Place and its Role in Venture Capital Funding

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***Abstract*— How are city demographics correlated with the amount of venture capital they receive? The paper uses a unique dataset of 58,000 venture deals from 2000 2014 from the CrunchBase dataset and census data from the same period. Place and the Role of Venture Capital asserts venture capital's spatial dependency and uses statistical software to find a strong positive correlation between the amount of venture capital funding and foreign, international, male professionals within a city, the gendering of venture capital, and the negative correlation of unskilled, foreign labor with funding.**
As venture capital travels along social ties, the paper suggests that foreign, international, and male professionals' positive correlation may be due to these members having a wider and more diverse social network, allowing the ability to conjure funds. Moreover, the demographic may be a synonym for Sassen's International Class, allowing the study to dovetail with a broader set of research. Finally, the paper also provides a mechanism to classify cities based off their venture capital activity. The implications of this study are a better understanding of the trends correlated with venture capital, a classification system for cities, and a possible caveat to 'virtuous cycle' theory. A supplement to the paper and to visualize implications for cities, we also created this d3 visualization visualizing the geographic positioning and relationships of those 58,000 deals, providing communicable and interactive research.

I. Literature Review

From Athens to Florence to Silicon Valley, humanity has always associated innovation with geography. Innovative places are, by definition, regions where humans innovate. Vicinity to research universities, cultural disposition towards risk, and access to capital are all factors impacting an area's inventiveness and ability to create (Florida 1996, Hambrecht 1984).

A cornerstone of entrepreneurship, modern venture capital arose from investment firms formerly specializing in railroads and traditional machines with the first firm specializing in investment into Boston's textile industry (Florida 1996, Hambrecht 1984). Once a profession where men had a difficulty describing to their wives what they did,' venture capitalism now underscores the success of three of the world's five most valuable companies as firms have restructured their need for upfront capital in hopes of rapid scaling (Florida 1996, Green and McNaughton 1987, Hambrecht 1984).

With the perceived impact of venture capital on innovation rising, cities and governments are increasingly crafting economic policies to capture venture capital funding for their own regions or fund their own. A 2001 National Governors Association report stated Venture capital is critical to growing the new businesses that will drive the new economy'. Finding ways to nurture the culture of entrepreneurs, and the capital that feeds them, must be the top priority of states (Henry Chen a, et al. 2009). The National Association of Seed and Venture Funds estimated that state venture capital funds in 2008 totaled $2.3 billion; meanwhile, an increasing share of the approximately $50 billion that states spend on industrial incentive areas is going to venture-backed firms (Henry Chen a, et al. 2009). Therefore, geographically studying venture capital is necessary and timely.

The theory behind incentivizing venture capital investment, virtuous cycle theory,' argues that easier funding for companies will result in additional organizations basing themselves in a specific area, resulting in more opportunity, and the attraction of a highly-educated workforce (Dahl and Sorenson 2010, Henry Chen a, et al. 2009, Khorsheed and Al-Fawzan 2014).

Historically, however, areas outside their contemporary virtuous cycles but able to connect with those existing have been most successful, showing greater geographic complexity than that presented solely by virtuous cycle theory (Engel and del-Palacio 2011, Hambrecht 1984).

For example, only a round of funding secured from New York based Fairchild Camera and Instruments by Arthur Rock, a financial analyst at the Wall Street investment firm of Hayden Stone Arthur, for Robert Noyce, a defector from Shockley Laboratories would set Santa Clara Valley– far outside the then current establishment–down the road to becoming Silicon Valley (Silicon).

Additionally, in the 1970's Dan Tolkowsky, a retired Israeli military officer, joined Discount Investment and flew to Silicon Valley to interest the young U.S. venture capital industry to invest in Israel, attracting some of the initial Silicon Valley investments in Israeli companies (Engel and del-Palacio 2011). Though outside the funding centers of its time, now Israel ranks third in number of companies listed on NASDAQ and has twice the venture capital investments as the whole of Europe (Engel and del-Palacio 2011).

Place matters, but clearly–when examining the historically detached nodes of Israel and Silicon Valley–it may matter less than ties to place and capital, providing hope and a path forward to new tech areas without strong VC bases (Engel and del-Palacio 2011). Research validates. In a study of over 3,132 investment decisions, personal ties from investor to company were found to be more important in terms of whether to invest than the prestige of other participating firms in the round, with both direct and indirect connections having impact on venture capital decisions (Wuebker et al 2015).

