Factors Affecting Spatial Variation of Microenterprises in the Rural U.S.

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Abstract

We investigate factors affecting microenterprises in nonmetro counties in the U.S. using county level data. The study uses a regional model and combines nonemployer data and establishment counts from County Business Patterns data that have less than 5 employees, and it incorporates a comprehensive county-level set of determinants including social capital and cultural capital. Results suggest that most of the economic and labor force, demographic, policy, regional, and socio-cultural factors are important in explaining the regional variation of microenterprise rates in rural counties in the United States. In particular, we find that regional labor market conditions, returns to microenterprise activities and risk associated with these earnings, owner-occupied housing units and housing value, existence of Wal-Mart in a county, median age, female labor force participation rate, ethnic minorities and ethnic diversity, public expenditure on education and family assistance, natural amenities, and social and cultural capital play a significant role in determining why some rural counties have more microenterprises than others.

1. Introduction

Despite their importance for rural communities, microenterprises have largely been ignored and poorly understood by researchers, policy makers and economic development practitioners for years. It has been argued that small businesses lead to creation of employment, alleviation of poverty, movement from welfare to work, decrease in population loss, improvement of farm and nonfarm earnings, and increase women employment. Despite these claims, anecdotal evidence,

and a growing literature on the economic importance of small businesses, much less is known about the contributions of microenterprises to economic performance and factors affecting the formation and growth of these firms at the local level in the U.S. The objective of this paper is to help create an environment that facilitates viable rural entrepreneurship in rural areas of the United States through investigating the determinants of microenterprises, utilizing county-level data.

Microenterprises are the smallest of small businesses. For the purpose of this research, we adopt the definition by the Aspen Institute (2000) and the Association for Enterprise Opportunity (2005) that a microenterprise is a sole proprietorship, partnership or family business that has fewer than five employees, including the businesses that have no paid employees whom are called nonemployers by the U.S. Bureau of the Census.[2] Most nonemployers are self-employed individuals operating very small unincorporated businesses, which may or may not be the owner's principal source of income.

The simplest conclusion that can be drawn from existing studies (described below) on microenterprises in the U.S. is that they do play an important role in local economic performance. The creation and development of sustainable local businesses that generate jobs and create economic opportunities are vital for rural America in the wake of declining farm income and employment, manufacturing relocation, and globalization. However, merely providing a few ad hoc programs and lip service will not lead to increasing the viability of these businesses in a community and subsequent economic growth and development as a result. From the policy viewpoint, it is important to know what is needed by these entrepreneurs for them to be successful and why there is a regional variation in the location of these types of businesses.

[2] Some researchers (Headd and Saade, 2008; Acs et al.,2009) argue that nonemployer firms and employer firms differ in size and number in a locality and therefore should not be grouped together because pooling data on both groups can lead to incorrect results and interpretations. We address these concerns in our empirical application.

The creation, the location, and the growth of microenterprises over time may vary with certain characteristics across localities, government policy and individual characteristics of entrepreneurs such as psychological, behavioral, and attitudinal factors. Although studying these factors has dominated the small business literature in general, to the best of our knowledge there are no comprehensive studies that investigate factors affecting the microenterprise sector in the U.S in general and in rural areas in particular. The environment that facilitates entrepreneurship in general and microenterprises in particular is largely dependent on these factors and activities of local economic development practitioners that promote entrepreneurship. Efforts to promote microenterprises at various levels of government and nongovernmental entities have been met with mixed success. This may reflect inadequate understanding on the part of policy makers and economic development practitioners regarding essential determinants of microenterprises in different regions or localities and characteristics of entrepreneurs. Understanding these determinants and characteristics may facilitate the development of appropriate policies and training economic development practitioners which will lead to fostering entrepreneurial activities more efficiently and effectively. Effective policies and practitioner training are derived from well planned research on investigating the factors that affect microenterprises in a locality. In this paper we investigate factors affecting the regional variation of microenterprises in rural areas using county level secondary data. The research will identify and determine the relative importance of community level factors and policy tools affecting the spatial variation of rural microenterprises.

2. Descriptive evidence

We define microenterprise as a firm that has less than five employees, including establishments that have no paid employees. Data show that over the last 11-year period, many county residents have chosen microenterprise as a source of their income (Figure 1). Based on our definition, microenterprises for the whole country have expanded from 19.04 million in 1997 to 25.63 millions in 2007, an increase over 34.35% in this period. The microenterprises in rural areas over the same period of time have expanded from 3.39 million in 1997 to 4.11 million in 2007 representing a 21% increase.

While the growth in microenterprises in rural areas has been steady, this growth has been uneven across the rural U.S. Some rural counties have a significantly higher rate of microenterprises than others and therefore they may enjoy a more conducive environment for this type of business (Figure 2). This geographic variation in the proportion of microenterprises in rural counties is the focus of this paper as it makes an effort to understand the factors affecting this variation. Another important aspect of the data is that although the per entrepreneur receipts of the majority of microentrepreneurs (nonemployers to be precise) has gone up over time in both metro and nonmetro areas, nonmetro areas have been lagging. According to Figure 3, the returns per nonemployer in nonmetro areas have been lagging behind the returns per nonemployer in metro areas between 1997 and 2007. In 1997, while the average nonemployer in metro areas earned $33,512, the average nonemployer in nonmetro areas earned $29,146. By 2007, the average nonemployer in metro areas earned $ 41,623, compared with $ 37,519 earned by the average nonemployer in nonmetro areas.

3. Literature Review

Increasingly, local entrepreneurship has been advocated and/or adopted as a popular approach to revitalizing rural America. Researchers and policy makers see rural entrepreneurship as a way to increase rural employment, reduce poverty, curtail population loss, improve farm earnings, and employ more women (Malecki, 1988). Flora and Johnson (1991) observe that small firms are the fastest growing segment of business enterprises in most sectors of metro and nonmetro areas and an important source of job growth through expansion. Miller (1991) finds that, in rural areas, small businesses grow faster and survive better than do branch plants of larger corporations. Henderson (2002) reviews entrepreneurial activities in rural America and suggests some of the new ways of encouraging such activities.

