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A Regional Analysis of New Firm Formation

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Abstract

Understanding the factors that promote or mitigate new firm birth is crucial to regional economic development efforts, since a high level of new firm creation significantly contributes to regional economic vitality and is a major signal of a dynamic economy. The literature suggest that various factors such as unemployment, population density/growth, industrial structure, human capital, the availability of financing, and entrepreneurial characteristics significantly influence regional variation in new firm birth rates.

In this study, we explore whether connections exist among regional social characteristics, human capital, and new firm formation. We argue that social diversity and creativity have a positive relationship with new firm formation. Building on the contributions of urbanist Jane Jacobs, Lee, Richard, and Gates (2001) showed that social diversity and human capital have positive and significant relationships with regional innovation production measured by per capita patent production. While it is well known that regional human capital stock positively affects new firm formation rates, little attention has been paid to the interaction among social diversity, human capital, and entrepreneurship. We argue that low barriers of entry into the regional labor market (as exhibited in part by the presence of a diverse population) and diverse culture facilitate the influx of a particular kind of human capital that promotes innovation and accelerates information flow, leading to the higher rate of new firm formation.

The empirical results support our main hypothesis. By using the Longitudinal Establishment and Enterprise Microdata (LEEM), we test the hypothesis at the MSAs (Metropolitan Statistical Areas) level as well as LMAs (Labor Market Areas) level. We find that new firm formation is strongly associated with diversity and cultural creativity when controlled for the variables suggested in the literature. Firm formation is positively and significantly associated with the share of the foreign-born but insignificantly with the Diversity index. The results strongly suggest that we need to pay attention to the social habitat of a region to boost a regional entrepreneurial dynamics.

INTRODUCTION

Ever since the seminal work of Schumpeter (1950), entrepreneurship has been regarded as a major topic in the theory and practice of economic growth and development. Practitioners and politicians are well aware of the importance of entrepreneurship because a significant portion of new employments are created by new firm and often new firms bring "productive innovation" with it (Baumol, 2002). Therefore, it is very crucial to understand the factors that promote or mitigate entrepreneurial creativity.

There have been various studies on the determinants of entrepreneurships. Much of the literature on entrepreneurship has investigated the characteristics of successful entrepreneurs. These studies have attempted to explain entrepreneurship by looking into individual characteristics such as personality, educational attainment, and/or ethnic origin (see Storey, 1994 for summary, the factors associated with new firm formation (Reynolds et al., 1994; Armington and Acs, 2002), the organizational, industrial and geographic factors associated with entrepreneurship (Reynolds et al., 1993; Saxenian, 1999), and the affect of new firm formation on regional growth and development (Storey, 1994; Kirchhoff et al., 2002).

Others have explored the factors associated with regional variation in new firm formation. These studies have found regional variation in new firm formation to be associated with factors such as population, industrial structure, human capital, university R&D, the availability of financing, and entrepreneurial characteristics (see Armington and Acs, 2002; Kirchhoff, Armington, Hasan, and Newbert, 2002). Stuart and Sorenson (2003) look at the effect of social ties on firm founding rate. They argue that new firms are attracted by other firms "because entrepreneurs find it difficult to leverage the social ties necessary to mobilize essential resources when they reside far from those resources." However, these researches have paid little attention to the social environment of the place where entrepreneurs live and work.

An influential line of research suggests that cities and regions function as "incubators" of creativity and innovation and that human capital factors in particular play an important role in spurring regional growth (Park, 1925; Jacobs, 1961; Thompson, 1965; Lucas, 1988). Park (1925) initially called attention to the role of cities in concentrating and spurring human creativity. Jacobs (1961) later explained how cities function as "open systems" to attract talented people from various backgrounds and stimulate their creative capacities. Lucas (1988) formalized the

insights of Jacobs to provide a basic theory, arguing that cities function as collectors of human capital, thus generating new ideas and economic growth.

This paper builds from this line of research focusing on the underlying social characteristics of a region that are associated with entrepreneurship or firm formation. Specifically, we explore the effect of factors such as creativity and diversity on new firm formation. While previous studies have examined the effect of human capital on firm formation, they have neglected the factors that may effect the concentration of human capital in the first place and how such factors affect rates of firm formation. Our basic hypothesis is that entrepreneurship is positively associated with regional environments that promote diversity and creativity. We thus argue that entrepreneurial activity requires not only a productive and supportive business climate along with an educated population, but also a climate where creativity, diversity, and innovation are encouraged and valued.

To test this hypothesis, this paper use measures of regional diversity and creativity and examines the effect of these factors on entrepreneurship while controlling for the effects of well known factors such as human capital, income change, and population . We argue that regions that are broadly creative and open to diversity possess the broad environment or habitat that promotes innovation and accelerates information flow, leading to the formation of new business. The empirical results support the hypothesis.

LITERATURE ON ENTREPRENEURSHIP

Academic approaches to the entrepreneurship can be categorized into two major ways. First is to focus on the entrepreneurs and try to explain why a person decides to be an entrepreneur and start a new firm. Second is to explain regional variation in firm formation in an aggregate level by looking structural variations in geographical areas. Two approaches will be explained in this section.

