

Skills, Capital and Connections, Too: A Regional Social Environment Perspective of Women Entrepreneurs*

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Creative Class and Gender

The question of why businesses locate in certain places more than in others has always been at the centre of regional science. Traditional explanations focused on costs of doing business (such as location and transportation), resource endowments, availability of infrastructure, and proximity to customers or suppliers. Until recently, almost no attention was paid to cultural or social aspects of the environment that may help or hinder business activity. That is, how the intangible characteristics of cities and regions may explain variation in economic performance. Prominent among these studies is Richard Florida's theory of the creative class,

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in which he asserts that the work force in the U.S. has shifted from manufacturing to creative and knowledge-based occupations (Florida 2002). This dominant work force – the creative class – has different values, norms, and attitudes and desires open, diverse, and tolerant regional environments. As a result, Florida suggests that future urban and regional economic growth and development depend on the location choice of the creative class and places that are appealing to this group will flourish more than others. Traditional location factors such as costs, resources, or infrastructure take a back seat to the intangible characteristics of place. Lifestyle, diversity, quality of life, authenticity, and tolerance may play a more central role in determining the economic fate of places as diverse as Pittsburgh, Portland, and Washington D.C.

The idea that a region's social environment is important to attract a talented work force was extended into the realm of entrepreneurship. Lee et al (2004) showed how creative and diverse regions support new firm formation, which is important given the recent emergence of an entrepreneurial economy (Audretsch and Thurik 2001; Von Bargen et al 2003). The U.S. has seen a large increase in new firm formation by diverse social and ethnic groups. The number of businesses owned by Hispanics, for example, grew by 31 % between 1997 and 2002, three times the national average of all businesses in the U.S. (Williams and Kang 2006). Another fast growing group of business owners are women. Women-owned businesses grew at almost twice the national average between 1997 and 2002 (19.8% versus 10.3%) and constitute a significant economic force in cities and regions (Lowrey 2006). Metropolitan areas, however, differ in regard to the growth of new companies and thus would be expected to also differ with respect to the growth of women- and minority-owned firms. This may be a result of a region's cultural and social environment that may support or hinder these entrepreneurs.

On the surface, Florida's ideas on the importance of diversity for regional economic competitiveness are promising especially regarding notions of gender equality and entrepreneurship. The premise of Florida's theories is that if a region's cultural milieu is open to the advancement of those who are different, then the region will experience economic growth because it is attractive to the creative class whose members "defy classification based on race, ethnicity, gender, sexual preference or appearance" (Florida 2002: 79). If diversity is indeed an indicator of economic success, then creative cities may be places where women can break the so-called glass ceiling in corporate management, can enter non-traditional occupations in areas such as engineering, sciences, or computer programming, and find support networks to assist with such moves.

Unfortunately the reality of women's advancement in their professional careers and as entrepreneurs looks quite different. Although female entrepreneurs do not differ much from their male counterparts concerning basic personal characteristics, they still face many challenges including structural barriers such as access to finances, issues related to career advancement and the glass ceiling, and stereotypes that might prevent them from achieving economic success. How a region supports the advancement of women may play an important role in the level and intensity of women's business ownership.

In this article, we examine the question of how the underlying social environment of a region influences women's business ownership. We hypothesize that women's business ownership is positively associated with a regional environment that promotes women's financial and career advancements but also allows women to enter non-traditional occupations and to gain critical entrepreneurial skills. To test this hypothesis, we use measures of openness, tolerance, and entrepreneurial capacity specifically related to female entrepreneurship, and examine the effects of these factors on women's business ownership in the 50 largest metropolitan areas in the U.S. In doing so, we follow emerging research explaining the link between a region's social environment and the attraction and retention of human capital in the form of well-educated individuals and entrepreneurs posited to be essential to the futures of regional economies (Florida 2002; Lee et al 2004).

Women's Business Ownership and Understanding the Regional Environment

In 2002, about 28.2 % or 6.5 million of all non-farm U.S. firms were women-owned (Lowrey 2006). Women-owned firms are among the fastest growing types of businesses. Although rapidly growing, the majority of women-owned firms do not have employees (only about 14 % are employer firms). However, they have made substantial contributions to their regional economies. Women-owned employer firms have added about 70,000 employees between 1997 and 2002, while firms owned by men and those jointly owned by men and women lost employees during the same time period (Lowrey 2006). Given the fact that the number of women-owned firms has grown and that those firms that have employees have contributed to their local economies by increasing employment, it is important to examine the influence of the regional environment on these trends.

Studies of women's business ownership can be categorized into four areas: individual and personal characteristics of women business owners, the characteristics of the businesses, the process of founding firms, and the environment in which women business owners operate (Brush 1992). Most research has focused on the individual characteristics of women as entrepreneurs and business owners. The majority of this work compares female entrepreneurs to their male counterparts and found that the genders do not differ much regarding their personal entrepreneurial characteristics (Brush 1992). However, the dynamics and characteristics of women-owned businesses are different. Female entrepreneurs encounter greater obstacles in obtaining financial support for their ventures. Consequently, women's businesses are more likely to be smaller and less lucrative (Brush 1997; Carter and Rosa 1998). In addition, women-owned businesses tend to be concentrated in the service sector (Loscocco and Robinson 1991). In contrast to the aforementioned areas, less attention has been paid to the environment in which women business owners operate. According to Brush "the impacts of political, cultural, technological, and social factors do remain to be studied" (Brush 1992: 16).

