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U.S. Venture Capital Ecosystem: an overview

Rosenberg Center for Global Finance Brief

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Over the past 30 years, venture capital (VC) has been an important source of financing for innovative companies. Not only have VCs harvested high profit from their portfolio of investments, but firms supported by VC too, including Amazon, Facebook, Google, Alibaba, and Intel have been high gainers. VC financing has had a large impact on the U.S. and global economy. With technology playing a more and more important role, we have seen that FinTech, Life Sciences/Biotech, and Information Technology have started to draw a large amount of capital from VCs in recent years.

In this study, we seek to better understand the trends in the overall venture ecosystem in the U.S. and its implications for the future growth of venture financing. Most importantly, we are looking across different VC clusters in the U.S. and providing an analysis for each cluster compared to the others.

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DATA AND METHODOLOGY

We collected all the data of VC deals in the last three decades (1990.01 - 2019.08) from VentureXpert. It is a dataset that contains unique identifiers for each VC deal, its dollar amount & round number, and the detailed information of each VC backed company, including business description, SIC industry, public status, etc. The whole dataset dollar amount is then cleaned and adjusted by 2019 CPI index. After excluding international companies, there are 169,273 VC deals of 61,965 companies in total.

For further research, we segmented the data into different decades, industries, and geographical regions and compared across these different levels. The entire time frame of our analysis, is divided into three parts, where years from 1990 to 1999 is the first decade, 2000 to 2009 is the second decade and 2010 to August 2019 is the most recent decade. By working on the data from different decades, we can easily compare the growth rates of different metrics. For industries, we segmented them into Life Science, Information Technology, FinTech and other industries. As for the geographical regions, we chose to segment the dataset into different metropolitan statistical areas (MSA), which is a region with a high population density at its economic core. Looking at the data on the MSA level is more systematic for the analysis afterward.

RESULTS AND ANALYSIS

Figure 1: U.S. Venture Capital Deals

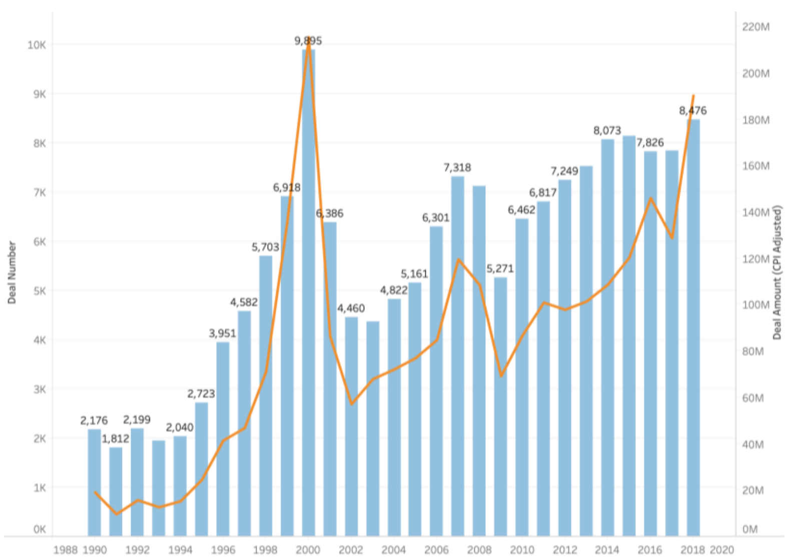
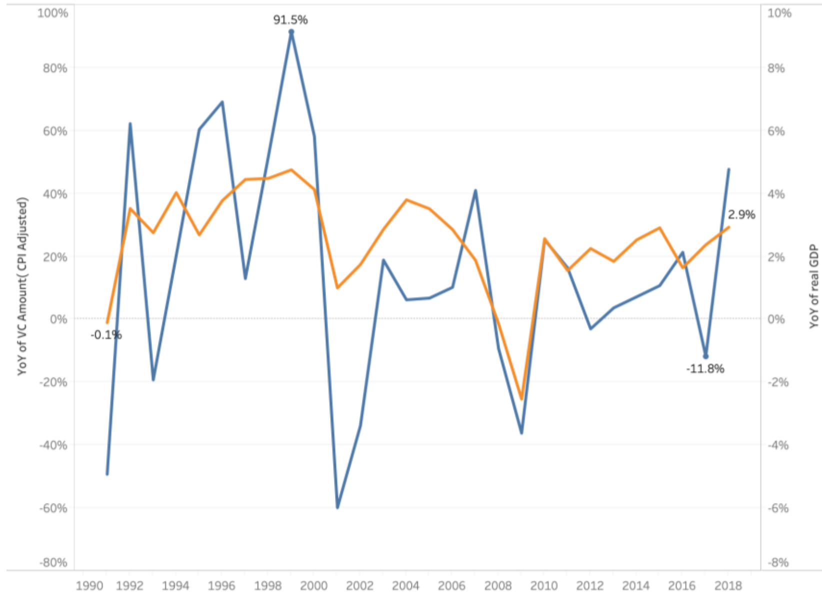