Traditionally, studies of entrepreneurship have focused on the individual characteristics of successful entrepreneurs. According to Storey (1994), these studies focus on the role of factors such as personality, human capital, and ethnic origin. Personality studies have found that entrepreneurship is associated with characteristics like entrepreneurial vision, alertness to business opportunities, proactivity, and family tradition (Blanchflower and Oswald, 1990; Chell,

Haworth, and Brearley, 1991). Human capital studies have found that entrepreneurship is related to educational attainment and work experience (Evans and Leighton, 1990). Researches showed that people with higher educational attainment tend to found new business more often than those with less educational attainment. Other studies have found entrepreneurship to be associated with ethnic origin (Jones, McEvoy, and Barrett, 1993). Lee (2001) found that Jews and Korean are more successful entrepreneurs than African Americans because they enjoyed better access to capital through family or ethnic networks than others. Some of these studies suggest that immigrants are more likely to be entrepreneurs, arguing that because new immigrants lack networks and contacts in existing businesses and are poor in communication skills and suffer from discrimination, they are more likely to start new firms and be self-employed (Yoon, 1997). Evans and Leighton (1989) found that men with more financial resources and with more confidence in their own ability are more likely to be self-employed by using the data from National Longitudinal Survey of Young Men and Current Population Survey.

Another line of researches have examined the factors at regional level, which effect regional variations in new firm formation. Early studies focused on factors such as tax rates, transportation costs, and scale economies at the plant level (Bartik, 1989; Kieschnick, 1981). Reynolds, Storey, and Westhead (1994) found that factors such as unemployment, population density, industrial clustering, and availability of financing were important in explaining regional variation in firm birth rates. More recently, Armington and Acs (2002) found that industrial intensity, income growth, population growth, and human capital were closely related to new firm formation. Kirchhoff et al. (2002) found academic research and development expenditure to be significantly associated with rates of new firm formation across regions. A number of studies have suggested that regional rates of entrepreneurship are associated with levels of immigration (Reynolds et al., 1995; Saxenian 1999; Kirchhoff et al., 2002). The entrepreneurship of the immigration can be approached in two ways. While most of immigrants are less educated and little skills to success in the U.S., some of them are extremely well educated and equipped with a good skill set. Although it is hard to find a common property between two groups, one they have in common is the fact that they are risk-takers. A study of immigrants in California found that immigrants with a good educational background were involved as founders in 20 to 25 percent of new high-technology firm formation in Silicon Valley (Saxenian, 1999).

Studies noted the importance of the role of network in entrepreneurship. Saxenian (1999) found that extensive networks of Chinese and Indian works help people start new firms by providing

contacts and financial supports in Silicon Valley. Stuart and Sorenson (2003) argue that businesses cluster because geographical proximity enables them to utilize "social ties necessary to mobilize essential resources." Their findings imply that entrepreneur's social relationship is crucial in utilizing critical business- resources which is critical to start a firm and set up a new organization.

We are interested in studying entrepreneurship in the context of clustering. The clustering of people and industries has been studied seriously in the literature. Following Park's initial attention to the role of cities in concentrating and spurring human creativity, Jacobs (1961) explained how cities function as "open systems" to attract talented people from various backgrounds and stimulate their creative capacities. She argued that open and diverse cities attract more talented people, thus spurring creativity and innovation, which are the underlying forces of entrepreneurship. Thompson (1965) was among the first to suggest that cities function as "incubators" of new ideas and innovation. Lucas (1988) formalized the insights of Jacobs to provide a basic theory, arguing that cities function as collectors of human capital, thus generating new ideas and economic growth. Following Jacobs, Desrochers (2001) argued that economic diversity is a key factor in city and regional growth, as creative people from varied background come together to generate new and novel combinations of existing technology and knowledge to create innovation and as a result, new firms. Building on these contributions, Lee, Florida, and Gates (2002) showed that creativity, diversity, and human capital have positive and significant relationships with regional innovation measured as per capita patent production. Also Florida (2002) argued that creativity is an important element in regional economic success and Florida and Gates (2001) found that diversity has a positive association with regional high-tech output and growth.

This research builds on this line of thinking, arguing that creativity and diversity of a region work together to increase regional capacity to generate entrepreneurial activity. Creativity and diversity are kinds of social infrastructure entrepreneurs and policy-makers can tap into. Creativity and diversity are quite distinctive since they cannot be easily measured or even defined properly. They are more fundamental than critical resources for entrepreneurship such as tax rate, human capital, venture capital, or entrepreneurial zone. We can regard it as social habitat.

How can diversity promote entrepreneurship? We argue that more diverse regions tend to have lower entry-barriers which make it easier for human capital with various backgrounds to enter the

region and stay within. If we can agree that the central focus of entrepreneurial studies is the entrepreneur themselves, it is natural to think that lower entry-barriers can play an important role in attracting creative human capital to come to a region and stay welcomed with a sense of membership. Hence a more diverse region could enjoy comparative advantage in attracting and retaining creative human capital.

How is creativity related to entrepreneurship? Sternberg defines creativity as "the ability to produce work that is both novel (i.e., original, unexpected) and appropriate (i.e., useful, adaptive concerning task constraints)" (Sternberg, 1988). According to Sternberg's definition, entrepreneurship is a form of creativity and can be labeled as business or entrepreneurial creativity because often new businesses are original and useful. Butcher (1968) argues that "creativity is perhaps best acquired by association with creativity." We assume that the presence and concentration of bohemians in an area creates an environment or a milieu that attracts other types of talented or high human capital individuals and promotes creativities of human capital, resulting in business creativity.