Focusing on the environment highlights that entrepreneurs and business owners do not exist in a vacuum (Scott 2006) and that the regional environment

– or milieu – can support or hinder their endeavors. Malecki (1997: 164) notes that “the ‘environment for entrepreneurship’ in a region or locale is a critical part of the entrepreneurial process itself, as well as of the chances for local economic development.” Even though a gap exists in the women’s business ownership literature, research that focuses on the local context of entrepreneurship in general provides some guidance. Studies have traditionally examined the influence of factors such as local market contacts, incubator industries, human capital, labor pool availability, universities, research laboratories, sources of financing, and government policies on a region’s entrepreneurial dynamics (Bruno and Tyebjee 1982; Malecki 1997). Most of these factors account for the presence of tangible resources that entrepreneurs can benefit from.

Other studies, however, have pointed to the more intangible factors such as the societal attitudes towards entrepreneurship (Cooper 1973) or the culture of incubator organizations (Feldman and Desrochers 2004). Cooper and Folta (2000) emphasize the importance of role models, advisors, and perceptions of friends and family members in the psychological support for entrepreneurs. They note that “an entrepreneurial environment may develop so that potential founders are buoyed and encouraged by the success of others and by the willingness of investors and other suppliers of resources to be supportive” (359). For women entrepreneurs, however, the environment might look very different and less supportive as gender stereotypes may influence regional attitudes and the provision of services. Hanson and Blake (2004), for example, illustrate how the geographic context of entrepreneurship is gendered. In particular, they find that the local resource system (i.e. business development counselors, bankers, lawyers, as well as others), social structures and gender cultures shape the success and orientation of women’s businesses. In her study of women’s ability to obtain bank loans, Blake (2006) finds that women’s access to financial resources varies depending on the local gender context. Summarizing these studies, we can argue that the entrepreneurial environment and in particular the local context and place characteristics (Blake and Hanson 2005) are important determinants of women’s entrepreneurial success.

Brush (1992) suggests taking a so-called “integrated perspective” of women’s business ownership into account when studying environmental aspects of entrepreneurship. In particular, questions about the influence of location and the regional social environment in which women business owners are embedded become important in the study of entrepreneurship and economic development. Following this suggestion, we examine the intensity of women’s business ownership in regions as it relates to the region’s openness, tolerance, and entrepreneurial capacity. That is, does the regional environment enhance a woman’s ability to achieve parity with men regarding her earnings (openness) and advance in non-traditional careers (tolerance), while providing the possibility to gain critical entrepreneurial skills (entrepreneurial capacity)?

Critical Environmental Factors

Openness

Entrepreneurship is a risk-taking endeavor and business owners need to be equipped with the necessary management skills and knowledge about the sector in order to be successful. The entrepreneur also needs to have access to financial capital to fund the venture (Bates 1993, 2006). Regions may differ in their openness to women's career advancement and their potential for women to earn high wages, both of which are important prerequisites for self-employment.

Financial assets are crucial to firm formation, and women typically have fewer assets than men when they enter self-employment (Bertrand and Hallock 2001; Catalyst 2006). As a result, their businesses remain smaller than those of men (Brush 1997; Carter and Rosa 1998). In addition, women continue to lag behind men in obtaining venture capital or participating in angel investments, which is crucial to starting and running capital-intensive firms (Brush et al 2004; Kauffman Foundation 2006). Given the fact that access to financial resources is an important determinant of self-employment, we examine the influence of a region's status on female earning power on the level of women's business ownership and hypothesize that: *Regions with higher female earnings relative to men foster financially successful women in general and are expected to have greater intensities of women's business ownership.*

Tolerance

Florida's creative class theory highlights the role of diversity and tolerance and finds a connection "between a metropolitan area's level of tolerance for a range of people, its ethnic and social diversity, and its success in attracting talented people, including high-technology workers" (Florida 2004: 130). Tolerant places are said to have low entry barriers for all kinds of human capital. However, just the presence of a diverse range of people does not suggest how tolerant a city or a region is regarding different entrepreneurial motivations or career choices, particularly the ability of women to enter careers in non-traditional sectors such as high-technology.

High-technology industries are commonly known for their entrepreneurial dynamics and high levels of startup activity (Bresnahan and Gambardella 2004; Saxenian 1994). They are also known, however, for their under-representation of women. The high-tech sector, which is characterized by a high percentage of scientists and engineers (Chapple et al 2004) is perceived as having a masculine, individualistic, and competitive work environment (Massey 1995; Newton 2001). Moreover, the long work hours and the need for a high degree of temporal flexibility often run counter to women's needs to combine work and family responsibilities (Gray and James 2007; Massey 1995). Thus, we utilize women's participation in non-traditional occupations to indicate how tolerant a region is to women's advancements. We hypothesize that: *Regions with higher ratios of women to men*

in high-tech occupations are expected to have greater intensities of women's business ownership because they are more supportive of women's advancement in industry sectors that are both highly entrepreneurial and where women have traditionally not been well represented.