Figure 2: U.S. Venture Capital and U.S. GDP Growth Rate



In Figure 1, the bar and the line represent the total U.S. VC deal counts and the total deal amounts respectively. As can be seen, the VC industry has grown during the last 30 years from less than 20 million in 1990 to almost 200 million in 2018, becoming one of the most important financing sources for private companies. VC activity was affected by the dotcom bubble, as seen in Figure 2 but was able to recover in the following years. In general, the overall growth rate of VC activity moves closely with the U.S. GDP. Since they are correlated to each other, any drop in the VC activity can be explained by the macro economy to some extent.

Figure 3: Top 10 MSA by Round Amounts

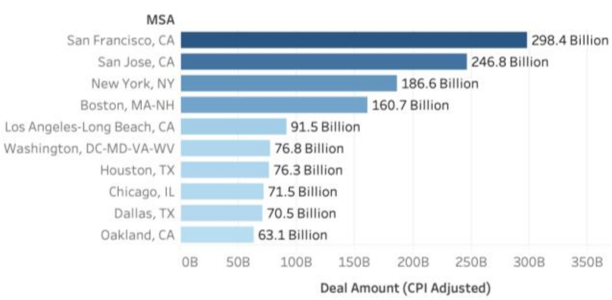
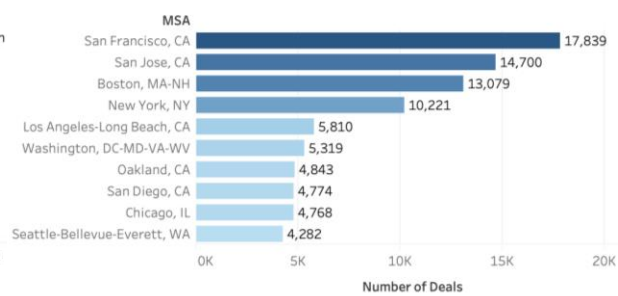


Figure 4: Top 10 MSA by Deal Counts



As shown in Figures 3 and 4, the top 5 MSAs between 1990 - 2019 are almost the same whether analyzed by deal count or the total amount invested. Over these last thirty years, the leading MSAs in the U.S. for VC activity have been. San Francisco and San Jose, followed by New York, Boston and Los Angeles. In the last three decades, San Francisco based deals have totaled around $300 billion, with investments made in approximately 18,000 deals, while the Boston region has invested around $160.72 billion in approximately 13000 deals.