The amount of investment dramatically impacts a city's funding structure, with a one standard deviation increase in the number of venture capital offices in an area associated with an increase of venture capital investments in that area of 49.7% (Henry Chen a, et al. 2009). But getting the right investment matters. Perhaps more important than the monetary infusion foreign investment brings, high-status investors bestow legitimacy that produces future investments because they are believed to be capable evaluators that affiliate only with promising organizations (Petkova et al. 2016). Therefore, foreign investment can legitimize behavior which is then imitated by those with local power and capital, meaning that investments in smaller, newer cities outside funding centers can have dramatic, cascading effects (Henry Chen a, et al. 2009, Petkova et al. 2016). Even in the case of early Silicon Valley, a New York investment started a wave of domestic activity directly contrasting other funding centers at the time. In the words of an active venture capitalist of the time:

Looking back, I am still amazed at how easy it was to raise money to start Hambrecht & Quist. My partner and I decided to start our firm one evening in San Diego. We wrote a brief four-page business plan on the plane. The next day, we visited four prominent San Francisco families that afternoon and by that evening we had raised a million dollars. I couldn't imagine doing that in New York, Boston, or Philadelphia. I know that my cousin, a Philadelphia banker, wouldn't have made the loan. But here in California, our investors are only one generation removed from the risk takers who had created the capital in the first place. Their willingness to take risks has its cultural roots in the pioneer traditions of this state...As a result, in 1981, California venture funds raised nearly three times the amount of capital raised by those of any other state, and accounted for over one-third of the capital raised nationwide. California also accounted for 36% of the new venture financings during 1981, over half of which were located in Santa Clara County alone. (Hambrecht 1984). As shown in Santa Clara Valley, previous investment into Fairchild Instruments by a high-power actor not only infused capital but loosened capital from domestic investors who then may make riskier choices, showing that where funding comes from matters and meaning that proportional domestic spending may offer a proxy to gauge a region's VC stage (Silicon). And as tastes change for those with access to capital, we may be on the cusp of a venture capital revolution. Increasingly transnational and globalized, those that have the power to invest are an increasingly cosmopolitan class, less bounded by place than ever before, presenting a huge opportunity for newer, less well-known innovation regions (Sassen 2000). With an increased willingness to inhabit and invest in places fluidly, increasingly cosmopolitan investors open opportunities for new cities enabled by heightened globalization and telecommunication to acquire capital outside their conventional centers (Sassen 2000). Most encouraging for newer cities, coupled with the elite's changing tastes, research states that geographically diverse investments also produce the highest investment returns when compared to domestic investments in established centers (Henry Chen a, et al. 2009).

Encompassing more than half the 1,000 venture capital firms listed in Pratt's Guide to Private Equity and Venture Capital, the venture capital firms located in Boston, NYC, and SF outperform those in other cities, but–importantly–not from their domestic, local investments but by their investments in different regions (Henry Chen a, et al. 2009). Though perhaps counter intuitively, why geographically diverse firms outperform VC's that invest in only local, blue-chip, virtuous cycle portfolios' is thought to be due to a higher barrier of entry, resulting in an extra layer of quality control and skepticism before investment (Henry Chen a, et al. 2009). And as firms continue to seek areas with larger returns, being a new innovation region outside current centers may not be a disadvantage but a huge opportunity.

Further necessitating the consideration of domestic investment in funding regions, predictably diminishing returns on investments occur as more venture capital flows to a specific area past a certain point (Henry Chen a, et al. 2009). Therefore, an opportunity for newer innovation centers seeking capital, older innovation centers look outside established centers to invest, captured in a lower domestic VC investment percentage (Henry Chen a, et al. 2009). Therefore, the percentage of domestic investment may also indicate a center's maturity by its investors' actions in investing elsewhere (Henry Chen a, et al. 2009).