Entrepreneurial capacity

Bates highlights the importance of entrepreneurial skills and capabilities to business ownership (Bates 2006). For women business owners it is important to have the necessary managerial expertise to lead their ventures. Hughes' (2005) study of Canadian women entrepreneurs finds that most women entrepreneurs had previous work experience prior to starting a business, and Scott (1986) shows that 63 % of the surveyed 154 women business owners in the U.S. state of Georgia had been employed as managers before going into business themselves. How supportive a region is regarding women's advancement in managerial positions may influence the level and intensity of female entrepreneurship. Thus, we hypothesize the following: *Regions that have a large percentage of women in management position are expected to also have greater intensities of women's business ownership.*

Networking and social capital are also important components of entrepreneurial success (Thornton and Flynn 2003). Entrepreneurs and business owners benefit from participation in social networks because they can access important information, advice, resources and social support (Aldrich et al 1989). The link between the presence of networks and social capital as support institutions and regional economic success has been well established in the entrepreneurship literature (Saxenian 1994). Research on female business owners shows that women are embedded in different personal and social networks than men. Aldrich et al (1989) show that for women networks tend to facilitate social support; however, social capital and networks also play an important role in obtaining financial capital to support business start-up costs (Carter et al 2003). Therefore, we hypothesize that: *Regions that support the creation of networks and social capital for women entrepreneurs are expected to have greater intensities of women's business ownership.*

Data and Methods

We examine the effects of regional openness, tolerance, and entrepreneurial capacity on the intensities of all women-owned firms and women-owned firms that have employees in the 50 most populous metropolitan areas (MSAs), according to the 2000 Census.¹ We utilize both bivariate and multivariate methods to analyze

1. Census 2000 PHC-T-29. Ranking Tables for Population of Metropolitan Statistical Areas, Micropolitan Statistical Areas, Combined Statistical Areas, New England City and Town Areas, and Combined New England City and Town Areas: 1990 and 2000.

TABLE 1 Summary Statistics

Variable	Observed	Mean	Std.		
			Deviation	Minimum	Maximum
Industry intensity of women-owned employer firms	50	0.0034	0.0006	0.0021	0.0049
Industry intensity of women-owned firms, employer and non-employer	50	0.0236	0.0038	0.0169	0.0361
Women's earnings as a % of men's	50	53.97	3.25	46.61	61.29
Women per man in high tech occupations	50	0.3158	0.0396	0.2339	0.4180
% of women in professional or management positions	50	21.73	6.64	7.12	58.33
Presence of entrepreneurial networking or social capital building opportunities	50	0*	--	--	--
<u>Average size of establishment in metro</u>	<u>50</u>	<u>13.81</u>	<u>1.86</u>	<u>9.80</u>	<u>17.72</u>

Note: * denotes mode.

the effects of the regional environment on women-owned businesses. The data for women-owned businesses are derived from the 2002 Economic Census Survey of Business Owners (SBO),² as reported in January 2006.³ Demographic data were obtained from the 2000 Census Summary File 4. Because the 2000 MSA definitions (and their corresponding counties) in most cases did not match the county by MSA listing in the 2002 SBO, we collected individual county data from the Census and aggregated these to obtain MSA level demographic data that corresponds with the 2002 SBO MSA definition. Summary statistics are presented in Table 1.

Industry Intensity of Women-owned Firms and Women-owned Employer Firms

The two dependent variables in this analysis are industry intensity of women-owned firms and number of women-owned employer firms in 2002. The Survey of Businesses defines a woman-owned firm as a business of which a woman owns

2. The 2002 Survey of Business Owners (SBO) was conducted by mail. One of two census forms was mailed to a random sample of businesses selected from a list of all firms operating during 2002 with receipts of \$1,000 or more, except those classified in the following NAICS industries: crop and animal production (NAICS 111, 112); scheduled air transportation (NAICS 4811, part); rail transportation (NAICS 482); postal service (NAICS 491); funds, trusts, and other financial vehicles (NAICS 525), except real estate investment trusts (NAICS 525930); religious, grantmaking, civic, professional, and similar organizations (NAICS 813); private households (NAICS 814); and public administration (NAICS 92).
3. A final, updated version of the 2002 Guide to the Economic Census, Women-owned Businesses was released in August 2006 after our analysis had already been conducted. <http://www.census.gov/prod/ec02/sb0200cswmn.pdf>.

51 % or more of its stock or equity. The distinction between the two dependent variables is important to this analysis. The first definition includes all firms that are women-owned whether they have employees or not, while the second represents only the number of women-owned firms with paid employees. These figures are then divided by metropolitan area population to derive a measure of intensity for the two types of firms. Paid employees are full and part-time employees, including salaried officers and executives of corporations but do not include proprietors or partners of unincorporated businesses. The latter definition allows for examination of the employment or economic development effect that women-owned businesses have in a region. In the U.S. approximately 14.1 % of all women-owned businesses have employees (more than 7.1 million people) (Lowrey 2006); this percentage is similar in our sample of the fifty largest metropolitan areas at 14.02 %, accounting for more than 4.1 million employees.