Table 1: Comparison of Top 5 MSAs in the last three decades - Total Deals

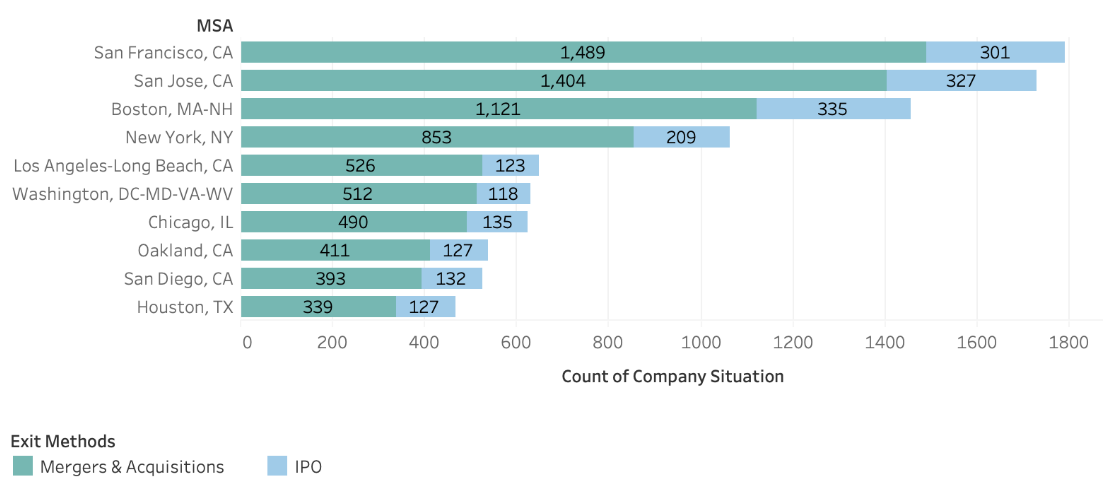
Total Deals	Deal Numbers			Growth Rate		Deal Amount($Million)			Growth Rate	
	D1	D2	D3	D1 to D2	D2 to D3	D1	D2	D3	D1 to D2	D2 to D3
San Francisco, CA	2,630	5,590	9,635	113%	72%	25,453	71,759	201,660	182%	181%
New York, NY	1,203	3,120	5,951	159%	91%	18,927	55,726	112,084	194%	101%
Boston, MA-NH	2,768	5,049	5,347	**82%**	**6%**	23,253	60,470	77,596	**160%**	**28%**
San Jose, CA	3,868	6,181	4,652	60%	-25%	33,744	88,382	124,699	162%	41%
Los Angeles-Long Beach, CA	1,032	1,995	2,797	93%	40%	14,263	31,819	45,458	123%	43%
Note: Define 1990-1999 as Decade1, 2000-2009 as Decade2, 2010-2019 as Decade3										

Table 2: Comparison of Top 5 MSAs in the last three decades - Early Round

Early Round	Deal Numbers			Growth Rate		Deal Amount($Million)			Growth Rate	
	D1	D2	D3	D1 to D2	D2 to D3	D1	D2	D3	D1 to D2	D2 to D3
San Francisco, CA	1,545	2,905	4,966	88%	71%	11,993	34,816	52,891	190%	52%
New York, NY	836	1,972	3,415	136%	73%	14,160	38,790	55,049	174%	42%
Boston, MA-NH	1,463	2,354	2,307	**61%**	**-2%**	13,087	27,404	26,851	**109%**	**-2%**
San Jose, CA	1,896	2,826	2,154	49%	-24%	14,535	35,708	30,453	146%	-15%
Los Angeles-Long Beach, CA	676	1,219	1,747	80%	43%	10,823	17,514	23,198	62%	32%
Note: Define 1990-1999 as Decade1, 2000-2009 as Decade2, 2010-2019 as Decade3										

From Tables 1 and 2, we can see that not only are San Francisco and New York leading in absolute number, their growth rates have also remained high over time. The other three MSAs including Boston slowed down and even shrank in certain years. For example, the growth rate in VC deal amount in Boston is 28% from D2 to D3, which is much less than 181% of San Francisco. This continuous high growth rate in San Francisco could be explained as it is considered as the global center of innovation, Silicon Valley. In addition, San Francisco has also benefitted from innovation spillovers leading to a scale effect on entrepreneurship thus contributing to this great momentum from decade to decade. Another point that is worth noting is that Boston has been surpassed by New York during the last decade. Although Boston is where venture ecosystem got started in the U.S., New York has caught up in terms of both deal numbers and total amounts in recent years.