DATA AND METHODS

We examine the effect of creativity and diversity on entrepreneurship at regional level. We use two geographic units to test our hypothesis.

One of them is Metropolitan Statistical Areas (MSAs) and Primary Metropolitan Statistical Areas (PMSAs). These cover urban areas of the U.S. Our data include information on firm births and deaths for all 320 MSAs/PMSAs and show that 80 percent of all new firm births occurred within in MSAs/PMSAs. However, complete data for all variables is available only for 236 MSAs/PMSAs. In general, the dropped MSAs are smaller in population size than the ones included in the regression. However, when controlled for the size, the firm birth per 1million shows little difference between two groups.

The other is the Labor Market Areas (LMAs) which is defined by the U.S. Department of Agriculture in 1990 (Tolbert and Sizer, 1990) and have been used in Armington and Acs (2002). Since the 3,141 counties are aggregated into 394 LMAs based on the predominant commuting patterns, the use of LMA as an unit of observation has an advantages to include residential locations as well as employment locations of populations in the same area. Different from

MSAs/PMSAs, LMAs cover the entire U.S.

Firm Birth: Our data on firm formation comes from the Longitudinal Establishment and Enterprise Microdata (LEEM) (for detailed explanation of LEEM see Armington and Acs, 2001; Armington 1998). This file was constructed by the Bureau of the Census from its Statistics of U.S. Business (SUSB) files, which were developed from the microdata underlying the aggregate data in Census County Business Patterns. The basic unit of the LEEM data is a business establishment (location or plant). An establishment is a single physical location where business is conducted or where services or industrial operations are performed. The microdata describe each establishment for each year of its existence in terms of its employment, annual payroll, location (state, county, and metropolitan area), primary industry, and start year. Additional data for each establishment and year identify the firm (or enterprise) to which the establishment belongs, and the total employment of that firm.

A firm (or enterprise or company) is the largest aggregation (across all industries) of business legal entities under common ownership or control. Establishments are owned by legal entities, which are typically corporations, partnerships, or sole proprietorships. Most firms are composed of only a single legal entity that operates a single establishment—their establishment data and firm data are identical, and they are referred to as "single unit" establishments or firms. The single unit businesses are frequently owner-operated. Only 4 percent of firms have more than one establishment, and they and their establishments are both described as multi-location or multi-unit. The LEEM data cover all private sector businesses with employees, with the exception of those in agricultural production, railroads, and private households. For MSAs/PMSAs, this study, we use LEEM data for 1997-1998. 1994-1996 LEEM is used for LMAs analysis.

Creativity: We measure creativity by using the Bohemian Index—a measure of the proportion of "bohemians" and other artistically creative people in a region. It measures the openness of a region to creativity of the sort that is not directly associated with technological and business-related innovations. This index measures a region's artistic creativity and intellectual dynamism. Regions with higher scores on this measure are expected to be both more attractive to creative people and also to cultivate new ideas and accelerate their flow, which are crucial in forming a new firm. It is a location quotient measure and is based on occupational data from the 1990 Decennial Census 5 percent Public Use Microdata Sample (PUMS) and includes authors, designers, musicians, composers, actors, directors, painters, sculptors, craft-artists, artist

printmakers, photographers, dancers, artists, and performers. Florida (2002) showed that there is a significantly positive relationship between creativity index and concentrations of high-technology industry.

Diversity: We employ two measures of diversity. As discussed before, we assume that more diverse regions are expected to have advantage in attracting and retaining creative people with unorthodox ideas by lowering the entry-barrier and making diverse ideas available. We employ two measures of diversity. One is the Melting Pot Index. The Melting Pot Index is a measure of the percentage of population that is foreign-born and is based on data from the 1990 Decennial Census 5 percent PUMS. Previous studies support the inclusion of the Melting Pot Index since they have found a significant and positive effect of immigrants on new firm formation (Reynolds et al., 1995; Saxenian 1999; Kirchhoff et al. 2002). Since the immigrants usually lack skills, resources, and networks, they tend to be more self-employed than non-immigrants. In addition to that, they bring new ideas and cultures to enrich a region and create new business opportunities. The Melting Pot Index is a measure of the percentage of population that is foreign-born and is based on data from the 1990 Decennial Census 5 percent PUMS).

A second measure of diversity, the Diversity Index (or Gay Index), is used to capture the broader diversity of a region. The Diversity Index is a measure of the concentration of same-sex male unmarried partners, commonly understood to be gay male couples, in the population and is used to approximate the level of openness or tolerance to newcomers or "non-conformists" in a region. It is assumed that high concentrations of gay men in a region signal a broader openness towards those who are different, creating lower entry-barriers to human capital of various kinds and backgrounds. Based on the 1990 Census PUMS data, the Diveristy Index is constructed as a location quotient of the over- or under-representation of coupled gay men in a region relative to the population (See Black et al., 2000, Florida and Gates, 2001 for more on this measure).

Human Capital: Human capital is measured as the percentage of adults in the population with a bachelor's degree and above. As discussed before, the educational attainment has been positively associated with entrepreneurship in the literature. These data come from the 1990 Decennial Census 5 percent PUMS.

