Economic Inquiry

WHERE ARE THE WOMEN ENTREPRENEURS? BUSINESS OWNERSHIP GROWTH BY GENDER ACROSS THE AMERICAN URBAN LANDSCAPE

TESSA CONROY and STEPHAN WEILER*

This study identifies the determinants of growth for male and female business ownership in a subset of U.S. counties. The results indicate that there are important characteristic and behavioral differences between the male and female populations in each county that affect regional changes in business ownership for each gender. In particular, the education level of males and females as well as the local family structure impact the propensity for firms owned by each gender differently. A Blinder-Oaxaca type decomposition, a novel approach in the context of regional outcomes, demonstrates that although the effect of characteristic differences is larger, the behavioral differences are key to narrowing the gender disparity in business ownership. (*JEL* L26, R2, R3)

I. INTRODUCTION

Small business is of growing importance in economic development strategies implemented by both the public and private sectors. Subsidies, tax breaks, and other incentives have been used at all levels of government in the United States with the goal of increasing the number of proprietors in the workforce. Yet, entrepreneurial activity in the United States varies dramatically across space. Regional studies of entrepreneurship show that such spatial variation is not random, but seems systematically related to specific factors associated with particular locations. Several studies, going back as far as Bartik (1985) and more recently by Goetz and Rupasingha (2009), try to identify the location-specific characteristics that explain the spatial variation in entrepreneurship. Although these studies link entrepreneurial activity to several important regional characteristics, none consider how the impact of these characteristics might vary by gender.

Existing studies establish several key relationships, but do so by pooling the entrepreneurial activity of men and women together, using firm births or the self-employment rate, for example. Yet, men and women do warrant separate study. Knowledge, resources, and constraints are distributed differently across members of society, and certainly across gender. Women are systematically different from men in their skills, social responsibilities, and opportunities. They can also be expected to assess the local market, value regional characteristics, and respond to their communities differently from men. This of course has implications for the spatial distribution of entrepreneurial activity for each gender.

In U.S. counties, the number of firms relative to the labor force is 19% on average but ranges from higher than 50% in some counties to less than 5% in others. However, measures of entrepreneurship that aggregate across gender conceal significant differences between men and women. In some rural southern counties the number of female-owned firms relative to the female labor force is as low as 2%, but is greater than 25% in several Colorado and Massachusetts counties, and for men, it ranges from 9% to over

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Conroy: Research Associate, Department of Agricultural and Applied Economics, University of Wisconsin-Madison, Madison, WI 53706. Phone 608-265-4327, Fax 608-262-4376, E-mail tconroy2@wisc.edu

Weiler: Professor and Research Associate Dean, Department of Economics, Colorado State University, Fort Collins, CO 80523. Phone 970-491-5538, Fax 970-491-0528, E-mail Stephan.Weiler@colostate.edu

ABBREVIATIONS

ACS: American Community Survey
MSA: Metropolitan Statistical Area
OLS: Ordinary Least Squares
SBO: Survey of Business Owners

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70%.[1] Clearly, the propensity for female-owned firms is higher in some counties than in others and likewise for men, but on average the propensity for female-owned firms is much lower than that for males.

In this study, we consider two possible sources of the gender disparity in business ownership. First, the male and female populations may be characteristically different at the mean, in education attainment for example. Second, male- and female-owned firm formation may result from gender-specific local behavioral patterns, indicated by different coefficients in gendered empirical models. This is the first known study using U.S. data to examine both the characteristic and behavioral differences in relation to the gender disparity in firm ownership across regional outcomes. This article applies a Blinder-Oaxaca type decomposition to establish whether the characteristic or behavioral differences are key to closing the gender gap.

First, we identify characteristic differences between the male and female populations across counties by evaluating mean differences. Then the empirical analysis identifies behavioral differences between the male and female populations as they relate to their respective entrepreneurial outcomes. We include a number of explanatory variables to control for both place- and people-based characteristics. Place-based characteristics include features of the location such as the industrial composition and level of natural amenities. People-based characteristics, or demographics, consist of countywide average values, so that each variable proxies for the average characteristics of the pool of workers/potential business owners.

We focus on explanatory variables related to education and family to better understand gender differences in firm ownership. For example we ask, what is the expectation for growth in female business ownership conditional on the education attainment of the pool of potential female business owners? One way to measure education attainment is with the share of the female population at each major degree level and then include the shares as explanatory variables in an empirical model. We follow this strategy for each gender and draw comparisons. As is typical when studying labor market outcomes for various groups, we use a decomposition to determine the relative importance of characteristic and behavioral differences between men and women in explaining the gender gap in business ownership.

The results indicate that there are characteristic and behavioral differences between the county-level male and female populations that drive the gender disparity in business ownership. We focus on these gender differences with regard to education attainment and the local family structure. Growth in the propensity for both male- and female-owned firms is higher in counties with a large share of males and females with bachelor's degrees, respectively, but the effect is much stronger for men. The propensity for female-owned firms lags in regions with a large share of the least and most highly educated women. Although the share of married adults has little to no effect, the number of children per adult is negatively associated with the growth in the propensity for firms owned by either gender, but again the effect is much larger for men.

The concluding decomposition shows that although the effect of having different mean characteristics is larger in absolute value, the behavioral differences are key to alleviating the gender disparity in business ownership, if that is indeed the goal of local policymakers. Many prior regional entrepreneurship studies have implicitly focused on males, potentially resulting in gender-blind policy implications. The decomposition makes clear that policies aimed at enhancing entrepreneurship affect men and women differently. Understanding the gender differences is an important aspect of informed policy aimed at equitably enhancing entrepreneurship.

II. MEASURING ENTREPRENEURSHIP

In this study, we measure entrepreneurship with the propensity for female (male)-owned firms calculated as the number of female (male)-owned firms relative to the female (male) labor force. Gendered data on business ownership by county comes from the 2002 and 2007 Survey of Business Owners (SBO) administered by the U.S. Census Bureau. Firms are classified as female-owned if women hold 51% or more of the stock or equity in the company. Firms are male-owned if women hold less than 51% of the stock or equity in the company.

The term entrepreneur has been used broadly, and consequently, has taken on a variety of meanings depending on the context. Sometimes "entrepreneur" refers simply to someone who

1. Prior to 2007, male-owned firms were not tabulated by the Census. Only female-owned firms and the total number of firms were counted. The number of male-owned firms is calculated as the total number of firms less female-owned firms.

is self-employed. At other times it implies specific functions such as risk-bearer or innovator. Unquestionably, entrepreneurs take on several varying roles, blurring the definition. Still, describing someone as an entrepreneur does identify that person as having unique qualities apart from others in the business sector. The term at least implies the most fundamental role of business owner or manager and the right to extract excess revenue above costs.

The multifaceted nature of entrepreneurship makes it difficult to measure. Precisely because of these difficulties, Low (2009) argues that economics is beginning to focus on a functional definition of entrepreneurship. The emphasis is now on, "what entrepreneurs do rather than who they are" (Low 2009, 5). The three main functions she identifies are (1) ownership or operation of a firm, (2) risk- and uncertainty-bearing, and (3) innovation or the reallocation of resources (Low 2009). Hence, key aspects of entrepreneurship are difficult to quantify, count, and measure. Data that entirely satisfy all of the common concepts of an entrepreneur are nonexistent. Where ideal data are nonexistent, research on entrepreneurship has had to resort to what is available. Although the number of firms relative to the labor force does not entirely capture the essence of entrepreneurship, it is available and gender disaggregated.

III. REGIONAL ENTREPRENEURSHIP AND GENDER

A. Regional Explanations of Entrepreneurship

The spatial variation in entrepreneurial activity has been linked to the characteristics of regions and the communities that reside in them. Previous studies show that the industrial composition, policy environment, and labor market all influence local levels of entrepreneurship. In addition, the demographic profile of some regions is more conducive to new business. That is, some locations have a population of people that is more entrepreneurial than others. Counties with more attractive natural amenities also tend to lure new businesses and host more entrepreneurs (Florida 2002).

To the extent that the local labor market determines the relative returns to self-employment, it has an important role in establishing the incentives for entrepreneurship. Goetz and Rupasingha (2009) find that proprietor earnings have a positive and significant impact on the growing density of proprietors, whereas wage-and-salary income has a negative impact, suggesting that individuals do in fact make their employment choice according to relative returns. Similarly, Low and Weiler (2012) found that in regions where wage-and-salary employment is more volatile or riskier, the self-employment rate is higher. Reasonably, the level of local joblessness also factors into the wage-and-salary option, although the unemployment rate can have a spurious relationship to measures of entrepreneurship (Storey 1991).