Figure 5: Successful Exits for All Sectors



However, VC investments by itself do not tell us the whole story of a VC ecosystem. One has to consider the success of these investments and hence we also looked at the successful exits of VC backed companies to gain further insights. As shown in Figure 5, where the successful exits include IPOs & mergers and acquisitions, Boston ranks third in terms of successful VC backed outcomes, closely following San Francisco and San Jose, and leading New York by about 37%. Overall, among all companies that were VC backed, around 6% went public and 20% got acquired while 7% went bankrupt and around 8% were leveraged buyouts in the last 30 years. The remaining VC backed companies resulted in failure.

Table 3: Comparison of Top 10 MSAs in the last three decades - Successful Exits Counts

Successful Exits Counts				Growth Rate	
Company MSA	D1	D2	D3	D1 to D2	D2 to D3
San Francisco, CA	559	748	492	34%	-34%
San Jose, CA	821	686	229	-16%	-67%
Boston, MA-NH	637	579	245	-9%	-58%
New York, NY	319	447	302	40%	-32%
Los Angeles-Long Beach, CA	256	270	127	5%	-53%
Washington, DC-MD-VA-WV	244	299	88	23%	-71%
Chicago, IL	278	238	113	-14%	-53%
Oakland, CA	260	213	69	-18%	-68%
San Diego, CA	227	225	77	-1%	-66%
Atlanta, GA	228	209	81	-8%	-61%

Successful Exits Counts / Population in Mill				Growth Rate	
Company MSA	D1	D2	D3	D1 to D2	D2 to D3
San Jose, CA	51.91	39.18	11.99	-25%	-69%
San Francisco, CA	14.30	17.86	10.97	25%	-39%
Boston, MA-NH	15.24	12.97	5.22	-15%	-60%
San Diego, CA	8.53	7.71	2.41	-10%	-69%
Washington, DC-MD-VA-WV	5.36	5.91	1.48	10%	-75%
Atlanta, GA	5.69	4.41	1.63	-22%	-63%
Chicago, IL	3.22	2.55	1.19	-21%	-54%
Los Angeles-Long Beach, CA	2.81	2.47	0.97	-12%	-61%
New York, NY	1.79	2.39	1.52	33%	-36%
Oakland, CA	0.07	0.05	0.02	-23%	-68%

Comparing the data segmented into three decades, we can get a few additional interesting insights. First, even though both Boston and San Jose have more successful exits in total than New York, they fell behind New York in the recent decade. Second, almost every MSA has seen a decline in the number of successful exits, even when scaled by population from D1 to D3. Most importantly, the growth rate of successful exit is negative for almost every top 10 MSA in the recent decade.

To analyze further, we did the same exercise by analyzing subsectors of FinTech, Life Science, IT and compared how start-ups trends changed in the last 30 years across the top 10 VC ecosystems in the U.S.

Figure 6: Round Amounts of Top 10 MSAs by subsectors (1990-1999)

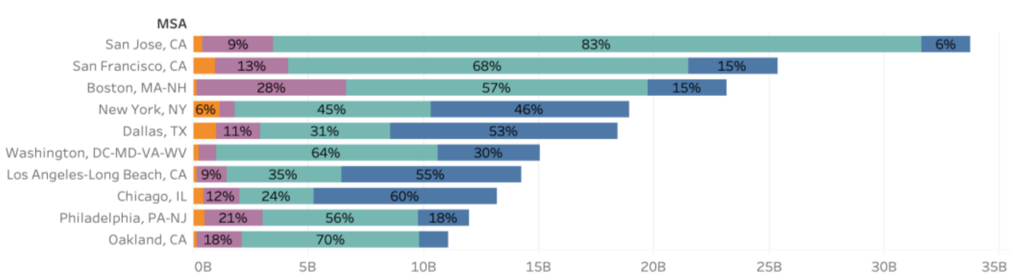


Figure 7: Round Amounts of Top 10 MSAs by subsectors (2000-2009)

