THE ASCENT OF AMERICA'S HIGH-GROWTH COMPANIES

An Analysis of the Geography of Entrepreneurship

Understanding the geographic trends of Inc. 500 companies over thirty years at the state and metropolitan levels

KAUFFMAN
The Foundation of Entrepreneurship

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Executive Summary

This report offers the first-ever deep dive into the geographic trends of America's fastest-growing private companies—the Inc. 500. *Inc.* magazine's annual ranking, which began in 1982, has become an important point of pride for high-achieving companies and a source of research for economists. Not until now, however, has anyone dissected the past thirty years of comprehensive data from these high-growth companies. Through a partnership with *Inc.* magazine, the Ewing Marion Kauffman Foundation has done just that.

In this, one of a set of studies examining Inc. 500 data over time, we offer a geographic analysis of how regional characteristics are associated with fast-growing companies and innovations. Tracing hundreds of Inc. firms per year and thousands per decade, we have captured a range of innovations and analyzed the regions that continuously produce fast-growing companies.

Knowing that very little is understood about the geography of high-growth companies, we approached this analysis with a range of questions: where are the fast-growing Inc. firms located at the state and metropolitan levels? How have they shifted over time? Do we find greater geographic concentration of Inc. firms over time? How is the geography of Inc. firms different from commonly associated growth factors, such as high-tech industries, venture capital firms, and research universities?

As you review the findings of this report, keep in mind that the creation of another ranking is not our primary objective. It is more important to demonstrate different regions with different sectors and strengths, in contrast to previously identified areas that have been highlighted as strong producers of high-tech companies. Thus, our objective is to shed light on formerly understudied areas of economic development.

We hypothesized that a geographic analysis of the Inc. data would highlight surprising regional and industrial sectors with high numbers of Inc. companies. Analysis of the Inc. 500 geographic and industrial information led to the following major findings:

- So-called high-tech sectors constitute only about a quarter of fast-growing Inc. firms: IT (19.4 percent) and Health and Drugs (6.5 percent). Other major sectors include Business Services (10.2 percent), Advertising and Marketing (8.5 percent), and Government Services (7.3 percent). Thus, innovations and growth of firms come from a wide range of industries.
- Among large metropolitan areas, Washington, D.C., has the highest concentration of Inc. firms in terms of the number and normalized score, with more than 46 percent of them in Government Services. This rise of D.C. high-growth companies is persistent in the last two decades, regardless of party administration,

and demonstrates that, ironically, outsourcing federal government services plays a large role in the growth of private firms.

- There are innovative, high-growth companies outside of the usual suspects of technology places, like Silicon Valley. Such surprise regions include Salt Lake City (second), Indianapolis (sixth), Buffalo, N.Y. (eleventh), Baltimore (fifteenth), Nashville (eighteenth), Philadelphia (nineteenth), and Louisville, Ky. (twentieth). These clusters of Inc. firms, including those in the area's so-called Rust Belt Region, suggest that population growth in the region is not necessarily a factor for growth of firms.
- While regional development literature suggests the presence of venture capital investment, high-quality research universities, federal R&D funding (such as SBIR), and patents are good sources for growth, Inc. firms had no correlations with these factors. In contrast, we find that the presence of a highly skilled labor force is important for concentration of Inc. firms.
- We do not find a uniform trend of increasing or decreasing concentrations of Inc. firms across regions in the last thirty years. This geographic inequality comes in a cycle of twelve to thirteen years. Most states remained at their relatively similar Inc. score throughout the last thirty years, while a handful of states experienced radical moves: D.C. and Utah became the rising stars, New Hampshire declined steadily, and Delaware had ups and downs.

1. Introduction

The following report is an analysis of data from the Inc. 500, a list of fast-growing private firms published every year since 1982 by *Inc.* magazine. Over time, many of these firms have further grown, and some of them experienced impressive Initial Public Offerings (IPOs), while others were acquired at the scale of millions or, occasionally, billions. Some Inc. firms are not unfamiliar to us at all. This includes well-known high-tech firms, such as Oracle, Microsoft, SAS, and Qualcomm; e-commerce firms with millions of customers, such as Zappos and E*Trade; and everyday retailers, such as Papa John's and Jamba Juice, as shown in Figure 1.[1] Thus, the economic impact of these specific Inc. firms is undeniably large.

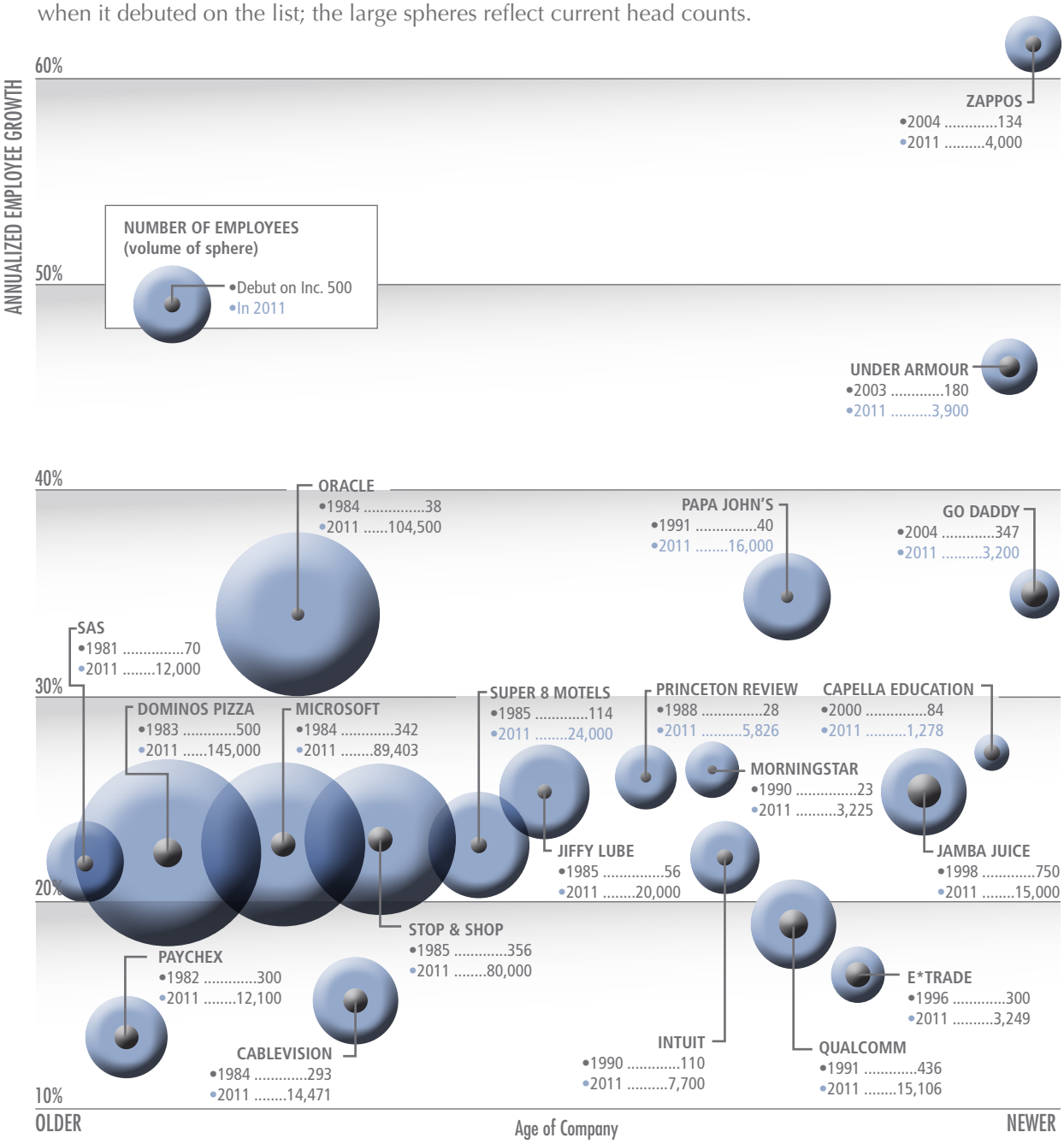
Nonetheless, surprisingly few studies have examined the economic importance of Inc. firms[2] and, to the authors' knowledge, no study has investigated their geographic aspects. Since this is the first such study, we will analyze rather descriptively and organize the report based on the following research questions:

1. Where are the fast-growing Inc. firms located at the state and metropolitan levels? How have they shifted over time?
2. Do we find greater geographic concentration of Inc. firms over time?
3. How is the geography of Inc. firms different from commonly associated growth factors, such as high-tech industries, venture capitals, and research universities?

Figure 1: Selected Inc. Firms and Their Employment Growth Over Years.[3]

20 Companies. 30 Years. 575,457 Jobs

Most economists agree that fast-growth startups create the bulk of the nation's new jobs. With that in mind, we thought it would be interesting to look back and see how some of the superstar Inc. 500 companies of the past three decades—the ones that have gone on to change their industries and become household names—have performed on that count. The answer, as this chart shows: pretty well. The small dots in the middle of the spheres below represent the size of each company's work force when it debuted on the list; the large spheres reflect current head counts.



What Makes an Inc. Firm

Every year, *Inc*. magazine selects the top 500[4] fastest-growing firms based on the following criteria:

1. The firm is a private company, i.e., its stocks are not publicly traded;
2. Revenue growth, calculated from the previous three years; for example, if the firm was selected for the 2011 list, its growth between 2007 and 2010;
3. The minimum ending revenue is $2 million dollars.

The scale of revenue growth by these Inc. firms is astounding. For instance, since 2008, firms had to achieve growth of at least 10.4 times to make it to the top 500 list, and the average growth rates are 17.4, 14.6, and 21.7 times in 2008, 2009, and 2010, respectively. Thus, these are not companies with marginal growth, but with massive growth, far more substantial than what David Birch called the "gazelle firms."[5]

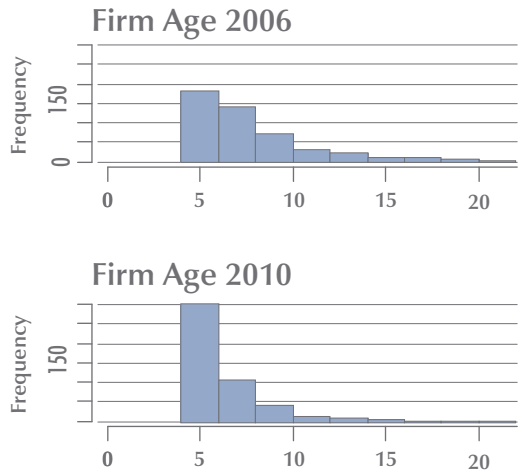
How old are these Inc. firms? Due to the calculation method, firms have to be at least four years old when they have made it to the Inc. list. Overall, they tend to be relatively young firms. For instance, the mean age for firms was 8.8 and 7.1 years in 2006 and 2010, respectively. The median age was 7.0 in 2006 and 6.0 in 2010. Moreover, 75 percent of firms were ten years or younger in 2006 and eight years or younger in 2010 (See Figure 2).

