Female Entrepreneurship, Agglomeration, and a New Spatial Mismatch

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Abstract

Female entrepreneurs may be less networked than their male counterparts and may face higher commuting costs because of greater domestic burdens. This paper develops a theoretical model of female entrepreneurship showing that these differences can lead to the segregation of male- and female-owned businesses, with female entrepreneurs choosing locations farther from agglomerations of economic activity. The model also predicts that the relationship between agglomeration and output will be weaker for female-owned businesses and that female entrepreneurs will commute shorter distances.

The paper's empirical results are consistent with these predictions. Using 2007 Dun and Bradstreet data for 35 industries, we find that private businesses that satisfy the Small Business Administration definition of "female-owned" are segregated from other companies, often to a degree similar to that observed for black-white residential patterns. Female-owned enterprises are located in less agglomerated areas: their local environment frequently features 10 to 20 percent less own-industry employment within one mile. In addition, the elasticity of sales per worker with respect to nearby own-industry employment is significantly lower for women-owned businesses. Further analysis based on the 2000 Census confirms that self-employed women commute shorter distances than their male counterparts, especially when children are present. In this case, the male-female commute time differential is roughly 20 percent. Together, these results demonstrate that the location pattern of private female businesses is quite different than for other private business. These results are new, and suggest that female businesses are less likely to be found in highly interactive, innovative, and productive centers of activity**.**

JEL Codes: R0, J2, L0

Key Words: Agglomeration, Female Entrepreneurship, Spatial Mismatch

I. Introduction

This paper considers two forces that are known to be associated with growth. The first is the agglomeration of activities into cities and industry clusters. The second is entrepreneurship, especially female entrepreneurship. That agglomeration has a positive effect on productivity and innovation goes back to Marshall (1890). The substantial economic literature on this topic is reviewed in Rosenthal-Strange (2004). The idea that entrepreneurship is important for growth also has a long history, including analysis by Knight (1921) and Schumpeter (1934). The importance of female business activity for growth is discussed in Landes' (1999) far-reaching analysis of the determinants of cross-sectional differences in prosperity. More recent research on the importance of entrepreneurship for growth includes Baumol (2002), Acs and Armington (2006), and Phelps (2007).

In considering the geography of female entrepreneurship, we are guided by a simple theoretical model of business location and urban spatial structure.[1] Entrepreneurs benefit from interacting with each other, and this encourages agglomeration. However, the spatial concentration of production requires long commutes, limiting the degree of agglomeration in equilibrium. All of this is standard. The new part of the analysis begins with the observation that the circumstances of entrepreneurs may differ between men and women. The first possible difference is that female entrepreneurs might derive less benefit from the agglomeration of local business activities than would male entrepreneurs. This would be the case if there were a tendency for female entrepreneurs to be less tightly networked than male entrepreneurs on average. The second possible difference is that the domestic division of labor might raise the cost of agglomerating for female businesspeople relative to male businesspeople. This is captured in the model in the assumption that female entrepreneurs have higher commuting costs. See Kohlhase (1986) on the general issue of the domestic division of labor and Madden (1981) and White (1986) on women's commuting patterns.[2]

There is considerable evidence that female entrepreneurs may not derive the same benefits from networks that males do. Bates (2002) documents patterns of differential treatment of females by suppliers and clients. Renzulli et al (1999) show that female entrepreneurs are more likely to have networks that are dominated by kin. They show that while there is no direct negative effect on entrepreneurial outcomes associated with an entrepreneur's being female, there is a negative effect associated with having a kin-heavy network. Similarly, Roth (2006) describes Wall Street Bankers, and finds considerable evidence that there is a tendency for women to perceive themselves as being outside of the old boys network of bankers. She quotes one as saying that

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[1] See Costa and Kahn (2000) for analysis of residential location, specifically how domestic circumstances and agglomeration economies interact in determining where different sorts of families live.

[2] See also Turner and Niemeier (1997) for a review of previous literature on gender differences in commuting behavior.

> To the extent that I think that Wall Street is kind of an 'old boys' network, you don't find too many men that want to pull in that many women... (Roth, p. 78)

Another observes that

> Sunday night was basketball night where everybody in the department goes and plays basketball. I don't play basketball. (Laughter) So there's a big social network there that revolved around men's sports and men's activities and to be on the outside of that really impacted my ability to develop relationships with people. (Roth, p. 85)

These are obviously only illustrative anecdotes, but they do capture the sorts of difference in networking that our model will incorporate.

There is also clear evidence that working females engage in more home production than do working males. Ramey (2007) uses time diaries to calculate a working woman's average non-market work plus primary child and adult care at 29.55 hours in 2003. For men, the figure is 17 hours. See also Ramey and Francis (2006) or Aguiar and Hurst (2006) for a similar gender differential. Again, the econometric evidence is consistent with qualitative research. Roth (2006) is again helpful, quoting a male banker's description of his domestic circumstances:

> For the first three years it was pretty much her by herself with help once a week or something like that...I really don't do anything at home. I would say we have more of a standard, old-fashioned [arrangement]...I go to work and she takes care of everything in the house. (Roth, p 127)

A female banker's experience is quite different:

> During the week when [the nanny is] not here I'm the one who is really responsible. Both in terms of physically being here but also things I'm noticing -- who needs diapers, who needs socks, who needs to go to the doctor... (Roth, p. 132)

The two assumptions of gender differences in networking and the domestic division of labor have important implications for the spatial allocation of female business. They imply first that there will tend to be segregation of female business activity from male business activity. This segregation will manifest itself in female businesses being less agglomerated than male business, choosing locations with less

concentration of aggregate activity and also with less concentration of activity in the own sector. They also imply that agglomeration will have a larger positive effect on the more networked male businesses. Finally, they imply that commutes will be shorter for female self-employed workers than for male self-employed workers. While there is a large literature on spatial segregation by race and another on occupational segregation by gender, this is the first paper of which we are aware that has considered spatial segregation by gender.[3]

We test these predictions using Dun and Bradstreet and Census data. Initially, we examine location patterns for 35 2-digit industries covering a wide range of activities in Manufacturing, Wholesale Trade, Finance Insurance and Real Estate (FIRE), and Services. Data for this analysis are obtained from Dun and Bradstreet's (D&B) Marketplace files for 2005 and 2007.[4] From the D&B data we obtain zipcode-level information on establishment and employment counts by industry (Standard Industry Classification - SIC), and also whether companies satisfy Small Business Association (SBA) definitions of whether an establishment is female-owned. We recode these data to year-2000 census tract geography, enabling us to control for tract-level socio-demographic attributes (from the 2000 Census). In characterizing the local economic environment faced by entrepreneurs when they choose locations, we further employ geographic information systems software (GIS) to construct two key variables. The first is the total employment across all industries within one mile of the establishment. This measures the degree of urbanization, which Jacobs (1969) and others have argued to be associated with productivity. The second variable is employment within one mile in the establishment's own 2-digit SIC industry. This allows for identification of localization effects, where the proximity to own-industry activity adds to productivity as in Marshall (1890). Individual-level data from the public use micro sample of the 2000 Census is also used to study worker commutes.

The results from a range of econometric models are strongly consistent with the model. In examining segregation, we focus primarily on the widely used dissimilarity index. This index measures the share of the minority (or majority) group that would have to relocate if local minority shares were to equal that of the overall population.[5] Using this statistic, we find a large departure from integration. In a number of industries, the index value exceeds 50 percent, implying a degree of segregation similar in

[3] See Kain (1992) for analysis of the black-white segregation and Altonji and Blank (1999) for a survey of the impacts of race and gender on labor markets.

[4] The D&B MarketPlace data provide information on over 13 million establishments in the United States. This large size of the data file is sufficiently comprehensive to permit effective analysis of business patterns. It should also be noted that the D&B data involves a type of filter, including only companies sufficiently noteworthy to make it into the database. This will exclude, for example, many part-time Schedule C filers that would appear as businesses in Census data.

[5] We also report values of an isolation index. It measures the tendency of a minority to be in close proximity to another minority. Details on the dissimilarity and isolation indexes are provided later in the paper.

magnitude to residential segregation experienced by African-American households.[6] Furthermore, we find that businesses defined by SBA as female-owned are located in places with less overall activity (urbanization) and also with less activity in their own sector (localization). These gender disparities differ across industries. They are often are in the 10 to 20 percent range, especially in Manufacturing, Wholesale Trade, and FIRE; differences are smaller in Services. Finally, we also find that the relationship between agglomeration and output is weaker for female-owned businesses. Specifically, the elasticity of sales per worker with respect to nearby own-industry employment is significantly lower for private SBA-defined women-owned businesses than for other privately owned enterprises.

The results described thus far are consistent with either the presence of differential networking or differential domestic responsibilities or both. They do not allow us to separate between the two forces governing the spatial pattern of female entrepreneurship. There are other patterns in the data, however, that can be used to separately identify the networking and home-attachment effects. First, we consider the a differences-in-differences model. In the presence of a discriminatory network of corporate "old boys," one would predict that female-owned firms would enjoy a larger benefit from proximity to employment at other female-owned firms relative to the rest of employment than would firms that are not female-owned. We find clear evidence of such a pattern in FIRE, but not in other 1-digit sectors. Second, we consider the commuting behavior of male and female workers. Among full-time workers, we find commutes to be shorter for female workers in general and for female self-employed workers in particular, especially when children are present in the household: among self-employed workers, when children are present, women commute roughly 5 minutes less 1-way relative to comparable male workers, a difference of roughly 20 percent. This is consistent with the domestic burdens force in our model.

Our findings on segregation, agglomeration, and commuting are new. Taken as a whole they imply a different kind of "spatial mismatch" than the sort that is usually considered. Originally, the term spatial mismatch referred to losses in economic opportunity for inner-city African-Americans caused by the combination of increasing suburbanization of jobs coupled with housing market discrimination that restricted African Americans to the city centers (Kain, 1968). Various papers have documented this phenomenon, studied its foundations, and considered its static and dynamic consequences. See Holzer (1991), Kain (1992), and Zenou (2007) for surveys. The new spatial mismatch that we have identified can also have important consequences for efficiency and equity. Densely developed locations and industry clusters are centers of interaction, innovation, and productivity (e.g. Audretsch and Feldman (1996)). They are, thus, important for the performance of the overall economy both for the ability to

[6] See for example, measures of tract-level residential segregation as reported by the U.S. Department of Census at http://www.census.gov/hhes/www/housing/housing_patterns/tab5-2.html .

deliver prosperity and also for the ability to deliver opportunity. The smaller presence of female entrepreneurial activity in the densest locations and in clusters means that both the productivity and opportunity advantages of cities may not be enjoyed proportionately by female entrepreneurs.

The remainder of the paper is organized as follows. Section II presents the theoretical model of female entrepreneurship and discusses its implications. Section III describes the data. Section IV presents results on the agglomeration of private SBA-defined female and other privately owned companies, the degree to which private businesses tend to segregate by gender, and differences in the agglomeration-output relationship. Section V looks at the mechanisms that are potentially responsible for the patterns outlined in Section IV, including differential benefits from agglomeration and differences in domestic responsibilities. Section VI concludes.

II. A simple model of entrepreneurship and urban spatial structure

A. Overview

This model will focus on two forces that impact the spatial pattern of women-owned business. The first is differential business networking. This is meant to capture many possible ways that networking opportunities might be more favorable for male entrepreneurs than for female entrepreneurs. The second is differential domestic responsibilities, manifested in a greater cost of working far from home. There are, of course, other important differences, such as customer discrimination. At the end of the section, we will discuss ways that the model could be generalized. It is appropriate for us to be explicit that in order to obtain clear predictions we begin with a characterization of differences between male and female entrepreneurs that is highly stylized, and therefore not completely accurate. Some female entrepreneurs are insiders who benefit greatly from networks. Some male entrepreneurs bear primary domestic responsibilities. We will discuss the interpretation of our results in light of these departures from our specification at the end of the section.

At the heart of the model is the assumption of a central business district that is an attractor for entrepreneurs. The business district can be taken as a downtown or as an edge city. In this regard, it should be emphasized that there is nothing in our model that presumes a monocentric city structure. In order to focus on business interactions, the model treats residential location as occurring at a point outside of the business district. It then solves for the spatial allocation of entrepreneurs in a competitive land market.

B. Model

1. Agents

There are three types of agent in the model: female entrepreneurs, male entrepreneurs, and builders. The entrepreneurs of both types choose whether or not to form businesses, choose locations if they have become active, and choose a degree of participation in community business activities (networking). Builders develop land into commercial space. This will determine building heights and densities throughout the city in which the agents are located. Because we treat all residential activity as occurring at a point, we focus on the distribution of land among the two types of entrepreneurs. This simplifies the discussion without affecting the model's qualitative predictions.

2. Commercial real estate markets

The entrepreneurs choose locations in a long, narrow city, with one unit of land at each location. Cities exist to facilitate interactions. Following Helsley and Strange (2007), we suppose that interactions occur at a single location. Locations are completely characterized by their distance from this "center," given by the variable x.

Entrepreneurs of both types are consumers of developed space, which is in turn produced by developers using land and other inputs. For simplicity, we suppose that both types of entrepreneur consume one unit of commercial space inelastically. The markets for space and land are both perfectly competitive. We denote the rent for commercial space at distance x by r(x) and the rent for land by R(x).

As is very well-known, there are two broad approaches to determining rents in a model of spatial structure like this one. The first is to assume that the economy is closed in the sense that there exist fixed populations of the two types of entrepreneur. In this sort of model, competition among entrepreneurs for space and land will determine equilibrium entrepreneurial profit levels, space rents, and land rents simultaneously. In this model, entrepreneurial participation is exogenous. We have chosen instead to adopt a second approach where the economy is "open" in the sense that potential entrepreneurs have options available in other cities or activities. In this situation, in equilibrium, all entrepreneurs of a given type will earn a payoff equal to the exogenous payoff that would be available in other cities or activities. This will determine equilibrium space and land rents. We will denote the equilibrium entrepreneur profit levels by π_w and π_m, where subscripts stand for women-owned and male-owned businesses.

3. Interaction

The literature on entrepreneurship has exhaustively documented the many sorts of interaction involved in business creation. These involve a long list of activities, including identifying entrepreneurial opportunities, hiring workers, obtaining credit and inputs, and marketing outputs. All of these activities are fundamentally social in that they require the entrepreneur to interact with his or her business community. As an aside, they are largely the same sorts of forces that Marshall (1890), Vernon (1961), Jacobs (1969) and others have argued to be fundamental to agglomeration and urban growth.