Other Variables: Income change is the absolute change between 1990 and 1996. We expect that higher income change will lead to more new firm formations by providing additional financial

resources necessary to start a firm. These data come from Bureau of Labor Economics. In order to control for the size and growth of each region, we include population and population growth. Population growth is the absolute change between 1990 and 1996. Since a bigger region tends to benefit more from knowledge-spillover effect which lead to more innovation and entrepreneurship, it is included in the equation. Also we include patent variable. The variable is defined as the number of patent issued per 100,000 people in 1995. Since technology plays an important role in recent venture firm boom, we expect that there will be positive relationship between patent and entrepreneurship.

Variables for LMAs: Establishment size is used to control for the entry barrier in a region. It is assumed that it will be harder to enter the market when the average firm size is bigger. Industry intensity is the total number of private sector establishments in the region, divided by the region's population, which can be interpreted as the industry intensity. Share of high school dropouts is defined as the percentage of adults without high school degrees and is a proxy for the proportion of poorly skilled labor force. Share of proprietors is defined as the number of service establishments in the region divided by the region's population in thousands and expected to capture the knowledge spillovers in the region (for detailed info on these measures, see Armington and Acs, 2002).

Some studies on organizational birth used Poisson regression or Negative Binomial regression to study new firm birth since dependent variables did not follow the normal distribution (Stuart and Sorenson, 2003). However, the firm birth rate which is used as a dependent variable in this study looks close to the normal distribution when it is controlled for the population size even though it is a slightly skewed. Therefore, we will use bivariate correlation analyses along with multivariate OLS regression models for the estimation in the study.

REGIONAL PATTERNS OF FIRM FORMATION

This section examines regional differences in rates of firm formation. Armington and Acs (2002) explained the characteristics of firm birth data at the LMAs level and the variables used in the study thoroughly. Therefore in this paper we will focus on the findings on MSAs/PMSAs. To control for differences in the size of regions, we define "firm birth rate" as firm births per 1 million people. Firm birth rates are calculated for all 320 MSAs/PMSAs using the LEEM between 1997 and 1998. Between 1997 and 1998, 580,803 new firms were created and 524,138

firms ceased to exist.

<Table 2> shows variations in new firm formation on a per capita basis at the state level. It ranges from 5,548 (Colorado) to 2,619 (West Virginia). The highest rates of firm formation are found in Colorado (5,548), Wyoming (5,349), Nevada (5,247), Montana (5138), and Idaho (4,769). California (3,729) ranks at 23rd and Texas at 21st respectively. <Table 3> shows variations at the regional level. Here, firm birth rates range from 6,910 (Naples, FL MSA) to 1,322 (Beaver County, PA PMSA). The top 10 regions are relatively small (under 500,000 population) with the exception of Las Vegas, West Palm Beach, and Fort Lauderdale.

<Table 4> shows summary statistics for regions by size. We assigned regions to three size-groups: large regions with populations above 500,000, medium-size regions with between 300,000 and 500,000 people and small regions with less than 300,000 people. <Table 4> suggests that larger regions benefit from their size. The average firm birth rate for large regions is 3,076 compared to 2,627 for the medium-size regions and 2,743 for small regions. These differences are statistically significant at 95 percent level. The average net firm birth rate for large regions is 304 compared to 207 for medium-size regions and 192 for small regions. These differences are statistically significant at the 0.10 level.

EXPLAINING REGIONAL DIFFERENCES IN FIRM FORMATION

We now turn to the results of bivariate and multivariate analysis of the factors associated with regional variations in new firm formation. The results of the correlation analysis for MSAs/PMSAs and LMAs are presented in <Table 5>.

The correlations for MSAs/PMSAs reported in <Table 5> indicate that entrepreneurship is most closely associated with the Creativity Index with a correlation coefficient of 0.515. New firm birth per 1 million is also strongly associated with human capital (0.476). It is moderately related to the Diversity Index (0.332) and the Melting Pot Index (0.169). Entrepreneurship is only moderately associated with patents (0.245) and the size of population (0.181). Firm formation is reasonably associated with income change as the literature suggests (0.270). Population growth is highly correlated to new firm birth (0.397). New firm birth in service industries shows similar patterns. However, new firm birth in manufacturing industries shows quite different pictures. Whereas the correlation with the Creativity Index is moderate (0.394), the correlations with the

Diversity Index and human capital are quite low (0.156 and 0.16 respectively). Also the correlation with the Melting Pot Index is quite weak (0.07). Relatively big size and resource-demanding nature of manufacturing industries may contribute to the difference of manufacturing industries from others.

Entrepreneurship in LMAs shows somewhat different pictures from MSAs/PMSAs.. Entrepreneurship is strongly related to population growth (0.541) and industry intensity (0.531). Establishment size is negatively related to entrepreneurship (-0.417). Share of college graduate is weakly related with the coefficient of 0.292. Creativity Index is moderately related (0.03) and Melting Pot Index is weakly correlated (0.186).

The regression results reported in <Table 6> are consistent with the analysis result based on the correlation among variables. In order to make the comparison easier, <Table 6> also reports the Beta Coefficients of variables. We ran three OLS regressions for MSAs/PMSAs by using three dependent variables; all industries, service industries, and manufacturing industries. The first column shows the results for all industries and; the second column summarizes the results for service industries (Standard Industrial Classifications Code 70-89); and the last column reports the results for manufacturing industries (Standard Industrial Classification Code 20-39). All industries model explains about 47 percent of the variation in the dependant variable, while the regressions for the service industries and manufacturing industries explain about 56 percent and 29 percent of the variation respectively.