Table 1: Summary Descriptive of Revenue Growth by Inc. Firms, 2008–2010

	2008	2009	2010
Minimum	6.3	5.3	7.0
Maximum	315.3	198.1	204.7
Average	17.4	14.6	21.7
Median	10.4	8.8	13.4

While the level of revenue growth and the number of created jobs are impressive, we will make a clear distinction from the past debate about gazelle firms, which mainly discussed how many new jobs small or young firms create in the overall economy. Economists[6] have had a series of debates on this topic, and many issues are unsolved methodologically and conceptually. For the scope of this paper, we will not analyze how much impact the Inc. firms have created to the overall economy. Instead, we simply focus on the geographic context of Inc. firms, i.e., where those companies are located. Such geographic analysis and regional variations allow us to understand whether certain regional characteristics promote the environment for fast-growing companies and innovations.

Figure 2: Firm Age



Advantages of Using Inc. Data

For geographic analysis, these Inc. data come with two advantages. First, the data have a methodological strength. Since *Inc.* magazine has collected data since 1982, we have almost thirty years of time-series data, which allows us to understand changes over time. The data have good locational information, down to the

street-level address, and we can easily and systemically aggregate to metropolitan or state level. The data further have industry information, and our regional analysis can be decomposed into industry analysis.

Second and more importantly, the use of Inc. data comes with a conceptual advantage of measuring innovations. This measurement of innovations is not an easy task because, by definition, innovation is something new and often does not fit into the existing framework, including standardized data collection methods. Past academic studies of innovations and economic development used some proxies with major limitations. We could classify those innovation proxies into two categories: innovation inputs and outputs.

First, input-oriented methods measured research and development expenditures by the private and public sectors, how many scientists and engineers were mobilized, and how many people were employed in the so-called high-tech sectors, such as information technology, and medical and pharmaceutical technology. Other measures included how much venture capital was invested and how much in federal government-sponsored Small Business Innovation Research (SBIR) awards has been disbursed. The major limitation of these input indicators was that they ignore the efficiency between inputs and outputs, and simply assumed that larger inputs would produce more innovations. This was a risky assumption because there was plenty of evidence that highly research-intensive firms went bankrupt as they produced unpopular products or products that similarly competed with other companies but produced no profits. Being high-tech or having large research capacity does not necessarily mean that the firm will innovate, lead the market, or produce profits.

Table 2: Types of Innovation Measures and Literature[7]

Types	Measure	Literature
Inputs	R&D expenditure	Feldman and Lichtenberg (1998); Adams (2002)
	R&D personnel	Porter and Stern (1999); Zucker, Darby, Brewer (1994)
	R&D employment	Fingleton, Igliori, Moore (2003); Malecki (1985); Maggioni (2002)
	Venture capital	Zook (2002); Kenney and Patton (2005)
	SBIR awards	Wallsten (2001)
Outputs	Patents	Guerrero and Sero (1997); Co (2002); O hUallachain and Leslie (2005); Sonn and Park (2010)
	Innovation counts	Feldman (1994); Audretsch and Feldman (1996); Acs et al. (2002)

We alternatively could measure innovations by output-oriented indicators, such as patents, which dozens of academic studies have examined in the last few decades. A patent grants an inventor the right to exclude anyone else from producing or using a specific new device, apparatus, or process for seventeen years in the United States, and could be a powerful tool to obtain a competitive edge in the market. However, a patent addresses an invention. It does not measure the economic value of technologies,[8] and it does not necessarily produce commercial values (cf. an innovation, by definition, is something that has a commercial value). In fact, the majority of patents have no commercial value at all.[9] Critics note that "patents are a flawed measure [as innovation output], particularly since not all new innovations are patented and since patents differ greatly in their economic impact."[10] At best, there are high correlations of patents and R&D-related activities,[11] the indicators we discussed previously about innovation inputs, but one still would have to make a large assumption that patents lead to some form of innovations.

The second measure of innovation output is innovation counts. The U.S. Small Business Administration compiled these data by collecting new product announcements by more than 100 technology, engineering, and trade journals.[12] This good list focused on new products—only a segment of innovations—and, because it was compiled just once, in 1982, it clearly is outdated now.

Thus, measuring innovations is a challenging task, and past studies have major limitations. Particularly, only limited methods have been available to measure innovation outputs. This is where the Inc. data can contribute. We have to go back almost a century to the original concept of innovation pioneered by Joseph Schumpeter: something new and producing commercial value. Schumpeter further provided examples in types of innovations: new product, new markets, new production methods, and new systems. This is not even an exclusive list. Innovations can have innumberable forms, as long as they produce commercial value. Nonetheless, the current economic studies of innovations almost exclusively have focused on the technology side of innovations, or perhaps on product-oriented aspects.

On the other hand, the Inc. firms' revenue growth is a straightforward measure of the original concept of innovations. With their high-growth achievement, it is reasonable to assume that these firms have competitive advantages based on some kind of innovations, because companies cannot grow more than 500 times within three years for no reason. Here, we do not argue that the growth of Inc. firms came from cutting-edge technology or knowledge-based innovations, or that Inc. firms are "innovative" in the same sense. Yet, the bottom line is that, by definition, Inc. firms have achieved successful commercialization, i.e., values of innovations expressed in the economy: someone obviously values what they provide!

At the same time, we do not know how innovative they are or on what their business strengths are based. However, it does not matter as long as we can capture the end-of-innovation measures—the commercialized value of corporate activities. Those innovations are forces of "creative destruction" and sources of economic development. Tracing hundreds of Inc. firms per year and thousands per decade allows us to capture the wide scope of innovations and to analyze where certain regions are able to produce such fast-growing firms continuously. And we need to remember that this scope of Inc. firms captures well-known, dynamic companies, such as Microsoft, Oracle, and Zappos.

Other Ranking Studies

This unique and wide scope of innovations by the Inc. data brings us a specific hypothesis in terms of geographic analysis compared to other innovation ranking studies and geographic analyses. There have been a number of state and metropolitan rankings with regard to innovations, competitiveness, and creativity, to name a few. There is no way to discuss all those rankings, but it is worth mentioning two frequently cited ones: the Tech Pole Index and the Creativity Index.

The Milken Institute's Tech Pole Index is based on a calculation of location quotient (LQ) and employment size in defining high-tech sectors.[13] The Institute selected nineteen sub-sectors in the manufacturing and service economy, with 3–4 digit NAICS codes. Those sub-sectors were essentially IT, bio-tech, precision machinery, and aerospace industries. The top ten metro areas are listed in the left column of Table 3.

Richard Florida's Creativity Index[14] is based on four indicators: 1) the ratio of the so-called "creative class" in the region, 2) Milken's Tech Pole Index, 3) innovations, measured as patents per capita, and 4) the Gay Index as a reasonable proxy for an area's openness to different kinds of people and ideas. The top ten metros also are listed in the right column of Table 3.

Not surprisingly, the two indices are correlated because one of the four components of Florida's index came from Milken's Tech Poles. We do find some differences, partly coming from a different classification of cities and metro areas. However, it is evident that the two lists are highly similar for the top ten metros.

Table 3: Top Ten Metropolitan Areas by Milken's and Florida's Rankings

Rank	Milken Tech Poles	Florida's Creative Regions
1	San Jose-Sunnyvale-Santa Clara, CA	San Francisco, CA
2	Seattle-Bellevue-Everett, WA	Austin, TX
3	Cambridge-Newton-Framingham, MA	San Diego, CA
4	Washington-Arlington-Alexandria, DC-VA-MD-WV	Boston, MA
5	Los Angeles-Long Beach-Glendale, CA	Seattle, WA
6	Dallas-Plano-Irving, TX	Chapel Hill, NC
7	San Diego-Carlsbad-San Marcos, CA	Houston, TX
8	Santa Ana-Anaheim-Irvine, CA	Washington, D.C.
9	New York-White Plains-Wayne, NY-NJ	New York, NY
10	San Francisco-San Mateo-Redwood City, CA	Dallas, TX
		Minneapolis, MN

The scope of Florida's index was more than high-tech industries, and included patents per capita and the ratio of the creative-class workers. As we discussed, patents per capita are an output measure of innovations. The creative-class workers consisted of a number of occupations, such as 1) engineers and software programmers, which were input indicators of innovations, and 2) lawyers and management consultants, who would have high correlations with high-tech industries. Thus, Florida's index mixed the input and output measures of innovations. We should approach this type of mixture with caution because of potentially high correlations between input and output measures, particularly in high tech, and because mixing many different dimensions can mitigate explanatory power.[15]

As these two rankings demonstrate, a number of rankings about innovations and competitiveness tend to measure similar aspects of the economy and give the crown to the usual suspects: Silicon Valley and Boston are favorite examples, often followed by Austin, Seattle, San Diego, New York, and Research Triangle in North Carolina. What happens if we broaden our scope of innovations by going beyond high-tech industries? Are we going to find the same regions for innovations based on Inc.-type fast-growing companies? We hypothesize that the geographic analysis based on the Inc. data can highlight areas other than the usual suspects and industrial sectors beyond the conventionally defined 'high-tech' sectors. There can be a number of fast-growing companies in so-called Rust Belt regions, such as the Northeast and Midwest, and equally a number of fast-growing companies outside high-tech sectors. Developing the regional ranking is only one of the objectives in this report. We further extend our analysis by examining whether regions with many Inc. firms have correlations with other rankings or high-tech industries.

At the same time, we emphasize that the creation of another ranking is not our primary objective in this report. It will be more important to demonstrate different regions with different sectors and strengths, in contrast to areas previously highlighted as strong producers of high-tech companies. Thus, our objective is to shed light on formerly understudied areas of economic development.