To allow for metropolitan comparisons of intensity of each type of firm, the two measures of women-owned firms are relative to metropolitan population in 2000, resulting in the two dependent variables of *women-owned firms industry intensity* and *women-owned employer firms industry intensity*. In our sample of the 50 largest MSAs, the mean industry intensity of women-owned firms is about 24 firms per 1,000 people. The Buffalo-Niagara Falls, New York region, with only 17 firms per 1,000 people, has the lowest concentration and the Miami-Ft. Lauderdale, Florida region, with 36 women-owned firms per 1,000 people, has the highest. For the second dependent variable, the mean industry intensity of women-owned employer firms is 3 firms per 1,000 people. The metropolitan area with the lowest concentration of women-owned employer firms is the Riverside-San Bernardino-Ontario, California MSA with 2 firms per 1,000 people. The Denver-Aurora, Colorado MSA has the greatest concentration, with nearly 5 firms per 1,000 people (for a ranking, see Table 2). These significant differences among regions suggest the importance of analyzing regional variation of both employer and non-employer women-owned businesses.

Openness

Openness of a region is measured using the earning power of females in the region. We hypothesize that metropolitan areas showing high levels of female earning power have a higher intensity of women's business ownership because financial capital is important in creating new ventures. Earning power is measured as women's earnings as a percentage of men's earnings, collected from the 2000 Census Summary File 3 for the aggregate earnings of female population of 16 years and over to that of males. On average, women in the metropolitan areas in our sample earned 54 % of men's earnings. The earning's gap is the smallest in the Washington, D.C. region, with women earning over 61 % of men's earnings. The Salt Lake City-Ogden, Utah MSA has the lowest level of female earning power, with women earning only 46.61 % of men's earnings.

TABLE 2 Rankings

Population Rank	2000 Geographic Area	Intensity of All WOFs	Intensity of WOFs with Paid Employees	Average Size of Firms in Metro Area	Average Size of WOFs with Paid Employees	Number of All WOFs, Employer & Non-employer	Number of WOFs with Paid Employees	Location Quotient of WOFs with Paid Employees
6	Miami-Fort Lauderdale-Miami Beach, FL	0.0361	0.0049	10.68	6.23	130,302	24,677	1.05
22	Denver-Aurora, CO	0.0315	0.0049	12.44	6.42	68,111	10,771	1.14
12	San Francisco-Oakland-Fremont, CA	0.0309	0.0043	14.09	7.7	127,387	17,685	1.05
7	Washington-Arlington-Alexandria, DC-VA-MD	0.0293	0.0039	13.3	8.11	140,676	18,565	1.01
11	Atlanta-Sandy Springs-Marietta, GA	0.0292	0.0038	13.46	7.39	124,061	16,179	1
2	Los Angeles-Long Beach-Santa Ana, CA	0.0279	0.0038	13.55	7.87	345,498	47,272	1.03
1	New York-Newark-Edison, NY-NJ-PA	0.0279	0.0038	13.51	7.55	510,736	69,079	0.94
25	Portland-Vancouver-Beaverton, OR-WA	0.0276	0.004	11.58	6.45	55,206	7,755	1.03
16	Minneapolis-St. Paul, MN-WI	0.0275	0.0038	14.26	7.86	81,607	11,178	0.95
10	Boston-Cambridge-Quincy, MA-NH	0.0268	0.0036	17.72	8.1	117,541	15,803	0.92
40	Austin-Round Rock, TX	0.0267	0.0038	14.3	6.42	33,387	4,700	1.03
17	San Diego-Carlsbad-San Marcos, CA	0.0261	0.0036	14.55	8.44	75,475	10,092	1.01
27	Sacramento--Arden-Arcade-Roseville, CA	0.0257	0.0029	10.71	7.4	46,266	5,225	0.92
15	Seattle-Tacoma-Bellevue, WA	0.0256	0.004	13.64	5.94	77,786	12,113	1.01
8	Houston-Baytown-Sugar Land, TX	0.0249	0.0033	9.3	9.06	117,216	15,699	1.03
39	Nashville-Davidson--Morristown, TN	0.0248	0.003	13.31	7.96	32,544	3,901	0.85
5	Dallas-Fort Worth-Arlington, TX	0.0247	0.0033	12.68	9.15	127,540	17,087	0.97
30	Orlando, FL	0.0245	0.004	12.39	6.51	40,270	6,521	1.03
31	Columbus, OH	0.0240	0.0033	16.75	9.15	38,766	4,535	0.86
47	Oklahoma City, OK	0.0238	0.0036	10.82	8.16	26,091	3,972	1
26	Kansas City, MO-KS	0.0238	0.0035	12.6	6.92	43,720	6,360	0.97
3	Chicago-Naperville-Joliet, IL-IN-WI	0.0236	0.0034	13.61	8.7	215,062	30,996	0.99
19	Baltimore-Towson, MD	0.0235	0.0034	12.41	7.65	60,089	8,626	1
45	Jacksonville, FL	0.0233	0.0039	14.7	6.15	26,307	4,320	1.08
37	Charlotte-Gastonia-Concord, NC-SC	0.0232	0.0037	14.47	8.87	30,982	4,894	0.96
38	New Orleans-Metairie-Kenner, LA	0.0232	0.0036	11.6	8.91	30,546	4,706	1.08
43	Louisville, KY-IN	0.0229	0.0031	14.99	9.29	26,569	3,539	0.92
21	Tampa-St. Petersburg-Clearwater, FL	0.0228	0.0036	16.26	6.92	54,350	8,711	0.98