II. Data

To test the international class's impact and inspect funding centers' nature, this paper uses data from CrunchBase.com and the 2010-2014 American Community Survey. Sourced from a foremost venture capital database, the CrunchBase dataset has 500,000 companies and 86,000 investor rounds reported. Extracted via a public API on March 4th, 2014, the Crunchbase data set contains all the information preceding the pull date with the study investigating 86,000 instances of funding rounds and their information including Investor Location, the investor's geographic location upon time of investment; Round Amount, the amount of money transmitted between investor firm and capital; and Company Location, the region where a company is headquartered.

Allowing us to better understand the impact of ties to place in global venture capital, the impact of legitimization, and whether an area is financially saturated, examining not just funding amount but the origin of funding and asserting the role of foreign and domestic origin offers a more granular consideration of place's impact. By considering place, the data also allows the assertion of the percentage of funding companies receive from the city they are based in along with the amount of investment by domestic firms, useful for regions as they seek funding and for understanding ties' role in an ever expanding venture capital field.

The second data set is sourced from the 2010-2014 American Community Survey via Social Explorer on April 9th, grouped by Metropolitan Statistical Area for the top 48 domestic VC metropolitan areas as identified by the

CrunchBase aggregated dataset and contains all available ACS statistics on demographics, socio-economic standings, gender, and residents' birth country for a given area.

A. Data Treatment

Treating the CrunchBase data for use involved subsetting the Investor Location, Round Amount, and Company Location entries from the complete data set and converting all string entries for those columns to lower case, stripping any non-alphanumeric characters from the entries and trimming any trailing spaces. After the automated data conditioning, I then corrected near string matches to equalities to allow value summing by equivalent values–for example, manually converting singapur' to singapore' in the data sheet. Due to the scraping method, the CrunchBase data erroneously duplicated the investment round's total aggregate dollar value for each individual investor's round contribution. To correct, I grouped data for where investment dates, unique company id, and investment series were equal, selected the first inputted individual round amount–which correctly identifies the total not individual round investment–counted the duplicate number, and then replaced the individual investor amounts by the total amount raised divided by the duplicate amount.

After correcting the individual investment amounts, I coded for when investment place and investment location equaled each other–indicating an investment by a firm in its own city–then aggregated total investments by region string name to find an area's total investment. I then repeated the process for only domestically coded instances to find the total amount of domestic investment. To find the domestic invested percentage, I divided the area's total domestic aggregated investmentsummed by the method describedby the region's total investment. To find the percentage of domestically raised funds, I substituted raised funds for invested and repeated the process.

In order to test Sassen's proposed international class's impact and better understand how cities attract investment, I then merged the top 48 US VC metropolitans' total investment, total domestic investment, and the percentage of domestic investment with the respective ACS data to create a new data set including ACS and CrunchBase data. Partly due to the San Francisco Bay Region, the aggregated total funding values behave exponentially, justifying a logarithmic transformation on the response variable before linear modeling. Transforming total invested dollars by log10, the regional total funding data displays less skew and behaves more normally.

B. Data Methods

Testing Sassen's international class's impact and the roles of ties on a region's total VC funding is possible by regressing the traits she ascribes to the class on the now log-transformed data set and inspecting their impact. By namesake, she attributes rising internationality with the class, writing that not only the transmigration of capital...takes place in this global grid but people. Regressing the ACS's foreign-born-population metrics on total investment, therefore, provides a way to proxy the international class's hypothesized positive impact on total and domestic investment. Sassen also notes rising inequality with internationalization, writing that when cities become more internationalized, they attract both a transnational professional workforce, and poor, mostly migrant workers. As the two foreign classes Sassen describes have disparate capital and means, a detectable split should exist in foreign residents' impact on regional funding, meriting the use of an interaction variable. And as more individuals immigrate with dramatically different capital to a region, the Gini coefficient should increase and be positively correlated with total funding. Sassen additionally highlights wealth and class. Possessing disproportionate affluence, the ACS's percentage of those earning over $200,000 in a region and the percentage of professionals in a region provides another means to proxy the international class and its impact on cities by linearly modeling against total investment.

C. Data Analysis

1) Impact of Gini: Statistically testing Sassen's proxies, linearly regressing the regional Gini coefficient in a least squares model as a predictor for total funding displays the Gini coefficient being correlated with near positive significance in predicting a city's total funding with a p-value above .05. The variable has limited descriptive power, though, with only 9.367 log10 dollars in total funding describing a perfectly equal to unequal transition. Though displaying the positive significance in line with Sassen's theory, the Gini coefficient by itself is marginally descriptive.