The regression results confirm the main hypothesis. Entrepreneurship is strongly associated with creativity across all three models. The beta coefficient for the creativity index is the second largest and is positive and significant at 1 percent significance level across all three models. The Beta coefficient of creativity index for all industries model suggests that one standard deviation increase in Creativity Index predicts 0.262 standard deviation increase in new firm formation per 1 million people. It supports the proposition that that there is a close and positive relationship between the entrepreneurship and the creativity in a region. The results on diversity measures are mixed. Entrepreneurship is positively and significantly associated with the Melting Pot index (the share of the foreign-born). The results are significant in all industries and service industries models, but insignificant in the manufacturing industries model. As explained before, it seems that the foreign-born's lack of required skills, networks, and resources hamper them from starting firms in manufacturing industries. Also it seems that the kind of diversity immigrants represents

does not benefit the manufacturing industry by large. As expected, the Diversity Index (or Gay Index), which is another measure of diversity, carries positive signs but statistically significant only in the service industry in all three models, which may be influenced by its high correlation to Human Capital variable (0.692). When the models are estimated without Human Capital variable, the coefficient of the Diversity Index becomes bigger and more statistically significant in all industries and service industries. It suggests that the kind of diversity captured by the Diversity Index is quite closely related to skilled workforce and have positive impact on the entrepreneurship in service industries.

New firm formation is also closely associated with both income growth rate and human capital as the literature suggest. Income growth is positive and significant in all industries and service industries. Curiously the coefficient for human capital in manufacturing industries is negative and significant but that in service industries is positive and significant. However, considering that manufacturing industries hire massive, less educated workforce and we define human capital as the percentage of people who have B.A. and above degree, negative sign becomes less puzzling. In the service industry model, human capital has a positive and significant coefficient. For service industries, we may expect the sign to be negative because it requires little expertise and thus hires a lot of less educated people. However, considering that the definition we used for service industries (SIC 70-89) also include industries which require highly skilled labors such as business service, legal service, educational service, and heath service, the positive and significant estimate becomes reasonable.

It turns out that the size of a region is negatively related to entrepreneurship. The coefficients for population are negative and statistically significant in all three models. However, population growth is positive and significant, which implies that the population growth, not the size, has a positive relationship with entrepreneurship. Based on the beta coefficients, population growth is the most influential variable. The coefficient for income change is significant and positive in all three models. It means that a region's entrepreneurial capacity can benefit from additional financial resource by increased income.

Regression results at LMAs are reported in <Table 7>. We added creativity index and melting pot index to the variables Armington and Acs (2002) used in their earlier study. The regression at LMAs shows that establishment size, industry intensity, and population growth are strongly related to firm birth. Unemployment rate and income growth have positive and significant effect

on entrepreneurship. As expected, Creativity index is positive and quite significant, which is consistent with the earlier findings at MSAs/PMSAs level. However, Melting Pot Index is negative and statistically significant in <Model 3>. The inconsistency may be caused from the fact that LMA includes rural areas as well as urban areas, which is not the case with MSAs/PMSAs.

In the model, both the "share of high school dropout" and the "share of college graduates" are positive and quite significant across three models and the effect of "share of college graduates" is bigger than that of "share of high school dropout." For human capital, Armington and Acs(2002) found that the ratio of high school drop-outs have significant and positive relationship with entrepreneurship in service industries, especially in service firms which are founded and managed by a small number of better educated people. The role of less skilled workers in entrepreneurship is worthy of further investigation.

DISCUSSION

This paper has analyzed the effect of regional characteristics such as creativity and diversity on new firm formation. We used a new measure of firm formation based on the LEEM data for 1994-1996 at LMAs and 1997-1998 at MSAs and also introduced some novel measures of creativity (the Bohemian Index) and diversity (the Melting Pot and Gay Indices). Our findings confirm the central hypothesis, though with some caveats. Overall, new firm formation is associated with creativity. It is associated with one dimension of diversity, foreign-born residents, but not with other types of diversity associated with the Diversity Index (or Gay Index). Entrepreneurship is also associated with human capital and income change as the literature suggest. These findings suggest that the regions that are open and creative and attract human capital enjoy more dynamic entrepreneurship.

Our findings seem to suggest that both scholars and policy-makers should pay more attention to the social context or habitat in which entrepreneurship takes place. It is important to note that our research is just a start. We encourage more research which focuses on the social context of entrepreneurship and firm formation and the way the factors such as diversity and creativity affect this.

<**Table 1**> **Summary Statistics**

MSAs/PMSAs

Variable	Obs	Mean	Std. Dev.	Min	Max
Firm Birth (All Industries)	320	1815.01	3109.84	126.00	27063.00
Firm Birth (Manufacturing Industries)	320	68.38	144.94	1.00	1694.00
Firm Birth (Service Industries)	320	692.20	1224.94	39.00	9997.00
Firm Birth per 1m (All Industries)	236	2519.33	667.04	1159.17	5049.13
Firm Birth per 1m (Service Industries)	236	918.42	294.46	422.76	2398.34
Firm Birth per 1m (Manufacturing Industries)	236	91.21	40.77	14.01	271.58
Creativity Index	237	0.92	0.37	0.32	2.90
Diversity Index	236	0.80	1.06	0.00	12.23
Melting Pot Index	252	0.07	0.07	0.00	0.54
Human Capital	236	0.21	0.06	0.09	0.42
Population	320	603772	1005119	56735	8863052
Income Growth Rate	236	1653.22	985.90	-1561.03	4465.92
Patents per 100k	237	201.59	195.00	6.29	1542.04
Population Growth Rate	236	0.07	0.06	-0.05	0.38