The local industrial composition explains much of the variation in entrepreneurship (Glaeser 2009). Some industries are more conducive to entrepreneurship, and some locations are more conducive to certain industries. The regional industrial mix will influence the opportunities that potential entrepreneurs are likely to see and exploit in a particular place. For example, Goetz and Rupasingha (2009) find that entrepreneurial activity is higher in counties with industry concentrations in construction and services. Conversely, mining and utilities do not support high levels self-employment (Glaeser 2009). New firms in particular industries also require certain inputs. Glaeser (2009) finds that concentrations of industry suppliers have a strong positive effect on self-employment rates.

Human capital has long been considered an important driver of entrepreneurship both at the individual and regional levels. Higher self-employment rates are generally found in locations with older and more educated populations, yet various measures of human capital and entrepreneurship yield mixed results (Acs and Armington 2004; Glaeser 2009; Goetz and Freshwater 2001; Goetz and Rupasingha 2009; Lee, Florida, and Acs 2004; Low, Henderson, and Weiler 2005). For example, Low, Henderson, and Weiler (2005) find that entrepreneurial depth, the value added by business owners, is higher in counties with higher college education attainment, but entrepreneurial breadth, the size, and quantity of small businesses, is unaffected.

A recent study in the microeconomic literature found that the relationship between education and entrepreneurship is curvilinear. Entrepreneurship is most strongly associated with education attainment at the bachelor's degree level, whereas both low and very high levels of formal education have a relatively weak or negative relationship to self-employment perhaps indicative of the evolving opportunity cost of self-employment across levels of education attainment (Kim, Aldrich, and Keister 2006). At relatively low levels of education, even low-wage employment could be

more lucrative than the income potential of self-employment. At high levels of education, the return in the wage-and-salary labor market may well exceed the return in self-employment. Consequently, the propensity for entrepreneurship may be highest among those with mid-level education attainment. It is quite possible that a similar pattern exists at the regional level. A large population of men and women with a bachelor's degree may be most conducive to local entrepreneurial activity.

A few regional studies include both the shares of high school graduates and college graduates as determinants of entrepreneurial activity. Acs and Armington (2006) found that the share of college graduates and, unexpectedly, the share of high school dropouts are both positively associated with higher entrepreneurial activity. They explain the unexpected effect of high school dropouts in terms of labor supply: entrepreneurs may benefit from abundantly available low-skill labor. In some cases, after controlling for age as a proxy for work experience, which is positive and statistically significant, the share of college graduates has no effect (Bartik 1989; Goetz and Rupasingha 2009). The mixed results across regional studies suggest that the relationship of local human capital accumulation to entrepreneurial activity is still somewhat unclear.

B. Gender Considerations: Human Capital and Family Structure

Regional factors such as human capital, labor market conditions, industrial composition, and natural amenities seem to drive entrepreneurship, but none of these factors have been considered in relation to gender. One recent study by Rosenthal and Strange (2012) focuses on women entrepreneurs and the importance of knowledge spillovers and agglomeration in their business location decision. They develop an analytical model where females are less networked than their male counterparts, and as a consequence, have limited access to knowledge spillovers. Empirically, the authors demonstrate that women are in fact located further from agglomerated areas. Yet even this recent study provides only a limited picture of female entrepreneurs in a regional context.

Previous studies of entrepreneurship in the microeconomic literature indicate that there are systematic differences between men and women business owners and those differences likely have implications for their respective local entrepreneurial activity. Women use processes different from men to identify opportunities (DeTienne and Chandler 2007) and make systematically different workforce management choices (Matsa and Miller 2014). Women entrepreneurs generally have less work experience in business and management, but more formal education than their male counterparts (Cowling and Taylor 2001). Compared to men, women with less education are more aware of their knowledge deficiencies, more likely to perceive certain obstacles, and ultimately, less likely to become entrepreneurs (Huarng, Mas-Tur, and Yu 2012; Kourilsky and Walstad 1998). Additionally, because of their lack of previous work experience, those women who do choose to start their business often fail to remain self-employed (Rosti and Chelli 2005).

Human capital is not the only factor that enters into the self-employment decision differently for men and women. Family and children also influence men and women differently in their decision to become self-employed (Boden 1996, 1999a; Georgellis and Wall 2005; Hundley 2000). Women still have primary responsibility for family and children, which means they have less flexibility in their daily lives (OECD 2004). For women, self-employment may allow the flexibility to stay at home and meet the demands of being a spouse and mother (Hundley 2000). Women with small children in the household are more likely to enter self-employment (Boden 1996; Bruce 1999) yet, the presence of young children had no significant impact for men (Boden 1999b). As further evidence of the demands of child rearing, women, especially women with young children, cite reasons related to family and schedule flexibility as their primary motivation for becoming self-employed (Boden 1999b). However, it seems that both men and women considering self-employment benefit from the support of a spouse (Boden 1999b; Taniguchi 2002).

C. Regional Implications of Gender in Entrepreneurship

The gender differences in entrepreneurship have mostly been determined in the microeconomic literature (i.e., Boden 1996; Hundley 2000; Georgellis and Wall 2005), which tends to consider entrepreneurship in an occupational choice framework drawing on Evans and Leighton (1995) and Blanchflower and Oswald (1998). In this framework, each person rationally chooses between entrepreneurship and wage-and-salary employment based on the

utility maximizing principle. Both pecuniary benefits, which are largely a function of human capital, and nonpecuniary factors, such as family responsibilities enter into the equation. In an efficient equilibrium allocation, only those entrepreneurial opportunities that are most lucrative will motivate departure from the competitive labor market. Hence, the extent of entrepreneurship in a given region represents the share of individuals with a self-employment opportunity that is better than their wage-and-salary option.

The gender differences previously discussed suggest that human capital and family structure, in particular, are considered in a consistently different way between men and women, and as a result, men and women make systematically different occupational decisions. Extrapolating this model out to the regional level implies that the local human capital profile and family composition would relate differently to the local propensity for male- and female-owned firms. While occupational choice theory focuses on individual characteristics, in this study, as in Goetz and Rupasingha (2009), county characteristics are used as proxies for the average characteristics of the population pool from which entrepreneurs are drawn, and to reflect the local environment in which they make their employment decisions. We use these factors to explain the propensity for male-owned firms and the propensity for female-owned firms, then draw gender comparisons.

IV. HYPOTHESES AND EMPIRICAL MODEL

A. *Hypotheses*

To develop the first hypothesis we consult recent studies of entrepreneurship that focus on human capital. Kim, Aldrich, and Keister (2006) suggest that entrepreneurial propensity is not a strictly increasing function of human capital. Individuals with low and very high levels of human capital are less likely to become entrepreneurs compared to those with a college degree who are most likely to become entrepreneurs. Men and women with only a high school diploma may lack the skills and resources necessary to earn high returns as an entrepreneur, and consequently, are more likely to choose wage-and-salary employment. Doctorates may also coincide with a lower propensity for entrepreneurship, but in contrast to those with high school education, because the highly educated generally have lucrative wage-and-salary options. Those with a college degree are likely well suited for a relatively profitable entrepreneurial option compared to wage-and-salary employment. In light of these findings, we hypothesize the regional parallel: the propensity for female (male)-owned firms is higher in regions with a large share of females (males) with bachelor's degrees, and lower in regions with larger shares of less and highly educated females (males). Hence, the relationship between local education attainment and the propensity for firms owned by either gender forms an inverted "U."

A secondary, but important consideration in a gendered study of entrepreneurship, is the impact of a spouse and children. Family structure and the demands of household production likely impact the entrepreneurial propensity of men and women very differently. While it may be the case that the demands of caring for children impede entrepreneurship, previous literature suggests children have a positive impact on the self-employment propensity for women as they seek a flexible professional life that can accommodate their family life. Children, however, have no impact on male self-employment. These gender differences suggest that women still bear the primary responsibilities of child rearing. It is reasonable to think that gender roles will have cumulative implications reflected in the local propensity for male- and female-owned firms. We hypothesize that the number of children per adult woman will positively impact the propensity for female-owned firms and the number of children per adult man will have no impact on the propensity for male-owned firms. With regard to marriage, we hypothesize that the propensity for firm ownership is higher where larger shares of men and women are married.