We model these social interactions in a simple way. Specifically, we suppose that the entrepreneur chooses a number of visits v to make to the center, allowing interaction with the business community. The quality of the business environment, K, contributes to the value of these interactions. Male and female entrepreneurs are different in their "connectedness," the breadth and usefulness of their professional networks. We capture differential networks by the parameter α, where a higher value of α denotes an entrepreneur who is more connected. Although there are certainly well-connected female entrepreneurs and poorly-connected male ones, we follow the entrepreneurship literature (e.g., Renzulli (1999) and Bates (2002)) by supposing female entrepreneurs to be less connected, $\alpha_w < \alpha_m$.

All of these forces are represented by the function $u(v,K,\alpha)$ that denotes the incremental profit earned from an entrepreneur's interactions at the center. Based on the above discussion, it is natural to suppose that u(-) is increasing and strictly quasi-concave in v and K. We also suppose that $\partial^2 u/\partial v \partial K > 0$, $\partial^2 u/\partial v \partial \alpha > 0$, and $\partial^2 u/\partial K \partial \alpha > 0$. Finally, we suppose that entrepreneur revenues are given by $u^0 + u(v,K,\alpha)$, where u^0 is a fixed component of entrepreneur profit.

Entrepreneurs choose the intensity of their interaction with the business community, v. These visits are costly, however. There are two costs associated with a visit to the center: a fixed cost T and transportation cost tx, $t > 0$. The assumption of a positive fixed cost of a visit is necessary in order that agents at $x = 0$ not choose an infinite quantity of visits. We suppose for simplicity that all other costs are assumed incorporated in u^0. For technical reasons (to be made clear shortly), we suppose that there exists a minimum level of interaction required to be in business, $\underline{v}$. We suppose that $\underline{v}$ is sufficiently low that entrepreneurs at all locations choose $v > \underline{v}$. Assuming the boundary condition $\lim v \to \underline{v}^+ \partial u(v,K,\alpha)/\partial v \to \infty$ ensures that this is true.

Finally, entrepreneurs also incur opportunity costs associated with working outside the home. Denote the boundary of the business area of the city by x^B. We solve for this below. As noted above, we have for simplicity supposed that housing requires no land, with all households located at the point x^B. Suppose that an entrepreneur located at x incurs commuting costs $\tau * (x^B - x)$. This captures not just morning and afternoon commuting costs, but also the costs associated with day care pickups, meetings

with teachers, and doctor appointments. Although there are certainly exceptions, these costs appear to fall more on females than on males (see Ramey (2007, Ramey and Francis (2006) or Aguiar and Hurst (2006)). We therefore suppose that female entrepreneurs incur greater "commuting" costs, $\tau_w > \tau_m$. In order to ensure that the business district occupies land at the center, and in that regard is bordered by a residential zone, we suppose that the attraction to home is weaker than is the attraction to the CBD. Assuming that $t\underline{v} > \tau_w$ ensures that this is true and so that bid-rent curves are always downward sloping.

C. Equilibrium interaction and urban spatial structure

1. Equilibrium interactions

In the above setup, the profits net of all opportunity costs of an entrepreneur located at x equal

$$y + u(v,K,\alpha) - r - (T + tx)v - (x^B - x)\,\tau. \quad (1)$$

The entrepreneur's choice of visit intensity satisfies the first-order condition:

$$-(T + tx) + \partial u/\partial v = 0. \quad (2)$$

(2) implicitly defines the optimal number of visits for a type-α consumer located at x, $v(x, K,\alpha)$. By the implicit function theorem,

$$\partial v/\partial x = t/(\partial^2 u/\partial v^2) < 0. \quad (3)$$

$$\partial v/\partial K = -(\partial^2 u/\partial v \partial K)/(\partial^2 u/\partial v^2) > 0, \quad (4)$$

$$\partial v/\partial \alpha = -(\partial^2 u/\partial v \partial \alpha)/(\partial^2 u/\partial v^2) > 0. \quad (5)$$

(3) implies that the number of visits decreases with distance. (4) implies that the number of visits increases with the quality of interactions and (5) is more important for our purposes. It implies that the number of visits increases with the degree to which an entrepreneur is connected to other businesses.

2. Equilibrium rent for space

Let $\pi^* \in \{\pi_w, \pi_m\}$represent the utility level available in other cities or activities. Rent must adjust to equate utility in entrepreneurship with the opportunity utility:

$$r(x,K,\alpha,\tau) = y - \pi^* - (T + tx)v(x,K,\alpha) + u(v(x,K,\alpha),K,\alpha) - (x^B - x)\tau. \quad (6)$$

The implicit function theorem yields

$$\partial r/\partial x = - tv(x.K,\alpha) + (\partial v/\partial x)(-(T + tx) + \partial u/\partial v) + \tau = - tv(x,K,\alpha) + \tau < 0. \quad (7)$$

$$\partial r/\partial K = (\partial v/\partial K)(-(T + tx) + \partial u/\partial v) + \partial u/\partial K = \partial u/\partial K > 0, \quad (8)$$

$$\partial r/\partial \alpha = (\partial v/\partial \alpha)(-(T + tx) + \partial u/\partial v) + \partial u/\partial \alpha = \partial u/\partial \alpha > 0, \quad (9)$$

$$\partial r/\partial \tau = (x^B - x) > 0. \quad (10)$$

The rent on space decreases with distance as in (7) by the assumptions on fixed visits and the cost of commuting. Rent on space also increases with the quality of interactions (8) and connectedness (9). By (10), an increase in commuting costs makes the equilibrium rent function flatter. An entrepreneur is less willing to pay a premium to locate near the CBD when the costs of getting there are higher because the entrepreneur will not interact as much in this case.

3. Bid-rent for space

The allocation of entrepreneurs to locations depends on the slope and intercept of the bid-rent curves for men and women. Differentiating (7) with respect to α or (9) with respect to x gives:

$$\partial^2 r/\partial\alpha\partial x = \partial^2 u/\partial\alpha\partial v\ (\partial v/\partial x) < 0. \quad (11)$$

This is fundamental. A higher value of α, a greater degree of connectedness, is associated with a steeper bid rent curve for space. Similarly, (10) establishes directly that an increase in commuting costs results in a flatter bid rent curve.

Together with the assumptions on α and τ, (10) and (11) establish the following:

Proposition 1. In any city where both male and female entrepreneurs are active, male entrepreneurs will occupy more central locations.

Both types of entrepreneurs benefit from agglomeration in the sense that value accrues from visits. Male entrepreneurs benefit to a greater degree to the extent that they are more connected (a higher value of α). Moving further from the center reduces participation (the number of visits). This reduces value associated with interaction to a greater degree for male entrepreneurs. Similarly, higher commuting costs for females (higher τ) result in a smaller net benefit from a central location.

In competitive space markets, space is allocated to the highest bidder. The next result places restrictions on the opportunity profit levels that must be achieved in order that an entrepreneur choose to be active.

Proposition 2. In any city where both male and female entrepreneurs are active, the reservation level of profits for female entrepreneurs must be lower than for male entrepreneurs, $\pi_w < \pi_m$.

Suppose not. Then by (6), bid rent is greater for male entrepreneurs at all locations. QED.

In our open model, Proposition 2 is a restriction on the exogenous parameters $\pi_w < \pi_m$. A closed model corollary – whether for a closed city or for a closed system of cities – would be that the equilibrium values of the reservation profit levels would exhibit $\pi_w < \pi_m$.

Propositions 1 and 2 together describe a new kind of spatial mismatch. The first spatial mismatch, introduced by Kain (1968), argued that barriers to African-American residential decentralization coupled with the decentralization of employment resulted in persistent racial inequality. The new spatial mismatch suggested by this paper's model pertains instead to females and does not depend on the patterns of residential locations at all. The issue here is that either discrimination in business networks or differences in domestic burdens can result in a situation where female entrepreneurship takes place outside of agglomerations. Since these agglomerations are well-known to be centers of innovation, learning, and productivity, this location pattern can result in persistent inequality, a new spatial mismatch.

Propositions 1 and 2 will be fundamental in our empirical work on the agglomeration of women-owned businesses. Before moving to that empirical work, we must complete the characterization of equilibrium urban spatial structure by solving for equilibrium land rents and densities.

4. Bid rent for land

The profit of a builder at location x is

$$\Pi(x,K,\alpha,\tau) = r(x,K,\alpha,\tau)\, n - c(n) - R, \qquad (12)$$

where c(n) is construction cost and, as noted previously, R is land rent. We assume that c(·) is increasing and strictly convex. The first-order condition for profit maximization implies

$$r(x,K,\alpha,\tau) - c'(n) = 0, \tag{13}$$

and this implicitly defines the maximizing density $n(x,K,\alpha,\tau)$. Implicitly differentiating (13) gives

$$\partial n/\partial x = (\partial r/\partial x)/c''(n) = [-tv(K,x)+ \tau]/c''(n) < 0. \tag{14}$$

$$\partial n/\partial K = (\partial r/\partial K)/c''(n) = (\partial u/\partial K)/c''(n) > 0, \tag{15}$$

$$\partial n/\partial \alpha = (\partial r/\partial \alpha)/c''(n) = (\partial u/\partial \alpha)/c''(n) > 0. \tag{16}$$

$$\partial n/\partial \tau = (\partial r/\partial \tau)/c''(n) = -(x^B - x)/c''(n) < 0. \tag{17}$$

Thus, structural density increases with the quality of interactions and connectedness and decreases with distance and commuting costs.

Competition ensures that the maximum profit of a builder equals zero, and this condition defines the bid rent for land:

$$R(x,K,\alpha,\tau) = r(x,K,\alpha,\tau)n(x,K,\alpha,\tau) - c(n(x,K,\alpha,\tau)) \tag{18}$$

Like the rent on space and structural density, the bid rent on land increases with the quality of interactions and connectedness and decreases with distance. This implies

$$\partial R/\partial K = (\partial r/\partial K)n + (r - c'(n))(\partial n/\partial K) = (\partial u/\partial K)n(x,K,\alpha,\tau) > 0, \tag{19}$$

$$\partial R/\partial \alpha = (\partial r/\partial \alpha)n + (r - c'(n))(\partial n/\partial \alpha) = (\partial u/\partial \alpha)n(x,K,\alpha,\tau) > 0, \tag{20}$$

$$\partial R/\partial x = (\partial r/\partial x)n + (r - c'(n))(\partial n/\partial x) = - tv(K,x)n(x,K,\alpha,\tau) < 0. \tag{21}$$

$$\partial R/\partial \tau = (\partial r/\partial \tau)n + (r - c'(n))(\partial n/\partial \tau) = -[(x^B - x)/c''(n)]\, n(x,K,\alpha,\tau) < 0, \tag{22}$$

5. Equilibrium land use

The last piece of the equilibrium is the characterization of equilibrium land use. This depends on R(-). Suppose that land not used by entrepreneurs commands a residential rent of 0.[7] Focusing on the case where the city contains both types of entrepreneurs, equilibrium land use will be characterized by two borders, x^b and x^B:

$$R(x^b,K,\alpha_m,\tau_m) = R(x^b,K,\alpha_w,\tau_w), \quad (23)$$

$$R(x^B,K,\alpha_w) = 0. \quad (24)$$

Land between the center (x = 0) and x^b is occupied by male entrepreneurs. Land between x^b and x^B is occupied by female entrepreneurs. Land at the point x^B is devoted to residential uses. These patterns are illustrated in Figure 1 where the relevant bid-rents are plotted.

D. Implications and extensions

The analysis thus far has several key implications:

i. There will be spatial segregation of businesses by the gender of the entrepreneur.

ii. Women-owned businesses will be less agglomerated than will male-owned businesses in the sense that the total level of activity will be lower in locations selected by female entrepreneurs (urbanization).

iii. Women-owned businesses will be less agglomerated than will male-owned businesses in the sense that the level of activity in the entrepreneur's own industry will be lower for female entrepreneurs (localization).

iv. Female entrepreneurs will have shorter commutes than male entrepreneurs.

v. The relationship between agglomeration and output will be weaker for female enterprises than for male enterprises.

vi. Female enterprises will exhibit lower productivity than other businesses.

[7]Setting residential bid-rents to zero in all locations does not affect the primary results but simplifies the discussion.

It is important to point out that the lower productivity (vi) is not an inherent difference in competency. Rather, it is a consequence of differential domestic burdens, networking, and agglomeration economies.

It is worth reiterating that the assumptions regarding networking and commuting that generate these predictions are oversimplifications. The models' predictions can, however, be obtained in a more general setting. To see this, suppose that there are four types of entrepreneur. Some are highly connected (high α) with low commuting costs (low τ). Some are poorly connected (high α) with high commuting costs (low τ). In addition, there are two off-diagonal cases. In this case, there will be four regions in the city, with the highly connected / low commuting cost workers nearest the business district and the poorly connected / high commuting cost workers farthest. The other two types will be in between in an order that will depend on the relative strengths of the networking and commuting cost effects. If male entrepreneurs are overrepresented among the highly connected workers and underrepresented among the high commuting cost workers, this will generate predictions (i) to (vi) with only slight modifications, such as that women-owned business will tend to be less agglomerated.

III. Data and Summary Statistics

A. Data

The primary data used for the analysis were obtained from the Dun & Bradstreet Marketplace files for the first quarter of 2007. These data were accessed in a form initially aggregated to the zipcode level. The data provide information on an establishment's industry (using the primary Standard Industrial Classification, SIC), its employment, years in business, and sales. The data also identify whether an establishment is publicly owned or privately owned, and if the latter, whether the Small Business Association classifies a company as female-owned. In this regard, the Small Business Association definition of a female-operated business is:

> "Women-owned small business concern means a small business concern—(a) which is at least 51 percent owned by one or more women; or, in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and (b) whose management and daily business operations are controlled by one or more women." [8]

Throughout the paper companies that satisfy the SBA definition above are described as private female-owned businesses (including partnerships and sole-proprietorships). Privately owned establishments that are not classified as female-owned are generally referred to as other private

[8] http://app1.sba.gov/faqs/faqindex.cfm?areaID=11

businesses. In all instances it is important to recognize that some female-owned companies may have significant male input from minority partners. Similarly, some companies not classified as female-owned may enjoy significant input from women. This will tend to reduce our ability to observe gender differences in business location patterns. That is because minority female decision makers may cause some non-female owned companies to behave more like women-owned establishments, while minority male decision makers may have the same effect on some female-owned companies. For these reasons, the patterns observed in our data likely understate the impact of the entrepreneur's gender on business location decisions.

The theory from Section II predicts that female-owned businesses will be located in less agglomerated areas than will other business. To consider this hypothesis, we must construct measures of the within-city local environment facing an entrepreneur. In considering the agglomeration of entrepreneurship, it is most common to use citywide variables, which for U.S. data means at the Metropolitan Statistical Area (MSA) level.[9] This approach has the advantage of allowing the use of large but geographically coarse datasets such as the PUMS data from the Census. It has the disadvantage of supposing that an entrepreneur in the far suburbs confronts the same environment as one downtown or in a dense edge city. It is thus clearly inappropriate for the intra-city predictions regarding entrepreneurship made by Section II's theory.