Notes: WOF = Women-Owned Firm

TABLE 2. Rankings (continued)

Population Rank	2000 Geography	Intensity of All WOFs	Intensity of WOFs with Paid Employees	Average Size of Firms in Metro Area	Average Size of WOFs with Paid Employees	Number of All WOFs, Employer and Non-employer	Number of WOFs with Paid Employees	Location Quotient of WOFs with Paid Employees
36	Lux Vegas-Paradise, NV	0.0227	0.0081	13.12	8.74	31,258	4,232	0.97
44	Hartford-West Hartford-East Hartford, CT	0.0227	0.0081	13.79	7.9	26,020	3,564	0.89
18	St. Louis, MO-IL	0.0223	0.0084	13.19	9.28	60,208	9,082	1
50	Salt Lake City-Ogden, UT	0.0223	0.0039	14.54	7.67	21,659	2,857	0.76
28	San Jose-Sunnyvale-Santa Clara, CA	0.0221	0.0041	15.28	8.61	38,337	7,116	1.09
34	Indianapolis, IN	0.0218	0.0081	14.21	8.11	33,240	4,789	0.83
14	Phoenix-Mesa-Scottsdale, AZ	0.0218	0.0081	14.71	8.82	70,817	10,141	0.97
9	Detroit-Warren-Livonia, MI	0.0216	0.0039	12.18	7.88	96,328	12,675	0.9
13	Riverside-San Bernardino-Ontario, CA	0.0216	0.0081	14.32	8.88	70,310	6,709	0.9
32	Presidents-New Bedford-Fall River, MA-MSA	0.0216	0.0035	11.33	6.78	34,140	5,532	1.01
49	Rochester, NY	0.0215	0.0027	16.52	9.32	22,274	2,788	0.91
23	Cleveland-Elyria-Mentor, OH	0.0202	0.0081	15.73	7.86	43,326	6,602	0.87
24	Cincinnati-Middletown, OH-KY-IN	0.0199	0.0036	15.06	9.35	40,009	5,176	0.83
29	San Antonio, TX	0.0198	0.008	14.38	7.66	33,828	5,085	1.02
46	Richmond, VA	0.0196	0.008	16.78	8.5	21,529	3,323	0.89
35	Milwaukee-Waukesha-West Allis, WI	0.0191	0.0032	13.12	8.06	28,720	4,752	0.89
4	DE-DC	0.0191	0.0081	11.26	7.49	108,386	17,356	0.92
48	Birmingham-Hoover, AL	0.0191	0.0027	12.79	7.09	20,049	2,879	0.86
33	NC	0.0185	0.0039	16.95	7.84	29,157	4,641	1.04
41	Memphis, TN-MS-AR	0.0183	0.0081	17.26	9.68	22,101	2,581	0.75
20	Pittsburgh, PA	0.0182	0.008	12.82	8.69	44,286	7,268	0.89
42	Buffalo-Niagara Falls, NY	0.0169	0.0039	16.43	6.76	19,770	3,423	0.95

Note: WOF = Women-Owned Firm

Tolerance

Our measure of tolerance in a region toward women entrepreneurs is specified by the proportion of women working in high-tech occupations. We hypothesize that metropolitan areas with higher ratios of women to men in high-tech occupations are expected to have a higher intensity of women's business ownership. Occupational data for men and women over 16 years old was obtained from the 2000 Census Summary File 4 for the following occupations: computer specialist; engineer; and life and physical scientist. These occupations are generally represented in high-tech industries (Chapple et al 2004). We calculated the proportion of women to men in these occupations to obtain a ratio for each metropolitan area. In our sample, there is an average of 3 women per 10 men in high-tech occupations. The Washington, DC-Arlington-Alexandria MSA has the most women per men in high-tech occupations with 4 women per 10 men, and the Riverside-San Bernardino-Ontario, California MSA has the least with 2 women per 10 men.

Entrepreneurial Capacity

This analysis measures entrepreneurial capacity of a region as the percentage of women in professional or management occupations, as well as the presence of networking and social capital building opportunities. We chose this variable in lieu of Florida's creativity measure to capture skills and opportunities necessary to start and run entrepreneurial ventures. Metropolitan areas that have a large percentage of women in professional or management positions are expected to also have a higher intensity of women's business ownership due to the skill set necessary to become an entrepreneur. The number of women in these occupations was divided by the female population in the metropolitan area that is 16 years and older.⁴ On average, 22 % of women in the fifty largest MSAs are in a professional or management positions. The Los Angeles-Long Beach-Santa Ana, California MSA has only 7 % while the Miami-Fort Lauderdale-Miami Beach, Florida MSA has nearly 58 % of women in professional or management positions.

Additionally, metropolitan areas that support the creation of networks and social capital for women entrepreneurs are expected to have a higher intensity of women's business ownership. Given the difficulty in measuring these concepts, we developed a dummy variable to reflect whether or not the metropolitan area has hosted Ladies Who Launch events and/or has a Women in Technology International (WITI) chapter. Both organizations assist women business owners. Ladies Who Launch is designed to provide women with the tools and networking opportu-

4. Data for the percentage of women in professional or management occupations was obtained from 2000 Census Summary File 4.

nities to help develop their businesses and entrepreneurial goals.⁵ It has incubator programs designed to help women expand and clarify their business visions and initiate participants to the concepts of incubating. WITI helps women advance by providing access to and support from other professional women working in all sectors of technology.⁶ Our networking and social capital variable reflects the presence (or lack thereof) of a Ladies Who Launch event or WITI chapter or both. Although the modal category for presence of networking and social capital is zero (40% neither hosted a Ladies Who Launch Event nor has a WITI chapter), 60% of the metros in our sample hosted a Ladies Who Launch event and/or had a WITI chapter (34% had one and 26% had both).