2) Impact of Foreign Born: Validating Sassen, a city's foreign-born population is positively correlated with a city's total funding though lacking descriptive power as a perfectly domestic to international population change displays a marginal 5.23 log10 dollar increase, showing an only foreign-born model's limitations. Capturing the Gini coefficient's descriptive power, adding the foreign-born percentage to the model causes the Gini coefficient to lose near significance. [1]

3) Impact of Wealth: Indicating personal wealth's positive effect, regressing a region's percentage of individuals earning more than $200,000 as an independent variable along with the foreign-born percentage to predict total funding shows that the wealth variable has a strong, statistical positive relationship with a city's total raised funding amount. A 10% increase in a region's population making over $200,000 is correlated with a $5.50 increase in log10 funding or the same impact that moving from a completely domestic to foreign-born city offers. Due to its descriptive power, when incorporating the wealth percentage the foreign-born-percentage variable moves from high significance to near

[1] Using foreign population to approximate the international class has some limitations as it excludes the American international class, a disproportionately large international class subsection due to disproportionately high affluence. Using the percentage of internationally born citizens, however, still has justification, while not a complete encapsulation of the class, as it directly relates to Sassen's definition.

significance with much of the descriptive power of the percentage of foreign born being captured in the percentage of those earning over $200,000.

4) Gendering of Venture Capital: When regressing the male percentage of professionals from all backgrounds in a region as defined by the ACS versus total investment, there is a slight significant relationship between the percentage and total funding, illustrating male professionalization's importance. When regressing the percentage of female professionals to total funding, however, the model has no significance, showcasing an outcome differing by gender.

5) Impact of Foreign Born Professional and Unprofessional labor: To assert the impact of foreign-born professionals I introduced a variable interacting a region's male professionals and foreign-born to test Sassen's international class. When used to predict total funding, the interaction variable displays a strong positive correlation with vastly more descriptive power than either the foreign born or professional percentage alone. Directly inline with the Sassen's theory, a 10% interaction variable increase is correlated with a $52.3 log10 increase in funding, illustrating the powerful correlations that the professional, international class has on a city's funding. The foreign born variable when not interacted with professionals additionally displays a significant negative coefficient, illustrating Sassen's writing on immigrant differences and capturing the human capital split in immigrants.

Variables	Estimate	Standard Error
% foreign	-12.0025*	(4.8422)
% male professional	-15.8173'	(7.8716)
% foreign*% male professional	169.069***	(47.1770)
Constant	9.6866***	(.7984)

' $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

6) Impact of Foreign-born Females and Professionals vs. Male: Repeating the interaction steps with female professionals, despite having little descriptive value alone, the female professional interaction variable has stronger significance with total funding than the male professional interaction variable as indicated by the p-value, with a 10% increase resulting in a $29.9 log10 increase. As with the male, the foreign-percentage variable by itself displays the negative correlation predicted by Sassen's human capital split. Significant in predicting a region's total funding when interacted with foreign-born, the female professional interaction variable demonstrates the unique relationship between internationality and professionalization as proposed by Sassen.

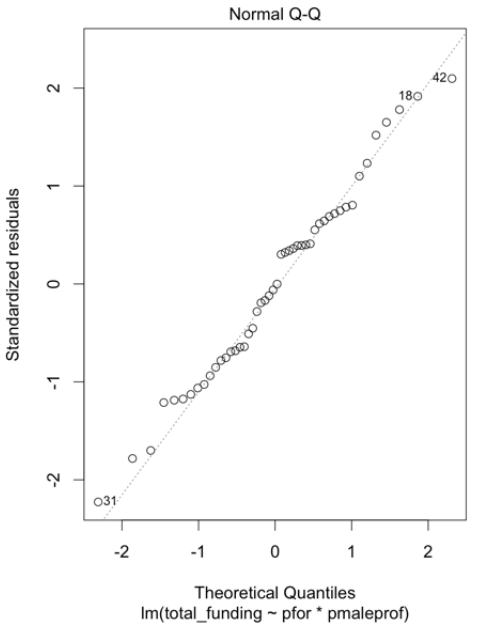
Internationalization and professionalization have significance, but comparing the model's descriptive quality with a place's wealth–a critical component in virtuous cycle–means comparing the foreign-born male professional interaction variable with a region's percentage of those earning over $200,000 and foreign born. The foreign-born and wealth interaction variable displays strong statistical significance for predicting total funding with the un-interacted wealth percentage variable remaining significant. Comparing the wealth-foreign interaction variable with the female-foreign and male-foreign interaction variables, high collinearity and shared variance exists between the three, underscoring the variables' similarities and descriptive nature.