As an alternative, we create variables for both own-industry and aggregate employment that are measured at a much narrower level of geography than the MSA. They are calculated as follows. First, employment in a given zipcode is converted to year 2000 census tract geography.[10] This allows us to control for tract-level socioeconomic variables when examining the relationship between agglomeration and sales per worker as described later. Then, using mapping software, 1-mile radius circles are drawn around the geographic centroid of each census tract. The level of a given type of employment contained within a given circle is then calculated by constructing a proportional (weighted) summation of the

[9] Among the few exceptions are Rosenthal and Strange (2003), Rosenthal and Strange (2005), and Henderson and Arzaghi (2006).

[10] Zipcodes were first matched to the Census zipcode tabulation area (ZCTA) geography and then further matched to the year 2000 census tract geography. U.S Postal Service zipcode boundaries are based on postal logistics while Census ZCTAs respect census tract borders and better reflect the socioeconomic concept of a neighborhood. Census has created a boundary file that approximates the geographic region associated with each US Postal zipcode based on the associated year 2000 census blocks found in that zipcode. The resulting geographic polygons correspond to an agglomeration of block-level geography and provide a close approximation to the US Postal zipcode boundaries. The corresponding ZCTA boundary file is available for download from Census. To further identify the location of a subset of postal zipcodes not covered by the ZCTA file we used a 1999 file available on the US Census website that reports the latitude and longitude of the US Postal zipcodes in the US in 1999. After merging those coordinates into the year 2000 ZCTA file, we were able to geocode all but a very small number of the year 2001 zipcodes obtained from D&B.

employment for those portions of the tracts intersected by the circle.[11] This is done for employment by industry at public, private female owned, and other privately owned companies.

When we examine the degree of segregation between private female- and other private owned companies we include establishments of all sizes and age in the sample. We do this because the theory outlined in Section II implies that in equilibrium male- and female-owned establishments should be segregated. For the same reason, when we examine the degree of urbanization and localization for private female-owned and other privately owned businesses we also focus on private female- and other privately owned establishments of all sizes and age that are present in 2007:Q1. We then measure urbanization by adding up employment throughout the economy – including all private plus publicly owned establishments – while localization is measured by adding all employment (private plus public) in a given establishment's own industry. In both cases this is done for activity within a 1-mile circle of each private establishment present in 2007:Q1.

When we examine the relationship between output and agglomeration we use establishment-level measures of sales per worker to measure output. Sales per worker are then regressed on measures of urbanization and localization in the nearby environment. Our primary focus in running these regressions is to describe correlations in the existing environment between sales per worker and agglomeration for female-owned and other private companies. As noted earlier, our theory suggests that such correlations will be weaker for female entrepreneurs. We also consider possible confounding effects of contemporaneous shocks that would affect both sales/worker and the level of agglomeration in the nearby environment. To mitigate that issue, we restrict the sample used to measure sales per worker to small (fewer than 10 workers), newly created (in the 12 months prior to 2007:Q1) private establishments that satisfy the SBA definition of female owned private companies and other private companies in 2007:Q1. Agglomeration measures for urbanization and localization are then based on 2005:Q4 MarketPlace data. Limiting the estimating sample to small establishments likely helps to reduce measurement error when calculating sales per worker. Limiting the estimating sample to new companies and lagging the independent variables helps to reduce the influence of contemporaneous shocks.[12]

Finally, when we examine commuting patterns we draw upon the 5 percent individual-level public use micro sample from the 2000 Decennial Census. These data were obtained over the web from the Integrated Public Use Micro Sample (IPUMS) website. The IPUMS provide all of the usual socioeconomic and demographic variables one would want to control for when analyzing differences in

[11] For example, if a circle includes all of tract 1 and 10 percent of the area of tract 2, then employment in the circle is set equal to the employment in tract 1 plus 10 percent of the employment in tract 2.

[12]Note also that a twelve month window is wide enough to allow for new establishments in the data, but narrow enough to limit the number of new companies that fail prior to 2007:Q1 and which do not appear in data.

commuting patterns across workers (e.g. family structure, race, education, etc.). Details are provided when the commuting patterns are discussed later in the paper.

B. Summary Statistics

Tables 1a-1c present summary measures of counts of employment, establishments, and sales in 2007:Q1 in the D&B data. This is done separately for the 1-digit industry groups for Manufacturing, Wholesale Trade, FIRE, and selected industries within Services. It is these industries that we focus on in all of the empirical work to follow. Analogous measures are reported for the 35 2-digit industries in Tables 2a-2c.

In Table 1a, total employment among private plus public establishments in the industries considered is roughly 51.7 million in the D&B data. Of this amount, Services account for 25.5 million, Manufacturing 12.9 million, FIRE 8.1 million, and Wholesale Trade another 5.3 million. Across these industries, the ratio of employment at SBA-defined female-owned private companies relative to other privately owned companies is 5.16 percent. The ratio is close to 6.15 percent in both Wholesale Trade and Services, 3.6 percent in FIRE, and 3.7 percent in Manufacturing. Analogous values are reported for the 2-digit industry subcategories in Table 2a, although with more variation across industries as would be expected. The industries with the highest share of employment at female-owned enterprises are Apparel (SIC 23) and Business Services (SIC 73) with 11.05 and 10.8 percent, respectively. These measures clearly indicate that in the D&B data SBA-defined female-owned enterprises account for a relatively small portion of overall employment. A similar pattern also appears in the 2002 Census Survey of Business Owners, where female-owned companies account for 6.45 percent of employment.[13] It is worth noting that the Census data include part-time Schedule C filers, a class of entrepreneurs that would typically not be reported in the D&B MarketPlace file. Throughout the economy, Altonji and Blank (1999) report that women account for 48.6 percent of workers in the United States as of 1995, a disproportionate number of which are part-time workers. Thus, female-owned businesses also account for a smaller share of workers relative to the comparative participation of women in the work force.

Table 1b presents establishment counts for privately owned companies in the first quarter of 2007. This is done both for companies of all ages and size, and also for small companies (fewer than 10 employees) created in the previous year. Notice that among all private companies, there are roughly 511,000 manufacturing establishments in the database, 529,000 Wholesale Trade establishments, just shy of 1 million FIRE establishments, and nearly 2.8 million Service establishments. Of these companies, women-owned businesses account for roughly 11 percent in Manufacturing, 10 percent in Wholesale

[13] See http://factfinder.census.gov/servlet/IBQTable?_bm=y&-geo_id=D&-ds_name=SB0200A1&-_lang=en for a tabulation of the 2002 survey of business owners by the Census.

Trade, 10.6 percent in Services, and 7 percent in FIRE. Similar although slightly lower numbers are evident for newly created establishments. The key feature of these patterns is that female-owned companies again account for a relatively small share of businesses.[14]

The small share of SBA-classified female-owned businesses is evident at the 2-digit level (Table 2b) as well, but with more variation across industries as would be expected. Among all private companies in 2007:Q1, Textiles (SIC 22) and Apparel (SIC 23) have especially high shares of female-owned enterprises, 18.8 percent and 27.7 percent, respectively. Business services (SIC 73) and engineering/management services (SIC 87) are also noteworthy, with 14.4 percent and 12.8 percent female shares. On the other hand, among depository institutions (SIC 60) and Security and Commodity Brokers (SIC 62), women-owned businesses account for only roughly 1 percent and 3.6 percent of small establishments, respectively.

Table 1c reports total sales in millions of 2007 dollars at small (fewer than 10 workers), newly created (under 1 year in age), private establishments for the different 1-digit industries. In total, sales at female-owned companies are roughly 6.0 percent of sales at all privately owned companies. Table 2c disaggregates these values by 2-digit industry and further reports sales per worker for each of the 35 industries. This is done for all private establishments, SBA-defined female private, and for other private establishments. In most industries, sales per worker at female-owned and other private companies are similar, but differences do occur. Averaging across the 35 industries, sales per worker at private companies not owned by women equal 0.0970 in millions of 2007 dollars, or $97,000. Sales per worker at female-owned companies are $92,800, a difference of roughly 4.3 percent. Not only are total sales at female-owned businesses lower than at other privately owned companies – as would be expected given the smaller number of women businesses – but sales per worker also are lower. The question then is, why?

IV. Segregation, Agglomeration, and Output

A. Overview

The model in Section II has several implications for equilibrium spatial patterns of female-owned establishments. Several are tested here. Before proceeding, it is worth reemphasizing that in the D&B

[14] In our data, 10 percent of businesses are female owned (see the bottom row of Table 1b). In contrast, the Census Survey of Business Owners (see http://factfinder.census.gov/servlet/IBQTable?_bm=y&-geo_id=D&-ds_name=SB0200A1&-_lang=en) reports 25 percent female ownership for all companies in the United States and 16 percent for companies that hire workers. However, these Census measures take into account companies in all industries in all locations. Ours, in contrast, exclude certain industries such as retail where female ownership is more common. In addition, as noted earlier, the Census data include all Schedule C filers and this likely further increases the relative presence of women by including many part-time companies.

data gender of the business owner is based on the SBA definition of a female-owned business. As noted earlier, the nature of that classification scheme ensures that companies characterized as female-owned tend to be more heavily dominated by women decision makers compared to other privately owned companies. To the extent that men may contribute to decision making at companies classified as female-owned, and vice versa, for reasons outlined earlier, our results likely understate gender differences in business patterns.[15]

Bearing these classification issues in mind, we consider whether female-owned and other privately owned businesses are segregated. We also examine whether female-owned businesses are located in less agglomerated areas. In addition, we assess whether there is a weaker correlation between agglomeration and sales per worker at female-owned businesses; in this context, sales per worker is used as our measure of output. We begin with segregation.

B. Segregation

As noted, the first prediction of our model is that there will be a tendency towards segregation by gender. We will examine this hypothesis using two standard statistics, each of which is measured separately for each 2-digit industry in each MSA. The first statistic is the dissimilarity index. Let x_i^f be the number of female-owned establishments in tract i and X^f be the number of female-owned establishments in the entire MSA. Let X_i be the total number of establishments in tract i and X be the total number of establishments in the MSA. Then the dissimilarity index is defined as[16]

$$DIS = (1/2)\,\Sigma_{i=1}^{I} \left| x_i^f/X^f - (X_i - x_i^f)/(X - X^f) \right|. \qquad (25)$$

The dissimilarity index measures the degree to which a city's distribution of female entrepreneurship mirrors the distribution of the rest of its entrepreneurial activity. It takes on values between 0 and 1. A value of p is to be interpreted as meaning that p-percent of female entrepreneurs would have to change tracts in order that there be no segregation and the distribution of female entrepreneurship would be exactly the same as the overall distribution.

The second statistic that we employ is the index of isolation. It is calculated as

$$ISO = \Sigma_{i=1}^{I} (x_i^f/X_i)(x_i^f/X^f). \qquad (26)$$

[15] The U.S. Census, for example, documents four classifications of companies by gender in the 2002 survey of business owners (http://www.census.gov/csd/sbo/index.html), male-owned, female-owned, equally male and female owned, and other, where the latter category includes publicly owned companies and other companies for which gender could not be determined.

[16] See Massey and Denton (1988) for a discussion of the dissimilarity index.

This also can take on values between 0 and 1. The interpretation is as follows. Suppose a given female entrepreneur encounters another entrepreneur in her tract. ISO gives the probability that another female entrepreneur is encountered. Obviously, this depends on the total amount of female entrepreneurship.

We will calculate these two statistics at both the 1-digit and 2-digit industry levels. These approaches amount to considering the degree of spatial segregation within a 1- or 2-digit industry. Thus, they calculate spatial segregation taking gender segregation across industries as given. Although the latter is interesting in its own right, the spatial segregation that we are computing does not include the segregation arising from the combination of the segregation of men and women across industries and industries across space.

Table 3 presents average values of isolation and dissimilarity indices across MSAs for 1-digit industries. Figure 2 plots these values in a bar chart to facilitate review. Notice that the dissimilarity index in Panel B ranges from 10 to 20 percent. As a reference point, the value for African-American housing segregation throughout MSAs in the United States is 65 percent. At the 1-digit level, therefore, segregation appears modest. The values of the isolation indices are also relatively small.

Table 4 presents average values of segregation and isolation indices across MSAs for 2-digit industries. These values are also plotted in bar charts, in this case in Figures 3a and 3b. These results are striking. Although the aggregate (1-digit SIC level) pattern of unevenness across cities' census tracts exhibits only moderate segregation, the disaggregated (2-digit SIC level) pattern is quite different. In particular, there are many industries that have values of the dissimilarity index near 50 percent. For some industries, the value is above 65 percent. This means that controlling for industry, there is considerable segregation between female-operated business and the rest of business activity. The magnitude approaches and sometimes exceeds the level of segregation experienced by African-American households in housing markets. The values of the isolation indices are lower but still well above the overall industry-specific shares of female-owned businesses noted in Table 2b. This also is indicative of segregation.

In sum, we have identified a previously unknown pattern in the spatial structure of business, with a fairly strong tendency for female businesses to be segregated.

C. Agglomeration

The key result above is that there is spatial segregation of female entrepreneurs. At this point, we look at the pattern of segregation: where within a city do female and male businesses tend to locate? The prediction of the Section II's model is that female entrepreneurs will tend to choose locations where there is less activity nearby. There are two senses in which a location may be less agglomerated. It may have less overall activity, and it may have less activity in the entrepreneur's own industry.

We will now consider both. In characterizing agglomeration, we will use the values of total employment within 1-mile of an entrepreneur (urbanization) and own-industry employment within 1-mile (localization). As described in Section III, these values are calculated by estimating the amount of activity within 1 mile of the centroid of an entrepreneur's census tract. We will present both the simple mean values of urbanization and localization and their natural logarithms, with the latter being a convenient way to assess the percentage difference in the degree of nearby employment for male and female entrepreneurs.

As above, we will begin by calculating aggregate 1-digit statistics. Table 5's Panel A deals with urbanization. The table shows that for Manufacturing, FIRE, and Services, female entrepreneurs choose locations with significantly less aggregate activity. For Wholesale Trade, the difference between female and overall activity is also negative, the predicted sign, but the difference in means is insignificant. In the log model, all four differences are significant. The log model is helpful for interpretation, allowing the computation of the percentage by which female entrepreneurs are exposed to less agglomeration. In Manufacturing, the value is roughly 9 percent, while in Wholesale Trade it is slightly above 4 percent. In FIRE, the value is almost 24 percent, and in Services it is about 1 percent.