Broadly, there are two streams of literature that are associated with microenterprise research: (1) effects of microenterprises and small businesses on local economic performance; and (2) the determinants of or factors affecting microenterprises and small businesses. Only the second category is directly related to present research. Broadly speaking, the literature associated with microenterprises can be considered as a subset of literature in the wider research area known as entrepreneurship and small business. The notion that entrepreneurship is important in revitalizing local economies is embedded in the idea of Schumpeter's (1942, 1961) innovative entrepreneur in the economic growth process. Subsequently, many economists and policy makers have recognized the viability of entrepreneurship to enhance economic growth in a country or a region. Though the empirical evidence concerning the effects of small business on economic development is far from being entirely clear, considerable interest is shown by a steadily increasing set of publications on this topic including, for example, Reynolds (1991), Acs and Audretsch (1992), Acs (1999), Acs and Armington (2003, 2006), De Groot et al. (2004),

Audretsch and Keilbach (2005), Shaffer (2002, 2006), Karlsson et al. (2006), Acs et al. (2006), and Yu and Stough (2006). These studies have analyzed the impact of small business on the economic development of regions or countries using correlations or regressions for assessing the relationship between an indicator of entrepreneurial activity and a measure of economic development that is based on employment or on income. For example Acs and Audretsch (1992) state that the growth of small and medium size firms has expanded employment in the U.S. Reynolds (1991) found that high employment is associated with an increase in new firm birth rates. Acs (1999) suggests that the small business sector has yielded the bulk of new jobs in the United States. Henderson and Weiler (2009), using nonfarm proprietors as a measure of entrepreneurship, assess the relationship between entrepreneurship and job growth across U.S. labor market areas and counties. To the best of our knowledge, the only study that is directly related to the effects of microenterprises on economic performance in the U.S. is Deller and McConnon (2009). Utilizing a Carlio-Mills type model and state level panel data, they investigate the role of microenterprises (defined as firms that have 1-4 employees) on population, employment, and income growth and find that goods producing microentrepeneurs have a negative effect on these measures of state economic performance.

The main objective of this study is to identify and determine factors associated with the regional variation of microenterprise in rural areas of the United States. Even though the entrepreneur was considered irrelevant by mainstream economists in the 1930s (Baretto, 1989), a large body of empirical literature has emerged on individual and broader socioeconomic regional characteristics associated with entrepreneurial activity and related firm "births" (e.g., Malecki 1988, 1990; Bartik 1989; Evans and Leighton 1989a,b; Bates 1993; Reynolds et al. 1994; Blanchflower and Oswald, 1998; Robson 1998a,b; Clark et al. 1998; Armington and Acs 2001;

Uusitalo 2001; Fölster, 2002; Goetz and Rupasingha, 2009). But we have not been able to locate a single regional level study that investigate factors affecting microenterprises in the U.S. except a recent unpublished study by Acs et al. (2009) who study nonemployers. As mentioned above, microenterprises consist of a vast number of nonemployers. Acs et al. (2009) investigate the determinants of non employer start-up rates across states in the U.S. and find that the start-up rates seem countercyclical with respect to the labor market, while employer start-up rates moved in line with the overall economic cycles.

In general, most of the existing studies on microenterprises in the U.S. focus on the effectiveness of support programs such as lending, technical assistance, training, and welfare to work. Some of these studies argue that businesses that have less than 5 employees (microenterprises) run by the self-employed were an important option for the low income, unemployed, underemployed, and disadvantaged society (Clark and Huston, 1993; Clark and Kays, 1995; Servon, 1998 and 2006; Woller, Wheeler, and Checketts, 1999; Rowe et al. 1999; Blair and Klein, 2001; Dobson, 2002; Hung, 2006). Some scholars see microenterprises as a promising way to help the working poor, the unemployed, and those who receive public assistance (Balkin, 1989; Clinton, 1997; Friedman, 1988; Raheim and Alter, 1998; Soloman, 1992). However, there are no studies that directly estimate the effects of microenterprises on these measures. According to Aspen Institute's 1999 Directory of U.S. Microenterprise Programs (Severens and Kays, 1999), the field of microenterprise development training and assistance has grown from a handful of programs to 341 in 46 states over a 16 year period and 91 percent of these programs targeted low income individuals. Servon and Bates (1998) argue that microenterprise programs targeting the poor who have skills, resources, and networks were useful vehicles for helping some escape poverty.

4. Analytical framework

Following Knight (1921), we model the micro-entrepreneurship as a labor market status. Many studies have modeled decision to become an entrepreneur as an expected utility-maximizing choice between paid employment and self-employment (for example, Borjas, 1986; Blau, 1987; Evans and Jovanovic, 1989; Parker, 1996; Geogellis and Wall, 2000), assuming away unemployment or withdrawal from the labor force. The following formulation is based on these existing studies.

The modeling approach for the representative individual's choice for self-employment is motivated by a random utility model. An individual in region i faces two choices ($J = s,e$): self-employment (s) or paid employment (e). Suppose that the utility level of choosing s for this individual in region i is U_{is} and the utility level of choosing e is U_{ie}. If the individual chooses self-employment then the utility U_{is} is the highest between the two choices ($U_{is} > U_{ie}$, $\forall$ s≠e). Define the index function:

(9) $$I_i = U_{is} - U_{ie} = X_i\beta + \varepsilon_i$$

Where X_i is a vector of explanatory variables that affect the choice and ε_i is a random term. The stochastic nature of the index function implies that the probability that self-employment is selected by the representative individual equals:

(10) $$P_{is} = Prob(U_{is} - U_{ie} > 0) = Prob(\varepsilon_i > - X_i\beta)$$

Variables in X are the individual's socio-economic, demographic and other characteristics. Based on Geogellis and Wall (2000), we can add the regional variation to this framework. Assume a representative individual as a member of the labor force and the utility she obtains from the two choices of labor force participation as U_{is} and U_{ie}, respectively. The utility that individuals derived from the two options, paid-employment and self-employment, can vary spatially due to differences in regional level characteristics. Under this scenario, the difference in the utility for the representative individual in region i is U_{is} - U_{ie} + δ_i, where δ_i differentiates the representative individual in region i from the representative individual in the country as a whole (Geogellis and Wall, 2000). Assume S_{ij} is a random variable that S_{ij} = 1 if individual j in region i is self-employed, and S_{ij} = 0 otherwise. Then the equation (10) can be rewritten as

$$(11) \qquad P(S_{ij} = 1) = Prob(U_{is} - U_{ie} + \delta_i > 0), \ \forall \ s \neq e$$

We focus on the labor market choice of all individuals in a region. Equation (11) takes the following form when all the self-employed individuals in region i are presented as a ratio of total labor force (N_i):

$$(12) \qquad S_i \equiv \frac{1}{Ni} \sum_{j=1}^{Ni} \Pr [\ S_{ij} = 1] = F(U_{is} - U_{ie} + \delta_i),$$

where $F' > 0$. Assuming a large N_i, the left hand side of (12) is the rate of self-employment in region i. If we further assume that the self-employment rate is affected by a set of m regressors, we can estimate the effects that regressors have on self-employment rate in a region. Typically, it is assumed that S_{ij} is a linear combination of the explanatory variables,

(13) $S_i = \beta_1 x_{i1} + \beta_2 x_{i2} + \ldots + \beta_m x_{im}$

This framework allows derivation of microenterprise activities as a function of numerous explanatory factors as well as stochastic variables. The S_i is the dependent variable that measures the spatial variation of microenterprise activities. Little is known about the specification of the variables that are affecting microenterprises. However, it is reasonable to assume that factors that generally affect the location of business activity may have some effect on the location of microenterprises as well. The model allows the incorporation of any number of groups of variables such as economic, policy, location, demographic, social, and cultural.

5. Data and Variables

The dependent variable in this model is a normalized rate of microenterprises. For the normalization, following Acs and Armington (2004), we assume that the number of microenterprises in each county would tend to be proportional to the size of the county, so these numbers are standardized by dividing by the size of the local labor force. This "labor market approach" which based on the theory of entrepreneurial choice (Acs and Armington, 2004, Evans and Jovanovic, 1989) is argued to be more accurate than other measures such as simple counts of establishments and the rate of microenterprises normalized by the total number of establishments.

Rural counties for the study are selected based on USDA-ERS rural-urban continuum codes. Our secondary data contain county level measures of nonemployer establishments and establishments that have fewer than five employees, and determinants of microenterprises. To

measure microentrepreneurs that have fewer than five employees, we use establishment numbers from the County Business Patterns (CBP) data. One drawback of this data is that they do not have respective sales or receipts for this particular category of establishments. Nonemployer establishments are also available from the Bureau of the Census. This data contain the number of establishments and sales or receipts of businesses without paid employees that are subject to federal income tax.

To motivate the selection of regressors for the aggregate model, we consult the large extant literature associated with entrepreneurial activity or firm location. We organize the determinants of microenterprises into five broad areas: Economic and labor force; demographic; policy; regional; and social and cultural capital. The descriptive statistics and variable explanations are presented in Table 1.

5.1. Economic and labor force characteristics

We include the returns to microenterprises, wage and salaries from formal employment, risk variables, unemployment rate, size of markets, local economic growth, home ownership, median housing value, and access to formal financial capital as measures of economic and labor force characteristics. We hypothesize that the returns to microenterprises are positively associated with and wage and salary are negatively associated with microenterprises. Riskiness of returns to entrepreneurship has been incorporated in the previous literature (Parker, 1996; Goetz and Rupasingha, 2009). We use two risk measures in this study. First measure (*risk1*) is to measure the risk in returns to microenterprises and we use the coefficient of variation of the ratio of nonemployer receipts to wage-and-salary income in a county for a 10-year period (1997-2006) to measure this variable. *Risk1* is hypothesized to be negatively associated with the rate of microenterprises. The second risk measure (*risk2*) is to account for the uncertainty in the local

labor market and we use the coefficient of variation of unemployment rate for a 10-year time period (1997-2006) to measure this variable. We postulate that the persistent uncertainty in the labor market may force people to seek self-employment and therefore *Risk2* is hypothesized to be positively associated with the rate of microenterprises. The unemployment rate itself is included in the model in order to measure the direct effect of it on microenterprises. The argument is that higher unemployment rates may encourage people to look for self-employment opportunities because of lack of opportunities in the formal employment sector (Goetz and Rupasingha, 2009). The size of the market is measured by the county total income and supposed to capture the possibility that bigger markets are able to support the larger number of diversified and new products that microenterprises can supply (Robson 1998a). In order to capture county economic growth, we incorporate the per capita income growth rate between 1995 and 2000. The general hypothesis with respect to local economic growth would be positive with microenterprise rate but we also hypothesized earlier that high and persistent unemployment in a locality would encourage microenterprises. Therefore we will not make an *a priori* hypothesis with respect to local economic growth. Home ownership and median housing value are included as measures of collateral to secure credit from the formal credit market (Robson 1998a, b) and hypothesized to be positive with the rate of microenterprises. Access to formal credit market (Malecki 1994) is measured using the amount of dollars deposited per capita in local banks (Goetz and Rupasingha, 2009) and is hypothesized to be positive.