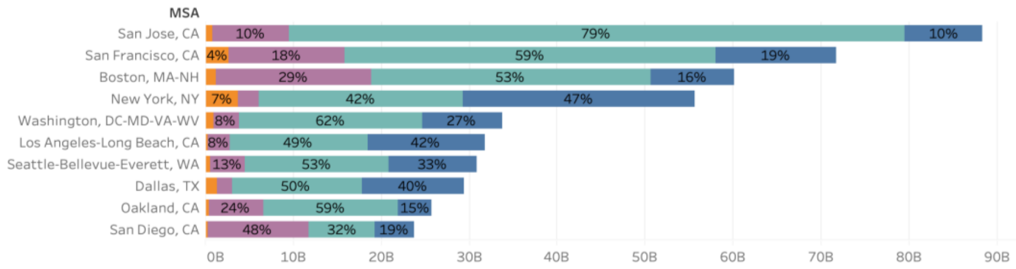
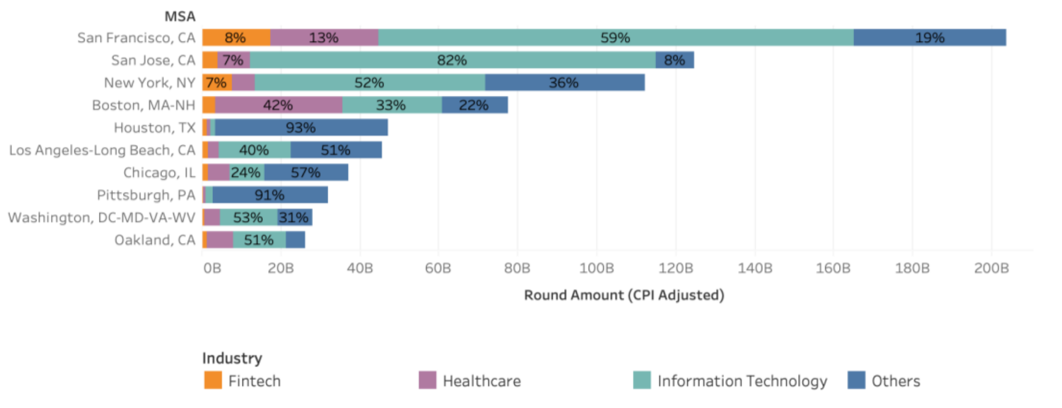


Figure 8: Round Amounts of Top 10 MSAs by subsectors (2010-2019)



Figures 6, 7, and 8 show the round amounts of subsectors in each MSA over the last three decades. As can be seen, most of the VC capital has been invested in the IT sector, especially in the early years when the information highway was a strong attraction. As for the other two subsectors, Life Science has been leading and growing in Boston and San Diego while FinTech is becoming a new focus in New York and San Francisco. Boston specifically, has been attaching greater importance to Life Science where the percentage invested has gone up from 28% to 42% in Life Sciences while the percentage of FinTech only grew from less than 1% to 3%.

Figure 9: Early Round Amounts of Top 10 MSAs by subsectors (1990-1999)

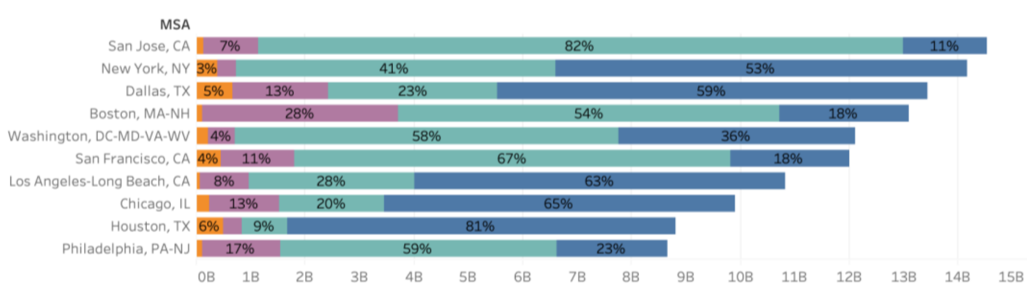


Figure 10: Early Round Amounts of Top 10 MSAs by subsectors (2000-2009)