B. *Empirical Model*

Regional studies of entrepreneurship that focus on gender are sparse, hence there is little guidance for developing a gendered empirical model. As highlighted above, there are gender-specific considerations that motivate occupational choice. It seems that the utility maximizing solutions are systematically different by gender, primarily because men and women consider their human capital and family situation differently. The regional drivers of male- and female-owned firms are also likely to be systematically different making it appropriate to use a gendered empirical model. The model developed here is applied separately, yet in parallel, to the propensity for male- and female-owned

firms. The explanatory variables were selected based on the regional characteristics previously shown to drive entrepreneurship based on the work of Goetz and Rupasingha (2009), Glaeser (2009), Acs and Armington (2006), and Acs and Armington (2004), as well as aggregate measures of the educational and demographic characteristics shown significant in the regional and micro-literature based on the work of Kim, Aldrich, and Keister (2006), Boden (1999b), and Taniguchi (2002). Considering each gender separately has the advantage of allowing us to compare coefficients across models and gain insight into how education and family structure factor differently into entrepreneurship for men and women.

We test the hypotheses discussed previously using a model that includes a vector of control variables with an additional vector of human capital variables and measures of marriage and children. In large part, we follow Goetz and Rupasingha (2009) in their choice of explanatory variables, so that we can focus the analysis on the human capital variables h, and measures of family structure f. The model can be described generally as follows, where e is the propensity for either male- or female-owned firms.

$$\Delta e = \delta h + \gamma f + \zeta r + \varepsilon. \quad (1)$$

For example, for women Δe is equal to the change in the propensity for female-owned firms, h contains variables measuring the education of the female population, f measures marriage and children in relation to the female population, and r is a set of regional control variables that are the same for the male and female models.

Whereas studies focused on the individual's entrepreneurial choice may use dummy variables for education attainment, here in a regional context we consider a slightly different question and empirical strategy. We ask, what is the expectation for growth in female (male) business ownership conditional on the education attainment of the pool of potential female (male) business owners? One way to measure education attainment is with the share of the female (male) population at each major degree level and then include the shares as explanatory variables in the empirical model. In the U.S. Census, education is measured by the highest level of education attainment for each person. We use the number of people at a level of education attainment aggregated and normalized into rates of education attainment for each county by gender. As in other regional studies of entrepreneurship we consider multiple levels of education. Acs and Armington (2004) and Goetz and Rupasingha (2009) include the share of adults with a high school degree as well as the share of college graduates. For this study, the four most advanced levels of attainment are considered, namely, a high school diploma, bachelor's degree, master's degree, and doctorate degree. To avoid collinearity, only 4 of 16 possible measures of education attainment are included. Levels below a high school diploma are excluded as are professional degrees, such as a JD or MD.

The variables that measure family structure focus on marriage and children separately. In the model of the propensity for female-owned firms, for example, we include married women as a share of women over the age of 15. We also include the number of children (age 17 or under) per female over the age of 16. Similarly, we include married males as a share of males over the age of 15 and the number of children per male in the model of the propensity for male-owned firms.

The explanatory variables include a number of demographic and regional characteristics widely used in regional models of entrepreneurship. This group of variables includes controls for the local labor market conditions, industry shares, and characteristics of the local community. In addition to the measures of education attainment, we also include the median age of the population of each gender to capture the typical amount of work experience in the local population. Labor market conditions are measured by the employment-population ratio for each gender, with the expectation that as employment increases the relative return to self-employment likely decreases as does the incentive to own a firm.

Proprietor earnings per job and wage-and-salary earnings per job are included to account for the relative incentives to each type of employment, expecting that as proprietor earnings fall, firm ownership will decrease and vice versa for wage-and-salary earnings. Wealth, as a form of collateral, is important to potential entrepreneurs who may seek loan financing. Owning a home and higher home value improve the prospects of securing the loan financing for a new venture. We include the share of owner-occupied homes and median value of homes. To control for economic growth, we include the growth rate of income per capita during the 5-year period preceding the business ownership measure. Services, retail trade, and construction industries are

included to control for the local industrial mix and the growth patterns of different sectors, measured as a share of total establishments (Malecki 1994). Population density controls for agglomeration and spillover effects. Last, the natural amenities score is included with the expectation that entrepreneurs who are more footloose will locate in more scenic areas. Variable descriptions and sources can be found in the Appendix.

V. DATA

Counties are becoming a common unit of analysis in studies of entrepreneurship (Goetz and Rupasingha 2009; Rupasingha and Goetz 2011). Arguably, metro areas are favorable for this analysis because they capture cities which are an intuitive economic unit. Similarly, commuting zones are a natural choice for regional analyses, as they link metro areas to the labor supply from surrounding counties. Counties too are a sensible unit of analysis for a regional study of entrepreneurship. They are generally centered on a large city, often the county seat, which anchors local labor and consumer markets. The county seat typically hosts a number of local government agencies that attract private businesses and residents. While commuting activity may blur county boundaries, people generally prefer to live close to their workplace and will choose to reside near the employment center in their county. Counties thus have the advantage of being a smaller geographic unit, within which there is reasonably cohesive economic activity.

A. *Sources*

County-level business ownership data come from the SBO, which is administered by the U.S. Census Bureau every 5 years (specifically, years ending in 2 and 7). The U.S. Census Bureau maintains a list of all nonfarm firms with and without paid employees operating during the year of the survey with receipts greater than $1,000 based on tax return data. A sample of those firms is questioned on their employment, payroll, and receipts. The resulting data are reviewed, edited and tabulated, then made available to the public by geographic area. In our analysis we use the publicly available estimates of the sum of employer and nonemployer firms for U.S. counties. As of 2007, 79% of firms were nonemployers, an increase from 76% in 2002.

Data from the SBO is withheld for many counties because the estimates do not meet publication standards, by having a relative standard error that is too high for example. Other data is withheld to avoid disclosing data for individual companies. Given the criteria for excluding an observation, there may be certain counties that are systematically absent from the full sample. Rural and sparsely populated counties where there are fewer businesses are more likely missing because of a higher variance in the data and the risk of exposing specific firms.

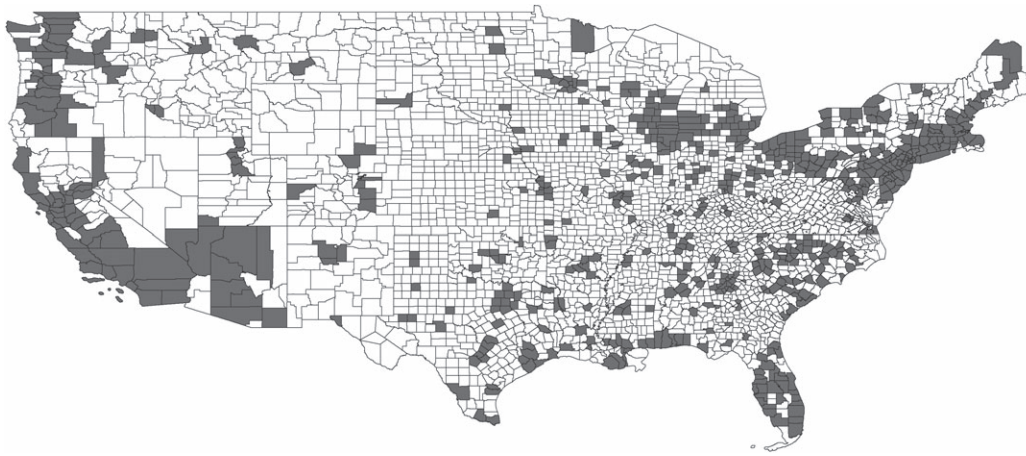
The regression analysis to follow analyzes changes in entrepreneurship as a function of prior conditions. Results from the U.S. Panel of Entrepreneurial Dynamics indicate that the median time for a new firm birth from conception to the start of business is 19–24 months (Reynolds 2007, 55–56). In light of these findings, data from the SBO is likely tied to factors from 1 to 2 years prior. With this reasoning, we match the change in business ownership data between 2002 and 2007 with demographic data from the 2000 Decennial Census.

Calculating the dependent variable requires using county-level labor force estimates for each gender. For the early time period, gendered labor force estimates are available from the 2000 Decennial Census. For the later period, labor force estimates are available from the 2005 American Community Survey (ACS). The 1- and 3-year estimates are limited by area size and consequently do not include all counties. Only areas with a population greater than 65,000 people are estimated annually.

Whereas the availability of labor force data is limited at the county level, data describing industry, wages, and income are more readily available. To be consistent with the demographic data, we use measures of employment and the local industrial mix from 2000. The wage and income data are from the Bureau of Economic Analysis Regional Data Center. The industry shares are calculated as a share of total establishments based on data available from the County Business Patterns. Data on natural amenities come from the U.S. Department of Agriculture (USDA)-Economic Research Service (ERS). The ERS calculates a natural amenities score for each county based on topography and climate, ranging from roughly −7 to 12, which is assumed constant over time.