LMAs

Variable	Obs	Mean	Std. Dev.	Min	Max
Firm Birth per 1k (95-96)	394	3.741	0.938	2.061	10.177
Establishment size (94)	394	15.097	2.881	8.266	21.237
Industry intensity (94)	394	0.022	0.004	0.011	0.045
Income Growth	394	1.104	0.033	1.016	1.220
Population Growth	394	1.011	0.010	0.980	1.062
Share of proprietors	394	0.206	0.058	0.099	0.448
Unemployment (Ave. 93~94)	394	0.066	0.025	0.020	0.287
Share of high school dropout	394	0.279	0.080	0.117	0.541
Share of college graduate	394	0.159	0.050	0.069	0.320
Creativity Index	394	0.689	0.284	0.097	1.973
Melting Pot Index	394	0.398	0.538	0.023	4.168

<Table 2> Entrepreneurship by State (per 1 million persons)

	State	Birth	State	Death	State	Net
1	COLORADO	5548	WYOMING	4597	NEVADA	1455
2	WYOMING	5349	COLORADO	4503	COLORADO	1045
3	NEVADA	5247	MONTANA	4495	DELAWARE	854
4	MONTANA	5158	DISTRICT OF COL	4319	UTAH	846
5	IDAHO	4769	FLORIDA	4318	WYOMING	752
6	UTAH	4690	VERMONT	4317	MONTANA	664
7	ALASKA	4648	ALASKA	4148	IDAHO	645
8	DELAWARE	4647	IDAHO	4123	GEORGIA	622
9	FLORIDA	4573	OREGON	4053	WASHINGTON	574
10	DISTRICT OF COL	4435	WASHINGTON	3849	MAINE	574
11	WASHINGTON	4423	UTAH	3843	MINNESOTA	572
12	OREGON	4409	SOUTH DAKOTA	3826	S. CAROLINA	503
13	VERMONT	4288	DELAWARE	3793	ALASKA	501
14	GEORGIA	4260	NEVADA	3791	VIRGINIA	486
15	SOUTH DAKOTA	4093	GEORGIA	3638	N. HAMPSHIRE	458
16	N. HAMPSHIRE	4035	ARIZONA	3590	N. CAROLINA	411
17	MAINE	4016	N. HAMPSHIRE	3577	NEW JERSEY	409
18	ARIZONA	3988	NEW MEXICO	3576	TEXAS	399
19	NEW JERSEY	3948	NEW JERSEY	3538	ARIZONA	398
20	N. CAROLINA	3837	ARKANSAS	3462	NEW YORK	390
21	TEXAS	3831	KANSAS	3458	CALIFORNIA	382
22	NEW MEXICO	3821	MAINE	3442	OREGON	356
23	CALIFORNIA	3729	NORTH DAKOTA	3437	MASSACHUSETTS	335
24	KANSAS	3724	TEXAS	3432	ILLINOIS	305
25	S. CAROLINA	3671	N. CAROLINA	3427	KENTUCKY	287
26	MINNESOTA	3614	OKLAHOMA	3401	SOUTH DAKOTA	267
27	OKLAHOMA	3607	CALIFORNIA	3347	KANSAS	266
28	VIRGINIA	3586	NEBRASKA	3324	FLORIDA	255
29	NEW YORK	3584	HAWAII	3323	NEW MEXICO	245
30	MISSOURI	3531	MISSOURI	3316	RHODE ISLAND	232
31	ARKANSAS	3503	CONNECTICUT	3312	WISCONSIN	223
32	NORTH DAKOTA	3498	MARYLAND	3212	LOUISIANA	216
33	NEBRASKA	3466	NEW YORK	3194	MISSISSIPPI	216
34	MARYLAND	3367	TENNESSEE	3174	MISSOURI	215
35	TENNESSEE	3366	S. CAROLINA	3167	OKLAHOMA	205
36	RHODE ISLAND	3344	RHODE ISLAND	3112	IOWA	205
37	CONNECTICUT	3322	VIRGINIA	3100	TENNESSEE	192
38	MASSACHUSETTS	3298	ALABAMA	3055	INDIANA	184
39	LOUISIANA	3232	MINNESOTA	3041	PENNSYLVANIA	165
40	ILLINOIS	3218	LOUISIANA	3016	MARYLAND	155
41	ALABAMA	3188	MASSACHUSETTS	2963	MICHIGAN	155
42	IOWA	3151	IOWA	2945	NEBRASKA	142
43	MISSISSIPPI	3100	ILLINOIS	2914	ALABAMA	133
44	HAWAII	3081	MISSISSIPPI	2884	DISTRICT OF COL	116
45	INDIANA	3068	INDIANA	2884	OHIO	110
46	WISCONSIN	3046	MICHIGAN	2840	NORTH DAKOTA	61
47	KENTUCKY	3026	WISCONSIN	2823	WEST VIRGINIA	61
48	MICHIGAN	2995	KENTUCKY	2739	ARKANSAS	41
49	OHIO	2782	OHIO	2672	CONNECTICUT	10
50	PENNSYLVANIA	2747	PENNSYLVANIA	2582	VERMONT	-29
51	WEST VIRGINIA	2619	WEST VIRGINIA	2558	HAWAII	-242

