture capital and

two key markers of talent: college graduates and the creative class. This is in line with considerable research on the role of talent and human capital in spurring innovation and economic growth in cities.[40] Venture capitalist Mark Suster sums up this locational preference, noting "Young people want to live where the action is. They want to live amongst other young people. They want nightly restaurants, bars, dance clubs, karaoke, or whatever other late night activities are available to those with fewer encumbrances."[41] He suspects that his "shift from the burbs to urban environments" is a trend that won't go away any time soon. Workers are increasingly choosing to live in dense urban areas, even if it requires them to make a lengthy reverse commute. Large numbers of Silicon Valley tech workers commute from their homes in urban districts of San Francisco. So much so that many leading high tech companies, Google among them, run private shuttle busses to transport these workers.

Second, density is efficient, especially for high tech startups. Established tech giants like Apple, Google, and Facebook require – and can afford to build – large corporate campuses. These are easier to accommodate in suburban areas, and do their best to emulate many of the features of proximity and interaction that occur naturally in cities. As venture capitalist Paul Graham has written: "For all its power, Silicon Valley has a great weakness: the paradise Shockley found in 1956 is now one giant parking lot. San Francisco and Berkeley are great, but they're forty miles away. Silicon Valley proper is soul-crushing suburban sprawl. It has fabulous weather, which makes it significantly better than the soul-crushing sprawl of most other American cities. But a competitor that managed to avoid sprawl would have real leverage."[42]

Older buildings in urban locations are much more affordable for small startups.[43] As Jane Jacobs famously wrote, "old ideas can sometimes use new buildings. New ideas must use

old buildings," making clear the relative flexibility and affordability of older spaces, the interactive quality of urban centers, and the role of density in innovation.[44] Many of the most promising young tech companies coming out of the Bay Area – like Pinterest, Zynga, Yelp, Square, and Salesforce – have chosen to locate in San Francisco, in some cases moving from the Valley to the city. After opening his company's new headquarters in a newly renovated Art Deco building in San Francisco's Mid-Market neighborhood, Twitter co-founder Jack Dorsey tweeted, "I love the idea of an urban corporate campus with all the energy and variety that provides."

The changing nature of technology plays an additional role. High tech industry has become less focused on hardware – which required factory-sized settings. Cloud computing now allows companies to shrink their footprints even more. Many tech startups are developing marketing or social media applications or work with multi-media such as news and entertainment, games, music and related fields. The talent that is required to create this kind of content – writers, editors, designers, composers, scenarists, marketers, copywriters, and the like – are much more likely to be found in urban centers. As Fred Wilson wrote in 201: "[T]hat's one of the reasons that many of the most interesting Bay Area startups are choosing to locate themselves in the city. And it is one of the reasons that NYC is developing a vibrant technology community. Society is at its most dense in rich urban environments where society and technology can inspire each other on a daily basis."[45]

This shift to urban tech does not necessarily mean the end of the suburban high tech or nerdistans. What appears to be emerging is a new spatial division of labor for high tech industry, in which smaller startups, especially those which draw on talent pools that are

thickest in urban centers are incubated in cities while established companies that require bigger floor plates and larger campuses remain in the suburbs, where land is cheaper and more available. Google perhaps exemplifies this, keeping its principle campus in Silicon Valley but opening urban outposts in New York, London, and other cities around the world.

A new, more urban geography of venture capital and high tech startups is clearly emerging. It may well turn out that the widespread movement of industry and people to the suburbs in the middle of the last century and the rise of high tech nerdistans that went along with it were historical aberrations, not the permanent new paradigm that many took it to be. Today, the locus of innovation and entrepreneurship is shifting back to the great urban centers that have been their true catalysts all along.

Appendix: Correlation Variables

The variables used in the correlation analysis are as follows.

Innovation: The innovation variable is patents per capita based and is from the US Patent and Trademark Office for the years 2007-2009.

High Tech: The high tech variable is based on the Milken Institute's Techpole Index that measures the concentration of high tech industry. It is based on data from the Bureau of Economic Analysis County Business Patterns for 2009.[46]

Wages: This is average metro wages from the U.S. Bureau of Labor Statistics for the year 2010.[47]

Income: Our variable for income is based on average income per capita from 2010 American Community Survey (ACS) of the U.S. Census.[48]

College Grads: This variable reflects the share of adults with a bachelor's degree and above and is from 2010 ACS.[49]

Creative Class: This reflects the share of workers in science and technology; arts, design, media and entertainment; and knowledge and professional occupations as per Florida's *Rise of the Creative Class,* 2002 and is based on 2010 data from the Bureau of Labor Statistics (BLS).[50]

Science and Tech Occupations: This variable is the share of the workforce in science and technology occupations from the 2010 BLS.[51]

Business and Management Occupations: This is the share of workers in business and management occupations from the 2010 BLS.[52]

Arts, Culture and Media Occupations: This variable reflects the share of the workforce in arts, culture, entertainment and media occupations from the 2010 BLS.[53]

Meds and Eds Occupations: This is the share of the workforce in medical and educational occupations also from the 2010 BLS.[54]

Foreign-Born: This is the share of the population born outside of the United States from the 2010 ACS.[55]

Gay: This is the concentration of gay and lesbian households (as a location quotient) from the 2005-2009 ACS.[56]

Density: This is the conventional measure of population per square mile divided by land areas from 2010 Census.[57]

Population-Weighted Density: This is 2010 population density weighted by the distance from City Hall from the 2010 US Census.[58] For more on how this is calculated see, http://www.census.gov/prod/cen2010/reports/c2010sr-01.pdf.

Bike to Work: This variable is based on the share of commuters who get to work by bike from 2010 ACS.

Drive Alone to Work: This is the share of the commuters who drive to alone to work also from the 2010 ACS.[59]

Housing Cost: This variable reflects housing costs as a share of household income based on the 2010 ACS.[60]

Wage Inequality: This is a measure of the wage disparity between the three major occupational classes defined by Florida in the Rise of the Creative Class, 2002: the creative class, the service class and the working class. It is based on the Theil index, an entropy measure that captures differences in wages between these three classes. The data are from the 2010 BLS.[61]

Income Inequality: This variable is the standard measure of income inequality and is from the 2010 ACS.[62]

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