The resulting dataset is a cross-section of 646 counties. The counties included are those with a population greater than 65,000 in 2005. The counties are limited in this way to take advantage of the ACS 2005 annual estimates, which

FIGURE 1
Counties



are produced only for a subset of counties above the 65,000 population threshold. This restriction is the most limiting factor in data availability, as it reduces the number of possible counties included in the analysis to fewer than 700. Missing values in the ACS and SBO require that additional counties be dropped, further limiting the cross-section analyzed here.

Truncating the counties included in the analysis by population as described above limits the analysis to a subset of primarily metro- and micropolitan counties (Figure 1). The counties included are 85% metropolitan counties with an urban core greater than 50,000, 10% micropolitan counties with an urban core between 10,000 and 50,000, and 5% of counties are nonmetro/micro- reflecting the possibility for a county to fall above our population threshold but not be part of a core-based metro area. The primarily metropolitan character of the remaining counties may limit the generalizability of the results, as less populated or rural areas may feature different entrepreneurial behavior (Figueroa-Armijos and Johnson 2013).

B. Summary Statistics

The regional gender differences in the propensity for male- and female-owned firms may be a function of characteristic differences and/or behavioral differences. We hypothesize that the populations of men and women are different in both ways: characteristically (a difference in means $\bar{x}$s) and behaviorally (a difference in coefficients βs). The regression analysis to follow describes the behavioral differences in detail. First, we examine the differences in characteristics shown by the descriptive statistics.

The propensity for female-owned firms is much lower than that for male-owned firms and the gap is persistent over time. On average the propensity for female-owned firms was 9.6% in 2002, less than half of the propensity for male-owned firms at 22.7%. The propensity for female-owned firms increased in 2007 to 10.7%, but the gender gap remained relatively constant as the propensity for male-owned firms also increased to 24.6%. The male propensity is not only higher on average but spread across a much wider range from approximately 12.1% to more than 47.7%, whereas the propensity for female-owned firms is as low as 4.5% and near 25.1% at the highest.

Table 1 shows that education attainment at all levels differs between genders. In 2000, 31.1% of women and 29.1% men held a high school diploma as their highest degree. At all higher levels of education attainment the share of women is smaller than that for men. However, the gender differences are slim with close to 15% of the population holding a bachelor's degree at the highest for both genders and close to 6% holding a master's degree for both genders. The largest gender difference is at the doctorate level; 1.4% of men have a doctorate, nearly three times the share of women with a doctorate.

A larger share of men than women were married in 2000 and there were also more children per male than per female. The employment population ratio was much higher for men at

TABLE 1
Summary Statistics

Number of Observations = 646 **Variable**	**Mean**	**SD**	**Min.**	**Max.**
Propensity for female-owned firms, 2002	9.57%	2.31%	4.44%	20.87%
Propensity for female-owned firms, 2007	10.66%	2.53%	5.63%	25.14%
Propensity for male-owned firms, 2002	22.66%	4.73%	12.06%	45.20%
Propensity for male-owned firms, 2007	24.55%	4.94%	13.79%	47.68%
Year = 2000				
Female HS graduates, as % of adult females	31.11%	6.67%	13.11%	52.17%
Female college graduates, as % of adult females	14.76%	5.26%	5.63%	34.52%
Females with MA degree, as % of adult females	5.65%	2.56%	1.65%	18.75%
Females with PhD, as % of adult females	0.56%	0.55%	0.04%	4.75%
Married females as % of females age 15+	55.87%	5.64%	34.10%	73.24%
Children per female over 16	0.58	0.09	0.27	0.95
Female emp. pop. ratio	55.35%	6.09%	35.26%	72.01%
Female median age	36.77	3.64	23.10	55.40
Male HS graduates, as % of adult males	29.14%	7.08%	10.13%	51.41%
Male college graduates, as % of adult males	15.84%	5.57%	6.06%	38.64%
Males with MA degree, as % of adult males	5.80%	2.78%	1.74%	20.54%
Males with PhD, as % of adult males	1.42%	1.34%	0.09%	11.57%
Married males as % of males age 15+	59.85%	5.26%	39.65%	74.75%
Children per male over 16	0.62	0.09	0.26	0.96
Male emp. pop. ratio	66.64%	7.43%	36.38%	86.35%
Male median age	34.40	3.41	23.40	52.70
Proprietor income per job ($1000s)	24.53	12.14	6.25	144.34
Wage-and-salary income per job ($1000s)	31.19	8.06	21.20	143.89
Growth rate of income per capita	19.95%	5.46%	2.51%	93.95%
Service estabs, % of total	37.86%	3.96%	25.07%	59.36%
Retail trade estabs, % of total	24.61%	3.49%	16.01%	41.39%
Construction estabs, % of total	11.35%	3.22%	1.83%	24.12%
Owner-occupied homes, % of total	68.99%	8.90%	19.54%	88.08%
Median housing value	121,379	62,962	47,700	1,000,000
Natural amenities scale	0.65	2.64	−5.01	11.17
Tract-weighted population density (thousands)	2.91	6.42	0.05	113.53

67% than for women at 55%. The median age of women is slightly higher for women, which is consistent with the higher life expectancy for women.

Proprietor income per job was less than wage-and-salary income per job, suggesting an incentive for traditional employment at the mean or indicating an equilibrium given the likely nonpecuniary benefits of self-employment, particularly for women (Lombard 2001). Income per capita grew nearly 20% between 1997 and 2002. The share of service establishments is the largest of those included, followed by retail trade, and construction. Nearly 69% of homes were owner-occupied, and the median housing value was just over $121,000.

The usual measures of population density may be heavily influenced by the nonurban area of counties which, as pointed out by Bunten et al. (2014), can be quite heterogeneous. Alternatively, we use tract-weighted population density. For the year 2000, tract population density is weighted with the tract population and summed by county.

C. *Difference in Means*

The difference in the mean propensity for male- and female-owned firms is clear from Table 1. However, the differences between genders in education attainment, the share of married adults, and children per adult may seem quite small. Table 2 shows that these differences are actually statistically significant. So, even if the behavioral differences are small or nonexistent, it is still the case that by county the population of females is systematically different from males in ways that may explain regional variation in the propensity for male- and female-owned firms.

VI. ANALYSIS

The empirical model explains the change in the propensity for firm ownership as a function of initial conditions given by the lagged regional characteristics. The model can be written as:

(2)
$$e_{git,t-\tau} = \beta_0 + \delta h_{gi,t-\tau} + \gamma f_{gi,t-\tau} + \zeta r_{i,t-\tau} + \varepsilon_{gi,t-\tau}$$

TABLE 2
Difference in Means

Variable	Female Mean	Male Mean	*t*-Statistic	*p* Value
Female (male)-owned firms relative to the female (male) labor force, 2002	9.57%	22.66%	−89.98	.000
Female (male)-owned firms relative to the female (male) labor force, 2007	10.66%	24.55%	−99.82	.000
Year = 2000				
High school graduates, as % of adult population	31.11%	29.14%	25.47	.000
College graduates, as % of adult population	14.76%	15.84%	−19.00	.000
Persons with MA degree, as % of adult population	5.65%	5.80%	− 3.26	.001
Persons with PhD, as % of adult population	0.56%	1.42%	−25.88	.000
Married persons as a share of the adult population	55.87%	59.85%	45.47	.000
Children per person age 16 and over	0.58	0.62	30.87	.000

where the subscript indicates the gender of focus g, at time t, in county i. e is the change in the propensity for female (male)-owned firms between time t and $t-\tau$, h is a vector of human capital variables, f is vector of family structure variables, and r is a vector of regional control variables. δ, γ, and ζ are the parameters to be estimated.