2. Analysis

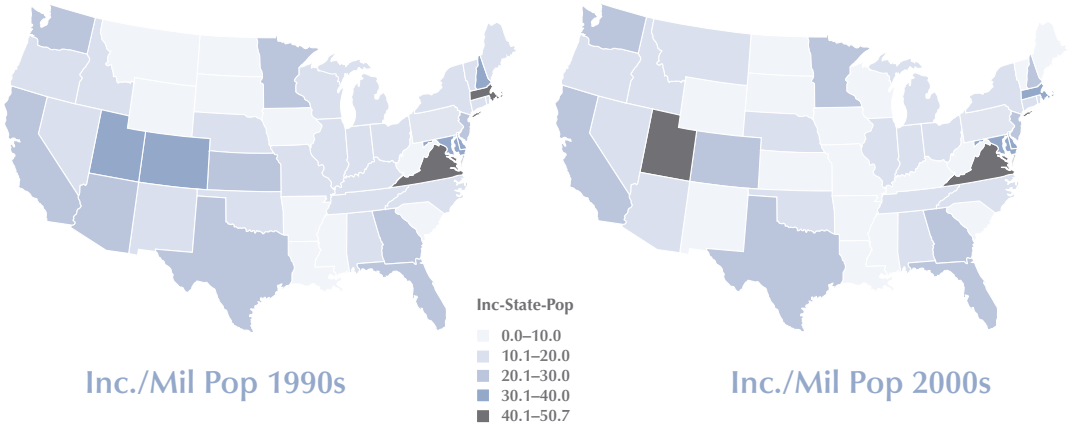
We start the analysis by following the main research questions: where are the fast-growing Inc. firms located at the state and metropolitan levels? How have they shifted over time? We aggregate the number of Inc. firms by states and analyze by decades. There is no mystery that California and Texas rank high in the total count of Inc. firms because they are the most populated states. Somewhat anomalous as to population size, Virginia ranks third, though its population was twelfth largest in the United States in 2010, and Massachusetts ranks sixth, though its population was fourteenth largest.

If we normalize this by population (the Inc. score, hereafter), a different picture comes up. In the 2000s, Washington, D.C., ranks at the top, followed by Utah, Virginia, Massachusetts, and Maryland. Several states, including Virginia, Maryland, and Massachusetts, have remained in the top ten through the three decades, while Washington, D.C., and Utah are rising stars. New Hampshire faced a steady decline in each decade. Interestingly, California and Arizona, which both experienced high population growth, continuously fell in the normalized score. Figure 3 presents the maps of those normalized scores in the 1990s and 2000s. For interactive animation of states, please find a graph on our website: http://www.kauffman.org/inc500.

Table 4: Top Twenty States with the Count and Score of Inc. Firms by Decades, Sorted by the Score in the 2000s

	Number of Inc. Firms				Inc./Pop (mil)			
Rank	State	1980s	1990s	2000s	State	1980s	1990s	2000s
1	CA	770	795	717	DC	31.5	24.5	54.6
2	TX	293	384	383	UT	16.2	30.3	42.1
3	VA	229	278	322	VA	36.9	39.1	40.1
4	NY	246	209	285	MA	36.7	42.0	33.1
5	FL	226	294	282	MD	29.8	31.3	29.2
6	MA	221	267	217	CO	20.9	30.3	26.9
7	GA	120	170	198	DE	20.9	34.3	23.3
8	IL	170	203	194	NH	43.2	32.2	22.0
9	NJ	168	180	172	WA	17.3	20.0	20.5
10	PA	197	169	172	GA	18.4	20.7	20.4
11	MD	143	166	169	NJ	21.7	21.3	19.5
12	OH	197	159	153	CA	25.7	23.4	19.2
13	WA	85	118	138	MN	13.9	22.1	18.8
14	CO	69	131	136	OR	11.9	17.2	17.5
15	UT	28	68	117	TX	17.2	18.3	15.2
16	MI	146	137	107	IL	14.9	16.3	15.1
17	MN	61	109	100	FL	17.4	18.3	15.0
18	AZ	77	91	95	AZ	20.9	17.6	14.8
19	NC	108	106	91	NY	13.7	11.0	14.7
20	IN	90	76	89	TN	15.1	12.1	14.0

Figure 3: States with Normalized Scores of Inc. Firms by Decade



We now shift to the metropolitan scale. Unfortunately, unlike states, the boundaries of metropolitan areas have shifted over time, usually expanding, and even the same metropolitan area has a substantially different set of counties after two decades.[16] This makes time-series analysis irrelevant, and so we focus only on the 2000s.

We start with large metropolitan areas with populations of one million or more. It was not Silicon Valley or Boston, but the Washington, D.C., area that ranked number one both with the count of Inc. firms and with the score, though the D.C. area is one of the usual suspects by other rankings: fourth by Milken's and eighth by Florida's. Other usual suspects included Austin (third), San Francisco (fourth), Boston (fifth), San Jose (seventh), and Raleigh-Cary, N.C. (eighth). Surprising places are Salt Lake City (second), but more particularly Indianapolis (sixth) and Buffalo, N.Y. (eleventh). The latter two metropolitan areas often are referred to as icons of Rust Belt cities, where old industries predominate with no innovations. Other Rust Belt areas include Baltimore (fifteenth), Philadelphia (nineteenth), and Louisville, Ky. (twentieth). Thus, five of the top twenty are surprise players. As a reference, the New York City and Los Angeles metro areas did host a large number of Inc. firms—337 and 251 firms, respectively—but they ranked low with the normalized score, only thirtieth and twenty-fifth, respectively. See Appendix A for the full list of fifty-two metropolitan areas that fit into this category. Additionally, we see little correlation between population growth (since 2000) and the Inc. score in these metropolitan areas, only 0.14. Therefore, there are regions that experience little or no population growth but enjoy a cadre of Inc. firms.

Table 5: Top Twenty Large Metropolitan Areas by Inc. Firms in the 2000s

Rank	MSA	Inc. Firms	Pop (mil)	Inc./Pop
1	Washington-Arlington, DC-VA-MD-WV	385	5.5	70.3
2	Salt Lake City, UT	57	1.1	50.4
3	Austin-Round Rock, TX	83	1.7	48.7
4	San Francisco-Oakland-Fremont, CA	198	4.3	45.9
5	Boston-Cambridge-Quincy, MA-NH	208	4.6	45.3
6	Indianapolis-Carmel, IN	66	1.7	37.9
7	San Jose-Sunnyvale-Santa Clara, CA	69	1.8	37.5
8	Raleigh-Cary, NC	42	1.1	37.3
9	Denver-Aurora-Broomfield, CO	89	2.6	34.9
10	Atlanta-Sandy Springs-Marietta, GA	187	5.5	34.2
11	Buffalo-Niagara Falls, NY	38	1.1	33.8
12	Seattle-Tacoma-Bellevue, WA	115	3.4	33.7
13	Portland-Vancouver-Beaverton, OR-WA	67	2.2	29.9
14	San Diego-Carlsbad-San Marcos, CA	89	3.1	29.1
15	Baltimore-Towson, MD	68	2.7	25.3
16	Dallas-Fort Worth-Arlington, TX	158	6.4	24.5
17	Minneapolis-St. Paul-Bloomington, MN-WI	79	3.3	24.2
18	Nashville-Davidson, TN	38	1.6	24.0
19	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	140	6.0	23.5
20	Louisville/Jefferson County, KY-IN	29	1.3	23.0

We then present metropolitan areas with populations between 300,000 and one million. Provo-Orem, Utah, an area south of Salt Lake City, ranked at the top, and Boulder, Colo., ranked second. Huntsville, Ala., ranking third, may be a less-known area, but has an economic base of NASA's flight center and the Army's aviation and missile research center. Two other metropolitan areas sharing the top five are located in the outskirts of larger metropolitan areas with high Inc. scores: Trenton, N.J., is east of Philadelphia (nineteeth), and Manchester, N.H., is north of Boston (fifth). See also Appendix B for the full list of 103 metropolitan areas in this category.

Integrating both large and mid-size metropolitan area rankings causes certain states to be ranked high. For example, D.C. (first), Virginia (third), and Maryland (fifth) are located in the Washington, D.C., metro area, and Salt Lake City (second in large cities) and Provo (first in medium cities) push Utah's rank high (second).

Table 6: Top Twenty Mid-Size Metropolitan Areas by Inc. Firms in the 2000s

Rank	MSA	Inc. Firms	Pop (mil)	Inc./Pop
1	Provo-Orem, UT	52	0.556	93.6
2	Boulder, CO	26	0.303	85.7
3	Huntsville, AL	24	0.406	59.1
4	Trenton-Ewing, NJ	19	0.366	51.9
5	Manchester-Nashua, NH	18	0.406	44.3
6	Santa Barbara-Santa Maria-Goleta, CA	14	0.407	34.4
7	Knoxville, TN	20	0.699	28.6
8	Bridgeport-Stamford-Norwalk, CT	21	0.901	23.3
9	Ann Arbor, MI	8	0.348	23.0
10	Greenville-Mauldin-Easley, SC	14	0.640	21.9
11	Madison, WI	12	0.570	21.1
12	Colorado Springs, CO	13	0.626	20.8
13	Palm Bay-Melbourne-Titusville, FL	11	0.536	20.5
14	Tulsa, OK	19	0.929	20.5
15	Jackson, MS	11	0.541	20.3
16	Des Moines-West Des Moines, IA	11	0.563	19.5
17	Reno-Sparks, NV	8	0.419	19.1
18	Omaha-Council Bluffs, NE-IA	16	0.850	18.8
19	Boise City-Nampa, ID	11	0.606	18.1
20	Akron, OH	12	0.700	17.1

Industry and Regional Analysis

Earlier, we observed that Washington, D.C., and Huntsville, Ala., ranked high, and both indicate concentrations of specific industrial sectors: government-related services for the former, and military and aeronautics for the latter. It is critical to analyze which industrial sectors compose Inc. firms. We focus on 2005 and after, when Inc. started to use a more systemic category of industries.

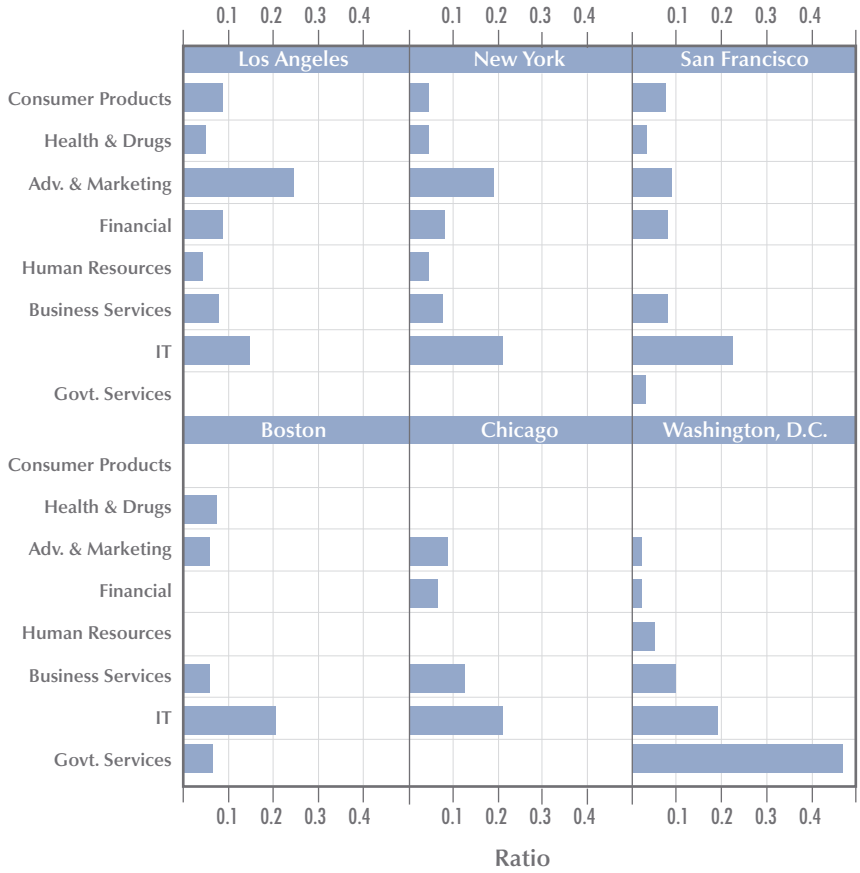
At the nationwide level, two sectors typically associated as high tech have a relatively large share: 19.4 percent for Information Technology (IT) and 6.5 percent for the Health and Drug sector. However, we have to note that they only constitute a quarter of sectors. The distribution of industrial sectors is wide, and several sectors that usually do not correspond with high-tech sectors share good portions: Advertising and Marketing (8.6 percent), Government Services (7.3 percent), and Construction (3.8 percent). It is possible that government service firms provide their products and services by employing high-level technologies, but this is hard for us to conclude at this level of industrial classification. However, we still can reasonably guess that the nation's top-level fast-growing firms do not necessarily come from commonly associated high-technology-oriented sectors.