5.2. Demographic characteristics

The role of education, age, race, ethnic diversity, gender, and marital status are included in the set of demographic characteristics. In the US, according to the SELP program, 58% of the micro entrepreneurs have more than a high school education, and 83% have a high school

education or the equivalent (Clark and Kays, 1995). Other studies find that education is positively associated with entrepreneurship (Evans and Leighton 1989; Bates 1993; Audretsch and Fritsch 1994; Malecki 1994; Bregger 1996; Robson 1998*a*). We include percent of high school diploma only and percent of college graduates and hypothesize both to be positively associated with rate of microenterprises. Based on the existing literature on self-employment (Evans and Leighton 1989; Bregger, 1996; Robson 1998*a*), we hypothesize that age has a positive association with the rate of microenterprises and include county median age to measure this variable. Age has been used as a proxy for experience in these studies. Numerous studies use race and ethnicity as factors affecting entrepreneurship. Some authors find that nascent entrepreneurs who gave up altogether are more likely to be White (Parker and Belighitar, 2006). Clark and Keys (1995) find that non-White individuals tend to use more microenterprise lending programs than White. We include African Americans and Hispanics as a percent of total population to measure minority effects on microenterprises and expect both to have a positive effect. Following Goetz and Rupasingha (2009), we also include the ethnic diversity index to measure how the "melting pot" idea affects rural microenterprise rates in rural counties as it has been argued that this has a positive effect on regional economic growth. We utilize the method used in Alesina, Baqir and Easterly (1999) to calculate ethnic diversity variable as follows:

(14) $$ethnic = 1 - \Sigma_i (Race_i)^2$$

where $Race_i$ denotes the share of population self-identified as of race $i \in I$ = {White, Black, Asian and Pacific Islander, American Indian, and Other}. This measure captures the odds that two individuals drawn at random from a county are of the same race. There are some studies that

show that most of the clients of the microenterprise programs are primarily females (Clark and Keys, 1995). Other studies suggest that women are less likely to become a micro entrepreneur compared to men (Kim et Al, 2000; Georgellis and Wall, 2000). Following Goetz and Rupasingha (2009) we include the female labor force participation rate in a county to measure the gender effects on rate of micro enterprises. According to Borjas (1986), self-employment propensities are greater for married people than single people in order to reduce the shirking associated with formal hired labor and maximize family income and we include the percent of married households as a percent of the total household in a county to measure this aspect.

5.3. Government Policies

It has been argued that local government policies such as local taxes and expenditure may affect local entrepreneurship. Taxes may affect entrepreneurship and small business development by discouraging investments by these firms. On the other hand, government expenditure in the areas of education and infrastructure may encourage such enterprise activities. We incorporate per capita taxes and per capita expenditure on highways and education to test these possibilities. Another aspect that may be unique to microenterprises is the effect of public assistance programs. It has been argued that self-employment is one form of work that recipients of the Temporary Assistance for Needy Families (TANF) and Aid to Families with Dependent Children (AFDC) can be used to fulfill work requirements, generate income, and move off assistance (Friedman et al., 1995; Alisultanov et al., 2002). This is particularly conceivable for women with children receiving welfare who are unable to find/afford child care (Klein et al., 2003). Cranwell and Kolodisky (2002) find a negative relationship between microenterprise growth and food stamps receipts. We use per capita family assistance expenditure in the model and hypothesize

that the beginning period levels of this expenditure are positively associated with the rate of microenterprises.

5.4. Regional Characteristics

We incorporate several fixed-county specific factors in the model. We explore the effects of location-specific natural amenities on regional variation in the microenterprise rate using McGranahn's(1999) measure and will expect a positive sign on it (Goetz and Rupasingha, 2009). Regional indicator variables based on the Bureau of Economic Analysis classification are included to capture regional effects: New England, Mideast, Great Lakes, Plains, Southeast, Southwest, and Rocky Mountain (and Far West being the excluded category).

5.5. Social and cultural capital

In this paper, we also consider a set of factors that has not received much attention in the empirical literature: social and cultural capital. Most microenterprise programs in the developing world make loans to the poor through groups that work through social capital (Light and Pham, 1998), but these groups in the United States tend to fall apart because of the lack of social capital (Woolcock, 1999, 2001). We incorporate county level social capital measures developed by Rupasingha et al. (2006) and available at http://nercrd.psu.edu/Social_Capital/index.html. Rafiq (1992), Werbner (1990) and Basu and Goswami (1999) emphasize the influence of religion on business style and to incorporate this factor in the our model we use county level religious adherence rates available from the American Religious Data Archive. Hypothesized relationships of the social capital and cultural capital to microenterprises, based on above papers, would be positive. But in the case of microentrepreneurs, most of them are self-employers and spend a significant amount of time working on their business. Social and cultural activities require

significant time-commitments. Because of this reason, the effects of social and cultural capital on microenterprises might be negative (Parker and Belghitar, 2006) and endogenous. Therefore, we appeal to empirical evidence that will result from this research rather than assigning *ex ante* relationships.

6. Estimation Methods and Issues

The main focus of this research is to study the determinants of the regional variation of microenterprises in rural areas. As mentioned above, our preferred measure of microenterprise activities is a normalized measure based on previous studies. We analyze both nonemployers and establishments that have 1-4 employees (employers hereafter) as our main category of microenterprises as well as separate analyses for the two categories. Although data is available for the North American Industrial Classification System (NAICS) categories such as mining, construction, utilities, manufacturing, wholesale trade, retail trade, and information, the data suppression is a major problem to estimate our model for these sub-categories.

The econometric model for determinants of microenterprises must account for two main estimation problems. First, both microenterprise activity and some of our measures of determinants may be simultaneously determined. Therefore, the estimates could reflect some degree of reverse causality or spurious correlation. To mitigate this issue, we use lag values of all independent variables (rate of microenterprises for 2007 versus control variables for 2000 or around that year), allowing us to more clearly determine the extent to which any relationship between microenterprises and their determinants. Second, for data comprised of observations on smaller geographic areas such as counties, changes in one locality may have spillover effects on its neighboring areas, creating a pattern of spatial dependence that requires a spatial econometric

approach. Previous studies using U.S. county- and state-level data have confirmed that these regional cross sectional data display spatial dependence (Rey and Montouri, 1999; Rupasingha et al., 2002; Rey and Janikas, 2005). Initially, we perform local indicators of spatial association (LISA) (see Anselin, 1995) in order to identify spatial dependence in the dependence variable and local "hot spots" of microenterprise activities. Spatial dependence can take two major forms. One is when there is spatial dependence in the dependent variable and the other is when there is spatial dependence in the error term. Statistical tests are performed to detect each type of bias. A spatial lag model is estimated to correct for lag dependence and a spatial error model is estimated to correct for error bias. If both types of spatial effects are evidenced, the suitable model is a general spatial model (Lesage, 1999).