We estimate the male and female models using ordinary least squares (OLS) and then combine the results using seemingly unrelated estimation, which applies the Eicker-Huber-White sandwich covariance estimator. The coefficients will be the same between the OLS and seemingly unrelated estimation but the standard errors are smaller in the latter estimation because it uses a larger number of observations to estimate the simultaneous (co)variance matrix. The standard errors are valid regardless of cross-equation correlation or heteroskedasticity. Estimating the model in this way allows for cross-model hypotheses that are useful for making gender comparisons.[2]

Selected results are presented in Table 3; the complete results are reported in the Appendix. Clearly, human capital and family structure do matter in determining changes in the propensity for both male- and female-owned firms. The results for female human capital accumulation are entirely consistent with our hypothesis. Growth in the propensity for female-owned firms is lower in regions with a larger share of females with only a high school diploma. Also consistent with the hypothesis is the strong positive effect of the share of females with a bachelor's degree. The coefficient on the share of females with a master's degree is also positive but only marginally significant. The relationship between human capital and growth in the propensity for female-owned firms turns strongly negative again at the doctorate level. These results are consistent with the descriptive analysis by Fairlie and Robb (2009) who found that compared to male business owners, a lower percentage of women business owners were high school dropouts and also that a lower percentage had graduate degrees. It seems the relationship of human capital accumulation to growth in the propensity for female-owned firms forms an inverted "U." Ownership growth is lower in counties with large shares of females with either a doctorate or high school diploma at the highest. Ownership growth is higher in counties with a large share of females with a bachelor's degree and, to a lesser extent, a large share of females with a master's degree.

The regional human capital profile that is most conducive to increasing the propensity for male-owned firms is simpler than that for women. The relationship of human capital to growth in the propensity for male-owned firms is concentrated entirely on the strong positive relationship to the share of males with a college degree. The inverted "U" relationship observed for females is only true for males to the extent that the college-educated seem to have the greatest potential for firm ownership.

Marriage has a weakly positive relationship to changes in the propensity for male-owned firms. Children, however, have strong negative effect on changes in the propensity for

2. Employment decisions for men and women are likely determined to some extent by the household and for that reason it may not be appropriate to estimate the regressions separately. Instead, the propensity for male- and female-owned firms may be correlated via household decision-making. Consequently, the models may be related via correlated error terms. If the two error terms are correlated, then estimating the equations jointly is a more efficient alternative to estimating them equation-by-equation. If the errors are uncorrelated across equations, then the estimates will be identical to the OLS estimates of each equation, which are reported in the Appendix. Though the results of seemingly unrelated regressions (SUR) are reported in the Appendix and differences are slight, we focus on seemingly unrelated estimation, which is robust to cross-model correlation and heteroskedasticity.

TABLE 3
Seemingly Unrelated Estimation

Number of Observations = 646 **Variable**	**Coef.**	**Robust SEs**
Δ *Propensity for female-owned firms*		
Female high school graduates, as % of female adult population	−.0847***	00.0165
Female college graduates, as % of female adult population	.0645**	00.0289
Females with MA degree, as % of female adult population	.0938*	00.0553
Females with PhD, as % of female adult population	−.6392***	00.2405
Married females as a share of the adult female population	.0177	00.0214
Children per female over 16	−.0612***	00.0127
Δ *Propensity for male-owned firms*		
Male high school graduates, as % of male adult population	−.0075	00.0253
Male college graduates, as % of male adult population	.1231***	00.0445
Males with MA degree, as % of male adult population	−.0607	0.0937
Males with PhD, as % of male adult population	.0013	0.1114
Married males as a share of the adult male population	.0552*	0.0320
Children per male over 16	−.0906***	0.0173

Significance at the 1%, 5%, and 10% level shown by ***, **, and *, respectively.

TABLE 4
Difference in Coefficients

	Female	**Male**	χ^2	***p* Value**
High school graduates, as % of adult population	−0.0847	−0.0075	6.34	.01
College graduates, as % of adult population	0.0645	0.1231	1.27	.26
Adults with MA degree, as % of adult population	0.0938	−0.0607	2.07	.15
Adults with PhD, as % of adult population	−0.6392	0.0013	7.10	.01
Married adults as a share of the adults population	0.0177	0.0552	1.01	.31
Children per adult	−0.0612	−0.0906	2.02	.15

male- and female-owned firms, contrary to our hypothesis. It seems that a local demographic with many young children would also feature a lower propensity for both male- and female-owned firms.[3]

The results are substantively consistent when including state fixed effects or a metropolitan statistical area (MSA) effect as reported in the Appendix. In this sample of counties, many MSAs have just one county ruling out a conventional fixed effect for each MSA. Instead we construct an MSA effect equal to one if there is at least one other county in the same MSA. We expect that there is a benefit to having neighboring counties via agglomeration effects. The results, reported in the Appendix, show a positive effect associated with having at least one MSA neighbor but the effect is only weakly significant in the female model and insignificant in the male model. The key results are generally consistent with the results presented in Table 3, but some cases show larger gender differences.

As a first step toward understanding gender differences, we compare the coefficients on human capital, marriage, and children from each model shown in Table 4. Only the coefficients on the share of male and female high school graduates and those with a doctorate are statistically different. Keeping in mind that the high school and PhD educated share of the population are significant only in the female regression, there is little evidence of behavioral differences between

3. This study uses all children under the age of 17 to calculate children per adult. However, it may be the case that the relationship between children per adult and the propensity for firms depends on the age distribution of children. As children age and become more independent, women in particular may be better able to commit themselves to a business venture or, as the case may be, pursue wage-and-salary employment. Using the National Longitudinal Survey of Youth, Taniguchi (2002) finds that having small children has no effect on women's entry into self-employment, though it has a negative effect on transitions into wage-and-salary employment. However, having older children who are more self-sufficient does positively impact transition in self-employment. Future research would benefit from decomposing the measure of children per adult into smaller age groups. Access to health insurance also likely interacts with the responsibility of raising children. Parents with insurance through their employer may be reluctant to transition to self-employment if it means reducing or giving up their coverage entirely. Unfortunately, insurance coverage is beyond the scope of this county-level study, but should be considered in future research.

TABLE 5
Impulse Responses (in Percentage Points)

	Female	Male
High school graduates, as % of adult population	−0.56	−0.05
College graduates, as % of adult population	0.34	0.69
Adults with MA degree, as % of adult population	0.24	−0.17
Adults with PhD, as % of adult population	−0.35	0.002
Married adults as a share of the adult population	0.10	0.29
Children per adult	−0.57	−0.82

genders. The college-educated population share and children per adult are the only variables that are statistically significant in both regressions, but there is no statistical difference between coefficients.

Comparing the coefficients as in Table 4 is informative, but incomplete for identifying gender differences. To get a more accurate sense of the gender differences it is necessary to consider the coefficients with respect to the data. Table 5 shows the impulse response to each variable, the percentage point change in the growth of the propensity for male- and female-owned firms that results from a 1 standard deviation change in each explanatory variable. Even though the coefficients are not statistically different in most cases, there are large gender differences as measured by the impulse responses shown in Table 5.

To simplify the discussion, we focus only on the impulse responses for statistically significant coefficients from the regression models. The largest positive impulse response is at the bachelor's degree across genders, though the effect for men is more than double the size of the effect for women. A 1 standard deviation increase in the share of college-educated males corresponds to an almost 0.7 percentage point increase to the change in the propensity for male-owned firms, equivalent to just over one-third of the average change in the propensity for male-owned firms. A 1 standard deviation increase in the share of females with a bachelor's degree corresponds to a 0.34 percentage point increase to the change in the propensity for female-owned firms equivalent to just under one-third of the average change in the propensity for female-owned firms. The share of females with a master's degree also corresponds to an increase in the change in the propensity for female-owned firms of 0.2 percentage points. A 1 standard deviation increase in the share of females with high school graduates and the share of females with doctorates correspond to a 0.6 and 0.4 percentage point decrease, respectively, to the change in the propensity for female-owned firms.

The impulse response to a 1 standard deviation change in the number of children per adult is larger for men. An increase of children per adult of 0.09, 1 standard deviation, corresponds to a roughly 0.6 percentage point decrease in the change in the propensity for female-owned firms relative to the labor force and a 0.8 percentage point decrease in the change in the propensity for male-owned firms.

The behavioral differences between men and women are relatively weak when we consider coefficients alone. It may be easy to conclude that behavioral differences between men and women do little to explain the gender disparity in business ownership. However, the impulse responses, which combine for each gender the behavioral component given by the coefficient with the characteristic component given by the data, show that the gender differences are substantial. In addition, it is also useful to consider the behavioral differences in aggregate. Combining the slight behavioral differences across the coefficients results in a cumulative effect that explains a significant portion of the gender gap as shown in the following section.

VI. BLINDER-OAXACA DECOMPOSITION

As in many studies that focus on the difference in labor market outcomes between groups, we decompose the mean differences in the change in the propensity for male- and female-owned firms based on the above linear regression models following the Blinder-Oaxaca Decomposition (Blinder 1973; Oaxaca 1973). Whereas the difference in means, coefficients, and impulse responses have been broken down for each variable of interest in the previous section, a Blinder-Oaxaca decomposition usefully summarizes the importance of the behavioral differences taken together versus characteristic differences taken together. As in Jann (2008), the question is how much of the mean outcome difference is accounted for by group differences in the explanatory variables between the male and female populations across counties.