At the regional level, the most striking (albeit unsurprising) feature is the concentration of Government Services (46.8 percent) in Washington, D.C. We have limited capacity to analyze metropolitan areas in time-series, but have to note that Washington, D.C., as a city and as a metropolitan area has been home to a number of Inc. firms since the 1990s. Thus, this high concentration of fast-growing companies has been a consistent pattern since the big- vs. small-government debate during the Clinton and George W. Bush administrations. Furthermore, our preliminary analysis of 2011 data also shows that Washington, D.C., is the largest area with the total count and score of Inc. firms, so the pattern of concentration has not changed at all during the years of the Obama administration.

Table 7: Top Ten Industrial Sectors by Inc. Firms in 2005–2010

Rank	Sector	Ratio
1	IT	19.4%
2	Business Services	10.2%
3	Advertising & Marketing	8.6%
4	Government Services	7.3%
5	Health & Drug	6.5%
6	Financial Services	5.6%
7	Consumer Products	5.0%
8	Telecom	4.0%
9	Construction	3.8%
10	Other Manufacturing	2.6%

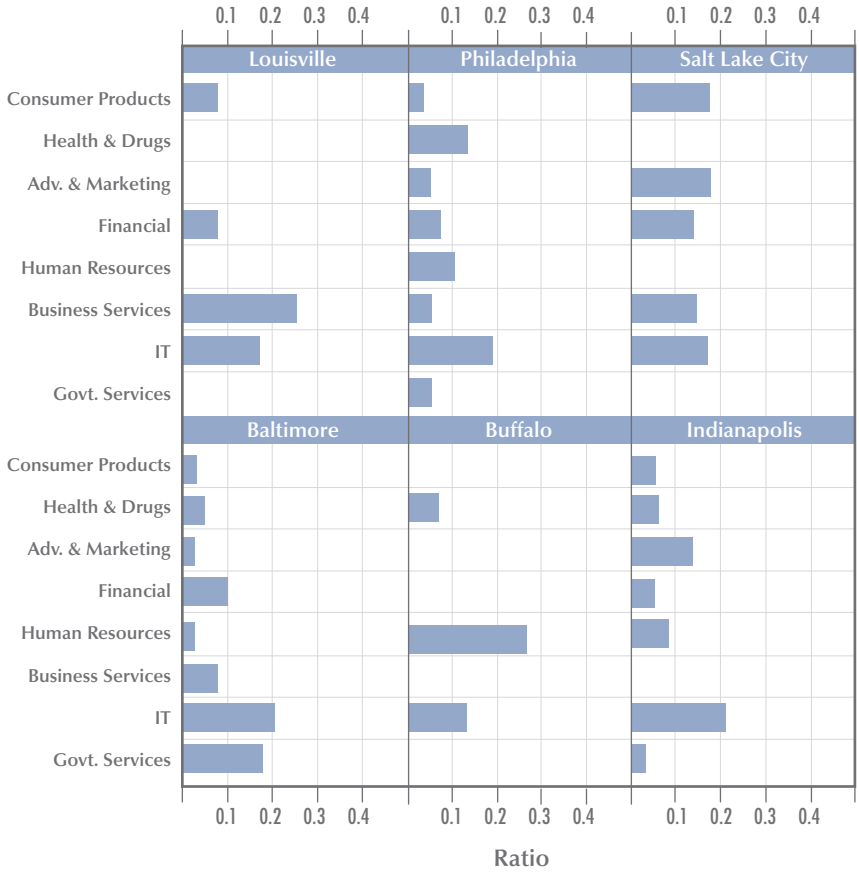
Figure 4: Industrial Sectors by Six Selected Metro Areas, 2005–2010.



There are further findings in the regional and industrial analysis. Reflecting the regional industrial cluster,[17] San Francisco had a higher ratio of IT firms (23.2 percent), and New York City and Los Angeles had higher portions of Advertising and Marketing firms (18.8 percent and 23.9 percent, respectively). Additionally, Atlanta (17.3 percent) and Chicago (12.9 percent) had higher concentrations of Business Services, and Dallas had a high concentration of Health and Drug firms (12.0 percent).

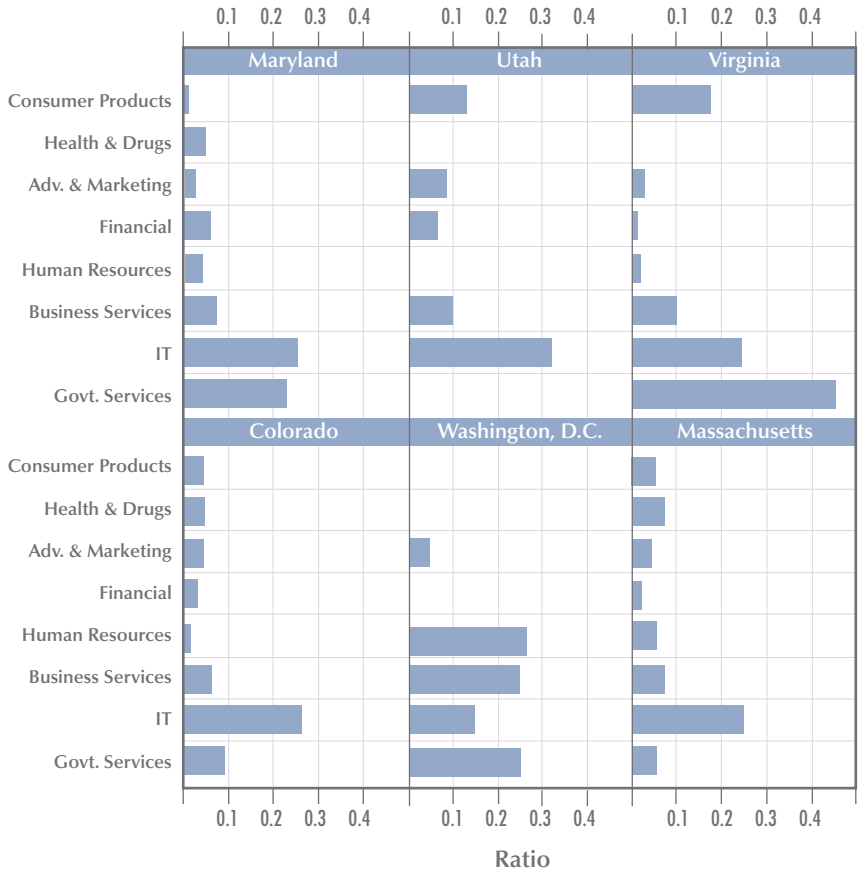
Among the "surprise metros," each metro comes out with a different industrial concentration. Louisville is high in Business Services (23.1 percent), Buffalo in Human Resources (23.5 percent) and Energy (17.6 percent) with repeat companies, and Salt Lake City with Consumer Products (15.6 percent) and Advertising and Marketing (also 15.6 percent). Indianapolis and Philadelphia contain a relatively well-rounded mix of industries, similar to the nationwide distribution. Proximity to D.C. seems to provide an advantage for Baltimore, with higher Government Services (16.3 percent) than the average.

Figure 5: Industrial Sectors by Six Selected "Surprise" Cities, 2005–2010.



At the state level, we reconfirm high ratios of Government Services in Virginia (45.3 percent), D.C. (25.0 percent), and Maryland (23.2 percent). Interestingly, Utah (32.2 percent) has a higher concentration of IT, ahead of Colorado (26.2 percent), Maryland (25.6 percent), Massachusetts (24.7 percent), and California (21.1 percent).

Figure 6: Industrial Sectors by Six Selected States, 2005–2010.



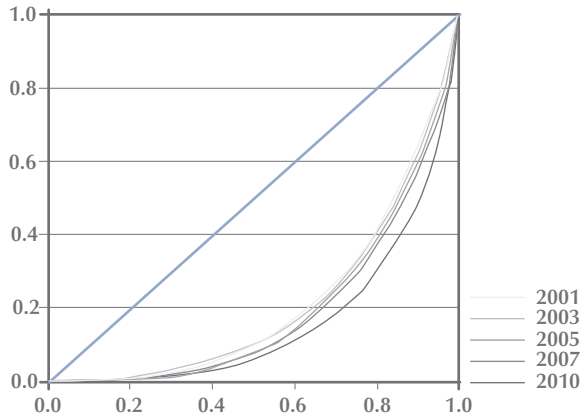
Shift in Geographic Concentration?

With the basic descriptive analysis of where Inc. firms are located, we analyze the next question: do we find more or less geographic concentration of Inc. firms over time? Answering this question is important for policy implications. More geographic concentration over time means a higher concentration of innovations in limited areas. Thus, it could enlarge geographic inequality in wealth and job creation. There are two contrasting theories and empirical evidence in this matter. We avoid an extensive literature review, but in a nutshell, the regional convergence theory[18] based on neo-classical economics suggests that innovations spill over, and innovations will be more

equally distributed geographically over time. In contrast, the regional divergence theory[19] based on evolutionary economics argues that certain economic and geographic endowments bring positive and increasing feedbacks to agglomeration and concentration. It is critical to examine empirically with specific case, time, and location.