One obvious problem that is encountered when estimating spatial models for rural counties only is the existence of 'islands.' In other words, since all nonmetro counties are excluded from the data set, we are excluding some of the metro counties that are neighbors to some nonmetro counties. The weight matrix that is created subsequently would reflect the proximity of the nonmetro polygons only. To mitigate the effect of this issue on results, we include dummy variables for all nonmetro continuum codes in order to account for their proximity to metro counties (excluding last category to avoid perfect collinearity).

6. Estimation and results

Our findings in this paper should be interpreted with a little caution due to the number of shortcomings. We lack information on actual costs and profits of microenterprises, an important aspect when studying factors affecting these firms. Another drawback is the lack of sales data for employers (establishments that have 1-4 employees). We try to overcome this by using nonemployer receipts which are roughly about 80% of all microenterprises but as mentioned

above, the two groups of establishments that we combine differ in numbers and sizes. It is also misleading to consider all records in the nonemployer universe as business firms in the usual sense. According to the Bureau of the Census, many nonemployers are employed in the formal wage or salary sector and do nonemployer activities such as side jobs, hobbies, or other activities that generate extra incomes for the family. It is also true that most of these nonemployers may never grow into employers and continue to expand as employer businesses.

All the variables included in the model are hypothesized to explain the regional variation in rural microenterprise rate calculated as a ratio between microenterprises and total full- and part-time employment in a county. Three specifications of the model are estimated using three different dependent variables: Total microenterprises as a percent of total full- and part-time employment; employer microenterprises as a percent of total full- and part-time employment; and nonemployer microenterprises as a percent of total full- and part-time employment.

As mentioned earlier, it is often argued and found that the data that consist of smaller spatial units such as counties have spatial spillover effects. We conduct an initial exploratory spatial data analysis using local indicators of spatial association or LISA (Anselin, 1995). We uncover significant local spatial clustering of microenterprises for all counties in the U.S. (Figure 4). The map in Figure 4 shows the counties with significant local Moran statistics in different shades of green (the corresponding p values are given in the legend). The three specifications of the model were tested for spatial dependence bias. The likelihood ratio tests performed to test for both spatial dependence bias in the lagged dependent variable and the error term were highly significant indicating that the inference using OLS estimation may be biased and inefficient. Therefore all three specifications were estimated using spatial econometric methods. Since both types of spatial dependence bias (in the dependent variable and error term) are present in the

data, we estimate the general spatial model (Lesage, 1999). The econometric estimates obtained using OLS estimation are presented in Table 2 for comparison purposes. The following inference is based on the general spatial model estimates that are presented in Table 3. Results show that both spatial parameters (*Rho* and *Lambda*) are highly statistically significant in all models indicating the presence of spatial spillover effects in our data.

First we discuss the estimation results for the aggregate microenterprise model (specification 1). We advise caution when interpreting these results that are based on a combined dependent variable that include non employers and employers (that have 1-4 paid employees). As suggested by Headd and Saade (2008), the results will tend to reflect trends among non employers because of their overwhelming proportion (82% of all microenterprises). We modeled the micro-entrepreneurship as a labor market status and this is indicated in our results. Results show that the relationship between market wage rate and rate of microenterprises is negative and highly significant indicating that lower wages in the formal labor market result in the higher regional rate of micro-entrepreneurship. Results also show that rate of return to microenterprises is significant and positively associated with the rate of microenterprises. The rate of unemployment also acts as a push factor for microenterprises. The unemployment rate is highly significant and positively associated with regional variation in the rate of microenterprises. It can be inferred that during economic downturns in these counties, people turn to microenterprise activities. We use two risk variables in the model: one is to measure the risk associated with microenterprises themselves by creating a variable to measure the risk related to non employer earnings; and the other is to measure the general uncertainty in the formal labor market, creating a risk variable using the unemployment rate. The risk variable associated with non employer earnings is negative and highly significant, indicating that microentrepreneurs respond

negatively to the fluctuations in earnings. This also shows that micro-entrepreneurs are risk-averse. The risk variable associated with unemployment is positive but not significant in this specification. To measure the effect of the size of the local market, we incorporate the total personal income in a county and this variable, though marginally (at 11%) significant, does not have the expected positive sign. The effect of per capita income growth over a five-year period is not significant. The home ownership rate and the median housing value were included to measure the effects of the availability of collateral for microentrepreneurs. Both variables are highly significant and positive. The per capita bank deposit in a county is included in the model to measure the availability of credit in the local market. This variable is highly significant but does not have the expected positive sign. The effect of Wal-Mart is highly significant and negative indicating that the existence of Wal-Mart in a county is not favorable for microenterprises.

To measure the effects of education, we incorporate both high school only graduates and college graduates in the model and results show that both variables seem to be capturing (significant at less than 5% level) some of the regional variation in the rate of microenterprises. The high school only variable is negative and the college variable is positive indicating that microentrepreneurs are relatively educated. The median age in a county is used as a proxy for experience and this variable is highly significant and positive, indicating that it is the older people who are engaged in microenterprise activities. Although only marginally significant (9%), the positive coefficient for the female labor force participation confirms that micro-entrepreneurship is more popular among female workers compared to their male counterparts. Results also show that microenterprise activities are more popular among Hispanics, Blacks

(6%), and married households. The ethnic diversity variable is highly significant but negative indicating that racially heterogeneous localities are not conducive for microenterprise activities.

Among the government policy variables, the per capita education expenditure variable is significant but negative. The per capita family assistance expenditure has a significant effect (6%) on regional variation in the rate of microenterprises. This variable is positive, indicating that the initial family assistance expenditure has a push effect on microenterprises. The per capita expenditure on highways and per capita taxes are not significant.