<Table 3> Entrepreneurship by MSAs/PMSAs (per 1 million persons): Top 50

Name	Birth
Naples, FL MSA	6910.0
Wilmington, NC MSA	5936.0
Boulder-Longmont, CO PMSA	5857.8
Las Vegas, NV MSA	5582.9
Boise City, ID MSA	5496.3
Reno, NV MSA	5301.0
West Palm Beach-Boca Raton-Delray Beach, FL MSA	5096.7
Fort Lauderdale-Hollywood-Pompano Beach, FL PMSA	5041.7
Santa Fe, NM MSA	4972.5
Bellingham, WA MSA	4961.7
Atlanta, GA MSA	4846.0
Denver, CO PMSA	4835.5
Fort Collins-Loveland, CO MSA	4749.2
Raleigh-Durham, NC MSA	4711.3
Austin, TX MSA	4662.4
Orlando, FL MSA	4542.6
Sarasota, FL MSA	4482.0
Billings, MT MSA	4479.0
Fort Myers-Cape Coral, FL MSA	4446.3
Portland, ME NECMA	4421.4
Miami-Hialeah, FL PMSA	4358.4
Seattle, WA PMSA	4351.4
San Francisco, CA PMSA	4279.5
Portland, OR PMSA	4215.9
Midland, TX MSA	4183.4
Fayetteville-Springdale, AR MSA	4126.7
Vancouver, WA PMSA	4125.1
Charlotte-Gastonia-Rock Hill, NC-SC MSA	4116.1
Dallas, TX PMSA	4091.5
Phoenix, AZ MSA	4053.5
Sioux Falls, SD MSA	4030.4
Springfield, MO MSA	3940.3
Fort Pierce, FL MSA	3907.3
Lafayette, LA MSA	3892.6
Fort Walton Beach, FL MSA	3881.0
Colorado Springs, CO MSA	3879.0
Nashville, TN MSA	3864.9
Asheville, NC MSA	3837.0
Middlesex-Somerset-Hunterdon, NJ PMSA	3830.2
Jacksonville, FL MSA	3820.3
Medford, OR MSA	3784.5
Anchorage, AK MSA	3782.0
Casper, WY MSA	3740.2
Anaheim-Santa Ana, CA PMSA	3734.6
Wilmington, DE-NJ-MD PMSA	3731.5
Salt Lake City-Ogden, UT MSA	3683.0
Jackson, TN MSA	3641.9
Santa Rosa-Petaluma, CA PMSA	3634.5
Columbia, MO MSA	3612.8
Charlottesville, VA MSA	3585.2

<Table 4> Summary Statistics by the Size of Regions

Regions over 500,000

Variable	Obs	Mean	Std. Err.	[95% Conf. Interval]	
Firm Birth per 1m	94	3076.9	87.7	2902.7	3251.1
Firm Death per 1m	94	2772.7	68.3	2637.1	2908.3
Net Firm Birth per 1m	94	304.3	30.1	244.5	364.0

Regions over 300,000 and less than 500,000

Variable	Obs	Mean	Std. Err.	[95% Conf. Interval]	
Firm Birth per 1m	50	2627.4	88.2	2450.1	2804.7
Firm Death per 1m	50	2420.3	70.8	2277.9	2562.6
Net Firm Birth per 1m	50	207.1	28.3	150.3	264.0

Regions less than 300,000

Variable	Obs	Mean	Std. Err.	[95% Conf. Interval]	
Firm Birth per 1m	176	2743.0	69.6	2605.6	2880.4
Firm Death per 1m	176	2550.3	54.4	2443.0	2657.7
Net Firm Birth per 1m	176	192.7	26.3	140.7	244.6

<Table 5> Correlation Analysis

MSAs/PMSAs

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Firm Birth (All Industries)	1.000													
2 Firm Birth (Manufacturing Industries)	0.938	1.000												
3 Firm Birth (Service Industries)	0.996	0.927	1.000											
4 Firm Birth per 1m (All Industries)	0.317	0.225	0.323	1.000										
5 Firm Birth per 1m (Service Industries)	0.384	0.272	0.405	0.938	1.000									
6 Firm Birth per 1m (Manufacturing Industries)	0.212	0.294	0.206	0.496	0.403	1.000								
7 Creativity Index	0.480	0.452	0.488	0.515	0.582	0.394	1.000							
8 Diversity Index	0.380	0.317	0.401	0.332	0.414	0.156	0.524	1.000						
9 Melting Pot Index	0.444	0.443	0.441	0.169	0.220	0.071	0.222	0.325	1.000					
10 Human Capital	0.340	0.248	0.363	0.476	0.588	0.160	0.692	0.495	0.168	1.000				
11 Population	0.972	0.940	0.965	0.181	0.251	0.158	0.415	0.318	0.417	0.282	1.000			
12 Income Growth Rate	0.072	0.007	0.080	0.270	0.294	0.175	0.273	0.116	-0.282	0.348	0.010	1.000		
13 Patents per 100k	0.147	0.140	0.163	0.245	0.340	0.307	0.435	0.209	0.085	0.534	0.126	0.276	1.000	
14 Population Growth Rate	0.038	-0.004	0.045	0.397	0.374	0.177	0.181	0.008	0.151	0.145	-0.063	0.014	0.026	1