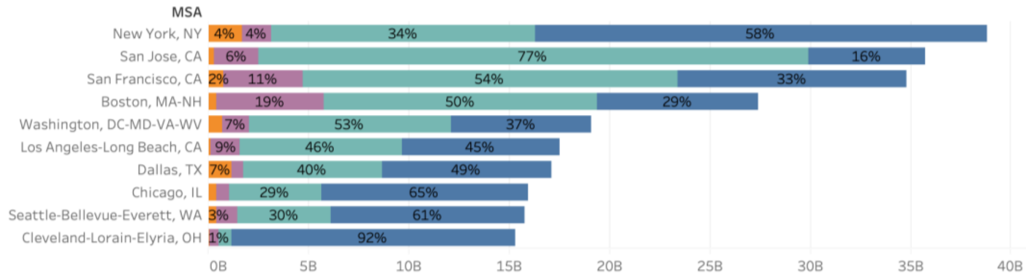
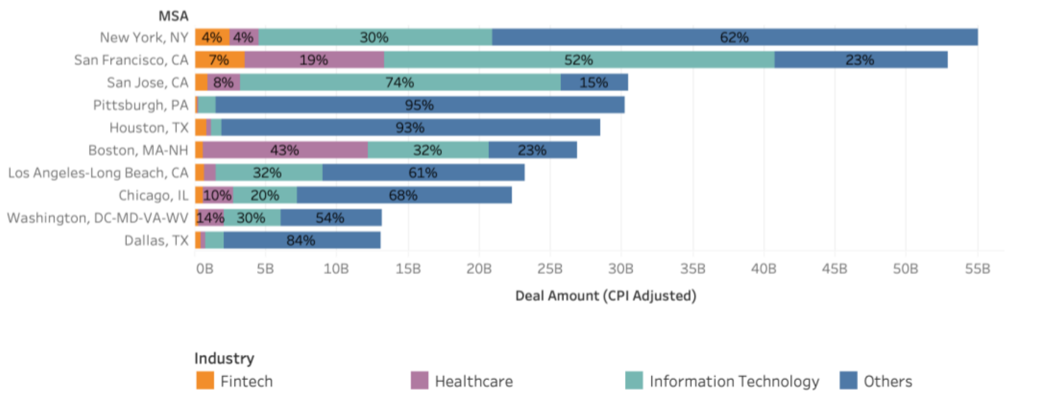


Figure 11: Early Round Amounts of Top 10 MSAs by subsectors (2010-2019)



Analyzing the early round amounts (i.e., only Series A and Series B investments) of sub sectors shown in Figures 9, 10 and 11, also provide us with some additional information. Overall, it shares the same pattern with the total round amount but there are some new geographic clusters that show up in the top 10, such as Cleveland and Pittsburgh. However, along with Houston and Dallas, they barely have capital invested in the three primary sectors we focus on, i.e., Fintech, Life Sciences, and Information Technology. Rather, most of the capital has been invested in other sectors, including capital intensive sectors such as manufacturing, transportation, communication, wholesale and retail trade. Since 2000, Boston is a few steps behind (by early stage amount invested), while San Jose and New York still come out at the top. Interestingly, San Francisco did not make it to the top 5 during 1990 to 1999, by early stage VC investments, but has caught up in the following 2 decades.

Figure 12: Deal Counts of Top 10 MSAs by subsectors (1990-1999)

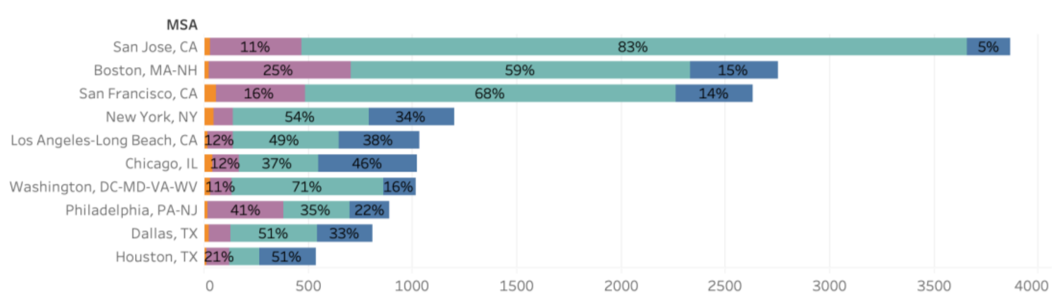


Figure 13: Deal Counts of Top 10 MSAs by subsectors (2000-2009)