The decomposition described here is formulated from the viewpoint of females. So, the group differences in the predictors are weighted by the coefficients from the female model. The

characteristic component measures the expected adjustment to the change in the propensity for female-owned firms if the average characteristics of the female populations were the same as the average characteristics of the male populations in our sample of counties. Similarly, the coefficient component measures the expected adjustment to the change in the propensity for female-owned firms, if the female population behaved as the male population, and therefore, the coefficients between the male and female model were equal.

The top panel of Table 6 reports the mean predictions of the change in the propensity for male- and female-owned firms and the difference, while the decomposition is in the bottom panel. In this sample, the mean change in the propensity for male-owned firms is 0.0189, close to 2 percentage points. The mean change in the propensity for female-owned firms is 0.0109, close to 1 percentage point. The differential of 0.008 is divided into three components. The largest component, the "characteristic effect" shows the importance of characteristic differences between the male and female populations across counties. It reflects the adjustment at the mean to the change in the propensity for female-owned firms that we might expect if the mean characteristics of the female populations across our sample of counties were the same as the mean characteristics of male populations. The decrease of 0.0554 indicates that if the differences in average education attainment, family structure, and other explanatory variables were eliminated, the change in the growth of propensity for female-owned firms would actually be negative. At the mean, the propensity for female-owned firms would have fallen from close to 9.6% in 2002 to roughly 5.1% in 2007. In the typical county in the sample beginning with approximately 8,100 female-owned firms in 2002, the negative change is equivalent to losing roughly 3,900 female-owned firms during the period from 2002 to 2007.

The second term of 0.013 measures the adjustment to the change in the propensity for female-owned firms if behavioral coefficients from the male model were applied to the data on female populations in our sample of counties. Adding the increase of 0.013 to the actual mean change in the propensity for female-owned firms of 0.0109, shows that if women behaved as men, the change in the propensity for female-owned firms would be more than twice as high. Under this scenario, the propensity for female-owned firms would have increased from close to 9.6% in 2002 to 12% in 2007, at the mean. This result implies an increase of approximately 1,800 female-owned firms from 2002 to 2007 for the typical county in the sample. The third component is the interaction term that measures the simultaneous effect of differences in characteristics and coefficients. In this case, it captures the offsetting effects of the difference in characteristics and the differences coefficients.

TABLE 6
Decomposition

	Coef.	Robust SE
Change in the propensity for male-owned firms	.0189***	0.0008
Change in the propensity for female-owned firms	.0109***	0.0006
Difference	.0080***	0.0010
Characteristics	−.0554***	0.0066
Behavior	.0130**	0.0050
Interaction	.0505***	0.0083

Significance at the 1% and 5% level shown by *** and **, respectively.

The implications of these results are important as they relate to policy. A policy that results in the female population acquiring characteristics more similar to the male population may actually result in an increased gender disparity in business ownership. As long as women behave differently, equalizing characteristics may do little to narrow the gender disparity in firm ownership. For example, if highly educated women are consistently more likely to enter wage-and-salary employment relative to their male counterparts, increasing the share of highly educated women to match the share of highly educated men will likely only reduce female entrepreneurship.

Rather, a locality interested in increasing the propensity for female-owned firms may be better served by a policy that instead focuses on behavioral differences. The female population does not behave as the male population. Policies aimed at increasing the change in the propensity of female-owned firms must recognize these gender-specific behaviors. For example, clearly the populations of men and women who hold a bachelor's degree have the greatest potential for business ownership. Yet, the propensity for college-educated males to act in terms of entrepreneurship is roughly twice that for females as indicated by the coefficients shown in Table 4 and the impulse responses shown in Table 5. A policy that either incentivizes college-educated women to choose entrepreneurship or relaxes the

constraints they face could effectively change the behavior of women in a way that increases female-owned firms resulting in greater equality in business ownership.

VIII. CONCLUSION

This study indicates that the determinants of growth in the propensity for male- and female-owned firms are different, particularly with regard to local education attainment. Only the share of males with a bachelor's degree explains changes in male firm ownership whereas all four measures of female education attainment explain changes in female firm ownership. The share of females with a doctorate and the share with only a high school diploma are both negatively related to changes in the propensity for female-owned firms, demonstrating that female-owned firms may not necessarily increase as the female population becomes more educated. The negative effect of large shares of less and very highly educated females combined with the positive effect at the bachelor's and master's degree level, suggests that the relationship between female entrepreneurial activity and human capital accumulation forms an inverted "U." The same relationship is true for men only to the extent that there is a strong positive effect at the college level. Family structure is also an important determining factor in the growth of male- and female-owned firms. In contrast to some previous studies that suggest that children have a positive relationship to entrepreneurship, our regional results show that the effect of children per adult has a highly significant negative effect on changes in the propensity for both male- and female-owned firms.

The article's decomposition shows that even though the effect from characteristic differences between the male and female population is much larger in absolute value, the behavioral differences are crucial for closing the gender gap in business ownership. If the female population had the same education attainment, marriage rate, average number of children, median age, and employment population ratio as the male population, the gender gap in the propensity for firm ownership may actually be much wider. Conversely, although the effect is smaller, if women exhibited the same behavior as males but were still characteristically different from men, the increase in the propensity for female-owned firms would be higher, resulting in a narrower gender gap. In contrast to most past considerations of regional entrepreneurship policy that have implicitly focused on males, the decomposition makes clear that policies aimed at enhancing entrepreneurship will affect men and women differently.

APPENDIX
DATA DEFINITIONS

TABLE A1
Data Sources and Descriptions

Variable	Source	Description
Propensity for female-(male-)owned firms	Survey of Business Owners 2002 and 2007, Census 2000, American Community Survey (ACS) 2005 Estimates	The ratio of female-owned (nonfemale owned) firms to the female (male) labor force.
High school graduates, as % of male/female adult population	Census 2000	The ratio of female (male) high school graduates to the female (male) population age 25 or older. *Education level determined by highest degree attained.*
College graduates, as % of male/female adult population	Census 2000	The ratio of female (male) college graduates to the female (male) population age 25 or older.
Persons with MA degree, as % of male/female adult population	Census 2000	The ratio of female (male) MA graduates to the female (male) population age 25 or older.
Persons with PhD, as % of male/female adult population	Census 2000	The ratio of female (male) PhD graduates to the female (male) population age 25 or older.
Employment population ratio	Census 2000	The ratio employed females (males) to the female (male) population.
Median age	Census 2000	As reported.
Proprietor income per job	Bureau of Economic Analysis	The ratio of proprietor income to proprietor employment.
Wage-and-salary income per job	Bureau of Economic Analysis	The ratio of wage-and-salary disbursements to wage-and-salary employment.

TABLE A1
Continued

Variable	Source	Description
Median housing value	Census 2000	As reported.
Owner-occupied homes	Census 2000	The ratio of owner-occupied homes to total.
Growth rate of income per capita	Bureau of Economic Analysis	Growth rate of per capita income for the 5-year period ending in the year of the measure of firm ownership (i.e., 1997–2002).
Construction establishments	County Business Patterns 2000	The ratio of construction establishments to total.
Service establishments	County Business Patterns 2000	The ratio of service establishments to total.
Retail trade establishments	County Business Patterns 2000	The ratio of retail trade establishments to total.
Natural amenities scale	United States Department of Agriculture, Economic Research Service	The natural amenities of a location based are based on topography and climate. A high natural amenity score for a county is associated with warm, sunny winters, low-humidity summers, and mountainous or otherwise scenic terrain.
Population density	Census 2000	Tract population density is weighted with the tract population and summed by county.