The natural amenity variable is highly significant and positive. This shows that high amenity rural counties are conducive for micro-entrepreneurship. All regional indicator variables that measure BEA regions are positive and highly significant.

The social capital variable is highly significant and negative. As discussed earlier, this may be due to the fact that social capital is higher in counties where formal wage and salary jobs are higher. Among the religious adherence variables, the percent of Mainline Protestants and Catholics are significant and negative. These results show that social and cultural capital high counties are not favorable for microenterprises.

Next we estimate the specification (2) for the dependent variable with employer microenterprises as a percent of total full- and part-time employment. The model fits slightly better for this set of microentrepreneurs than for the aggregate model in terms of R-squared (57% versus 53%). Overall, the results are similar to those of the specification 1 with some notable exceptions. For the sake of brevity, we will discuss only these exceptions. The significance level of the relationship between the nonemployer receipts and the rate of employers goes down to a level that is only marginally significant (10%). This is not surprising given the measurement issue associated with this variable. Effects of the size of the local market and economic growth is

now highly significant but have an unexpected negative sign for both parameters indicating that smaller markets are better and the spatial variation of these employers is counter cyclical in terms of economic growth. The per capita bank deposit variable is now positive but not significant and the Wal-Mart variable is still negative but not significant any more. The female labor force participation rate is negative and highly significant indicating that most of these micro-entrepreneurs are males. While the Blacks variable is highly significant and positive, the Hispanics variable is not significant any more. The married variable is only marginally significant and the ethnic diversity variable is not significant. The per capita expenditure on family assistance is also not significant any more. One of the most striking changes in the results is the change in the signs of social capital and some of the religious adherence variables. The social capital variable is now positive and significant indicating that social capital is actually playing a positive role in the regional variation in this category of microenterprises. Among the religious adherence variables, both Mainline Protestants and Catholics are positive but only the Catholics adherent rate has a significance level of 7%.The Jewish adherent rate is now significant but remains negative.

Specification 3 of the model uses the third dependent variable: nonemployers as a percent of total full- and part-time employment. The results are presented in column three of Table 3. The results are very similar to those of specification 1 where we include both nonemployers and employers with 1-4 paid employees. This is not surprising given the fact that about 82% of the total microenterprises in our data set are nonemployers. Therefore this group weighs heavily in driving the results obtained in specification 1. However, there is one exception. The education variable that represents college graduates is not significant in this specification although it was significant in the aggregate model. This result in the aggregate model may have been driven by

the highly significant college graduate parameter in the specification 2. Most of the other variables that were significant in the aggregate model tend to be even more significant in this specification. For example, social capital and cultural capital variables seem to be increasing their significance levels.

Results for separate specifications for employers and nonemployers show that our working definition for microenterprises is questionable. While some determinants of regional variation for these two groups are the same, there are major differences between the two groups. For example one hand, several variables that are significant determinants for nonemployers are not significant for employers and vice versa. It appears that while the size of the local market and local economic growth are highly significant and negative in the employer equation, these two variables do not play a role in the spatial variation of nonemployers. Per capita bank deposits and Wal-Mart stores play no role in the employer variation but they are highly significant and negative in the nonemployer equation. The college graduates variable is highly significant and positive in the employer group but not significant in the nonemployer group. The female labor force participation rate is negative and significant in the employer equation but it is positive and significant in the nonemployer equation. Hispanics and ethnic diversity variables play no role in the employer equation. The Hispanics is positive and the ethnic is negative and both are highly significant in the nonemployer equation. The per capita family assistance expenditure is positive and highly significant in the nonemployer equation but not significant in the employer equation.

On the other hand, the nature of the effect (measured by the sign of parameters) of some variables are different between the two groups. This is clearly evident in the results related to the social capital and religious adherence variables. The effect of social capital is positive and highly significant in the employer equation but negative and highly significant in the nonemployer

group. Among the cultural capital variables, the Mainline adherent variable is positive and marginally significant (16%) in the employer group but is negative and highly significant in the nonemployer group. Also, the Catholic adherent variable is positive and significant at 7% in the employer group but is negative and significant at 2% in the nonemployer group. The Jewish adherents rate is negative and marginally significant (at 9%) in the employer group but negative and not significant in the nonemployer group.

7. Conclusions

This research attempts to fill an important knowledge gap in the area of microenterprises in the rural United States: the exploration of factors affecting the regional variation of the microenterprise rate. This is valuable information to the efforts that community development researchers and practitioners are undertaking in the area of small business development rural communities, and especially important when considering that many entrepreneurial ventures in rural areas are microenterprises and that the knowledge about this group of businesses is nearly non-existent. From a policy viewpoint, it is important to know what drives the regional variation in rural microenterprises and what is needed by rural microentrepreneurs for them to be successful. And the contribution of this paper is a step toward that direction.

We estimate a model for regional variation in microenterprises in the rural counties of the U.S. and investigate the roles of local economic and labor market conditions, demographic characteristics, policy factors, county-specific fixed factors, and social and cultural capital. Our findings suggest that most of these factors are important in explaining the regional variation of microenterprise rates in rural counties of the United States. In particular, we find that regional labor market conditions, returns to microenterprise activities and risk associated with these earnings, owner-occupied housing units and housing value, existence of Wal-Mart in a county,

median age, female labor force participation rate, ethnic minorities and ethnic diversity, public expenditure on education and family assistance, natural amenities, and social and cultural capital play a significant role in determining why some rural counties have more microenterprises than others.

We also estimate separate specifications of the model for employer microenterprises and nonemployers in our data and find that some factors affect differently on the regional variation of these two groups, implying that it may not be a good idea to pool these types of establishments together in investigating factors affecting their regional variation. Based on these differences, we find that smaller local markets and local economic downturns, higher levels of college graduates, higher male labor force participation, higher levels of social capital, and higher levels of Catholics adherents play a significant role in determining why some rural counties have more employer microenterprises than others. On the other hand, we find lower per capita bank deposits, lower Wal-Mart stores, higher female labor force participation rate, more Hispanics, more ethnically homogenous communities, a higher number of married households, higher initial per capita family assistance expenditure, less social capital, and lower rates of Mainline and Catholic adherents are associated with a higher rate of nonemployers in rural communities. The significant factors that are common to higher rates of both types of microenterprises are lower wage and salaries, higher returns to microenterprises, higher unemployment rates, a lower risk in returns to micro enterprises, higher home ownerships and median housing values, a higher median age, higher levels of African Americans, lower government expenditure on education, and higher natural amenities.