We employ the Lorenz curve and Gini coefficient to analyze this pattern. Simply put, the lower the distribution curve is located, the more unequal it is. The Gini coefficient measures the inequality among values of a frequency distribution and ranges from zero (perfect equality) to one (perfect inequality). We analyze at the state level for several methodological reasons. First, the state level is the most consistent unit over time, as mentioned before. Second, we compare the inequality trend with other indicators, such as population and venture capital investment (VC), and the latter is unavailable at the sub-state level.

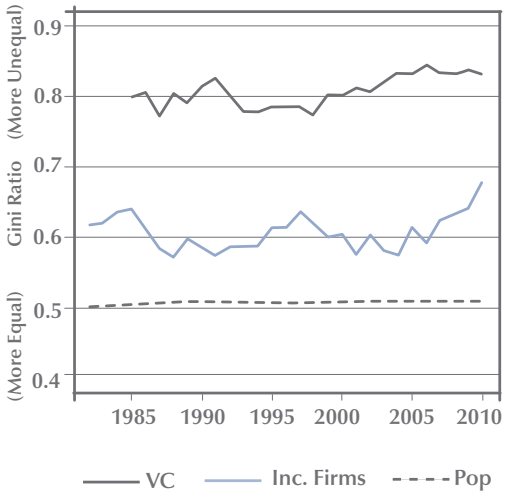
Figure 7: Lorenz Curve of Inc. Firm Distribution with Fifty States and D.C., 2001–2010.



The Lorenz curve indicates that the geographic distribution of Inc. firms is somewhat unequal, as the curves are way below the 45° line. More solid black lines on the lower side of the curves further demonstrate that the distribution became more uneven throughout the 2000s.

Next, we plot the level of Gini coefficients between 1982 and 2010. Among the three variables we analyze, population has the least unequal distribution by floating slightly above 0.5. VC investment is known to be highly unequal because of the extremely high concentration in California and Massachusetts,[20] and the Gini coefficient confirms as much, at around 0.8. The distribution of Inc. firms is somewhere between population and VC investment, ranging from 0.573 to 0.678. Additionally, its geographic concentration comes in waves: increasing inequality toward 1985, followed by a modest decline, with another peak in 1997. Then, it started to increase again in 2006. In sum, the geography of Inc. firms is not as concentrated as VC investment is, but is more unequally distributed than the general population. Such geographic concentration of Inc. firms does not have a uniform pattern of convergence or divergence over time, but comes in a cycle of about twelve to thirteen years. Currently, we are experiencing the most unequal distribution since this data collection started. At this level of descriptive analysis, it is hard to know what contributes to the inequality, and further research is needed.

Figure 8: Graph of Gini Coefficients at the State Level, 1982–2010.



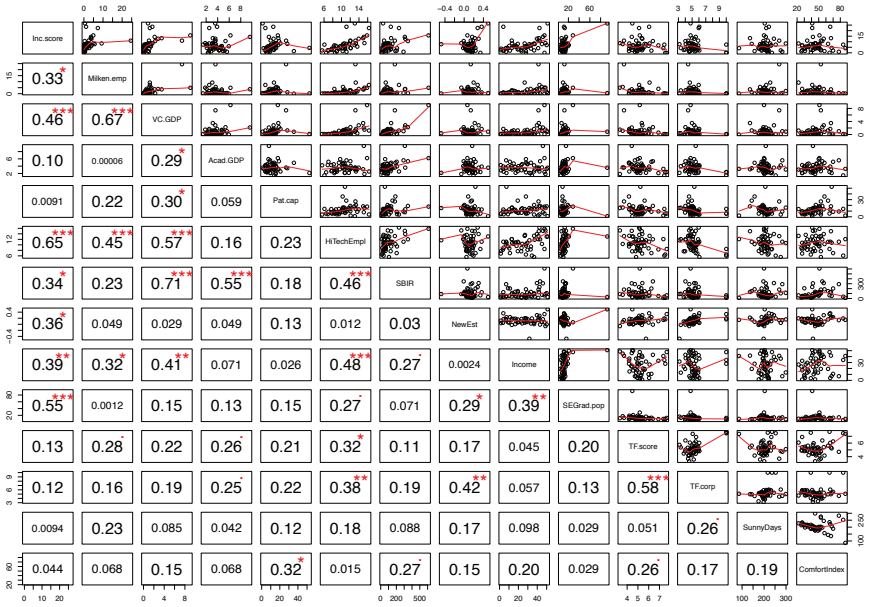
Regression Analysis

It is more difficult to analyze what factors are associated with enlarging regional inequality, but it is relatively easier to analyze what factors are associated with the Inc. score by regions. More importantly, our previous analysis has demonstrated that the location of Inc. firms does not necessarily associate with prototypical high-tech or VC indicators, but this was only a descriptive analysis. It is important to investigate in a multivariate analysis.

In this section, our dependent variable is the Inc. score at the state level between 2006 and 2010 because, as stated earlier, the VC data are available only at the state level. Since the Inc. score is a normalized indicator, we likewise employ normalized indicators for our independent variables. Our focus is whether the Inc. score is correlated with indicators of high-tech industries, VC investment, university, and patents. We generate the high-tech indicator[21] by reconstructing Milken's Tech Pole Index because the original index was generated only at the metropolitan level. Other indicators related to VC and university presence come from the National Science Foundation's Science and Engineering Indicators. We further include tax-related variables, derived from the Tax Foundation's report, and physical weather-related variables from BestPlaces.net.

The correlational matrix (in Figure 9) demonstrates that the Inc. score is moderately correlated with VC investment (0.46), the ratio of high-tech employment (0.65), and the ratio of science and engineering graduates per population (0.55). Moreover, VC investment has decent correlations with the SBIR disbursement variable (0.71) and the high-tech employment variable (0.57). We keep in mind these correlations for concerns of multicollinearity in the multivariate analysis.

Figure 9: Pearson Correlations of Variables



We start with a base of Model 1, which included Milken's Tech Pole Index, VC investment over Gross State Product (GSP), Academic R&D over GSP to control for the university factor, and patents per capita. Only the VC factor is significant at the 95 percent level. Note the low adjusted R-sq, only 0.172.

Table 8: Regression Result

Variables	Model 1 Coeff.	Model 2 Coeff.	Model 3 Coeff.
(Intercept)	7.273	-5.654	-11.815
Milken score	0.026	0.045	0.004
VC invt / GSP	1.741**	0.386	0.578
Academic R&D / GSP	-0.236	-0.536	-0.309
Patent / cap	-0.097	-0.056	-0.049
Ratio of high-tech empl		1.070***	1.181***
SBIR fund / GSP		0.006	
New estab / all estab		10.076**	9.030*
Per-capita income		-0.022	-0.025
Sci. & Eng. graduates / Pop		0.162***	0.165***
Overall score by Tax Foundt'n			0.550
Corp tax rate by Tax Foundt'n			-0.130
# of sunny days			0.010
Comfort index			0.009
N	51.000	51.000	51.000
Degrees of freedom	46.000	41.000	38.000
F-statistics	3.590	8.835	6.259
Adj. R-sq	0.172	0.585	0.558

Note: Significance level: *** - Pr(>|t|) > 0.01, ** - Pr(>|t|) > 0.05, and * - Pr(>|t|) > 0.1.

In Model 2, the ratio of high-tech employment over total employment, the ratio of new establishments over all establishments, and the ratio of science and engineering graduates per population are significant, while the VC factor is now insignificant. Analysis of VIF (variable inflation factor) results in a high factor for VC investment, 5.11. We will be conservative to avoid any multicollinearity and exclude SBIR in the next model.

In Model 3, we control for taxes and weather. None of these tax and weather factors is significant, while high-tech employment and science and engineering graduates remain significant. The ratio of new establishments is only significant at the 90 percent level, and VC investment is again not significant.

ANOVA between models indicates that Model 2 is substantially better than Model 1, but Model 3 does not improve Model 2. We consider that Model 2 sufficiently explains the dependent variable, but find little difference in significance level of variables between Model 2 and Model 3.

Table 9: ANOVA Table

		DF	RSS	Sq	F-statistic	Pr(.|t|)
Test 1	Model 1	46	1207.57			
	Model 2	41	539.07	668.5	10.169	0.000
Test 2	Model 2	41	539.07			
	Model 3	38	532.32	6.8	0.161	0.922

Summary of regression findings is as follows: We conclude that VC does not statistically contribute to predicting the Inc. score, given the low level of significance of VC investment in Model 1 and insignificance in Models 2 and 3. The high-tech score of Milken's Index, university R&D level, and patents per capita do not contribute, either. Therefore, the geography of Inc. firms is statistically different from those conventional factors in the regional development model.

Note that Milken's Tech Pole Index measured the high-tech-ness with the location quotient, as well as the size factor with the ratio of employment toward the overall employment in the United States. As a result, California is a total outlier by scoring 24.5. This score's median for all states is 0.94, while 75 percent of states rank 2.64 or lower. Our Inc. score does not have a size element in its measure, as we normalized by the population, and is most appropriate to be regressed with a ratio factor. That is why we introduced the ratio of high-tech employment, which turns out to be significant in the models. Therefore, we can conclude that the Inc. score does not correlate with the size factor (the Milken score), but does with the ratio of high-tech employment.

University R&D or patent factors all are insignificant. At the same time, we further introduced an additional measure in the university role, namely, how many science and engineering graduates reside in the population. This factor is significant, so the Inc. score is not associated with university R&D, but with how many high-skill workers the university has produced or attracted. Therefore, while the literature in economic development has called attention to the importance of research universities, we find that the university's teaching and training role is more important.

Last, while a number of organizations[22] claim that lower taxes are better for new firm creation and innovation, we do not see any connections between Inc. firms and scores provided by the Tax Foundation.

Conclusion and Implications

To sum up our findings, we go back to our original three research questions.

1. Where are the fast-growing Inc. firms located? How have they shifted over time?

First, we did find the usual suspects of high-tech regions, such as Austin (third), San Francisco (fourth), San Jose (seventh), Boston (fifth), and Seattle (twelfth). However, the metropolitan ranking came with a few surprises. Washington, D.C., topped the list as to both the number and score, and Salt Lake City was second. Moreover, we found high scores in regions little known as being innovative, such as Indianapolis, Buffalo, Baltimore, Nashville, Philadelphia, and Louisville. Scholars and ranking producers have discussed little about these Rust Belt cities as places of innovation. Yet, the results from the Inc. data suggest that we should avoid a simple classification of growing, innovative regions vs. declining, un-innovative regions.

Second, we can answer this question more cohesively by adding the industry analysis. In fact, two stories lead to one concluding story. At the nationwide level, only a quarter of Inc. firms are in conventional high-tech sectors, such as IT and Health and Drugs, and the industrial sector distribution is extremely wide, including Business Services (10.2 percent), Advertising and Marketing (8.6 percent), Government Services (7.3 percent), Construction (3.8 percent), and the rest. At the metropolitan level, we observed regional variations and specializations. Government Services in Washington, D.C., was the best example; other cases include Advertising and Marketing in New York City and Los Angeles, Business Services in Chicago and Atlanta, and Health and Drug firms in Dallas.