Panel B repeats this exercise for localization. The table shows that for Manufacturing, FIRE, and Services, female entrepreneurs choose locations with significantly less activity in their own industry (in levels). For Wholesale Trade, the difference is negative but insignificant. This is exactly the same as the urbanization pattern from Panel A. In the log model, the differences are significant except for Services. For the other three sectors, the percentage differences are large, equal to roughly 21 percent in Manufacturing, nearly 11 percent in while in Wholesale Trade, and nearly 29 percent in FIRE. In addition to being farther from centers of activity like downtowns and edge cities, female entrepreneurs appear to also be farther from centers of their own industry. This is exactly the pattern that the model predicts.

Tables 6 (urbanization) and 7 (localization) carry out the same exercise at the 2-digit level. These measures are also displayed in Figures 4a (urbanization) and 4b (localization) to facilitate review. The results are broadly consistent with the results from Table 5. Beginning with urbanization, we see that the signs in the linear and logarithmic models are nearly always negative; female entrepreneurs choose locations with less activity nearby. The percentage reductions in urbanization exposure for female entrepreneurs are quite large for some industries. In Textile Mill Products (SIC 22) the difference is more than 31 percent. In Apparel (SIC 23) it is more than 54 percent. In FIRE, the differences are respectively more than 33 percent and 26 percent for Insurance Carriers and Real Estate (SIC 63 and 65). For Legal Services (SIC 81), the difference is more than 21 percent. It is worth noting that many of the differences for individual industries are insignificant in the linear model. Inspection of Table 2 shows that these tend

to be industries with relatively little female activity, with the consequence being imprecise estimation. Even for these, differences are often significant in the log model.

The pattern for localization is quite similar, as Table 7 (and Figure 4b) shows. The last column shows some very large percentage differences in own industry employment within 1 mile. Returning to Textile Mill Products and Apparel (SIC 22 and 23), the differences are now roughly 75 percent. Every industry in the FIRE sector has a negative percentage difference, with the difference for Insurance Carriers (SIC 63) of over 64 percent. In sum, at the 2-digit industry level as at the 1-digit level, the data are consistent with the model's predictions. Female entrepreneurs choose locations that are farther from centers of overall activity and also centers of activity in their own industries.

D. Output

A further prediction of the model from Section II is that the correlation between a given level of agglomeration and output should be weaker for female entrepreneurs than for male entrepreneurs. Female entrepreneurs may derive less benefit from agglomeration because of cultural barriers that limit access to male-dominated business networks. This would reduce the positive impact of agglomeration on output at female- versus male-owned companies. Second, it is possible that female entrepreneurs may be less likely to locate their businesses in agglomerated areas (e.g. downtowns) because they face higher commuting costs as a consequence of their greater domestic burdens. For both reasons, we anticipate that the correlation between output and agglomeration should be weaker for SBA-defined private female-owned companies than for other privately owned companies.

To consider this issue, we regress establishment-level measures of sales per worker on localization and urbanization employment within one mile of the individual establishment. As noted earlier, we restrict the estimating sample to private establishments in 2007:Q1 that are small (fewer than 10 workers) and new (less than 1 year in age). The agglomeration measures are based on 2005:Q4 employment data including workers at companies of all sizes and age.[17] In addition, all of the sales/worker models control for 14 socio-demographic (SES) attributes of the year-2000 census tract.[18]

[17] As noted earlier, focusing on small establishments helps to mitigate measurement error in the sales data. Lagging the agglomeration controls relative to the dependent variable further helps to eliminate confounding effects of contemporaneous shocks that would impact both the amount of employment in an area and output.

[18] The SES controls included the percent of the tract population that is Hispanic, percent African American, average age of the tract population, percent of adults that are male, average income and income squared, percent of adults with high school degree, percent with some college, percent with college or more, unemployment rate, poverty rate, percent of female headed households with children, average age of the housing stock, percent of housing stock that is single family.

This helps to control for the possibility that factors other than the local level of business agglomeration may influence our estimates.[19]

Results of the sales per worker regressions are presented in Table 8 for all industries together and also stratified into the four 1-digit industry groups. When grouping all industries together we include controls for 1-digit industry fixed effects. When stratifying by 1-digit categories, we include controls for 2-digit fixed effects. In addition, in Panel A we control only for urbanization effects, while in Panel B we control for both urbanization and localization effects. All of these measures and the dependent variable are in logarithms.[20] The coefficients, therefore, represent elasticities. It is important to emphasize that our focus here is on correlations in the data. Those correlations reflect the combined effects of possible differential benefits from a given amount of agglomeration and differences in domestic circumstances.

In Panel A, when all industries are grouped together (the first column), the urbanization elasticity for other private businesses is 0.49 percent. The elasticity is -0.3 percent for female-owned business. This difference is highly significant. This confirms the basic prediction of the model of a stronger correlation between agglomeration and output at companies not classified by the SBA as female-owned as compared to female-owned private establishments. Stratifying the model into 1-digit industries and including 2-digit fixed effects, analogous qualitative differences are obtained for Manufacturing, Wholesale Trade, FIRE, and Services.

Consider now Panel B, which includes controls for localization (own-industry) employment within one mile. With this specification a sharper pattern emerges. In particular, previous literature (e.g. Rosenthal and Strange (2003)) has found that localization measures are especially positively associated with indicators of output upon controlling for urbanization. With that in mind, we focus on the localization elasticities for the 1-digit industry regressions including 2-digit fixed effects.

In Panel B of Table 8, the localization elasticity is significantly higher for non-female (other) private businesses than for female-owned businesses in three of the four 1-digit industries, Wholesale Trade, FIRE, and Services. In these industries, the differences are roughly 3.5 percentage points, 3.0 percentage points, and 2.9 percentage points, respectively. In Manufacturing the difference is much smaller, just 0.41 percentage points, and of the opposite sign. For Wholesale Trade, FIRE, and Services, therefore, these estimates confirm the basic proposition that the correlation between output per worker and localization should be stronger for private companies that do not satisfy the SBA definition of female ownership as compared to those that do.

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[19] All of the sales/worker models were also run omitting the SES variables. Although the SES variables are generally significant, omitting these variables had little impact on the qualitative or even the quantitative magnitude of the estimated agglomeration coefficients.

[20] To avoid having to drop locations from the sample in which no 2005:Q4 employment in a given category was present (e.g. female-owned companies in a given 2-digit industry), we added 1 to the employment counts before creating the urbanization and localization variables. This was done both in Table 8 and also in Table 9.

V. Mechanisms

A. Business networks

This section considers the two mechanisms at work in Section II's models: differential access to business networks and differences in domestic burdens. We focus first on access to business networks.

Barriers that limit the access of female entrepreneurs to male-dominated business networks are a possible explanation of the new spatial mismatch documented in the previous section. Identifying such barriers is parallel to identifying discrimination in labor markets. As noted at length in Altonji and Blank's (1999) survey and in many other places, identifying such discrimination is very difficult. In wage studies, for example, regressing wage on worker characteristics and a dummy for gender produces an unexplained residual. While this residual is consistent with discrimination, the set of controls for worker characteristics is always incomplete, so it is difficult to be certain that the unexplained residual is associated with discrimination rather than with unobserved heterogeneity. Similarly, we must be concerned with unobserved heterogeneity in our analysis of entrepreneurship as well. For that reason, we view our evidence on differential access to business networks as tentative given the limitations of our data. Nevertheless, our focus on entrepreneurship and agglomeration provides an opportunity to consider discrimination in a way not possible in wage studies.

Suppose that female entrepreneurs are less able to access male-dominated business networks because of cultural differences and/or outright discrimination. In this case, female entrepreneurs would derive less spillover benefits from proximity to employment at male-owned and publicly held companies than would male entrepreneurs. In other words, the old boys network hypothesis makes predictions about double-differences: the extent to which male and female entrepreneurs are impacted differently by different sorts of activity nearby. In order to see if this pattern appears in the data, we disaggregate the agglomeration controls in the regression models reported in panel B of Table 8. Specifically, the controls are disaggregated into employment at SBA-defined female-owned, other privately owned, and publicly-owned companies. Results from this exercise are presented in Table 9. As before, the coefficients measure the elasticity of sales per worker with respect to different types of employment within one mile.

We are looking for evidence of whether localization elasticities with respect to employment at other private- and publicly-owned companies are lower for female entrepreneurs than for entrepreneurs at companies that do not meet SBA definitions of female ownership. In Table 9, we do not see compelling evidence of such patterns in Manufacturing, Services, or Wholesale Trade. In FIRE, the situation is different. In this industry, for private companies that do not meet SBA definitions of female ownership, the localization elasticity with respect to employment at private non-female owned establishments is roughly 3.0 percentage points higher than for female business owners. That difference is highly

significant. For employment at publicly-owned companies, the corresponding difference is roughly 1.2 percentage points, and also highly significant. This pattern echoes the interviews with FIRE workers presented in the introduction. It is consistent with what one would expect to find if women faced cultural barriers that restricted their access to male-dominated business networks. For FIRE, therefore, the regression results are consistent with gender differentials in access to business networks. At the same time, we emphasize again that our evidence of differential access to business networks is tentative given limitations of the data. As will be apparent, our evidence on gender differences in commuting behavior is more definitive.

B. Commuting

The model in Section II also predicts shorter commutes for female workers. This is similar to predictions in Madden (1981), White (1986), and Turner and Niemeier (1997), all of whom emphasize differences in domestic burdens. In our model, shorter commutes for female workers is a consequence of both the lower value of traveling to agglomerated work sites and also the greater opportunity cost of agglomerating because of more burdensome domestic responsibilities. The former reduces the reward from a long commute, while the latter actively penalizes a long commute.[21]

To examine commuting patterns, we use individual-level data from the 5 percent sample of the 2000 Decennial Census. The basic specification will be an OLS regression of commuting minutes on various socio-economic and demographic characteristics. The key variables for our purposes relate to gender. We include a dummy for a female worker, another for whether children are present in the home, and a third interactive dummy for both being female and having children in the home. The models are estimated for a sample of workers with strictly positive commute time (not working at home) and for a sample including all workers. The latter includes individuals who work out of their homes and report zero commutes. Within these two samples, the commuting models are estimated separately for self-employed workers (a standard way to capture entrepreneurs in Census data), for non-self-employed, and for all workers. In all cases, we restrict our samples to those individuals who work full time, defined here

[21] Madden (1981) uses data from the Panel Survey of Income Dynamics to examine gender differences in commute times. White (1986) uses data for New York city from the 1980 Annual Housing Survey. Turner and Niemeier (1997) use roughly 19,000 observations from the 1990 National Personal Transportation Survey. As will be apparent, our empirical analysis of commuting behavior differs from these earlier studies in two important respects. First, we use more recent year-2000 data from the public use micro sample of the Census. The more recent data better matches the time period of our D&B data (2007) and allows for changes in commuting behavior that may have occurred in the last few decades. In addition, the PUMS sample contains millions of individual records and this allows us to focus only on full-time workers while also including extensive controls in the regression model. Those controls include most measures typically found in wage regressions, in addition to roughly 16,000 MSA/Occupation fixed effects. The extensive set of controls helps to address possible unobserved worker and location attributes that could otherwise obscure gender differences in commuting behavior..

as 35 hours or more per week.[22] All of the models also control for a standard range of socio-demographic worker attributes (e.g. education, race, age, etc.). In addition, we further control for roughly 11,000 to 16,000 MSA/occupation fixed effects depending on the model specification.

Table 10 presents the results. The sign on the female dummy is always negative and very strongly significant. For the three models of workers not working at home, the values are quite similar, with female workers commuting between 1.3 and 1.5 minutes less per trip to work. The numbers are slightly larger for the all-workers sample, while the commuting difference is much larger for self-employed. This reflects the presence in this sample of many self-employed workers who work at home, and so have zero commute time. Having a child present in the home is associated with an increase in commuting time in the range of 0.6 to 0.7 minutes. This should be interpreted as the effect on a male worker. Importantly, the interaction of female dummy and the presence of a child is negative, large, and highly significant. Among self-employed workers, that term implies that for individuals not working at home, women commute 1.2 minutes less (1-way) relative to comparable men when children are present. Among all self-employed workers, the presence of a child reduces the women's commute 2.3 minutes relative to a comparable male worker. The combined impact of these estimates can be obtained by adding together the relevant coefficients. Among self-employed workers who do not work at home, women with children commute roughly 2.5 minutes less than men. Among all self-employed workers, women with children commute just over 5 minutes less than comparable men. Considering that the average commute for a typical full-time worker in the United States is roughly 25 minutes, these are very large effects.

This pattern of results is consistent with predictions of the model. If women workers incur higher commuting costs because of the domestic division of labor the coefficient on *Female* should be negative. The same would be true if women derive less value from business networks found in agglomerated areas. The negative coefficient on *Female*, therefore, is consistent with the idea that women workers face constraints relative to their male counterparts. Note, however, that differential access to business networks would not explain the negative coefficient obtained on the interacted variable, *Female*Child Present*. Instead, that result provides direct evidence that women workers with children have larger domestic burdens than their male counterparts, and as a consequence, shorter commutes.[23]

[22] This is identified in the IPUMS by the usual hours worked per week variable.

[23] It is worth noting that these interpretations are consistent with findings from the 1976 Panel Survey of Income Dynamics analysis of Madden (1981). The key result there is that domestic roles impact commuting times for women.

VI. Conclusion

Despite the high costs involved, entrepreneurs continue to be drawn to cities and to industry clusters. This is because agglomeration can contribute to business success by allowing firms to draw on local business networks and other features of the local economy. For two reasons, however, female entrepreneurs may be less strongly attracted than their male counterparts to cities and industry clusters. The first is that women often bear disproportionate responsibilities at home, and as a result, incur greater costs from lengthy commutes. This can discourage women from locating their businesses in densely developed areas, which are often far from attractive residential opportunities. The second is that businesswomen may be less networked than their male counterparts, and as a result, may benefit less from agglomeration. This reduces the attraction of industry centers.

This paper has presented a model incorporating these forces and has tested the model's predictions by comparing the location patterns of companies classified by the SBA as female-owned to those of other privately owned businesses. Segregation measures indicate that for most industries, there is extensive spatial stratification of female- and non-female owned businesses within individual cities, often to a degree roughly comparable in magnitude to white-black residential segregation. In addition, for a wide range of industries, female-owned companies are located in less agglomerated areas, both with respect to the overall level of business activity and also the level of nearby employment in the own industry. Finally, there is evidence that the relationship between output and agglomeration is weaker for female entrepreneurs. All of these outcomes are predicted by the conceptual model. But none of these outcomes have previously been documented.

To consider the mechanisms responsible for these patterns, the paper has carried out two further sorts of analysis. The first is to consider whether the relationship between output and employment at other private and publicly held companies is weaker for businesses classified by the SBA as female-owned as compared to other privately owned establishments; this would likely be the case in the presence of networking barriers. We find significant evidence of this pattern for the FIRE sector, but not in Manufacturing, Wholesale Trade, and Services. This suggests that one needs to look beyond old boy networks for an explanation of the widespread gender differences in business location patterns observed in the other industries. Accordingly, the second sort of analysis examines commuting behavior. Consistent with several early studies (e.g. Madden (1981) and White (1986)), the paper finds that women commute shorter distances, an effect that is magnified if children are present in the home. This is consistent with the idea that women entrepreneurs (and workers in general) face higher implicit commuting costs because of their greater domestic demands. This mechanism is also general, applying to entrepreneurs in all industries.