Control Variables

Control variables in this analysis include the average employee size of total establishments in the metropolitan area and the designated U.S. Census region. Larger than average establishments are those that have more employees per establishment, as calculated using data from the 2002 Economic Census (2002). This variable is controlling for the barrier to entry that a new firm would experience when entering a metropolitan market that has larger employers. The mean number of employees in establishments in the top fifty metropolitan areas is 14 employees. The Houston-Baytown-Sugar Land, Texas, MSA has the least amount of employees per firm, with an average of 10. The Boston-Cambridge-Quincy, Massachusetts-New Hampshire MSA has the most, with an average of nearly 18 employees per firm. The U.S. Census regional variable is geographically broader than the metropolitan area, dividing the nation into four larger regions: Northeast, Midwest, South, or West.⁷ We include a regional dummy variable to control for variations such as population and population growth. Given the need to examine the variables important to our theory within a sample of only fifty metropolitan areas, we use region to absorb these effects and save degrees of freedom.

5. See their website: <http://www.ladieswholaunch.com/>.

6. See their website: <http://www.witi.com/>.

7. U.S. Census Regions include: the Northeast (Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont); the Midwest (Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin); the South (Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia); and the West (Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming).

TABLE 3 Correlation Analysis

	Industry intensity of WOFs, employer and non-employer	Industry intensity of women-owned employer firms	Women's earnings as a % of men's	Women per man in high tech occupations	% of women in prof. or mgt. positions	Presence of entrepreneurial networking or social capital building opport.	Average size of establishment in metro	Census region
Industry intensity of women-owned firms, employer and non-employer	1	--	--	--	--	--	--	--
Industry intensity of women-owned employer firms	0.779**	1	--	--	--	--	--	--
Women's earnings as a % of men's	0.060	0.014	1	--	--	--	--	--
Women per man in high tech occupations	0.092	0.068	0.685**	1	--	--	--	--
% of women in professional or management positions	0.556**	0.541**	0.192	0.237	1	--	--	--
Presence of entrepreneurial networking or social capital building opportunities	0.436**	0.368**	-0.003	0.156	0.133	1	--	--
Average size of establishment in metro	-0.334**	-0.332*	0.106	0.108	-0.147	-0.099	1	--
Census region	0.336*	0.244	-0.298*	-0.153	-0.082	-0.024	-0.130	1

Note:

1. WOF = Women-Owned Firm

2. ** = Correlation is significant at the 0.01 level (2-tailed).

3. * = Correlation is significant at the 0.05 level (2-tailed).

Explaining Regional Variation in the Intensity of Women-Owned Businesses

The results of the bivariate correlation analysis are presented in Table 3. The bivariate analysis shows that the intensity of women-owned firms is positively correlated with our measures of entrepreneurial capacity. Both the presence of networking and social capital building opportunities (.436) and the percentage of women in professional or management positions (.556) exhibit positive correlations to the intensity of women-owned firms that are statistically significant at the .01 level. Our analysis shows that this does not hold for our variables for tolerance (number of women per man in high tech occupations (.092)) or openness (women's earnings as a percentage of men's earnings (0.06)). Neither is statistically significant.

Similar results hold true for intensity of all women-owned employer firms.

Our bivariate analysis shows that the intensity of women-owned employer firms is positively correlated with our variables for entrepreneurial capacity: the presence of networking and social capital building opportunities (.368) and the percentage of women in professional or management positions (.541).⁸ However, the correlations indicate that industry intensity for all women-owned employer firms is not strongly associated with our measure of tolerance – the number of women per man in high tech occupations (.068) – or the measure of openness – women’s earnings as a percentage of men’s earnings (0.14), and both are not statistically significant.

Interestingly, the average size of all firms in the metropolitan area, whether they are women-owned or men-owned, exhibits a statistically significant negative correlation with both the intensity of women-owned firms (-.334) and the intensity of women-owned employer firms (-.332). This indicates that competition against larger firms in the region acts as a barrier to women’s entry into entrepreneurship. This is consistent with the findings reported in Lee et al (2004).

Our understanding of the regional environment’s influence on female entrepreneurship cannot only examine bivariate relationships because of the interdependent and integrated nature of this environment. Thus, we develop two regression models to predict industry intensity for women-owned firms and women-owned employer firms in order to determine how metropolitan areas can affect the existence of firms relative to the region’s population. The regression models include the metropolitan characteristics described above, representing our model of openness, tolerance, and entrepreneurial capacity as well as controls for the both average size of all establishments in the metropolis and regional location within the U.S. We estimate the final regression models with OLS, using White’s standard errors correction for heteroskedasticity.⁹ There is no evidence of serial correlation based on the Durbin Watson test statistics, and condition indices and variance decomposition proportions indicate that a minimal but acceptable level of multicollinearity exists.¹⁰ The results of the two estimations are presented in Tables 4 and 5.