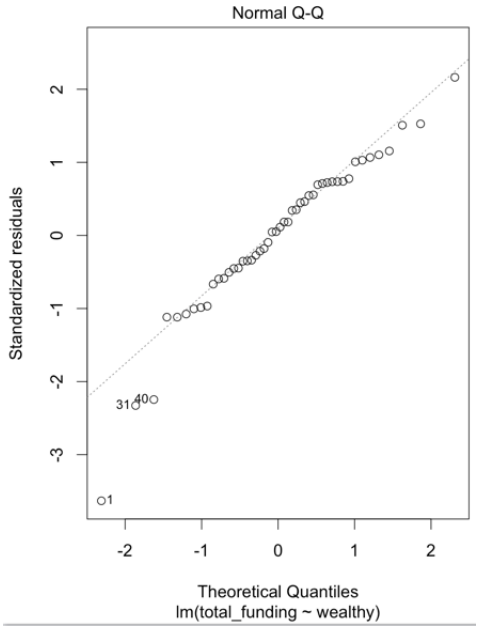
Not just a means to an end, though, the foreign-born and male professional model provides a more useful model for predicting total funding as it provides a theoretical mechanism for how cities become wealthy while offering a similar MSE, R-squared value, and a more stable q-q plot than the wealth-foreign interaction. The female foreign-born professional percentage, on the other hand, performs worse than the professional, foreign-born percentage in terms of q-q fit and predicting total funding, again showing the gendering of capital and variation between male and female professionals. While having wealth and being professional and foreign born are highly correlated, the foreign-born professional interaction variable offers higher value to cities as it provides a means by which cities acquire wealth.

7) Comparing Wealth and Foreign-born, Professionals's Impact: Expanding past the wealthy international demographic, comparing the foreign-born, male, professional percentage regression with the percentage of those earning $200,000 from all backgrounds when regressed on total funding, the foreign-born-professional interaction variable has only marginally higher MSE and lower adjusted r-squared values while the male international-professional q-q plot displays similar fitting qualities and absorbs outliers. Both having validity, the foreign-born, male interaction variable explains similar variance with the percentage of those earning $200,000 from all backgrounds. Demonstrating the international class's significance and forwarding a mechanism past just an area's immediate wealth, the percentage of male foreign-born professionals provides an equally or more descriptive model than the female-professional interaction model, the interaction between the percentage of those making over $200,000 and foreign-born, and the percentage of those earning over $200,000 from all backgrounds, indicating both venture capital's gendering and international professionalization's nuanced significance in a city's ability to raise capital.

III. Analysis Implications

Displaying the international class's impact, foreign-born, male, professionals provide a reasonable predictor for total funding possibly through wider, international social networks, important for funding as noted by Wuebker. Showing the disproportionate effect the wealthy have on attracting investment, the median income of a city has little impact on overall funding. And as professionalization involves building ties to wealth and management, their social networks would hold high power for cities andas shown by the modelparticularly when globalized. Individuals earning ACS professional status may also better describe traits that contribute to funding companies than the wide range of how one can earn more than $200,000. Another possibility, the foreign professionals living in the United States may also comprise





an elite group of global professionals. In any case, the interaction variable displays that a city's ability to attract a professional, male, and international class is correlated with its ability to secure investment to a similarly high degree as the percentage earning over $200,000 in a city.