Regardless of the underlying mechanism, our finding that women entrepreneurs agglomerate less is important. There is a large body of work establishing that densely developed locations and industry clusters confer both static and dynamic advantages on those who locate there. This paper shows that these benefits are not proportionately enjoyed by the female business sector. Instead, because women entrepreneurs face constraints relative to their male counterparts they tend to operate their companies in less advantageous locations. We characterize this as a new sort of spatial mismatch.

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Table 1a
Employment at Different Types of Establishment in the First Quarter of 2007 1-Digit Industry[a]

Industry Name	Industry SIC Category	Private Plus Public Establishments	Female-Owned Private Establishments	Other Private Establishments	Percent of Total Employment at Female-Owned Private Establishments
Manufacturing	20-39	12,908,676	478,844	11,806,672	0.0371
Wholesale Trade	50, 51	5,257,851	322,815	4,898,385	0.0614
FIRE	60-65, 67s	8,112,456	293,279	7,630,573	0.0362
Services	73, 80, 81, 86, 87, 89	25,503,650	1,577,183	23,692,583	0.0618
TOTAL	All Industries Above	51,782,633	2,672,121	48,028,214	0.0516

Table 1b
Privately Owned Establishment Counts in the First Quarter of 2007 by 1-Digit Industry[a]

		All Establishments of All Ages and Size				Newly Arrived (< 1 year in age) Small (< 10 employees) Establishments			
Industry Name	Industry SIC	Total Private	Female Owned	Other Private	Percent Female Owned	Total Private	Female Owned	Other Private	Percent Female Owned
Manufacturing	20-39	510,717	56,149	454,568	0.1099	24,872	2,335	22,537	0.0939
Wholesale Trade	50, 51	529,261	54,104	475,156	0.1022	27,756	2,441	25,315	0.0879
FIRE	60-65, 67	958,226	67,745	890,481	0.0707	56,440	2,030	54,410	0.0360
Services	73, 80, 81, 86, 87, 89	2,759,019	291,995	2,467,024	0.1058	139,904	9,306	130,598	0.0665
TOTAL	All Industries Above	4,757,224	469,994	4,287,230	0.0988	248,971	16,112	232,860	0.0647

Table 1c
Total Sales (Millions in 2007 Dollars) at Privately Owned, Small (< 10 Employees), Newly Arrived (< 1 year) Establishments in the First Quarter of 2007 by 1-Digit Industry[a]

Industry Name	Industry SIC Category	All Private Establishments	Female Owned Private Establishments	Other Private Establishments	Percent of Total Sales at Female-Owned Establishments
Manufacturing	20-39	4,986	419	4,567	0.0840
Wholesale Trade	50, 51	11,209	762	10,448	0.0680
FIRE	60-65, 67	11,855	398	11,456	0.0336
Services	73, 80, 81, 86, 87, 89	20,143	1,313	18,830	0.0652
TOTAL	All Industries Above	48,193	2,892	45,301	0.0600

[a]Private companies classified by the SBA as women-owned are labeled "Female Owned".

Table 2a
Employment at Different Types of Establishment in the First Quarter of 2007 by 2-Digit Industry[a]

Industry Name	Industry SIC	Private Plus Public Establishments	Female-Owned Private Establishments	Other Private Establishments	Percent of Total Employment at Female-Owned Private Establishments
Food and Kindred Products	20	1,037,496	31,674	975,229	0.0305
Tobacco Products	21	29,867	100	27,689	0.0033
Textile Mill Products	22	230,189	9,413	214,256	0.0409
Apparel & Other Fabric Products	23	310,553	34,314	267,015	0.1105
Wood Producs Except Furniture	24	366,835	13,117	351,088	0.0358
Furniture and Fixtures	25	328,969	12,497	306,861	0.0380
Paper and Allied Products	26	446,013	13,591	410,067	0.0305
Printing, Publishing & Allied	27	1,366,527	75,921	1,271,705	0.0556
Chemicals and Allied Products	28	882,247	18,556	754,757	0.0210
Petroleum Refining and Related	29	113,964	1,816	98,842	0.0159
Rubber & Misc Plastic Products	30	639,004	24,745	597,139	0.0387
Leather & Leather Products	31	45,881	3,669	37,646	0.0800
Stone, Clay, Glass, Concrete Prod.	32	393,885	13,915	375,855	0.0353
Primary Metal Industries	33	441,220	10,925	416,647	0.0248
Fab Metal Ex Machinery & Trans.	34	1,085,625	53,043	1,020,884	0.0489
Ind & Com. Mach. & Computers	35	1,516,204	58,700	1,379,616	0.0387
Elec & Components Ex Computer	36	1,235,751	33,420	1,083,813	0.0270
Transportation Equipment	37	1,185,381	14,872	1,136,988	0.0125
Photo, Medical & Optical Goods	38	857,516	19,521	732,074	0.0228
Misc Manufacturing	39	395,550	35,036	348,502	0.0886
Wholesale Trade: Durables	50	3,355,516	202,356	3,128,283	0.0603
Wholesale Trade: Non-Durables	51	1,902,335	120,458	1,770,102	0.0633
Depository Institutions	60	1,247,243	5,489	1,201,796	0.0044
Nondepository Credit Institutions	61	841,336	40,918	788,657	0.0486
Security & Com, Brokers/Dealers	62	708,521	9,751	668,571	0.0138
Insurance Carriers	63	1,113,988	8,863	1,031,390	0.0080
Insurance Agents, Brokers, Service	64	1,020,389	50,131	964,188	0.0491
Real Estate	65	2,616,416	168,156	2,443,860	0.0643
Holding & Other Investment Offices	67	564,562	9,973	532,111	0.0177
Business Services	73	6,938,361	749,751	6,018,505	0.1081
Health Services	80	9,534,705	384,284	9,126,432	0.0403
Legal Services	81	1,303,925	54,553	1,249,180	0.0418
Membership Organizations	86	2,235,121	369	2,234,728	0.0002
Eng, Acc, Research, Management	87	5,314,152	368,137	4,906,458	0.0693
Services not elsewhere classified	89	177,386	20,089	157,280	0.1133
TOTAL of all Industries Above	-	51,782,633	2,672,121	48,028,214	0.0516

[a]Private companies classified by the SBA as women-owned are labeled "Female Owned".

Table 2b
Privately Owned Establishment Counts in the First Quarter of 2007 by 2-Digit Industry[a]

		All Establishments of All Ages and Size				Newly Arrived (< 1 year in age) Small (< 10 employees) Establishments			
Industry Name	Industry SIC	Total Private	Female Owned	Other Private	Percent Female Owned	Total Private	Female Owned	Other Private	Percent Female Owned
Food and Kindred Products	20	25,859	2,580	23,279	0.0998	1,200	133	1,066	0.1112
Tobacco Products	21	481	24	457	0.0491	39	0	39	0.0000
Textile Mill Products	22	8,689	1,636	7,053	0.1883	433	73	359	0.1696
Apparel & Other Fabric Products	23	24,784	6,872	17,912	0.2773	1,688	350	1,337	0.2076
Wood Products Except Furniture	24	28,230	1,616	26,614	0.0572	1,730	48	1,682	0.0277
Furniture and Fixtures	25	14,144	1,261	12,883	0.0891	629	55	574	0.0868
Paper and Allied Products	26	9,138	978	8,159	0.1071	273	51	222	0.1863
Printing, Publishing & Allied	27	90,845	12,698	78,148	0.1398	5,736	482	5,254	0.0840
Chemicals and Allied Products	28	24,412	2,263	22,149	0.0927	988	120	869	0.1211
Petroleum Refining and Related	29	3,137	163	2,974	0.0520	87	2	84	0.0271
Rubber & Misc Plastic Products	30	16,018	1,182	14,836	0.0738	327	31	296	0.0943
Leather & Leather Products	31	3,087	541	2,546	0.1752	250	44	206	0.1769
Stone, Clay, Glass, Concrete Prod.	32	20,742	2,174	18,568	0.1048	1,035	101	934	0.0980
Primary Metal Industries	33	9,054	509	8,545	0.0562	209	12	197	0.0569
Fab Metal Ex Machinery & Trans.	34	43,050	3,408	39,642	0.0792	1,266	103	1,163	0.0815
Ind & Com. Mach. & Computers	35	66,992	4,741	62,251	0.0708	2,144	128	2,016	0.0595
Elec & Components Ex Computer	36	32,108	2,282	29,826	0.0711	1,650	94	1,556	0.0571
Transportation Equipment	37	16,887	987	15,900	0.0584	790	58	732	0.0731
Photo, Medical & Optical Goods	38	22,822	1,780	21,042	0.0780	818	70	748	0.0860
Misc Manufacturing	39	50,241	8,455	41,785	0.1683	3,580	379	3,201	0.1058
Wholesale Trade: Durables	50	355,138	32,689	322,449	0.0920	18,084	1,427	16,657	0.0789
Wholesale Trade: Non-Durables	51	174,123	21,415	152,707	0.1230	9,672	1,013	8,658	0.1048
Depository Institutions	60	83,954	979	82,975	0.0117	1,318	19	1,299	0.0141
Nondepository Credit Institutions	61	92,497	7,213	85,283	0.0780	7,898	258	7,640	0.0327
Security & Com, Brokers/Dealers	62	64,290	2,291	61,999	0.0356	5,409	152	5,256	0.0282
Insurance Carriers	63	27,101	1,291	25,810	0.0476	957	46	912	0.0478
Insurance Agents, Brokers, Service	64	153,480	14,430	139,050	0.0940	5,755	347	5,407	0.0604
Real Estate	65	454,494	38,611	415,882	0.0850	25,802	992	24,810	0.0384
Holding & Other Invest. Offices	67	82,412	2,930	79,482	0.0356	9,301	216	9,085	0.0232
Business Services	73	881,672	126,949	754,724	0.1440	66,996	4,823	62,173	0.0720
Health Services	80	603,510	58,041	545,470	0.0962	15,313	994	14,319	0.0649
Legal Services	81	199,788	18,023	181,765	0.0902	3,264	212	3,052	0.0650
Membership Organizations	86	389,545	67	389,479	0.0002	7,480	4	7,476	0.0005
Eng, Acc, Research, Management	87	600,395	76,926	523,469	0.1281	37,479	2,855	34,624	0.0762
Services not elsewhere classified	89	84,108	11,990	72,118	0.1426	9,372	418	8,954	0.0446
TOTAL of all Industries Above	-	4,757,224	469,994	4,287,230	0.0988	248,971	16,112	232,860	0.0647

[a]Private companies classified by the SBA as women-owned are labeled "Female Owned".

Table 2c
2-Digit SIC Industry TOTAL Sales and Sales Per Worker (Millions in 2007 Dollars)
at Small (< 10 Employees) Privately Owned, Newly Arrived (< 1 year) Establishments
in the First Quarter of 2007 by 2-Digit Industry[a]

		Total Sales at New Establishments			Sales Per Worker at New Establishments		
Industry Name	Industry SIC	All Private	Female-Owned Private	Other Private	All Private	Female-Owned Private	Other Private
Food and Kindred Products	20	467	35	432	0.1546	0.1224	0.1580
Tobacco Products	21	8	0	8	0.1081	-	0.1081
Textile Mill Products	22	105	21	84	0.1107	0.1453	0.1045
Apparel & Other Fabric Products	23	288	56	233	0.0897	0.0956	0.0883
Wood Producs Except Furniture	24	245	10	235	0.0785	0.0887	0.0782
Furniture and Fixtures	25	112	9	103	0.0772	0.0721	0.0777
Paper and Allied Products	26	55	10	45	0.0946	0.1032	0.0930
Printing, Publishing & Allied	27	753	63	690	0.0711	0.0674	0.0715
Chemicals and Allied Products	28	285	22	263	0.1086	0.0880	0.1108
Petroleum Refining and Related	29	36	0	36	0.1331	0.1000	0.1337
Rubber & Misc Plastic Products	30	89	4	85	0.1004	0.0722	0.1022
Leather & Leather Products	31	38	5	33	0.0757	0.0598	0.0788
Stone, Clay, Glass, Concrete Prod.	32	181	12	169	0.0787	0.0675	0.0797
Primary Metal Industries	33	120	4	116	0.1913	0.1060	0.1963
Fab Metal Ex Machinery & Trans.	34	366	38	327	0.1110	0.1532	0.1075
Ind & Com. Mach. & Computers	35	543	25	519	0.1013	0.0732	0.1032
Elec & Components Ex Computer	36	465	22	443	0.1062	0.0876	0.1073
Transportation Equipment	37	166	26	140	0.0867	0.1705	0.0796
Photo, Medical & Optical Goods	38	190	12	178	0.0864	0.0721	0.0875
Misc Manufacturing	39	471	45	426	0.0772	0.0696	0.0781
Wholesale Trade: Durables	50	7,253	442	6,811	0.1757	0.1474	0.1779
Wholesale Trade: Non-Durables	51	3,956	319	3,637	0.1905	0.1611	0.1936
Depository Institutions	60	423	2	421	0.1295	0.0666	0.1302
Nondepository Credit Institutions	61	2,289	85	2,203	0.1137	0.1280	0.1132
Security & Com, Brokers/Dealers	62	940	38	902	0.0764	0.1109	0.0754
Insurance Carriers	63	540	9	532	0.2306	0.0915	0.2364
Insurance Agents, Brokers, Service	64	976	55	921	0.0778	0.0759	0.0779
Real Estate	65	4,526	163	4,363	0.0804	0.0778	0.0805
Holding & Other Investment Offices	67	2,161	46	2,115	0.1083	0.1069	0.1084
Business Services	73	9,047	672	8,376	0.0814	0.0793	0.0816
Health Services	80	2,757	146	2,611	0.0651	0.0615	0.0654
Legal Services	81	510	33	477	0.0634	0.0700	0.0630
Membership Organizations	86	858	0	857	0.0586	0.0500	0.0586
Eng, Acc, Research, Management	87	5,980	414	5,567	0.0873	0.0806	0.0879
Services not elsewhere classified	89	990	47	943	0.0868	0.0770	0.0874
TOTAL of all Industries Above	-	48,193	2,892	45,301	0.0967	0.0928	0.0970

[a]Private companies classified by the SBA as women-owned are labeled "Female Owned".