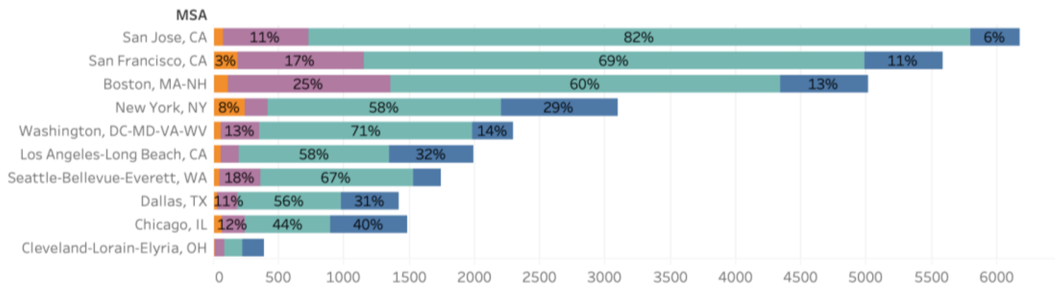
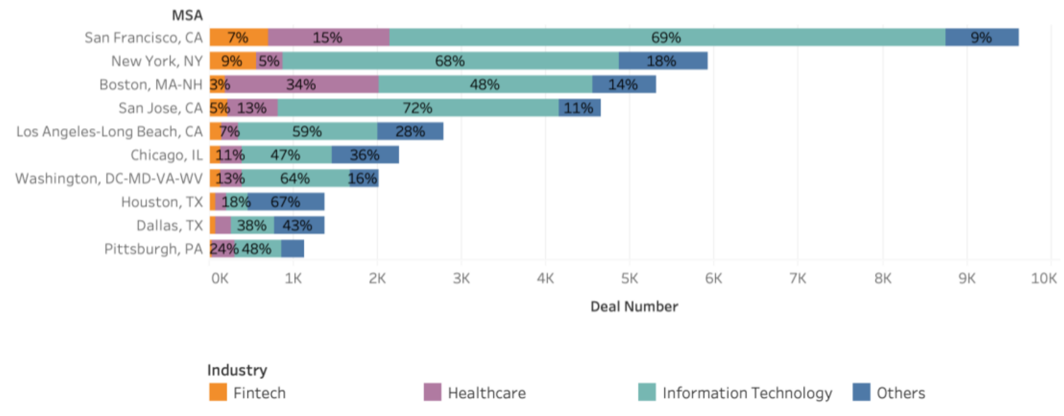


Figure 14: Deal Counts of Top 10 MSAs by subsectors (2010-2019)



Consistent with what is mentioned in the previous paragraph that "other" sectors are relatively more capital intensive, thus accounting for a lower portion by deal counts (Figures 12, 13 and 14) than when analyzed by deal amounts. Otherwise, the top 10 MSAs share the same overall pattern by deal counts as they do with deal amounts. San Francisco and New York have seen a drastic increase in the number of deals and their growth rates are more than 300% and 500% respectively, much larger than that of San Jose and Boston, which were the leading MSAs prior to the bust of the tech bubble. San Jose in particular, which was the number one MSA in the first two decades, has shrunk in the number of deals during 2010-2019, falling from 6,181 deals in the last decade to 4,651 deals in the current decade.

Conclusion

Overall, the Venture Capital market in the U.S. is huge and is continuously growing. Except for the effects of the dotcom bubble and the financial crisis, the industry has been growing over the last thirty years. In 2018, there were more than 8000 deals and around 200 million dollars were invested. San Francisco, San Jose, New York and Boston are the four MSAs that have the highest deal amounts and deal numbers. However, they all have been showing very different venture ecosystem dynamics. In the U.S., Boston is where venture capital investments started; Silicon Valley and the Bay areas have over time developed more professionalized and institutionalized

VC funds, while New York has seen a very robust venture market over time because of the presence of Wall Street and institutional capital. A more detailed analysis by sector, would likely provide additional insights to the dynamic nature of VC ecosystems in the U.S.

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