These two findings lead to the same conclusion. Innovations can come from a wide range of sectors and regions. It highlights the vitality of formerly understudied and underappreciated regions and opens up new research questions: what are the sources of growth for those Inc. firms in the surprise regions? What are the connections between those Inc. firms within each region? Do we find different models of regional development in those regions? These questions clearly are beyond the scope of this descriptive report, and we need more in-depth research in the future.

2. Do we find more geographic concentration of Inc. firms over time?

Our analysis with the Gini coefficient has shown that, while we are experiencing the heaviest geographic concentration in the past decade, the concentration or inequality of Inc. states comes by cycles of about twelve to thirteen years. Therefore, we do not find a uniform trend of increasing or decreasing concentration of Inc. regions. This time-series analysis is clearer in the graphic animation. Most states remained at their relatively similar Inc. score throughout the last thirty years, while a handful of states experienced radical moves: D.C. and Utah became the rising stars, New Hampshire declined steadily, and Delaware had ups and downs. We suspect that the cycle of inequality comes from changes in these large ups and downs by a small number of states.

3. How is the geography of Inc. firms different from commonly associated growth factors, such as high-tech industries, venture capitals, and research universities?

As we suspected by highlighting understudied regions, we found almost no correlations between the Inc. score and commonly associated growth factors. Our regression analysis has pointed out further that VC investment, Milken's Tech Pole Index, academic R&D level, SBIR fund ratio, and patents per capita do not correlate with the Inc. score at the state level. However, we find correlations with the ratio of high-tech employment, and science and

engineering graduates, which both are workforce indicators and not research dollar indicators. These findings indicate that the conventional regional development factors are not important for Inc. firms. Furthermore, innovations and high growth can come from sources other than high tech, science, or cutting-edge technology descending from universities. Relatedly, the presence of VC or research funds from the federal government is not the sole source of growth.

Our regression analysis further indicated that we have to be cautious with the role of universities. We do not find evidence that research activity at universities is important, but universities' teaching and training element is highly relevant. A high concentration of high-tech industries do not contribute to the higher Inc. score, since Milken's Index was insignificant, but the presence of a high-skill labor force is important for the concentration of Inc. firms.

We have to draw findings into a policy implication. Many state and local governments have tried to promote economic development through high-tech-oriented programs, such as science parks, incubation centers, and state venture funds. There is enough empirical evaluation research to conclude that those programs do not function as desired, which this report will not spare.[23] Additionally, the analysis through Inc. firms demonstrates that high-growth Inc. firms are not related to those high-tech-oriented programs, because there was no correlation with high-tech-ness, SBIR funds, and VCs. We have to fundamentally revisit the effectiveness of state economic programs. Moreover, state programs should not target high-tech firms, but high-growth firms, which create more revenue and employment.

The rise and dominance of the Washington, D.C., metro area requires further discussion. The federal government, whose bulk functions are concentrated in Washington, D.C., and surrounding areas in Maryland and Virginia, has increased its spending, adjusted to inflation, but its employment and the share of GDP have fluctuated in the meantime. In a nutshell, high spending and employment were shed during the Clinton years in the 1990s. Employment held steady during the George W. Bush administration, but spending per GDP increased during the 2000s. The Obama administration has increased both employment and spending since 2008 (see Table 10). In any case, the continuous rise of Inc. firms in the D.C. metro area does not coincide with the employment trend, but does coincide with the spending element, with roughly one-third of that spending growth driven by defense spending. Thus, it is reasonable to conclude that outsourcing of government services, regardless of Democrat or Republican regimes, has fed the huge complex of fast-growing companies in the D.C. area. This is totally ironic, but many nations' fastest-growing companies have persistently had deep connections with their federal governments. The United States government is not conventionally known as a government with industrial policy;[24] however, we find de facto industrial policy through outsourcing. Table 11 further confirms that D.C., Maryland, and Virginia are the top states with the highest ratio of government employment among the continental forty-eight states.

This opens up new debates about the function and location of federal government. The Washington, D.C., area was among the country's fastest-growing metropolitan areas in the past two decades, and it was the first major metro area to recover from the housing bubble in early

2009, ahead of New York, and comparable to San Francisco and Los Angeles.[25] In short, D.C.'s rapid and sustainable growth has depended on the federal government. Then, though we may not have two federal capitals, can we decentralize some functions of the federal government to other areas to avoid the high D.C. concentration, assuming that the locational division would not cause friction?[26] The Inc. data suggest that we need to revisit the role of government and its spillover effect.

Table 10: Federal Employment, Spending since 1990[27]

Year	Fed Empl (thous)	Total Spending (bil, 1990)	Defense Spending (bil, 1990)	DHS Spending (bil, 1990)	GDP (bil)	Spending/GDP
1990	2,250	1,253.0	342.1		5,800.5	21.6%
1991	2,243	1,270.8	307.5		5,750.1	22.1%
1992	2,225	1,287.0	324.6		5,908.3	21.8%
1993	2,157	1,274.8	311.1		6,030.7	21.1%
1994	2,085	1,289.1	296.6		6,248.6	20.6%
1995	2,012	1,299.9	279.9		6,358.9	20.4%
1996	1,934	1,299.9	263.4		6,529.6	19.9%
1997	1,872	1,303.8	264.6		6,785.3	19.2%
1998	1,856	1,325.0	259.0		7,051.0	18.8%
1999	1,820	1,335.1	261.4		7,337.9	18.2%
2000	1,778	1,357.8	272.2		7,553.2	18.0%
2001	1,792	1,374.8	270.2		7,591.2	18.1%
2002	1,818	1,460.9	306.4		7,731.8	18.9%
2003	1,867	1,534.2	343.0	22.2	7,914.6	19.4%
2004	1,882	1,586.4	375.3	25.3	8,201.3	19.3%
2005	1,872	1,654.3	401.5	26.9	8,447.7	19.6%
2006	1,880	1,721.3	402.7	26.2	8,672.6	19.8%
2007	1,888	1,720.1	411.4	27.1	8,843.1	19.5%
2008	1,960	1,810.6	442.9	28.5	8,722.8	20.8%
2009	2,094	2,143.0	483.7	26.0	8,491.9	25.2%
2010	2,133	2,071.6	507.8	33.2	8,707.0	23.8%

Table 11: Top Five States with Federal, State, and Local Government Employment Ratio[28]

States	Percentage
D.C.	38
Alaska	31
Virginia	27
Maryland	26
Hawaii	24

Last, we have to reconsider what the state or metropolitan rankings mean or do not mean. The world can have as many rankings as proposed with different data and methodology. However, that is not the end of story. People, media, and politicians are not only keen to rankings, but also driven by rankings.[29] Policymakers initiate or justify their economic development programs based on some selection of rankings. While those rankings by states vary substantially,[30] many of them highlight the usual suspects, which we have referred to as conventional high-tech regions. Indeed, some analysis in this report contains rankings of states and metropolitan areas. However, we cannot emphasize enough that the objective in our rankings was not to celebrate the winners, but to highlight formerly understudied regions and industries, as well as to discuss alternative models of regional development. Since the scope of this report was descriptive analysis, we have achieved only a beginning piece. We hope that further analysis of Inc. and other regional data will bring new debates in policy and economic development.

Endnotes

1. *Inc.* magazine (2011) calculated that the top ten largest job-creating firms generated net growth of 370,592 jobs. Accessed on March 10, 2012. http://images.inc.com/inc5000/2011/inc5000-job-creators.gif. In our calculation, 478 of the top 500 firms in 2011 generated 28,365 jobs, an average of 59.3 employment increase per firm over three years.

2. A few exceptions we found are Bhide (2000), and Markmand and Gartner (2002).

3. *Inc.* magazine. 2012. *20 companies. 30 years.* 2011 [cited March 15, 2012]. Available from http://images.inc.com/inc5000/2011/employee-growth-chart-lg.jpg.

4. Since 2007, Inc. has expanded the list from 500 to 5,000. Because the primary objective of this report is the geographic distribution over time since the 1980s, we will focus on the top 500 firms of every year.

5. The precise definition of "gazelle firms" by Birch (1982) was private businesses having at least $100,000 in annual revenues and sustaining annual revenue growth of more than 20 percent over a four-year period. He focused on those firms because they produced disproportionately large—more than 70 percent—of net new jobs.

6. See, for example, Birch (1981, 1987), Acs and Audretsch (1989), Brown et al. (1990), Davis et al. (1996a, 1996b), Haltiwanger and Krizan (1999), Acs (2008), Acs and Mueller (2008), and Henrekson and Johansson (2010).

7. Modified from Ratanawaraha and Polenske (2003, 32–34) and Acs et al. (2002, 1069).

8. Hall et al. (2001).

9. Griliches (1990, 1679) found that the median value of patents is close to zero or below. Mowery (2010) stated that more than 90 percent of patents filed in the United States had no commercial value.

10. Pakes and Griliches (1980, 378).

11. Feldman and Florida (1994); Audretsch and Feldman (1996).

12. For details of this database, see Acs and Audretsch (1988, 1990).

13. See Devol et al. (2009, 53–54) for details.

14. See Florida (2004) or Florida (2002): http://www.washingtonmonthly.com/features/2001/0205.florida.html.

15. As a reference, Milken's and Florida's rankings have a relatively low correlation of 0.377, out of 261 compatible metro areas.

16. For example, the Kansas City metropolitan area had eleven counties in its boundary in the 1990s, but added four more counties in the 2000s.

17. See Porter (1998, 82) as an example for the description of regional clusters.

18. See McLuhan (1964), Pascal (1987), Co (2002), and Johnson and Brown (2004).

19. See Romer (1994), Arrow (2000), O hUallachain (1999), and Bettencourt et al. (2007).

20. NSF (2011, 8–122, 8–124).

21. By following their methodology (Milken, 2009, 53).

22. For example, Tax Foundation (2012), Small Business and Entrepreneurship Council (2011), and Beacon Hill Institute (2010).

23. See, for example, Lerner (2009) for state venture funds and Amezcua (2010) for incubation centers.

24. See Motoyama et al. (2011) for this debate.

25. Standard and Poor's. 2012. Case-Shiller Index. http://www.standardandpoors.com/indices/sp-case-shiller-home-price-indices/en/us/?indexId=spusa-cashpidff--p-us----, downloaded June 6, 2012.

26. For instance, Schramm (2006) proposed moving the Department of Labor to Detroit. We do not necessarily argue which department should be relocated to which city, as this is totally an open subject. http://www.inc.com/magazine/20060601/views-opinion.html, downloaded June 13, 2012.