Table 3
Segregation of Female-Owned Private Businesses for 1-Digit Industries

Average Segregation Index Values Across MSAs
Based on Counts of Establishments in the First Quarter of 2007

Industry Name	Industry SIC Category	Isolation Index[a]	Dissimiilarity Index[b]
Manufacturing	20-39	0.133	0.196
Wholesale Trade	50, 51	0.121	0.200
FIRE	60-65, 67	0.087	0.169
Services	73, 80, 81, 86, 87, 89	0.101	0.105

[a]The Isolation index measures the extent to which private women-owned businesses are "exposed" only to one another. This is computed as the women-owned weighted average of the women-owned proportion of businesses in a given census tract in a given MSA.

[b]The Dissimilarity index measures the percentage of private women-owned establishments in a given MSA that would have to move to a different census tract if each tract in the MSA was to have the same percentage of private women-owned businesses as the MSA overall.

Table 4
Segregation of Female-Owned Private Businesses for 2-Digit Industries

Average Segregation Index Values Across MSAs
Based on Counts of Establishments in the First Quarter of 2007

Industry Name	Industry SIC	Isolation Index[a]	Dissimilarity Index[b]	Industry Name	Industry SIC	Isolation Index[a]	Dissimilarity Index[b]
MANUFACTURING				WHOLESALE TRADE			
Food and Kindred Products	20	0.366	0.644	Durables	50	0.120	0.244
Tobacco Products	21	0.056	0.047	Non-Durables	51	0.181	0.313
Textile Mill Products	22	0.606	0.664				
Apparel & Other Fabric Products	23	0.565	0.537	FIRE			
Wood Products Except Furniture	24	0.270	0.683	Depository Institutions	60	0.072	0.545
Furniture and Fixtures	25	0.408	0.632	Nondepository Credit Institutions	61	0.180	0.473
Paper and Allied Products	26	0.442	0.568	Security & Com, Brokers/Dealers	62	0.166	0.571
Printing, Publishing & Allied	27	0.252	0.392	Insurance Carriers	63	0.271	0.584
Chemicals and Allied Products	28	0.374	0.623	Ins. Agents, Brokers, Service	64	0.148	0.318
Petroleum Refining and Related	29	0.262	0.325	Real Estate	65	0.117	0.210
Rubber & Misc Plastic Products	30	0.333	0.572	Holding & Other Invest. Offices	67	0.173	0.590
Leather & Leather Products	31	0.473	0.501				
Stone, Clay, Glass, Concrete Prod.	32	0.400	0.666	SERVICES			
Primary Metal Industries	33	0.333	0.510	Business Services	73	0.156	0.137
Fab Metal Ex Machinery & Trans.	34	0.263	0.587	Health Services	80	0.106	0.185
Ind & Com. Mach. & Computers	35	0.204	0.539	Legal Services	81	0.139	0.284
Elec & Components Ex Computer	36	0.294	0.585	Membership Organizations	86	0.004	0.174
Transportation Equipment	37	0.302	0.607	Eng, Acc, Research, Management	87	0.144	0.185
Photo, Medical & Optical Goods	38	0.331	0.587	Services not elsewhere classified	89	0.252	0.432
Misc Manufacturing	39	0.333	0.445				

[a]The Isolation index measures the extent to which private women-owned businesses are "exposed" only to one another. This is computed as the women-owned weighted average of the women-owned proportion of businesses in a given census tract in a given MSA.

[b]The Dissimilarity index measures the percentage of private women-owned establishments in a given MSA that would have to move to a different census tract if each tract in the MSA was to have the same percentage of private women-owned businesses as the MSA overall.

Table 5
Excess Urbanization and Localization of Female-Owned Private Establishments in 2007:Q1
by 1-Digit Industries

PANEL A: Excess Urbanization[a]

Industry Name	Industry SIC	Mean for All Private Est.	Mean Female-Owned - Mean All Private	T-ratio on Mean Female-Owned - Mean All Private	Coeff on Female Dummy in Semi-Log Model	T-ratio on Female Dummy in Semi-Log Model	% Excess Urbanization of Women-Owned Business[c]
Manufacturing	20-39	339694	-40144	-13.72	-0.0975	-11.59	-9.29
Wholesale Trade	50, 51	41478	-1329	-0.45	-0.0450	-5.28	-4.41
FIRE	60-65, 67	132687	-48230	-18.50	-0.2739	-36.54	-23.96
Services	73, 80, 81, 86, 87, 89	109878	-5430	-4.24	-0.0102	-2.78	-1.02

PANEL B: Excess Localization[b]

Industry Name	Industry SIC	Mean for All Private Est.	Mean Female-Owned - Mean All Private	T-ratio on Mean Female-Owned - Mean All Private	Coeff on Female Dummy in Semi-Log Model	T-ratio on Female Dummy in Semi-Log Model	% Excess Localization of Women-Owned Business[c]
Manufacturing	20-39	2194	-293	-3.25	-0.2435	-25.79	-21.62
Wholesale Trade	50-51	1493	-81	-0.89	-0.1157	-12.08	-10.93
FIRE	60-65, 67	3165	-1475	-18.38	-0.3377	-40.13	-28.66
Services	73, 80-81, 86-87, 89	5731	-327	-8.30	0.0003	0.08	0.03

[a]Urbanization is measured as total employment in 2007:Q1 at companies in all industries within 1 mile.
[b]Localization is measured as total employment in 2007:Q1 at companies in the "own" 1-digit industry within 1 mile.
[c]Equal to 100 x (exp[b - V(b)/2] - 1) where b is the coefficient on the Female dummy in the semi-log model, and V(b) is its estimated variance. See Halvorsen and Palmquist (1980) and Kennedy (1981) for details.

Table 6
Excess Urbanization of Female-Owned Private Establishments in 2007:Q1
by 2-Digit Industries[a]

Industry Name	Industry SIC	Mean for All Private Est.	Mean Female-Owned - Mean All Private	T-ratio on Mean Female-Owned - Mean All Private	Coeff on Female Dummy in Semi-Log Model	T-ratio on Female Dummy in Semi-Log Model	% Excess Urban-ization of Women-Owned Business[b]
Food and Kindred Products	20	10770	687	0.43	0.0279	0.72	2.75
Tobacco Products	21	15365	-5486	-0.34	0.0929	0.24	1.58
Textile Mill Products	22	41871	-21446	-10.27	-0.3789	-7.42	-31.63
Apparel & Other Fabric Products	23	62528	-37179	-34.42	-0.7726	-29.24	-53.84
Wood Products Except Furniture	24	5543	2360	1.21	0.1041	2.18	10.84
Furniture and Fixtures	25	12459	102	0.05	-0.0581	-1.06	-5.79
Paper and Allied Products	26	12400	-667	-0.26	-0.1002	-1.59	-9.72
Printing, Publishing & Allied	27	25645	-8303	-11.40	-0.2529	-14.20	-22.36
Chemicals and Allied Products	28	16337	-3736	-2.22	-0.2314	-5.63	-20.72
Petroleum Refining and Related	29	13090	-1583	-0.26	-0.0190	-0.13	-2.97
Rubber & Misc Plastic Products	30	8816	976	0.42	0.0459	0.82	4.53
Leather & Leather Products	31	36991	-9820	-2.72	-0.2903	-3.29	-25.48
Stone, Clay, Glass, Concrete Prod.	32	7918	399	0.23	-0.0720	-1.71	-7.03
Primary Metal Industries	33	11683	-4512	-1.30	-0.0719	-0.85	-7.27
Fab Metal Ex Machinery & Trans.	34	9442	736	0.54	0.0126	0.38	1.21
Ind & Com. Mach. & Computers	35	8274	277	0.24	0.0143	0.51	1.40
Elec & Components Ex Computer	36	12842	-1905	-1.15	-0.1662	-4.11	-15.38
Transportation Equipment	37	7448	-650	-0.26	-0.1048	-1.71	-10.11
Photo, Medical & Optical Goods	38	11759	2015	1.07	-0.0746	-1.62	-7.29
Misc Manufacturing	39	26888	-11102	-12.23	-0.3255	-14.66	-27.80
Wholesale Trade: Durables	50	16601	142	0.32	-0.0246	-2.28	-2.44
Wholesale Trade: Non-Durables	51	29476	-4317	-7.77	-0.1035	-7.62	-9.84
Depository Institutions	60	16026	-28	-0.01	0.2367	3.95	26.48
Nondepository Credit Institutions	61	12314	-2535	-2.72	-0.1043	-4.57	-9.93
Security & Com, Brokers/Dealers	62	39387	-9637	-5.95	-0.2093	-5.28	-18.95
Insurance Carriers	63	22503	-9839	-4.53	-0.4006	-7.54	-33.10
Insurance Agents, Brokers, Service	64	12265	-2807	-4.22	-0.1393	-8.56	-13.02
Real Estate	65	17121	-5260	-12.99	-0.3108	-31.37	-26.72
Holding & Other Investment Offices	67	33355	-15535	-10.85	-0.2653	-7.57	-23.35
Business Services	73	18234	-1840	-7.97	-0.0675	-11.94	-6.53
Health Services	80	13681	1588	4.78	0.0451	5.54	4.61
Legal Services	81	40065	-10162	-17.10	-0.2340	-16.09	-20.88
Membership Organizations	86	12447	8700	0.93	0.5803	2.54	74.07
Eng, Acc, Research, Management	87	20703	-2547	-8.67	-0.1111	-15.45	-10.52
Services not elsewhere classified	89	13679	1215	1.62	0.0442	2.41	4.50

[b]Urbanization is measured as total employment in 2007:Q1 at companies in all industries within 1 mile.
[b]Equal to 100 x (exp[b - V(b)/2] - 1) where b is the coefficient on the Female dummy in the semi-log model, and V(b) is its estimated variance. See Halvorsen and Palmquist (1980) and Kennedy (1981) for details.

Table 7
Excess Localization of Female-Owned Private Establishments in 2007:Q1
By 2-Digit Industries[a]

Industry Name	Industry SIC	Mean for All Private Est.	Mean Female-Owned - Mean All Private	T-ratio on Mean Female-Owned - Mean All Private	Coeff on Female Dummy in Semi-Log Model	T-ratio on Female Dummy in Semi-Log Model	% Excess Local-ization of Women-Owned Business[b]
Food and Kindred Products	20	120	-21	-0.18	-0.4717	-10.35	-37.67
Tobacco Products	21	213	-155	-0.13	0.0243	0.05	-7.99
Textile Mill Products	22	201	-127	-0.82	-1.5125	-25.09	-78.00
Apparel & Other Fabric Products	23	2043	-1357	-17.01	-1.3773	-44.19	-74.79
Wood Producs Except Furniture	24	18	-1	-0.00	-0.0576	-1.02	-5.75
Furniture and Fixtures	25	53	-17	-0.10	-0.4116	-6.35	-33.88
Paper and Allied Products	26	116	-53	-0.28	-1.0631	-14.30	-65.56
Printing, Publishing & Allied	27	969	-413	-7.68	-0.3924	-18.67	-32.47
Chemicals and Allied Products	28	175	-76	-0.62	-0.8532	-17.60	-57.45
Petroleum Refining and Related	29	135	-75	-0.17	-0.4171	-2.36	-35.13
Rubber & Misc Plastic Products	30	70	-12	-0.07	-0.3233	-4.87	-27.79
Leather & Leather Products	31	44	-19	-0.07	-0.7317	-7.02	-52.15
Stone, Clay, Glass, Concrete Prod.	32	28	-8	-0.06	-0.4854	-9.75	-38.53
Primary Metal Industries	33	57	-22	-0.08	-0.4668	-4.66	-37.61
Fab Metal Ex Machinery & Trans.	34	156	19	0.18	-0.0867	-2.21	-8.37
Ind & Com. Mach. & Computers	35	167	-5	-0.05	-0.0822	-2.48	-7.94
Elec & Components Ex Computer	36	193	-38	-0.31	-0.3222	-6.75	-27.62
Transportation Equipment	37	167	-70	-0.38	-0.2637	-3.66	-23.38
Photo, Medical & Optical Goods	38	104	-6	-0.04	-0.3438	-6.34	-29.20
Misc Manufacturing	39	251	-128	-1.91	-0.4875	-18.62	-38.61
Wholesale Trade: Durables	50	576	2	0.06	-0.0966	-7.58	-9.21
Wholesale Trade: Non-Durables	51	1271	-251	-6.11	-0.2227	-13.89	-19.97
Depository Institutions	60	365	-70	-0.39	0.1365	1.93	14.34
Nondepository Credit Institutions	61	137	-29	-0.42	-0.0933	-3.46	-8.94
Security & Com, Brokers/Dealers	62	2490	-844	-7.05	-0.4082	-8.74	-33.59
Insurance Carriers	63	703	-443	-2.76	-1.0247	-16.36	-64.18
Insurance Agents, Brokers, Service	64	193	-57	-1.16	-0.2394	-12.47	-21.31
Real Estate	65	618	-208	-6.95	-0.3223	-27.58	-27.56
Holding & Other Investment Offices	67	945	-622	-5.88	-0.4568	-11.06	-36.72
Business Services	73	1841	-249	-14.60	-0.0729	-10.95	-7.04
Health Services	80	1300	33	1.35	-0.0386	-4.03	-3.79
Legal Services	81	2540	-809	-18.42	-0.4273	-24.91	-34.78
Membership Organizations	86	318	119	0.17	0.4154	1.55	46.15
Eng, Acc, Research, Management	87	1756	-252	-11.60	-0.1218	-14.36	-11.47
Services not elsewhere classified	89	26	3	0.06	0.1246	5.75	13.25

[a] Localization is measured as total employment in 2007:Q1 at companies in the "own" 1-digit industry within 1 mile.
[b] Equal to 100 x (exp[b - V(b)/2] - 1) where b is the coefficient on the Female dummy in the semi-log model, and V(b) is its estimated variance. See Halvorsen and Palmquist (1980) and Kennedy (1981) for details.