RESULTS

TABLE A2
OLS Results

Number of Observations = 646 $R^2 = 0.2602$ $F = 13.33$ **Δ Propensity for Female-Owned Firms** **Variable**	**Coef.**	**Robust SE**	Number of Observations = 646 $R^2 = 0.1527$ $F = 5.44$ **Δ Propensity for Male-Owned Firms** **Variable**	**Coef.**	**Robust SE**
Propensity for female-owned firms, 2002	−.3400**	00.0440	Propensity for male-owned firms, 2002	−.0856***	00.0285
Female high school graduates, as % of female adult population	−.0847**	00.0167	Male high school graduates, as % of female adult population	−.0075	00.0257
Female college graduates, as % of female adult population	.0645*	00.0294	Male college graduates, as % of male adult population	.1231**	00.0451
Females with MA degree, as % of female adult population	.0938	00.0561	Males with MA degree, as % of male adult population	−.0607	00.0951
Females with PhD, as % of female adult population	−.6392**	00.2441	Males with PhD, as % of male adult population	.0013	00.1131
Median age	−.0010***	00.0003	Median age	−.0022**	00.0005
Female employment population ratio	−.0762**	00.0164	Male employment population ratio	.0093	00.0220
Married females as a share of the adult female population	.0177	00.0217	Married males as a share of the adult male population	.0552	00.0325
Children per female over 16	−.0612**	00.0129	Children per male over 16	−.0906**	00.0176
Proprietor income per job	.0000	00.0001	Proprietor income per job	−.0001	00.0001
Wage-and-salary income per job	.0000	00.0001	Wage-and-salary income per job	−.0002	00.0002
Median housing value	.0000	00.0000	Median housing value	.0000**	00.0000
Owner-occupied homes, % of total	.0276*	00.0128	Owner-occupied homes, % of total	.0455*	00.0205
Growth rate of income per capita	.0001	00.0001	Growth rate of income per capita	.0002	00.0002
Service establishments, % of total	−.0037	00.0240	Service establishments, % of total	−.0233	00.0392
Retail trade establishments, % of total	−.0034	00.0272	Retail trade establishments, % of total	−.0330	00.0392
Construction establishments, % of total	.0199	00.0300	Construction establishments, % of total	−.0853*	00.0400
Natural amenities score	.0006	00.0003	Natural amenities score	.0012**	00.0005
Population density	.0003	00.0002	Population density	.0007**	00.0002
Constant	.1430***	00.0236	Constant	.1215	00.0352

Significance at the 1%, 5%, and 10% level shown by ***, **, and *, respectively.

TABLE A3
Seemingly Unrelated Regressions

	Observations	R^2	χ^2	p
Δ Propensity for female-owned firms	646	0.2597	237.63	.00
Δ Propensity for male-owned firms	646	0.1519	122.51	.00
Breusch Pagan test of independent residuals p value	$p = .0448$			

Variable	Coef.	SE
Δ *Propensity for female-owned firms*		
Propensity for female-owned firms, 2002	−.3601***	0.0342
Female high school graduates, as % of female adult population	−.0855***	0.0171
Female college graduates, as % of female adult population	.0683***	0.0270
Females with MA degree, as % of female adult population	.0893*	0.0533
Females with PhD, as % of female adult population	−.6037***	0.2137
Married females as a share of the adult female population	.0189	0.0199
Children per female over 16	−.0590***	0.0128
Female employment population ratio	−.0774***	0.0160
Median age	−.0009***	0.0003
Proprietor income per job	.0000	0.0001
Wage-and-salary income per job	.0000	0.0001
Median housing value	.0000	0.0000
Owner-occupied homes, % of total	.0279**	0.0140
Growth rate of income per capita	.0001	0.0001
Service establishments, % of total	−.0032	0.0239
Retail trade establishments, % of total	−.0036	0.0233
Construction establishments, % of total	.0198	0.0267
Natural amenities score	.0007**	0.0003
Population density	.0003*	0.0002
Constant	.1408***	0.0224
Δ *Propensity for male-owned firms*		
Propensity for male-owned firms, 2002	−.1018***	0.0219
Male high school graduates, as % of male adult population	−.0076	0.0239
Male college graduates, as % of male adult population	.1263***	0.0373
Males with MA degree, as % of male adult population	−.0468	0.0803
Males with PhD, as % of male adult population	.0043	0.1055
Married males as a share of the adult male population	.0569**	0.0289
Children per male over 16	−.0909***	0.0152
Male employment population ratio	.0064	0.0180
Median age	−.0021***	0.0005
Proprietor income per job	−0.0001	0.0001
Wage-and-salary income per job	−.0003*	0.0002
Median housing value	.0000**	0.0000
Owner-occupied homes, % of total	0.0464**	0.0205
Per capita income growth	0.0002	0.0002
Service establishments, % of total	−0.0329	0.0365
Retail trade establishments, % of total	−0.0377	0.0346
Construction establishments, % of total	−0.0876**	0.0369
Natural amenities score	0.0012***	0.0004
Population density	0.0007***	0.0002
Constant	0.1272***	0.0310

Significance at the 1%, 5%, and 10% level shown by ***, **, and *, respectively.

TABLE A4
Seemingly Unrelated Estimation

Number of Observations = 646

Variable	Coef.	Robust SEs
Δ *Propensity for female-owned firms*		
Propensity for female-owned firms, 2002	−.3400***	0.0433
Female high school graduates, as % of female adult population	−.0847***	0.0165
Female college graduates, as % of female adult population	.0645**	0.0289
Females with MA degree, as % of female adult population	.0938*	0.0553
Females with PhD, as % of female adult population	−.6392***	0.2405
Married females as a share of the adult female population	.0177	0.0214
Children per female over 16	−.0612***	0.0127

TABLE A4
Continued

Number of Observations = 646 **Variable**	**Coef.**	**Robust SEs**
Female employment population ratio	−.0762***	0.0162
Median age	−.0010***	0.0003
Proprietor income per job	.0000	0.0001
Wage-and-salary income per job	.0000	0.0001
Median housing value	.0000	0.0000
Owner-occupied homes, % of total	.0276	0.0126
Growth rate of income per capita	.0001	0.0001
Service establishments, % of total	−.0037	0.0236
Retail trade establishments, % of total	−.0034	0.0268
Construction establishments, % of total	.0199	0.0296
Natural amenities score	.0006**	0.0003
Population density	.0003	0.0002
Constant	.1430***	0.0233
Δ *Propensity for male-owned firms*		
Propensity for male-owned firms, 2002	−.0856***	0.0281
Male high school graduates, as % of male adult population	−.0075	0.0253
Male college graduates, as % of male adult population	.1231***	0.0445
Males with MA degree, as % of male adult population	−.0607	0.0937
Males with PhD, as % of male adult population	.0013	0.1114
Married males as a share of the adult male population	.0552*	0.0320
Children per male over 16	−.0906	0.0173
Male employment population ratio	.0093	0.0217
Median age	−.0022***	0.0005
Proprietor income per job	−.0001	0.0001
Wage-and-salary income per job	−.0002	0.0002
Median housing value	.0000***	0.0000
Owner-occupied homes, % of total	.0455**	0.0202
Per capita income growth	.0002	0.0002
Service establishments, % of total	−.0233	0.0386
Retail trade establishments, % of total	−.0330	0.0387
Construction establishments, % of total	−.0853**	0.0394
Natural amenities score	.0012***	0.0005
Population density	.0007***	0.0002
Constant	.1215***	0.0346

Significance at the 1%, 5%, and 10% level shown by ***, **, and *, respectively.

TABLE A5
Seemingly Unrelated Estimation with State Fixed Effects

Number of Observations = 644 **Variable**	**Coef.**	**Robust SEs**
Δ *Propensity for female-owned firms*		
Propensity for female-owned firms, 2002	−.4589***	0.0452
Female high school graduates, as % of female adult population	−.0142	0.0278
Female college graduates, as % of female adult population	.1074***	0.0316
Females with MA degree, as % of female adult population	.1790**	0.0826
Females with PhD, as % of female adult population	−.4926**	0.2504
Married females as a share of the adult female population	−0.0306	0.0238
Children per female over 16	0.0071	0.0153
Female employment population ratio	−.0622***	0.0180
Median age	.0004	0.0004
Proprietor income per job	.0000	0.0001
Wage-and-salary income per job	−.0002	0.0001
Median housing value	5.70E-08**	0.0000
Owner-occupied homes, % of total	−.0119	0.0164
Growth rate of income per capita	.0004***	0.0001
Service establishments, % of total	−.0447*	0.0235
Retail trade establishments, % of total	.0009	0.0264
Construction establishments, % of total	.0388	0.0304
Natural amenities score	.0010**	0.0004
Population density	.0001	0.0002
Constant	.0859***	0.0274

TABLE A5
Continued

Number of Observations = 644 **Variable**	**Coef.**	**Robust SEs**
Δ *Propensity for male-owned firms*		
Propensity for male-owned firms, 2002	−.1393***	0.0336
Male high school graduates, as % of male adult population	.0293	0.0387
Male college graduates, as % of male adult population	.1204**	0.0483
Males with MA degree, as % of male adult population	.0950	0.0984
Males with PhD, as % of male adult population	.0288	0.1116
Married males as a share of the adult male population	.0107	0.0342
Children per male over 16	−.0413**	0.0190
Male employment population ratio	−.0148	0.0221
Median age	−.0007	0.0006
Proprietor income per job	−.0001	0.0001
Wage-and-salary income per job	−0.0003*	0.0001
Median housing value	−1.01*E*-08	0.0000
Owner-occupied homes, % of total	.0121	0.0245
Per capita income growth	.0004*	0.0002
Service establishments, % of total	−.0646	0.0412
Retail trade establishments, % of total	−.0503	0.0399
Construction establishments, % of total	−.0705	0.0479
Natural amenities score	.0025***	0.0007
Population density	.0004**	0.0002
Constant	.1228***	0.0368

Significance at the 1%, 5%, and 10% level shown by ***, **, and *, respectively. Vermont and Wyoming not included because they each only have one county in the sample.