LMAs

	1	2	3	4	5	6	7	8	9	10	11
1 Firm Birth per 1k (95-96)	1.000										
2 Establishment size (94)	-0.417	1.000									
3 Industry intensity (94)	0.531	-0.317	1.000								
4 Income Growth	0.366	0.195	0.002	1.000							
5 Population Growth	0.541	-0.017	0.044	0.699	1.000						
6 Share of proprietors	0.305	-0.635	0.460	-0.190	0.005	1.000					
7 Unemployment (Ave. 93~94)	-0.019	-0.270	-0.370	-0.172	0.004	-0.205	1.000				
8 Share of high school dropout	-0.194	-0.050	-0.523	0.038	-0.117	-0.193	0.400	1.000			
9 Share of college graduate	0.292	0.221	0.374	0.065	0.229	-0.054	-0.332	-0.701	1.000		
10 Creativity Index	0.300	0.276	0.350	0.113	0.238	-0.111	-0.237	-0.590	0.799	1.000	
11 Melting Pot Index	0.186	0.000	0.024	-0.059	0.234	-0.116	0.351	-0.132	0.398	0.481	1.000

<Table 6> Regression Results at MSAs/PMSAs

	Firm Birth per 1 million (97-98)		
	All Industries	**Manufacturing Industries**	**Service Industries**
Creativity Index	**476.595**	**50.421**	**166.095**
	(3.30)***	(5.09)***	(2.85)***
Diversity Index	**52.158**	**0.940**	**32.763**
	(1.28)	(0.34)	(1.99)**
Melting Pot Index	**503.671**	**-5.545**	**287.801**
	(0.85)	(0.14)	(1.20)
Human Capital	**1,651.893**	**-236.561**	**1,161.862**
	(2.01)**	(4.20)***	(3.51)***
Population (90)	**-0.000**	**0.000**	**0.000**
	(0.01)	(0.67)	(0.69)
Income growth rate(90-96)	**0.102**	**0.004**	**0.042**
	(2.54)**	(1.51)	(2.59)**
Patents per 100k(95)	**-0.091**	**0.056**	**0.048**
	(0.43)	(3.86)***	(0.56)
Population growth rate (90-96)	**3,374.308**	**94.757**	**1,354.182**
	(5.81)***	(2.38)**	(5.77)***
Constant	**1,264.370**	**67.006**	**293.348**
	(9.53)***	(7.36)***	(5.47)***
Observations	**236**	**236**	**236**
R-squared	**0.41**	**0.25**	**0.50**

Note: Absolute value of t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Beta Coefficients	**All Industries**	**Manufacturing Industries**	**Service Industries**
Creativity Index	0.262***	0.454***	0.207***
Diversity Index	0.083	0.024	0.118**
Melting Pot Index	0.054	-0.010	0.070
Human Capital	0.161**	-0.377***	0.256***
Population (90)	-0.001	0.046	0.039
Income growth rate(90-96)	0.151**	0.100	0.141**
Patents per 100k(95)	-0.027	0.269***	0.032
Population growth rate (90-96)	0.316***	0.145**	0.287***
Constant	1.895***	1.643***	0.996***

Note: * significant at 10%; ** significant at 5%; *** significant at 1%

<Table 7> Regression Results at LMAs

	Firm Birth per 1k (95-96)		
	Model 1	**Model 2**	**Model 3**
Establishment size (94)	**-0.118**	**-0.106**	**-0.118**
	(7.61)***	(6.87)***	(7.57)***
Industry intensity (94)	**112.878**	**121.447**	**113.163**
	(10.25)***	(11.16)***	(10.32)***
Income Growth	**4.671**	**4.463**	**4.152**
	(3.49)***	(3.24)***	(3.05)***
Population Growth	**31.548**	**33.405**	**33.356**
	(7.46)***	(7.64)***	(7.74)***
Share of proprietors	**-0.097**	**-0.080**	**-0.025**
	(0.13)	(0.11)	(0.03)
Unemployment Rate (Ave. 93~94)	**2.691**	**4.168**	**4.135**
	(1.75)*	(2.43)**	(2.44)**
Share of high school dropout	**2.824**	**2.785**	**3.022**
	(5.30)***	(5.12)***	(5.60)***
Share of college graduates	**3.508**	**5.815**	**3.969**
	(3.35)***	(6.13)***	(3.72)***
Creativity Index	**0.515**		**0.635**
	(3.06)***		(3.57)***
Melting Pot Index		**-0.060**	**-0.146**
		(0.87)	(2.02)**
Constant	**-35.838**	**-37.942**	**-37.375**
	(10.80)***	(11.03)***	(11.02)***
Observations	394	394	394
R-squared	0.68	0.67	0.68

Note: Absolute value of t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

	Model 1	**Model 2**	**Model 3**
Establishment size (94)	-0.364***	-0.325***	-0.361***
Industry intensity (94)	0.431***	0.464***	0.432***
Income Growth	0.165***	0.158***	0.147***
Population Growth	0.348***	0.369***	0.368***
Share of proprietors	-0.006	-0.005	-0.002
Unemployment Rate (Ave. 93~94)	0.071*	0.111**	0.110**
Share of high school dropout	0.242***	0.238***	0.259***
Share of college graduates	0.189***	0.313***	0.213***
Creativity Index	0.156***		0.192***
Melting Pot Index		-0.035	-0.084**

Note: * significant at 10%; ** significant at 5%; *** significant at 1%

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