Table 8: Elasticity of Sales/Workers With Respect to Existing Employment for Small (< 10 workers), Privately-Owned, Newly Created (< 1 year) Establishments[a] (t-ratios based on robust standard errors in parentheses)

PANEL A: Urbanization Only

	All SIC 20-39; 50-51; 60-65,67; 73,80,81,86,87,89			Manufacturing SIC 20-39			Wholesale Trade SIC 50, 51			FIRE SIC 60-65,67			Services SIC 73,80,81,86,87,89		
	All	Female Owned	Other Private	All	Female Owned	Other Private	All	Female Owned	Male Owned	All	Female Owned	Other Private	All	Female Owned	Other Private
Log(All employment)	0.0046 (6.63)	-0.0032 (1.01)	0.0049 (6.74)	0.0031 (1.15)	-0.0058 (0.65)	0.0041 (1.44)	0.0440 (16.70)	0.0270 (2.96)	0.0441 (15.68)	0.0098 (5.90)	0.0028 (0.25)	0.0101 (5.95)	-0.0033 (4.98)	-0.0091 (2.41)	-0.0029 (4.28)
SES Controls	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
1-Digit SIC FE	4	4	4												
2-Digit SIC FE				20	19	20	2	2	2	7	7	7	6	6	6
MSA FE	304	304	304	304	287	304	304	288	304	304	255	304	304	297	304
Observations	247,264	16,019	231,244	24,712	2,324	22,388	27,553	2,428	25,125	56,071	2,021	54,049	138,926	9,245	129,681
Adj R^2	0.2016	0.0861	0.1979	0.0331	0.0330	0.0320	0.0719	0.0352	0.0678	0.1114	0.0163	0.1137	0.1839	0.0469	0.1853
F-value	195.55	5.70	178.73	3.51	1.25	3.20	7.69	1.29	6.73	22.69	1.12	22.40	97.92	2.44	92.34

PANEL B: Urbanization and Localization

	All SIC 20-39; 50-51; 60-65,67; 73,80,81,86,87,89			Manufacturing SIC 20-39			Wholesale Trade SIC 50, 51			FIRE SIC 60-65,67			Services SIC 73,80,81,86,87,89		
	All	Female Owned	Other Private	All	Female Owned	Other Private	All	Female Owned	Other Private	All	Female Owned	Other Private	All	Female Owned	Other Private
Log(All employment)	0.0175 (17.78)	0.0088 (1.85)	0.0185 (18.01)	-0.0064 (1.90)	-0.0167 (1.45)	-0.0050 (1.39)	-0.0239 (4.56)	-0.0037 (0.20)	-0.0228 (4.07)	-0.0098 (3.43)	0.0084 (0.43)	-0.0102 (3.52)	-0.0173 (12.46)	0.0046 (0.54)	-0.0177 (12.14)
Log(Own 2-Digit employment)	-0.0140 (18.46)	-0.0132 (3.39)	-0.0147 (18.72)	0.0130 (4.56)	0.0163 (1.49)	0.0122 (4.10)	0.0692 (14.97)	0.0325 (1.96)	0.0679 (13.81)	0.0227 (8.46)	-0.0068 (0.34)	0.0235 (8.62)	0.0143 (11.47)	-0.0137 (1.79)	0.0151 (11.61)
SES Controls	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
1-Digit SIC FE	4	4	4												
2-Digit SIC FE				20	19	20	2	2	2	7	7	7	6	6	6
MSA FE	304	304	304	304	287	304	304	288	304	304	255	304	304	297	304
Observations	247,264	16,019	231,244	24,712	2,324	22,388	27,553	2,428	25,125	56,071	2,021	54,049	138,926	9,245	129,681
Adj R^2	0.2027	0.0867	0.1991	0.0339	0.0336	0.0327	0.0794	0.0365	0.0748	0.1125	0.0158	0.1149	0.1847	0.0472	0.1862
F-value	196.27	5.72	179.54	3.56	1.25	3.24	8.43	1.30	7.35	22.87	1.12	22.59	98.12	2.44	92.57

[a]Employment controls are based on all-age and all-size establishments within 1-mile of the census tract centroid in 2005:Q4. Sales are measured in millions in 2007 dollars.
Private companies classified by the SBA as women-owned are labeled "Female Owned" while other private companies are labeled as "Male Owned" to conserve space.

Table 9: Elasticity of Sales/Workers With Respect to Existing Employment for Small (< 10 workers), Privately-Owned, Newly Created (< 1 year) Establishments[a] (t-ratios based on robust standard errors in parentheses)

	All SIC 20-39; 50-51; 60-65,67; 73,80,81,86,87,89			Manufacturing SIC 20-39			Wholesale Trade SIC 50, 51			FIRE SIC 60-65,67			Services SIC 73,80,81,86,87,89		
	All	Female Owned	Other Private	All	Female Owned	Other Private	All	Female Owned	Other Private	All	Female Owned	Other Private	All	Female Owned	Other Private
Log(All employment) at Female Owned	-0.0006 (0.24)	0.0047 (0.42)	-0.0002 (0.09)	-0.0076 (0.82)	-0.0105 (0.33)	-0.0054 (0.55)	-0.0164 (1.79)	0.0043 (0.13)	-0.0170 (1.75)	-0.0093 (1.67)	0.0428 (1.06)	-0.0101 (1.76)	0.0000 (0.00)	0.0102 (0.72)	0.0003 (0.13)
Log(All employment) at Male Owned	0.0151 (6.80)	0.0036 (0.35)	0.0159 (6.84)	0.0008 (0.09)	-0.0093 (0.32)	0.0008 (0.08)	-0.0153 (1.74)	-0.0093 (0.30)	-0.0140 (1.49)	-0.0025 (0.47)	-0.0279 (0.74)	-0.0020 (0.38)	-0.0190 (8.33)	-0.0007 (0.05)	-0.0196 (8.22)
Log(All employment) at Publicly Owned	0.0073 (14.82)	0.0020 (0.84)	0.0075 (14.55)	0.0005 (0.27)	0.0012 (0.17)	0.0002 (0.07)	0.0133 (6.88)	0.0076 (1.04)	0.0129 (6.33)	0.0026 (2.20)	0.0075 (0.91)	0.0021 (1.75)	0.0025 (4.96)	-0.0037 (1.28)	0.0029 (5.62)
Log(Own 2-digit emp) at Female Owned	0.0310 (30.78)	0.0046 (0.81)	0.0316 (30.37)	0.0065 (1.41)	0.0223 (1.24)	0.0036 (0.75)	0.0268 (5.25)	-0.0027 (0.14)	0.0316 (5.84)	-0.0095 (3.17)	-0.0198 (0.89)	-0.0104 (3.41)	0.0146 (11.95)	-0.0053 (0.64)	0.0148 (11.69)
Log(Own 2-digit emp) at Male Owned	-0.0386 (40.34)	-0.0177 (3.59)	-0.0400 (40.30)	0.0033 (1.04)	0.0056 (0.46)	0.0033 (0.99)	0.0478 (9.31)	0.0299 (1.60)	0.0440 (8.06)	0.0220 (7.43)	-0.0070 (0.32)	0.0232 (7.73)	0.0035 (2.59)	-0.0112 (1.36)	0.0039 (2.72)
Log(Own 2-digit emp) at Publicly Owned	0.0161 (17.27)	0.0068 (1.44)	0.0169 (17.38)	0.0346 (7.59)	0.0157 (0.85)	0.0347 (7.31)	0.0036 (0.75)	0.0052 (0.28)	0.0049 (0.97)	0.0206 (6.58)	0.0087 (0.31)	0.0211 (6.66)	0.0033 (3.97)	0.0042 (0.85)	0.0033 (3.80)
SES Controls	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
1-Digit SIC FE	4	4	4												
2-Digit SIC FE				20	19	20	2	2	2	7	7	7	6	6	6
MSA FE	304	304	304	304	287	304	304	288	304	304	255	304	304	297	304
Observations	247,264	16,019	231,244	24,712	2,324	22,388	27,553	2,428	25,125	56,071	2,021	54,049	138,926	9,245	129,681
Adj R^2	0.2098	0.0868	0.2065	0.0365	0.0332	0.0352	0.0826	0.0356	0.0783	0.1137	0.0149	0.1161	0.1862	0.0470	0.1879
F-value	202.33	5.67	185.65	3.74	1.25	3.39	8.66	1.29	7.58	22.86	1.11	22.58	97.92	2.42	92.46

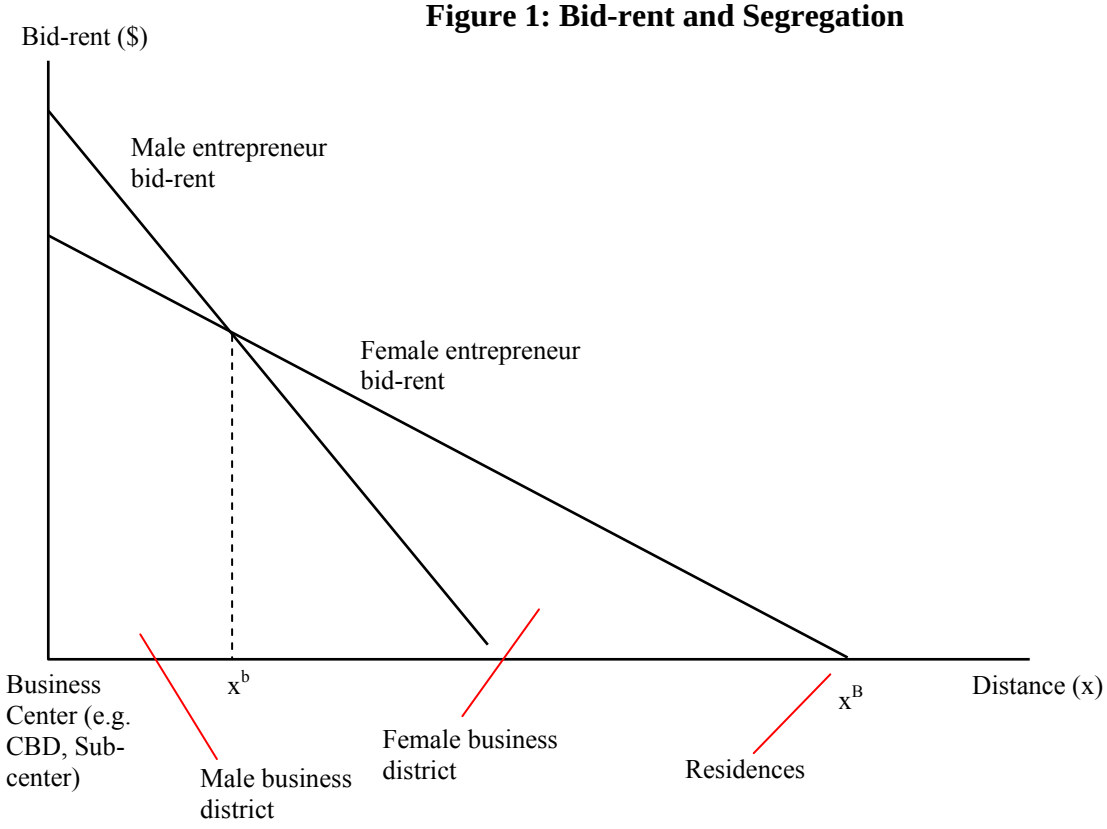
[a]Employment controls are based on all-age and all-size establishments within 1-mile of the census tract centroid in 2005:Q4. Sales are measured in millions in 2007 dollars. Private companies classified by the SBA as women-owned are labeled "Female Owned" while other private companies are labeled as "Male Owned" to conserve space.

Table 10: Commute Time Regressions
(Dependent Variable: Commute time in minutes;
Absolute value of t-ratios in Parentheses)*

	All Workers			Workers NOT Working at Home		
	All	Non Self-Employed	Self-Employed	All	Non Self-Employed	Self-Employed
Family Total Income	8.680E-06	1.130E-05	6.470E-06	5.990E-06	8.760E-06	4.030E-07
	(55.07)	(63.85)	(18.29)	(35.55)	(46.76)	(0.98)
Investment Income	-4.790E-05	-4.740E-05	-1.970E-05	-3.480E-05	-3.240E-05	-1.500E-05
	(52.73)	(43.54)	(11.90)	(35.46)	(27.96)	(7.70)
Age	0.76837	0.83994	0.25309	0.31119	0.34183	-0.01644
	(194.39)	(197.91)	(19.15)	(68.04)	(70.44)	(0.97)
Age Squared	-0.00931	-0.01002	-0.00358	-0.00370	-0.00396	-0.00015
	(204.43)	(202.27)	(26.42)	(69.30)	(69.27)	(0.84)
Female	-1.67657	-1.83615	-2.90762	-1.31026	-1.48334	-1.35822
	(72.03)	(75.89)	(33.56)	(53.00)	(58.27)	(12.60)
Child Present	0.62047	0.61121	0.75240	0.58751	0.57198	0.67592
	(14.60)	(13.59)	(5.95)	(13.20)	(12.22)	(4.67)
Female X (Child Present)	-1.47385	-1.44320	-2.32252	-0.95815	-0.96160	-1.22142
	(29.49)	(27.51)	(13.93)	(18.22)	(17.56)	(6.08)
Married	0.86265	0.93668	0.38254	0.83248	0.89578	0.05512
	(45.48)	(47.37)	(5.78)	(41.4)	(43.09)	(0.69)
Asian	-0.49289	-0.87472	2.36460	0.10314	-0.04872	1.81637
	(9.69)	(16.38)	(14.54)	(1.90)	(0.86)	(9.58)
Black	0.36841	0.13923	1.28495	2.03183	1.91894	2.96440
	(12.20)	(4.51)	(8.81)	(62.58)	(58.22)	(16.72)
Hispanic	-1.22120	-1.44353	0.08531	0.03193	-0.10553	1.38243
	(28.50)	(32.54)	(0.53)	(0.69)	(2.20)	(7.16)
Other Race	-1.11000	-1.33483	0.53202	0.17359	0.02071	1.88920
	(31.20)	(36.27)	(3.93)	(4.49)	(0.52)	(11.56)
Some Years in College	0.91672	1.03215	-0.18416	0.35199	0.43831	-0.64677
	(43.70)	(46.92)	(2.70)	(15.80)	(18.93)	(7.95)
College Graduate or More	1.49957	1.77652	-0.95723	0.56848	0.74220	-1.43430
	(55.39)	(61.89)	(11.71)	(19.99)	(24.9)	(14.65)
11-20 years in US	-0.08713	-0.09572	0.14086	0.40263	0.48158	-0.74957
	(1.57)	(1.66)	(0.69)	(6.58)	(7.63)	(3.04)
Over 20 years in US	1.06774	1.05207	0.48868	0.37870	0.46021	-1.45206
	(24.09)	(22.98)	(2.84)	(7.81)	(9.25)	(6.9)
Constant	5.34914	4.08786	13.17069	18.42662	17.66641	25.97300
	(60.47)	(43.82)	(39.2)	(183.27)	(168.05)	(61.37)
Observations	5,755,765	5,213,398	542,367	4,833,526	4,435,117	398,409
Occupation/MSA FE	15,970	15,874	11,327	15,836	15,743	10,626
R-squared (overall)	0.0209	0.0241	0.0258	0.0099	0.0119	0.0134

*Data source is the year-2000 5 percent sample of the Decennial Census. Samples are restricted to individuals working 35 or more hours per week and who receive no welfare income. All models are estimated by ordinary least squares.