Figure 1. Microenterprises as a percent of total employment, 1997-2007

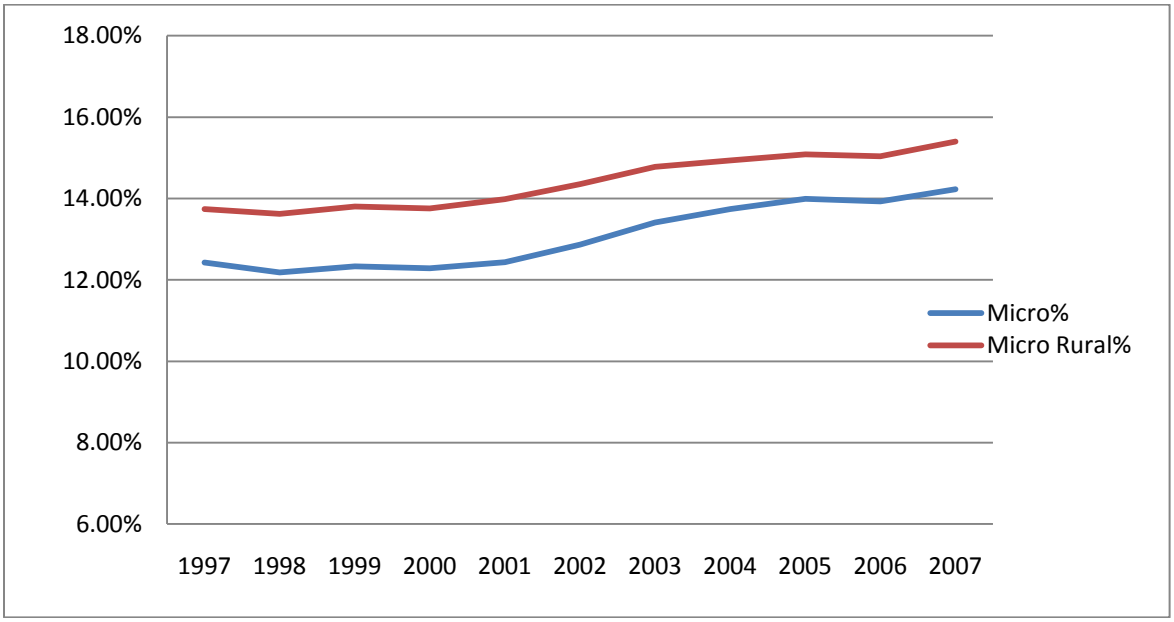

Figure 2. Spatial variation of microenterprises as a percent of total employment, 2007