So while a region's immediate wealth is highly correlated with garnering investment so too is foreign professionalization independent of wealth. Instead of a virtuous circle, where all activity takes place within an established ecosystem, the significance of foreign-born professionals suggests a virtuous lattice, where the ability to attract ties to the international classand the ties that come with themhas significance along with the nodes themselves, a concept further solidified by city classification and when visualizing the data. [2]

IV. Proposing a New Method to Classify Cities' Role in Venture Capital

A refinement of virtuous circle, and as detailed by Wuebker, the ability to receive funding depends on ties as well as place. How cities attract these connections and their significance widely varies, and as some ties have as much significance as immediate domestic wealth on the ability to raise funds, it merits creating a city classification system that expands past virtuous cycles strictly wealth-based focus and that includes funding origins. Summing investment instances coded for domestic regionwhen a firm invests in their own cityand dividing by the total amount invested by the region's firms yields the percentage of domestic investment from VC's. By repeating the process for the funding raised by companies, summing the amount of domestically [3] coded instance by regionthe investments raised from domestic fundersand dividing by the total amount of money raised by the region yields the domestic percentage of raised money. For clarity, the two percentages, though seemingly similar, measure completely different scenarios. For example, a region with a small VC scene may heavily invest in their own city, making one percentage high, but that funding may account for only a small percentage of the total money that companies raise in the city. Dividing cities into four groups by a 25% domestic investment cutoff and a 25% domestically raised cutoff results in four uniquely different city characterssself-sustaining centers, tech hubs, spatially mismatched centers, and financial center. See table in appendix and visualization.

A. Self Powered Cities

Self-powered centersBoston and San Franciscodisplay high proportional amounts of investment from investors based in the city along with high proportional amounts of domestically raised funding by companies. Here, the high percentage of domestic financial activity is indicative of localized, geographic capital and also strong companies that attract investment. In other words, self-powered cities have both strong finance and tech presences that complement one another. In addition, these cities are also some of the world's most diverse, providing local access to international networks. [4] Exemplifying virtuous cycle theory, self-powered

[2] Importantly, Sassen never mentions a particular educational pedigree for the international class, and when running correlations between total funding and the percentage of those receiving bachelor or doctorate degrees, the coefficients are negligible for the dataset. In Adam Grant's book Originals, the Wharton professor notes that individuals will make riskier decisions if their risk is minimized in other areas, a perspective repeated by an interviewed Anthos Capital associate. The investor noted that whether the firm's invested founders had health care impacted their portfolio and company outcomes. In this data set, however, the percentage of health care coverage has low predictive power on total investment most likely due to health care's availability in sectors not traditionally funded by venture capital.

[3] Domestic in this paper refers to an interaction within the same city while foreign refers to an interaction outside the city.

[4] Cities that are conducive to immigration may also have political qualities that are more favorable to fund raising and the International class.

cities have companies attracting high foreign investment along with high domestic investment. [5]

B. Tech Hubs

Exhibiting a more cosmopolitan nature than explained by virtuous circle theory, the second class of cities represents smaller, younger cities that lack a high domestic VC presence compared to self-powered centers that disproportionately receive funding from other cities. These cities, such as Austin and Seattle, represent a class of cities where domestic VC's channel high amounts of investment into the region they occupy but an amount only accounting for a small proportion of the total received funding due to the high influx of foreign capital. Methodologically, these cities' investors invest over 25% of total investment domestically with the total domestic amount of money raised by the city below 25%. As explained by Henry Chen et al, these cities possess desirable businesses, accounting for the high inflow of capital, and as with a young Silicon Valley and Israel, the high degrees of foreign investment's legitimization may also influence the high level of domestic investment. Due to these cities' high reliance on foreign funding, ties to funding centers matter greatly for these cities' companies.

C. Spatially Mismatched

Exemplified by LA, Minneapolis, Shanghai, and Dallas's domestic activity, the third city type displays spatial mismatch between local VC and tech needs–either with VC capabilities or interests being unable to match local companies' needs or local companies being unable to match the VC needs. Methodologically, cities exhibiting spatial mismatch have less than 25% total domestic investment along with sub 25% in total money raised domestically. In practice, this may result from sub-tier local tech not fitting the portfolio needs of highly-rated VC firms in primarily investor cities or from nascent local VC firms being unable to fulfill the needs of top-rated companies. As a result, firms invest elsewhere along with companies drawing their funds from other means. In these cities, ties and links to other cities, along with attracting the International class, may hold most importance due to regions' heavy reliance on both non-domestic funding and investment.