Industry Intensity of Women-owned Firms

The first model exhibits the results for the industry intensity for all women-owned firms (Table 4). Metropolitan areas with more women-owned firms relative to their population are more likely those where the earnings of women relative to men’s earnings are greater, more women are employed as managers and professionals,

8. All are significant at the 0.01 level (2-tailed).

9. This correction adjusts the standard errors for the coefficients of the independent variables enabling proper interpretation of t-stats, but it does not change the coefficients themselves.

10. The rule of thumb is that if the condition index is between 10 and 30, there is moderate to strong multicollinearity. However, none of the condition indices for the models are greater than this threshold (Gujarati 1995: 338).

TABLE 4 Women-Owned Business Industry Intensity by Regional Factors

Concept	Variable	B Coefficient	Beta Coefficient
	Constant	0.0097 (0.0061)	--
Openness	Women's earnings as a % of men's	0.0002** (0.0001)	0.2015**
Tolerance	Women per man in high tech occupations	-0.0141 (0.0131)	-0.1456
Entrepreneurial Capacity	% of women in professional or management positions	0.0003*** (4.14E-05)	0.5076***
Entrepreneurial Capacity	Presence of entrepreneurial networking or social capital building opportunities	0.0018*** (6.07E-05)	0.3836***
Control	Average size of establishment in metro	-0.0004* (0.0002)	-0.1743*
Control	Census Region	0.0015*** (0.0004)	0.4019***
	Adjusted R-squared	0.5912	--
	F-statistic	12.8109***	

Note: 1. Significance levels *** at 0.01, ** at 0.05, and * at 0.10. Standard Errors of the unstandardized coefficients are in parentheses.

and females are supported by organizations that provide entrepreneurial networking and social capital opportunities. On average, larger intensities of women-owned firms occur in metropolitan areas where there are lower barriers to entry with the average firm having fewer employees. The regional control coefficient is significantly positive, indicating that intensity for all women-owned firms is greater in the west and south.

In accordance with our theory relative to a region's openness, the greater proportion of women's earnings relative to men's has a significantly positive effect on women-owned firms industry intensity. As the fourth most influential effect in the model (beta coefficient of 0.2015), a 3.2 % (one standard deviation) increase of women's earnings relative to men's results in approximately 0.02 % increase in a region's women-owned firms intensity. Metropolitan areas with greater total firm intensity seem to provide greater opportunities for women to earn more, possibly because of career advancement given our findings on management positions, explained below. The greater opportunity for earnings may translate into greater opportunity in amassing necessary financial capital to start a business.

The second variable conceptualizing tolerance is not significant. In fact, the number of women to men in high-tech occupations is negatively related to the

intensity of women-owned firms. Although insignificance means that the effect is not different from zero in regard to statistical generalizations, with respect to our analysis of the fifty largest metropolitan areas in the U.S., the negative result may indicate that these metropolitan areas provide multiple opportunities for career advancement other than high-tech. Florida (2002) also recognizes this when he qualifies the effect of diversity on regional growth:

While the Creative Class favors openness and diversity, to some degree it is a diversity of elites, limited to highly educated, creative people. Even though the rise of the Creative Class has opened up new avenues of advancement for women and members of ethnic minorities, its existence has certainly failed to put an end to the long-standing divisions of race and gender. Within high-tech industries in particular these divisions still seem to hold. (Florida 2002: 79-80)

Consequently, the importance of economic structure and power relationships may affect this proxy. Additionally, instead of the measure implying tolerance to enter nontraditional careers, the measure may suggest that women feel less inclined to enter self-employment as a means to advance their careers. These issues need further refinement.

A region's entrepreneurial capacity has a strong effect on women-owned firms intensity. Metropolitan areas with higher percentages of women in professional and management positions have significantly greater representation of women-owned firms relative to their population. With the largest beta coefficient in the model (0.5076), the effect is two times as great as the other non-control variables. A 6.6 % (one standard deviation) increase in women in these positions results in approximately 0.03 % increase in a region's total women-owned firms intensity, suggesting that metropolitan areas have greater female entrepreneurship when women have greater opportunities to gain entrepreneurial capacity through experience in management positions. This is particularly interesting given the effect of women's earnings. Metropolitan areas with greater intensity of women-owned firms seem to be more open to career advancement of women, which likely translates into opportunities to amass the necessary financial capital to start a business. The skill set enhancement and improved financial capital access enable greater female participation in the entrepreneurial market.

However, financial and management factors are only part of the story. Metropolitan areas with organizations that provide entrepreneurial assistance as well as networking opportunities have significantly greater firm intensity of women-owned businesses. Female entrepreneurs, not unlike other entrepreneurs, benefit from groups that provide activities that provide training but also provide critical networking opportunities. As the second most influential non-control variable in the model (beta coefficient 0.3836), the networking and social-capital building opportunities that these groups afford beginning entrepreneurs are also relevant to female entrepreneurs.