Figure 1: Bid-rent and Segregation



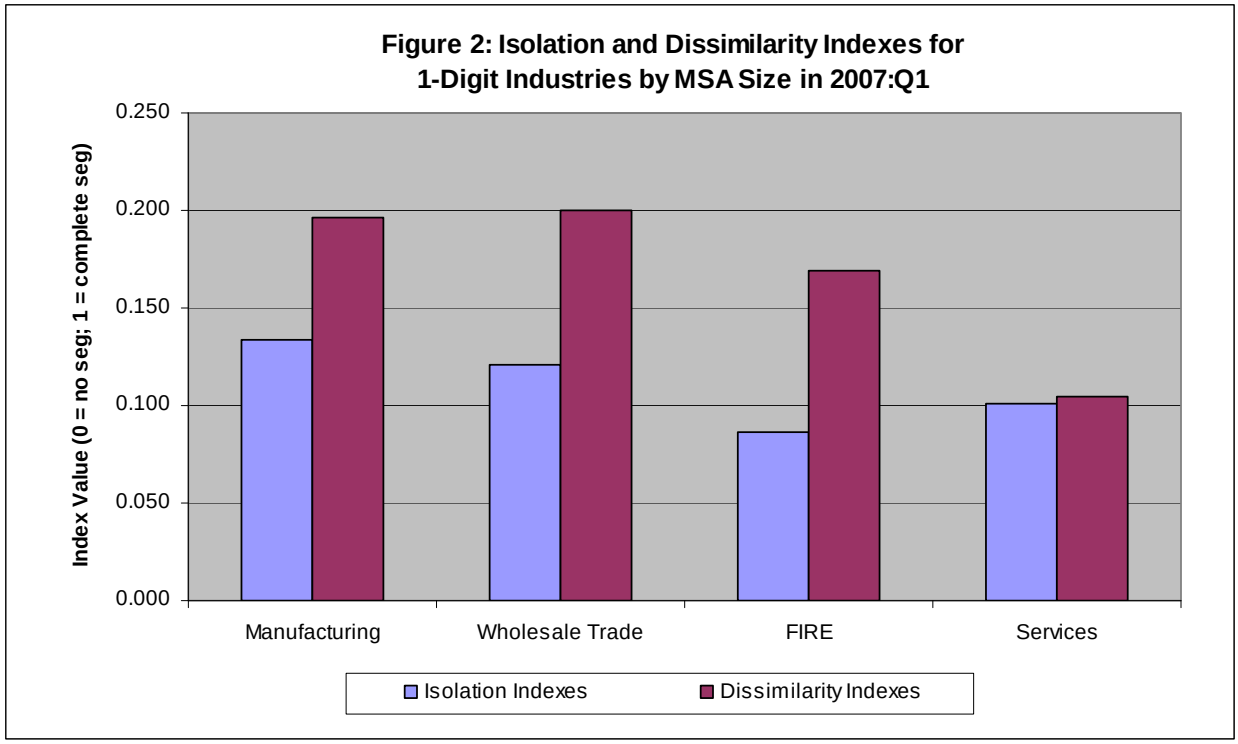


Figure 2: Isolation and Dissimilarity Indexes for
1-Digit Industries by MSA Size in 2007:Q1
Index Value (0 = no seg; 1 = complete seg)
0.250
0.200
0.150
0.100
0.050
0.000
Manufacturing
Wholesale Trade
FIRE
Services
Isolation Indexes
Dissimilarity Indexes

Figure 3a: Isolation Index For 2-Digit Industries in 2007:Q1

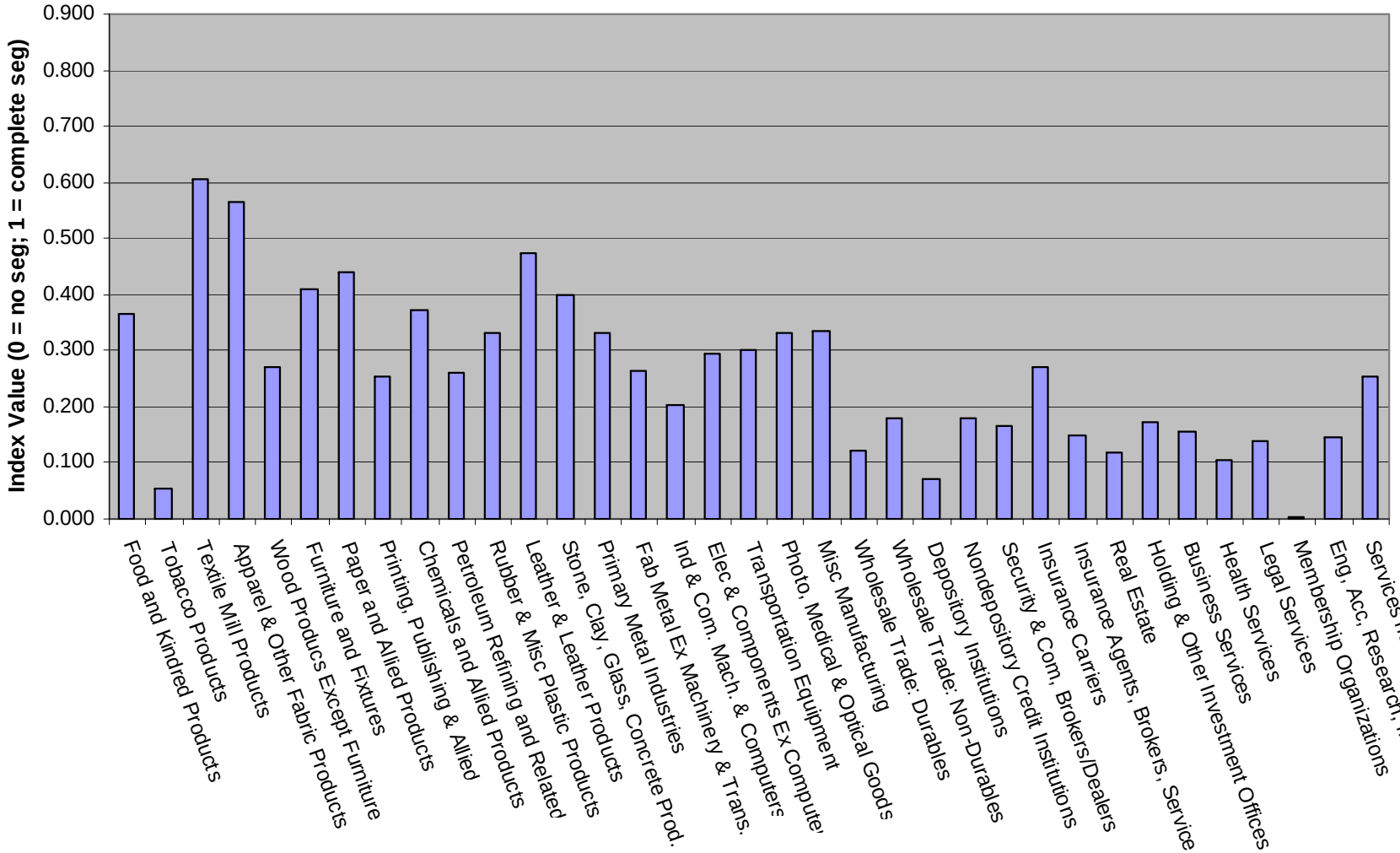


Figure 3b: Dissimilarity Index For 2-Digit Industries in 2007:Q1

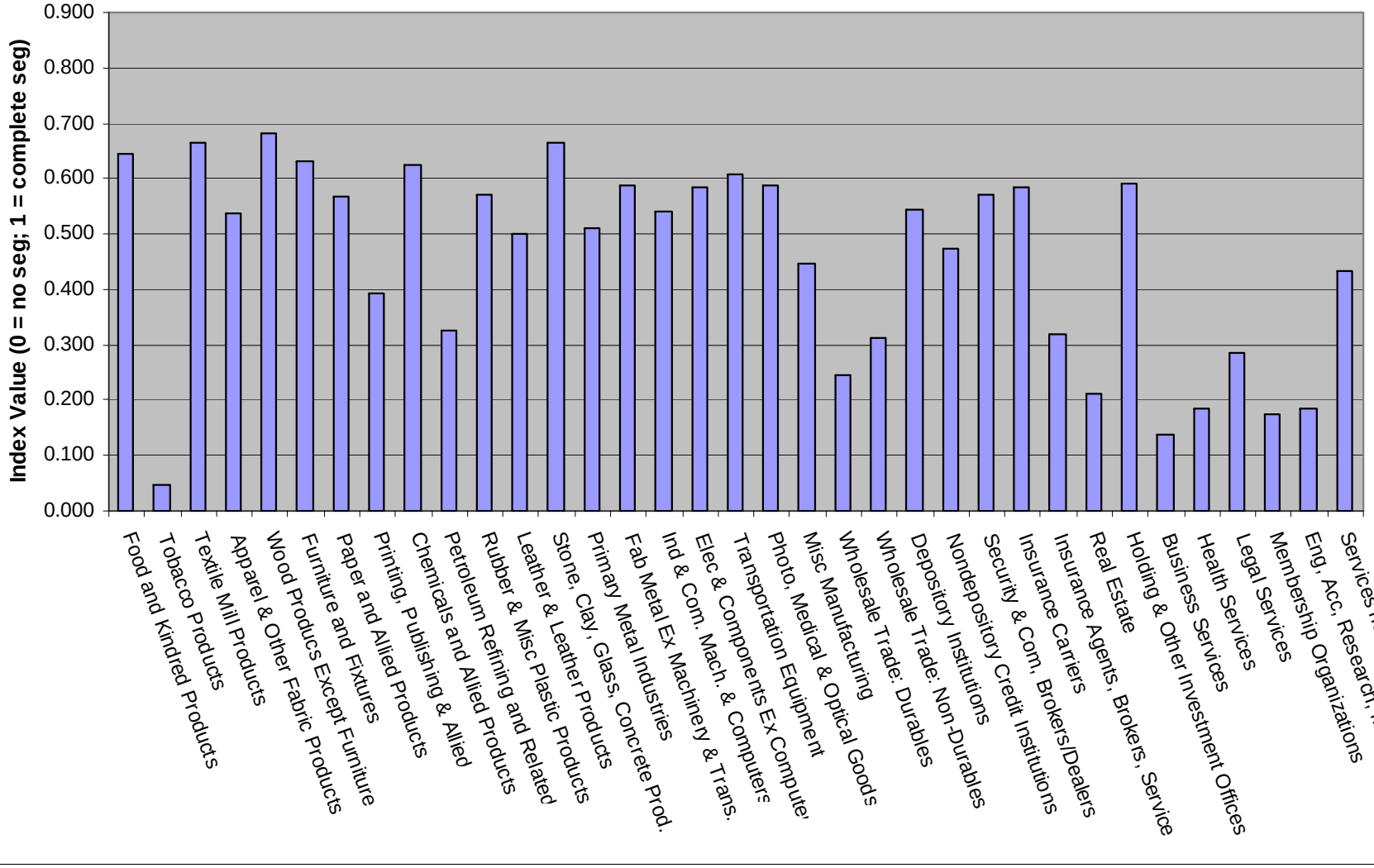


Figure 4a: Percent Excess Urbanization For Women-Owned Businesses By 2-Digit Industry in 2007:Q1

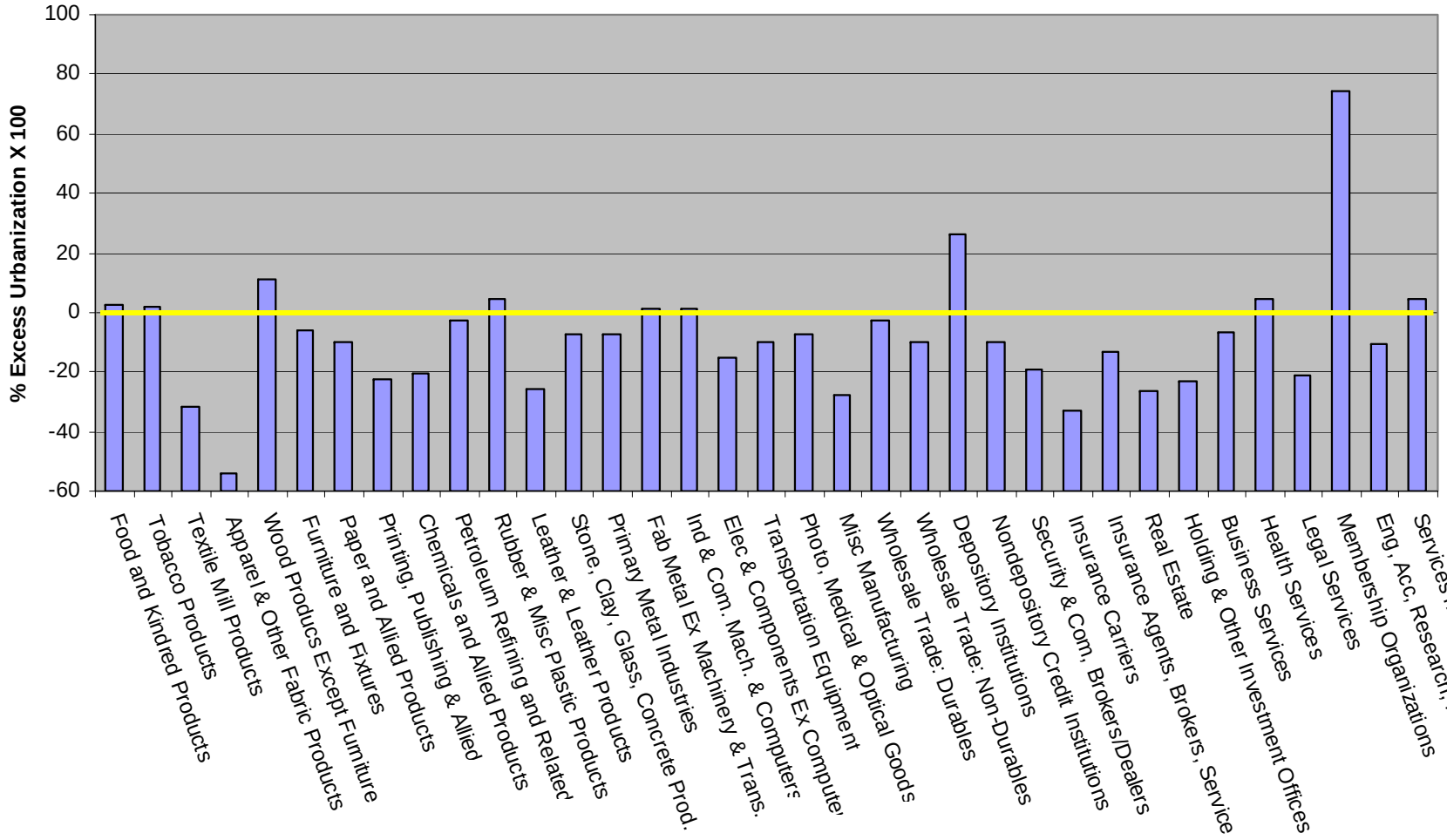


Figure 4b: Percent Excess Localization For Women-Owned Businesses By 2-Digit Industry in 2007:Q1