27. Employment figure from U.S. Office of Personnel Management. 2012. http://www.opm.gov/feddata/HistoricalTables/ExecutiveBranchSince1940.asp, downloaded June 6, 2012; Spending and GDP figures from USGovernmentSpending.com. 2012. http://www.usgovernmentspending.com/download_multi_year_1990_2010USb_13s1li101mcn_F0f, downloaded June 6, 2012; Consumer Price Index from Bureau of Labor Statistics. 2012. http://data.bls.gov/pdq/SurveyOutputServlet, downloaded June 6, 2012; Department of Homeland Security. Budget in Brief. http://www.dhs.gov/xabout/budget/dhs-budget.shtm, downloaded June 13, 2012.

28. Gallup Economy. 2012. http://www.gallup.com/poll/141785/gov-employment-ranges-ohio.aspx, downloaded June 6, 2012.

29. Erickson (1987).

30. Fisher (2005) and Kolko et al. (2011).

Bibliography

Acs, Zoltan. 2008. High-impact firms: Gazelles revisited. In *Small Business Research Summary.* Washington, D.C.: Small Business Administration Office of Advocacy.

Acs, Zoltan, Luc Anselin, and Attila Varga. 2002. "Patents and innovation counts as measures of regional production of new knowledge." *Research Policy* no. 31 (7):1069–1086.

Acs, Zoltan, and David B. Audretsch. 1988. "Innovation in large and small firms: An empirical analysis." *American Economic Review* no. 78 (4):678–90.

Acs, Zoltan, and David B. Audretsch. 1989. "Birth and firm size." *Southern Economic Journal* no. 56 (2):467–475.

Acs, Zoltan, and David B. Audretsch. 1990. *Innovation and small firms.* Cambridge, MA: MIT Press.

Acs, Zoltan, and Pamela Mueller. 2008. "Employment effects of business dynamics: Mice, Gazelles, and Elephants." *Small Business Economics* no. 30 (1):85–100.

Amezcua, Alejandro S. 2010. *Boon or Boondoggle?: Business Incubation as Entrepreneurship Policy,* Doctoral Dissertation in Public Administration, Syracuse University, Syracuse, N.Y.

Arrow, Kenneth J. 2000. "Increasing returns: historiographic issues and path dependence." *European Journal History of Economic Thought* no. 7 (2):171–180.

Audretsch, David B., and Maryann P. Feldman. 1996. "R&D Spillovers and the Geography of Innovation and Production." *American Economic Review* no. 86 (3):630–640.

Beacon Hill Institute. 2010. State Competitiveness Report. Boston: Suffolk University.

Bettencourt, Luis M.A., Jose Lobo, and Deborah Strumsky. 2007. "Invention in the city: Increasing returns to patenting as a scaling function of metropolitan size." *Research Policy* no. 36:107–120.

Birch, David L. 1981. "Who creates jobs?" *The Public Interest* no. 65:3–14.

Birch, David L. 1987. *Job creation in America: How our smallest companies put the most people to work.* New York: Free Press.

Bhide, Amar. 2000. *The origin and evolution of new businesses.* Oxford: Oxford University Press.

Brown, C., J. Hamilton, and J. Medoff. 1990. *Employers large and small.* Cambridge, MA: Harvard University Press.

Co, Catherine. 2002. "Evolution of the Geography of Innovation: Evidence from Patent Data." *Growth and Change* no. 33 (4):393–423.

Davis, S.J., John Haltiwanger, and S. Schuh. 1996. *Job creation and destruction.* Cambridge, MA: MIT Press.

Davis, S.J., John Haltiwanger, and S. Schuh. 1996. "Small business and job creation: Dissecting the myth and reassessing the facts." *Small Business Economics* no. 8 (4):297–315.

DeVol, Ross C., Kevin Klowden, Armen Bedroussian, and Benjamin Yeo. 2009. North America's high-tech economy: The geography of knowledge-based industries. Santa Monica, CA: Milken Institute.

Feldman, Maryann P., and Richard Florida. 1994. "The geographic sources of innovation: technological infrastructure and product innovation in the U.S." *Annals of the Association of American Geographers* no. 84:210–229.

Fisher, Peter. 2005. Grading places: What do the business climate rankings really tell us? Washington, D.C: Economic Policy Institute.

Florida, Richard. 2002. The Rise of the Creative Class: Why cities without gays and rock bands are losing the economic development race. *Washington Monthly*, May.

Florida, Richard L. 2004. T*he rise of the creative class.* New York, N.Y.: Basic Books.

Griliches, Zvi. 1990. "Patent statistics as economic indicators: A survey." *Journal of Economic Literature* no. 28 (4):1661–1707.

Hall, Bronwyn H., Adam B. Jaffe, and Manuel Trajtenberg. 2001. The NBER patent citations data file: Lessons, insights and methodological tools. In *NBER Working Paper.* Cambridge, MA: National Bureau of Economic Research.

Haltiwanger, John, and C.J. Krizan. 1999. "Small business and job creation in the United States: The role of new and young businesses." In *Are small firms important? Their role and impact,* edited by Zoltan Acs, 79–97. Boston: Kluwer Academic.

Henrekson, Magnus, and Dan Johansson. 2010. "Gazelles as job creators: A survey and interpretation of the evidence." *Small Business Economics* no. 35 (2):227–244.

Johnson, Daniel K., and Amy S. Brown. 2004. "How the west has won: Regional and industrial inversion in U.S. patent activity." *Economic Geography* no. 80 (3):241–260.

Kolko, Jed, David Newmark, and Marisol Cuellar Mejia. 2011. Public policy, state business climates, and economic growth. In *NBER Working Paper.* Cambridge, MA: National Bureau of Economic Research.

Lerner, Joshua. 2009. Boulevard of broken dreams: *Why public efforts to boost entrepreneurship and venture capital have failed and what to do about it.* Princeton: Princeton University Press.

Markman, Gideon D., and William B. Gartner. 2002. "Is extraordinary growth profitable? A study of Inc. 500 high-growth companies." *Entrepreneurship Theory and Practice* no. 27 (1):65–75.

McLuhan, Marshall. 1964. *Understanding media: the extensions of man.* 1st ed. New York: McGraw-Hill.

Motoyama, Yasuyuki, Richard P. Appelbaum, and Rachel Parker. 2011. "The National Nanotechnology Initiative: Federal support for science and technology, or hidden industrial policy?" *Technology in Society* no. 33 (1-2):109–118.

Mowery, David. 2009. "Nanotechnology: A new wave of the U.S. national innovation system?" In *Society for the Study of Nanoscience and Emerging Technologies* (S.Net). Seattle, WA.

National Science Foundation. 2011. Science and Engineering Indicators. Washington, D.C.: National Science Foundation.

O hUallachain, Breandan. 1999. "Patent places: Size matters." *Journal of Regional Science* no. 39 (4):613-636.

O hUallachain, Breandan, and Timothy F. Leslie. 2007. "Rethinking the regional knowledge production function." *Journal of Economic Geography* no. 7:737–752.

Pascal, Anthony. 1987. "The vanishing city." *Urban Studies* no. 24:597–603.

Porter, Michael E. 1998. "Clusters and the New Economics of Competition." *Harvard Business Review* no. 76 (6):77–90.

Ratanawaraha, Apiwat, and Karen R. Polenske. 2007. "Measuring the Geography of Innovation: A Literature Review." In *Economic Geography of Innovation,* edited by Karen R. Polenske, 30–59. Cambridge: Cambridge University Press.

Romer, Paul M. 1994. "Origins of Endogenous Growth." *Journal of Economic Perspectives* no. 8 (1):3–22.

Schumpeter, Joseph Alois. 1912. *Theorie der wirtschaftlichen entwicklung (Theory of Economic Development).* Leipzig: Duncker and Humblot.

Schumpeter, Joseph Alois. 1926. *The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle, Social science classics series.* New Brunswick, N.J.: Transaction Books.

Small Business and Entrepreneurship Council. 2011. Small Business Survival Index: Ranking the Policy Environment for Entrepreneurship Across the Nation. Edited by Raymond J. Keating. Washington, D.C.: SBEC.

Tax Foundation. 2012. State Business Tax Climate Index. *In collaboration with KPMG LLP.* Washington, D.C.: Tax Foundation.

Appendix A: Large Metropolitan Areas (populations of 1 million +)

Rank	MSA	Inc. Firms	Pop (mil)	Inc./Pop
1	Washington-Arlington, DC-VA-MD-WV	385	5.5	70.3
2	Salt Lake City, UT	57	1.1	50.4
3	Austin-Round Rock, TX	83	1.7	48.7
4	San Francisco-Oakland-Fremont, CA	198	4.3	45.9
5	Boston-Cambridge-Quincy, MA-NH	208	4.6	45.3
6	Indianapolis-Carmel, IN	66	1.7	37.9
7	San Jose-Sunnyvale-Santa Clara, CA	69	1.8	37.5
8	Raleigh-Cary, NC	42	1.1	37.3
9	Denver-Aurora-Broomfield, CO	89	2.6	34.9
10	Atlanta-Sandy Springs-Marietta, GA	187	5.5	34.2
11	Buffalo-Niagara Falls, NY	38	1.1	33.8
12	Seattle-Tacoma-Bellevue, WA	115	3.4	33.7
13	Portland-Vancouver-Beaverton, OR-WA	67	2.2	29.9
14	San Diego-Carlsbad-San Marcos, CA	89	3.1	29.1
15	Baltimore-Towson, MD	68	2.7	25.3
16	Dallas-Fort Worth-Arlington, TX	158	6.4	24.5
17	Minneapolis-St. Paul-Bloomington, MN-WI	79	3.3	24.2
18	Nashville-Davidson, TN	38	1.6	24.0
19	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	140	6.0	23.5
20	Louisville/Jefferson County, KY-IN	29	1.3	23.0
21	Columbus, OH	40	1.8	22.2
22	Miami-Fort Lauderdale-Pompano Beach, FL	122	5.5	22.0
23	Phoenix-Mesa-Scottsdale, AZ	86	4.4	19.7
24	Orlando-Kissimmee, FL	41	2.1	19.7
25	Los Angeles-Long Beach-Santa Ana, CA	251	12.9	19.5
26	Rochester, NY	19	1.0	18.3
27	Chicago-Naperville-Joliet, IL-IN-WI	175	9.6	18.3
28	Milwaukee-Waukesha-West Allis, WI	28	1.6	18.0
29	Oklahoma City, OK	22	1.2	17.9
30	New York-Northern New Jersey, NY-NJ-PA	337	19.1	17.7
31	Birmingham-Hoover, AL	19	1.1	16.8
32	Cleveland-Elyria-Mentor, OH	35	2.1	16.7
33	Houston-Sugar Land-Baytown, TX	97	5.9	16.5
34	Detroit-Warren-Livonia, MI	68	4.4	15.4
35	Tampa-St. Petersburg-Clearwater, FL	41	2.7	14.9
36	Charlotte-Gastonia-Concord, NC-SC	26	1.7	14.9
37	Sacramento--Arden-Arcade--Roseville, CA	31	2.1	14.6
38	St. Louis, MO-IL	41	2.8	14.5
39	Cincinnati-Middletown, OH-KY-IN	31	2.2	14.3
40	Richmond, VA	17	1.2	13.7
41	Las Vegas-Paradise, NV	26	1.9	13.7
42	Pittsburgh, PA	31	2.4	13.2
43	Kansas City, MO-KS	27	2.1	13.1
44	San Antonio, TX	26	2.1	12.5
45	Virginia Beach-Norfolk-Newport News, VA-NC	21	1.7	12.5
46	Providence-New Bedford-Fall River, RI-MA	18	1.6	11.2
47	Jacksonville, FL	14	1.3	10.5
48	Hartford-West Hartford-East Hartford, CT	11	1.2	9.2
49	Memphis, TN-MS-AR	12	1.3	9.2
50	Tucson, AZ	7	1.0	6.9
51	Riverside-San Bernardino-Ontario, CA	20	4.1	4.8
52	New Orleans-Metairie-Kenner, LA	0	1.2	0.0