In regard to the model's control variables, metropolitan areas have greater

TABLE 5 Women-Owned Business Employer Firms Industry Intensity by Regional Factors

Concept	Variable	B Coefficient	Beta Coefficient
	Constant	-0.0024* (0.0013)	
Openness	Women's earnings as a % of men's	1.15E-05 (2.90E-05)	0.0854
Tolerance	Women per man in high tech occupations	-0.0015 (0.0023)	-0.0932
Entrepreneurial Capacity	% of women in professional or management positions	4.37E-05*** (1.03E-05)	0.5006***
Entrepreneurial Capacity	Presence of entrepreneurial networking or social capital building opportunities	0.0002*** (7.41E-05)	0.3042***
Control	Average size of establishment in metro	-5.94E-05* (3.56E-05)	-0.1907*
Control	Census Region	0.0002** (6.67E-05)	0.2787**
	Adjusted R-squared	0.5088	
	F-statistic	7.4231***	

Note: 1. Significance levels *** at 0.01, ** at 0.05, and * at 0.10. Standard Errors of the unstandardized coefficients are in parentheses.

intensity of women-owned firms when average employee size of establishments in the area is smaller and located in the west and south. Consequently, women-owned businesses have greater barriers to entering the local market when they are competing against larger firms in terms of number of employees. The regional control variable depicts the opposite scenario, with metropolitan areas in the west and south as homes to a relatively larger population of women-owned firms. This regional control is also likely absorbing other regional characteristics such as population and population growth. However, the sample of fifty metropolitan areas required a parsed model to save degrees of freedom, and region provided this flexibility.

Industry Intensity of Women-Owned Employer Firms

The second model exhibits the results for intensity of women-owned employer firms (Table 5) and examines the employment angle of women-owned firms. All of the variables except one are similar to the findings in the first model. Metropolitan areas having greater intensities of women-owned employer firms have more females employed as managers and professionals and are supported by organizations that provide entrepreneurial networking and social capital opportunities.

Again, these metropolitan areas have smaller average firms and are likely located in the western and southern regions. However, in contrast to the first model, the earnings variable, our measure of openness, is not a significant explanatory variable in predicting the intensity of women-owned employer firms in a metropolitan area.

The examination of this subset of women-owned firms, those that have employees (14.02 % in our sample) suggests a varied relationship. In regard to openness in the workplace and metropolitan area, the relative earnings of women, and the resulting financial capacity, is less important for an employer. To be an owner of a firm with employees, a woman may already have a certain level of capital to sustain a business so that relative earnings play a secondary role. The employment angle of female entrepreneurship is a slightly different question than that of what predicts the population of women-owned firms. Employment is often a measure of economic impact; however, it may not be the best means of understanding entrepreneurship. In fact, for female entrepreneurship to have a positive effect on employment, metropolitan areas may need to decrease traditional barriers in order to create and grow firms, making an employment impact possible. Our theory of the regional environment's effect on female entrepreneurship is the primary question while the employment impact of women-owned firms is secondary.

Conclusion

This research seeks to understand the effects of regional dynamics on female entrepreneurship. Using recent contributions of regional theorists, we examine how social and cultural factors in a metropolitan setting can affect a particular type of entrepreneurship, the intensity of women-owned firms, not just as self-employed, but also as employers of paid employees. The exploratory nature of this study combines what is known to promote entrepreneurial dynamics at the individual level to understand if these translate into how regions can influence this connection. Successful regions in terms of a greater than average presence of women-owned firms and employer firms are those that provide relatively open and entrepreneurially supportive environments.

More specifically, our findings describe the kind of environment that fosters female entrepreneurship. We find that tangible factors such as managerial skills as well as access to finances support women's business ownership. Regions where women earnings are on par with men are more likely to have higher levels of female business ownership in general. However, a region's attitude towards women's financial success does not significantly predict the level of women-owned firms that have employees. Regions where women are able to hold professional and management positions see more women's business ownership. These findings support Bates' (Bates 1997, 2006) theory about the importance of human capital and financial resources. However, we also find that in addition to these two factors, women business owners benefit from a regional environment that provides them with the ability to network and gain social capital. Thus, the regional envi-

ronment needs to not only support women's ability to gain skills and money, but it also needs to provide opportunities for women to network and learn from other entrepreneurs. Individual skills and money are important, but so are the connections.

This research has important public policy implications especially regarding the ways in which economic development practitioners and policymakers can support female entrepreneurship given that women-owned businesses are 28.2 % of a growing entrepreneurial economy (Lowrey 2006). Our results indicate that creating a regional environment supportive of entrepreneurial capacity may have the greatest influence on women's business ownership. Policymakers should partner with local organizations such as WITI or Ladies Who Launch in order to facilitate entrepreneurial networking and social capital formation. Through such partnerships policymakers will also affect the development of entrepreneurial capacity and financial capital because these organizations function as important intermediaries between entrepreneurs, existing businesses, venture capitalists, and other important economic actors in a region. Silicon Valley, for example, hosts many organizations that are geared towards supporting women entrepreneurs. Among them are a dedicated incubator for women-owned technology businesses (Women's Technology Cluster incubator), venture capital forums for women entrepreneurs (i.e. Springboard), and networking groups such as Women in Technology International (WITI) and Ladies Who Launch.¹¹ Working with these groups may prove to be the most effective and efficient way for local and regional economic development practitioners to positively affect women's business ownership and take advantage of a major contributor to the entrepreneurial economy.

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11. More information about Silicon Valley's Women's Technology Cluster incubator can be found at <http://www.wtc-sf.org/index.html>.

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