Geographic positioning to other cities may also cause spatial mismatch as one city's virtuous cycle may be a vicious cycle for others, making it more difficult for other regions to build critical mass as neighboring regions captures its funding. While economically efficient, allocation of resources may not be desirable from the perspective of local governments and other cities that seek local employment growth (Henry Chen a, et al. 2009). Considering their spatial relation to one another, SF Bay and Austin may have detrimental impact on Sacramento and Dallas's ability to start their own centers.

[5] While also relatively self-feeding, due to the strength of these cities, it should also be noted that they also fund many other cities.

D. Finance Centers

The fourth category represents financial centers, cities that have high amounts of funding sourced by companies from local investors but that accounts for only a small percentage of a city's total investment, meaning that these cities primarily function as funding centers. In other words, the city's companies raise more than 25% of total funding from within the city but the city's venture capital firms invest less than 25% of their portfolio domestically. Exemplified by New York City, London, and Paris, these cosmopolitan cities contain high international class amounts and seemingly have more capital than startups, with most funding proportionately going to other cities. Though sharing many census characteristics with self-sustaining cities, in financial centers only a small portion of foreign investor money funnels into the cities' startupsperhaps also due to financial crowding by domestic centers. In other words, financial centers are VC first, startup center second. And as shown with historic Silicon Valley and New York City, ties to these cities hold much value for fledgling venture capital cities. [6]

V. Implications

Considering the percentage of domestic funding invested and raised provides a way to assess a city's ties to others, better describing city natures and opening the possibility to assess cities beyond their immediate space but also their actions. Showcasing the range of feasible funding structures for cities through domestic activity also shows virtuous circle theory's limitations through the variety in which region's acquire funding. Creating a city classification system provides additional and transmissible insight for cities by moving past the binary, one-sized virtuous cycle and is useful for cities when considering strategic partnerships and symbiotic relationships with other cities along with better governance for their own. For example, in known finance cities city governance may transition slotted subsidies encouraging venture capital to tech companies and universities.

Illuminating the significant effect foreign-born, male professionals have on a city's total funding allows the opportunity to display the importance of ties to placenot just place itself. Instead of a solely wealth-based narrative, international, male, professionals also have high importance in predicting total funding, possibly through highly socially integrated careers, as shown by Wuebker et al. Through social ties having impact, by definition a city's ability to raise capital is in part relational, indicating a necessary addition to virtuous circle theory: place matters, but so too, and sometimes more importantly, does its ties to others. And by funding being impacted by more than just a region's ability to fund itself liberates cities that do not currently have a high venture capital concentration.

[6] Importantly, the classified city examples are sorted by total funding and total money raised but classifications may vary based upon industry. Minneapolis, MN is classified as spatially mismatched by total funding, as an example, but is considered a self-sustaining city for biotech. In addition, as enabled by the visualization, city types can also differ by year, thoughand as shown by the visualizationthere's high inertia in cities to do so.

VI. Conclusion

Venture capital is more spatially fluid and dynamic than described by a solely place-based narrative as shown through establishing the international class's significance and illustrating the variety of city structures, therefore meriting a more flexible framework that includes ties to other places. Further research should examine how cities transition from one classification to another–as exemplified by historic Silicon Valley exhibiting high Tech Hub characteristics before becoming a self-sustaining powerhouse. Additionally, Sassen's argumentation opens an interesting opportunity to track how residents move from one city to another, potentially illuminating a tightly interconnected human and financial marketplace, possibly showing how one can influence the other. Further study should additionally delve deeper into venture capital's gendering and the theoretical and statistical reasons why female professionalization has no significance when regressed with total funding.

Providing cities and governments with a better model of how venture capital acts and who can conjure funding, including ties' importance fosters greater understanding of who funds innovation and from where. And as Sassen's international class becomes increasingly cosmopolitan, a possible renascence of venture capital could result as male, foreign, professionals connect with more regions. In the 21st century, place matters but by showing internationalities significance and cities' interdependence, so too does connection to place, meriting varying city classifications, asserting that the male international class has significance in determining a city's funding, and providing a flexible addition to the virtuous circle paradigm.

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APPENDIX

Punnett Square of City Classifications.

High Domestic Investment Funding	Seattle Salt Lake City Austin	San Francisco Boston
Low Domestic Investment Funding	Chicago Minneapolis Washington DC	London New York City
	Low Domestic Company Funding	High Domestic Company Funding