TABLE A6
Difference in Coefficients with State Fixed Effects

	Female	**Male**	χ^2	***p* Value**
High school graduates, as % of adult population	−0.0142	0.0293	1.03	.31
College graduates, as % of adult population	0.1074	0.1204	0.06	.80
Adults with MA degree, as % of adult population	0.1790	0.0950	0.46	.50
Adults with PhD, as % of adult population	−0.4926	0.0288	4.12	.04
Married adults as a share of the adults population	−0.0306	0.0107	1.03	.31
Children per adult	0.0071	−0.0413	4.13	.04

TABLE A7
Impulse Responses with State Fixed Effects (in Percentage Points)

	Female (%)	**Male (%)**
High school graduates, as % of adult population	−0.09	0.21
College graduates, as % of adult population	0.57	0.67
Adults with MA degree, as % of adult population	0.46	0.26
Adults with PhD, as % of adult population	−0.27	0.04
Married adults as a share of the adults population	−0.17	0.06
Children per adult	0.07	−0.37

TABLE A8
Seemingly Unrelated Estimation with MSA Effect

Number of Observations = 646 **Variable**	**Coef.**	**Robust SEs**
Δ *Propensity for female-owned firms*		
Propensity for female-owned firms, 2002	−.3397***	0.0431
Female high school graduates, as % of female adult population	−.0840***	0.0165
Female college graduates, as % of female adult population	0.0644**	0.0287
Females with MA degree, as % of female adult population	0.0870	0.0559
Females with PhD, as % of female adult population	−.6033	0.2391
Married females as a share of the adult female population	0.0188	0.0212
Children per female over 16	−.0607***	0.0126
Female employment population ratio	−.0776***	0.0160

TABLE A8
Continued

Number of Observations = 646 **Variable**	**Coef.**	**Robust SEs**
Median age	−.0010***	0.0003
Proprietor income per job	0.0000	0.0001
Wage-and-salary income per job	0.0000	0.0001
Median housing value	0.0000	0.0000
Owner-occupied homes, % of total	0.0239*	0.0127
Growth rate of income per capita	0.0001	0.0001
Service establishments, % of total	−0.0090	0.0236
Retail trade establishments, % of total	0.0046	0.0272
Construction establishments, % of total	0.0157	0.0294
Natural amenities score	0.0006	0.0003
Population density	0.0002	0.0002
MSA neighbors	0.0022*	0.0012
Constant	0.1434***	0.0232
Δ *Propensity for male-owned firms*		
Propensity for male-owned firms, 2002	−.0834***	0.0284
Male high school graduates, as % of male adult population	−.0057	0.0252
Male college graduates, as % of male adult population	0.1214***	0.0446
Males with MA degree, as % of male adult population	−.0607	0.0936
Males with PhD, as % of male adult population	0.0122	0.1113
Married males as a share of the adult male population	0.0565	0.0320
Children per male over 16	−.0904***	0.0173
Male employment population ratio	0.0081	0.0216
Median age	−.0022***	0.0005
Proprietor income per job	−.0001	0.0001
Wage-and-salary income per job	−.0002	0.0002
Median housing value	0.0000**	0.0000
Owner-occupied homes, % of total	0.0432**	0.0201
Per capita income growth	0.0002	0.0002
Service establishments, % of total	−.0277	0.0390
Retail trade establishments, % of total	−.0288	0.0390
Construction establishments, % of total	−.0887**	0.0399
Natural amenities score	0.0012***	0.0005
Population density	0.0006***	0.0002
MSA neighbors	0.0016	0.0017
Constant	0.1223***	0.0346

Notes: The variable "MSA neighbors" is a dummy variable equal to 1 if a county has at least one other "neighbor" county in their MSA included in the sample.

Significance at the 1%, 5%, and 10% level shown by ***, **, and *, respectively.

TABLE A9
Difference in Coefficients with MSA Effect

	Female	**Male**	χ^2	***p* Value**
High school graduates, as % of adult population	−0.0142	0.0293	1.03	.31
College graduates, as % of adult population	0.1074	0.1204	0.06	.80
Adults with MA degree, as % of adult population	0.1790	0.0950	0.46	.50
Adults with PhD, as % of adult population	−0.4926	0.0288	4.12	.04
Married adults as a share of the adults population	−0.0306	0.0107	1.03	.31
Children per adult	0.0071	−0.0413	4.13	.04

TABLE A10
Impulse Responses with MSA Effect (in Percentage Points)

	Female (%)	**Male (%)**
High school graduates, as % of adult population	−0.09	0.21
College graduates, as % of adult population	0.57	0.67
Adults with MA degree, as % of adult population	0.46	0.26
Adults with PhD, as % of adult population	−0.27	0.04
Married adults as a share of the adults population	−0.17	0.06
Children per adult	0.07	−0.37

BLINDER-OAXACA DECOMPOSITION

As in Jann (2008), the question is how much of the mean outcome difference,

$$D = E\left(e_{mit,t-\tau}\right) - E\left(e_{fit,t-\tau}\right) \tag{A1}$$

where $e_{git,t-\tau}$ denotes the expected value of the change in propensity for male- or female-owned firms between time t and $t-\tau$ in county i, is accounted for by group differences in the explanatory variables. In our case, the female population in a county i is an observation. The female populations across counties form a "group." The structure for the male "group" follows the same logic.

Based on the linear model

$$e_{git,t-\tau} = X'_{gi,t-\tau}\beta_g + \varepsilon_{git}, \quad E\left(\varepsilon_{git}\right) = 0 \quad g \in (m,f) \tag{A2}$$

where h, f, and r are summarized by X, β summarizes the estimated parameters, and ε is the error term, the mean differential can be expressed as the difference in the group-specific means of the regressors as follows

$$\begin{aligned} D &= E\left(e_{mit,t-\tau}\right) - E\left(e_{fit-t-\tau}\right) \\ &= E\left(X_{mi,t-\tau}\right)'\beta_m - E\left(X_{fi,t-\tau}\right)'\beta_f \end{aligned} \tag{A3}$$

because

$$\begin{aligned} e_{git,t-\tau} &= E\left(X'_{gi,t-\tau}\beta_g + \varepsilon_{git}\right) = E\left(X'_{gi,t-\tau}\beta_g\right) + E\left(\varepsilon_{git}\right) \\ &= E\left(X_{gi,t-\tau}\right)'\beta_g \end{aligned} \tag{A4}$$

where $E(\beta_{git}) = \beta_{git}$ and $E(\varepsilon_{git}) = 0$ by assumption.

To identify the contribution of group differences in the explanatory variables to the outcome difference (A4) can be rearranged and expressed as follows.

$$\begin{aligned} D = &\left(E\left(X_{mi,t-\tau}\right) - E\left(X_{fi,t-\tau}\right)\right)'\beta_f + E\left(X_{fi,t-\tau}\right)'\left(\beta_m - \beta_f\right) \\ &+ \left(E\left(X_{mi,t-\tau}\right) - E\left(X_{fi,t-\tau}\right)\right)'\left(\beta_m - \beta_f\right). \end{aligned} \tag{A5}$$

The decomposition is expressed in three parts.

$$D = E + C + I. \tag{A6}$$

The first part,

$$E = \left(E\left(X_{mi,t-\tau}\right) - E\left(X_{fi,t-\tau}\right)\right)'\beta_f \tag{A7}$$

captures the component of the differential that is due to characteristic differences between the male and female population, also called the "endowments effect." The second part,

$$C = E\left(X_{fi,t-\tau}\right)'\left(\beta_m - \beta_f\right) \tag{A8}$$

measures the part of the differential attributable to behavioral differences measured by the differences in coefficients. Last,

$$I = \left(E\left(X_{mi,t-\tau}\right) - E\left(X_{fi,t-\tau}\right)\right)'\left(\beta_m - \beta_f\right) \tag{A9}$$

is an interaction term that captures the fact that differences in endowments and coefficients exist simultaneously between men and women.

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