Appendix B: Small Metropolitan Areas (populations between 300,000 and 1 million)

Rank	MSA	Inc. Firms	Pop (mil)	Inc./ Pop
1	Provo-Orem, UT	52	0.556	93.6
2	Boulder, CO	26	0.303	85.7
3	Huntsville, AL	24	0.406	59.1
4	Trenton-Ewing, NJ	19	0.366	51.9
5	Manchester-Nashua, NH	18	0.406	44.3
6	Santa Barbara-Santa Maria-Goleta, CA	14	0.407	34.4
7	Knoxville, TN	20	0.699	28.6
8	Bridgeport-Stamford-Norwalk, CT	21	0.901	23.3
9	Ann Arbor, MI	8	0.348	23.0
10	Greenville-Mauldin-Easley, SC	14	0.640	21.9
11	Madison, WI	12	0.570	21.1
12	Colorado Springs, CO	13	0.626	20.8
13	Palm Bay-Melbourne-Titusville, FL	11	0.536	20.5
14	Tulsa, OK	19	0.929	20.5
15	Jackson, MS	11	0.541	20.3
16	Des Moines-West Des Moines, IA	11	0.563	19.5
17	Reno-Sparks, NV	8	0.419	19.1
18	Omaha-Council Bluffs, NE-IA	16	0.850	18.8
19	Boise City-Nampa, ID	11	0.606	18.1
20	Akron, OH	12	0.700	17.1
21	Scranton--Wilkes-Barre, PA	9	0.549	16.4
22	Kingsport-Bristol-Bristol, TN-VA	5	0.306	16.4
23	Durham-Chapel Hill, NC	8	0.501	16.0
24	South Bend-Mishawaka, IN-MI	5	0.318	15.7
25	Pensacola-Ferry Pass-Brent, FL	7	0.455	15.4
26	New Haven-Milford, CT	13	0.848	15.3
27	Ogden-Clearfield, UT	8	0.542	14.8
28	Dayton, OH	12	0.835	14.4
29	Rockford, IL	5	0.354	14.1
30	Albany-Schenectady-Troy, NY	12	0.858	14.0
31	Oxnard-Thousand Oaks-Ventura, CA	11	0.803	13.7
32	Charleston-North Charleston-Summerville, SC	9	0.659	13.7
33	Chattanooga, TN-GA	7	0.524	13.4
34	Grand Rapids-Wyoming, MI	10	0.778	12.9
35	Lexington-Fayette, KY	6	0.471	12.7
36	Naples-Marco Island, FL	4	0.319	12.6
37	Portland-South Portland-Biddeford, ME	6	0.517	11.6
38	Montgomery, AL	4	0.366	10.9
39	Spokane, WA	5	0.469	10.7
40	Youngstown-Warren-Boardman, OH-PA	6	0.563	10.7
41	Davenport-Moline-Rock Island, IA-IL	4	0.379	10.6
42	Little Rock-North Little Rock-Conway, AR	7	0.685	10.2
43	Roanoke, VA	3	0.300	10.0
44	Reading, PA	4	0.407	9.8
45	Mobile, AL	4	0.412	9.7
46	Springfield, MO	4	0.431	9.3
47	Kalamazoo-Portage, MI	3	0.327	9.2
48	Worcester, MA	7	0.804	8.7
49	Cape Coral-Fort Myers, FL	5	0.587	8.5
50	Tallahassee, FL	3	0.360	8.3
51	Fayetteville, NC	3	0.360	8.3
52	Albuquerque, NM	7	0.858	8.2
53	Beaumont-Port Arthur, TX	3	0.378	7.9
54	Lancaster, PA	4	0.508	7.9
55	Stockton, CA	5	0.675	7.4
56	Canton-Massillon, OH	3	0.408	7.4
57	Charleston, WV	2	0.304	6.6
58	Santa Rosa-Petaluma, CA	3	0.472	6.4
59	Deltona-Daytona Beach-Ormond Beach, FL	3	0.496	6.0
60	Toledo, OH	4	0.672	6.0
61	Savannah, GA	2	0.343	5.8

Appendix B: Small Metropolitan Areas (populations between 300,000 and 1 million)

Rank	MSA	Inc. Firms	Pop (mil)	Inc./ Pop
62	Greensboro-High Point, NC	4	0.715	5.6
63	Harrisburg-Carlisle, PA	3	0.537	5.6
64	Killeen-Temple-Fort Hood, TX	2	0.379	5.3
65	Port St. Lucie, FL	2	0.406	4.9
66	Vallejo-Fairfield, CA	2	0.407	4.9
67	Wichita, KS	3	0.613	4.9
68	Syracuse, NY	3	0.646	4.6
69	Fresno, CA	4	0.915	4.4
70	Bakersfield, CA	3	0.807	3.7
71	Springfield, MA	2	0.699	2.9
72	Eugene-Springfield, OR	1	0.351	2.8
73	Evansville, IN-KY	1	0.352	2.8
74	Wilmington, NC	1	0.355	2.8
75	Columbia, SC	2	0.745	2.7
76	Anchorage, AK	1	0.375	2.7
77	El Paso, TX	2	0.751	2.7
78	Salem, OR	1	0.396	2.5
79	Allentown-Bethlehem-Easton, PA-NJ	2	0.816	2.5
80	Fort Wayne, IN	1	0.414	2.4
81	Corpus Christi, TX	1	0.416	2.4
82	Flint, MI	1	0.424	2.4
83	Honolulu, HI	2	0.908	2.2
84	Fayetteville-Springdale-Rogers, AR-MO	1	0.465	2.2
85	Winston-Salem, NC	1	0.485	2.1
86	Modesto, CA	1	0.510	2.0
87	Baton Rouge, LA	0	0.787	0.0
88	McAllen-Edinburg-Mission, TX	0	0.741	0.0
89	Bradenton-Sarasota-Venice, FL	0	0.688	0.0
90	Poughkeepsie-Newburgh-Middletown, NY	0	0.677	0.0
91	Lakeland-Winter Haven, FL	0	0.583	0.0
92	Augusta-Richmond County, GA-SC	0	0.539	0.0
93	Lansing-East Lansing, MI	0	0.454	0.0
94	Visalia-Porterville, CA	0	0.430	0.0
95	York-Hanover, PA	0	0.429	0.0
96	Asheville, NC	0	0.413	0.0
97	Salinas, CA	0	0.410	0.0
98	Brownsville-Harlingen, TX	0	0.396	0.0
99	Shreveport-Bossier City, LA	0	0.392	0.0
100	Peoria, IL	0	0.376	0.0
101	Hickory-Lenoir-Morganton, NC	0	0.365	0.0
102	Ocala, FL	0	0.329	0.0
103	Green Bay, WI	0	0.305	0.0

Appendix C

State	1980s	1990s	2000s		1980s	1990s	2000s
AK	15	5	3		27.1	8.0	4.2
AL	42	55	57		10.4	12.4	11.9
AR	16	4	10		6.8	1.5	3.4
AZ	77	91	95		20.9	17.6	14.8
CA	770	795	717		25.7	23.4	19.2
CO	69	131	136		20.9	30.3	26.9
CT	76	62	47		23.1	18.2	13.1
DC	19	14	33		31.5	24.5	54.6
DE	14	27	21		20.9	34.3	23.3
FL	226	294	282		17.4	18.3	15.0
GA	120	170	198		18.4	20.7	20.4
HI	15	0	4		13.5	0.0	2.9
IA	34	24	28		12.2	8.2	9.2
ID	15	16	19		14.8	12.3	12.1
IL	170	203	194		14.9	16.3	15.1
IN	90	76	89		16.2	12.5	13.7
KS	40	53	23		16.1	19.7	8.0
KY	30	52	35		8.1	12.8	8.1
LA	25	24	15		5.9	5.4	3.3
MA	221	267	217		36.7	42.0	33.1
MD	143	166	169		29.8	31.3	29.2
ME	6	13	11		4.9	10.2	8.3
MI	146	137	107		15.7	13.8	10.8
MN	61	109	100		13.9	22.1	18.8
MO	62	76	57		12.1	13.6	9.5
MS	7	14	20		2.7	4.9	6.7

State	1980s	1990s	2000s		1980s	1990s	2000s
MT	2	3	10		2.5	3.3	10.1
NC	108	106	91		16.2	13.1	9.5
ND	2	2	5		3.1	3.1	7.4
NE	25	18	23		15.8	10.5	12.6
NH	48	40	29		43.2	32.2	22.0
NJ	168	180	172		21.7	21.3	19.5
NM	24	31	11		15.8	17.0	5.3
NV	5	18	33		4.1	8.9	12.2
NY	246	209	285		13.7	11.0	14.7
OH	197	159	153		18.1	14.0	13.3
OK	30	51	41		9.5	14.8	10.9
OR	34	59	67		11.9	17.2	17.5
PA	197	169	172		16.6	13.8	13.5
RI	23	19	14		22.9	18.1	13.3
SC	33	27	35		9.4	6.7	7.5
SD	5	4	0		7.2	5.3	0.0
TN	74	69	89		15.1	12.1	14.0
TX	293	384	383		17.2	18.3	15.2
UT	28	68	117		16.2	30.3	42.1
VA	229	278	322		36.9	39.1	40.1
VT	9	10	2		15.9	16.4	3.2
WA	85	118	138		17.3	20.0	20.5
WI	77	84	51		15.7	15.6	9.0
WV	5	7	8		2.8	3.9	4.3
WY	6	3	2		13.2	6.1	3.5

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