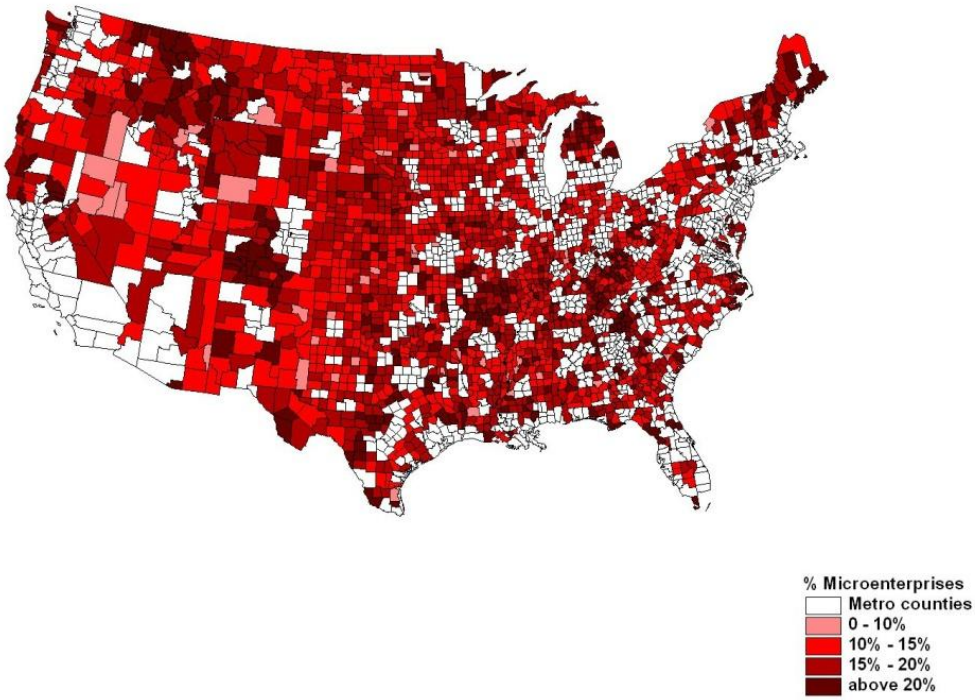

Figure 3. Per Capita Nonemployer Receipts 2007

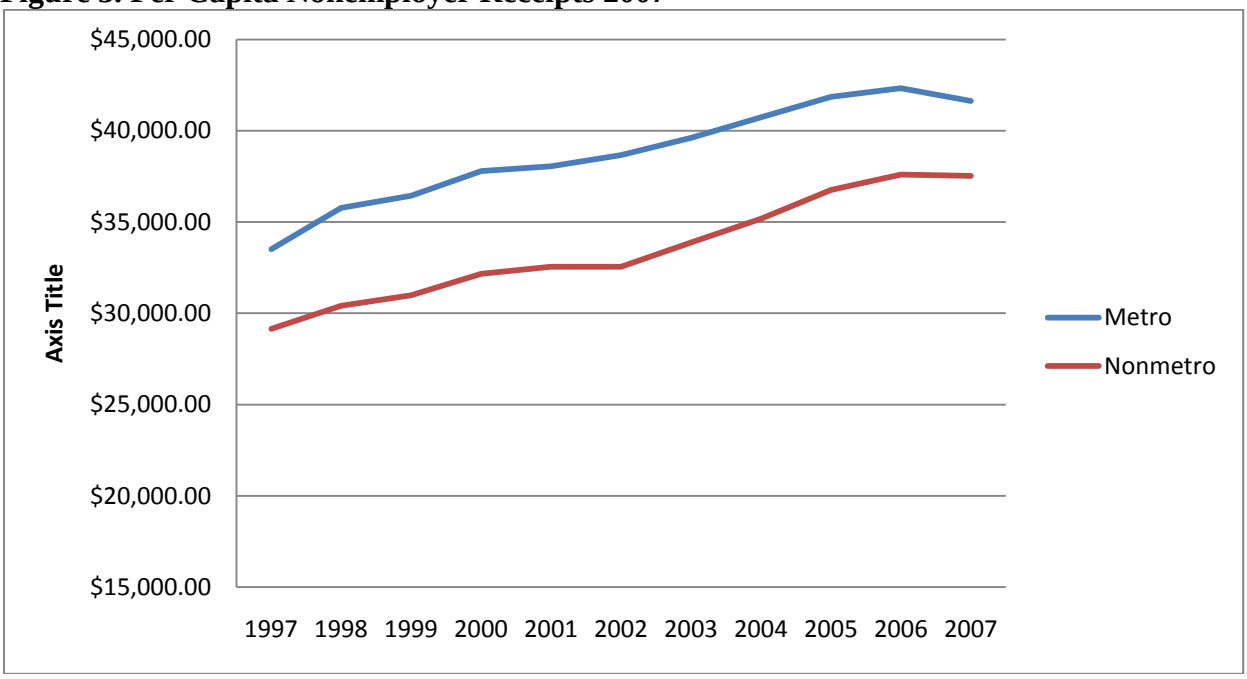

Figure 3. LISA Significance Map

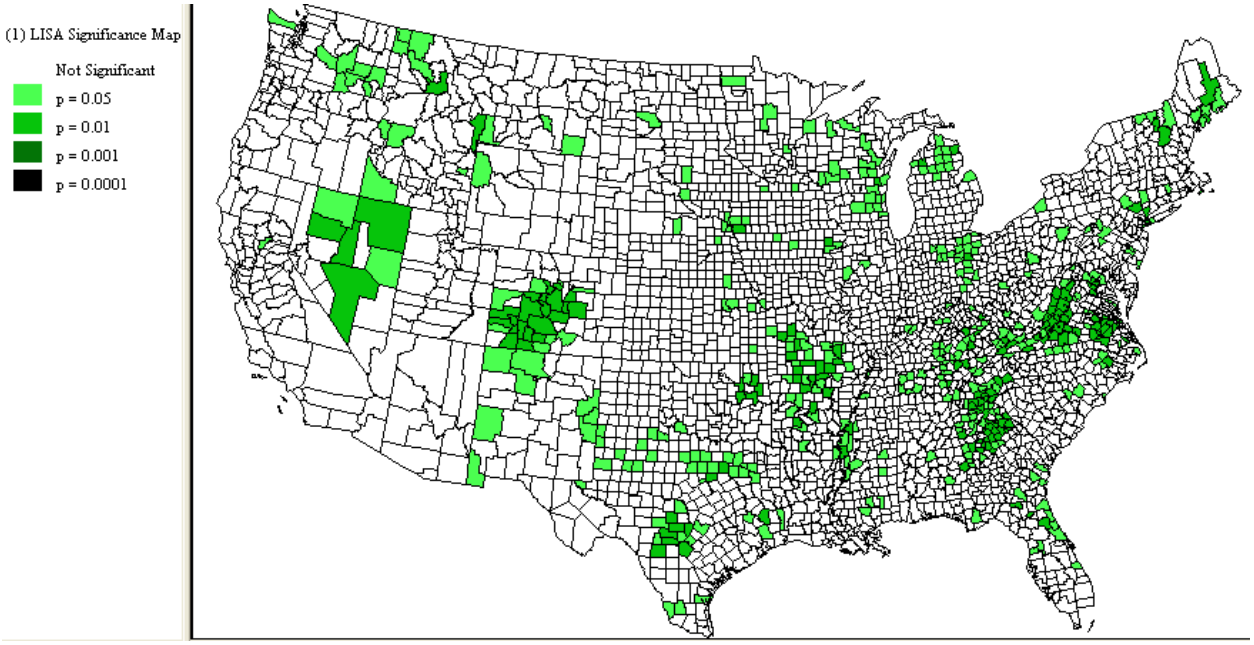

Table 1. Variables and descriptive statistics

Variable	Description	Mean	Std.Dev.
MICROTOT	Rate of total microenterprises, 2007	0.163	0.043
ESTB1_4	Rate of establishments with 1-4 employees, 2007	0.027	0.009
NONEMP	Rate of nonemployers, 2007	0.139	0.039
WAGE/1000	Wage and salary per worker, 2000	23.18	3.81
RECEIPTS/1000	Nonemployers receipts per nonemployer, 2000	32.17	7.06
URATE	Unemployment rate, 2000	0.060	0.029
RISK1	Risk measure using nonemployer receipts, 1997-2006	0.121	0.060
RISK2	Risk measure using unemployment rate, 1997-2006	0.213	0.082
TOTINC/10000	Total personal income, 2000	52.86	57.24
INCGRWTH	Per capita income growth, 1995-2000	0.220	0.080
HOMEOWN	Owner-occupied housing units per capita, 2000	75.10	5.986
MEDIANHV/1000	Median housing value, 2000	70.47	36.29
DEPOSITS	Per capita bank deposits, 2000	12.38	7.09
WALMART	Wal-Mart stores, 2002	0.507	0.593
HIGHSCH	% High school only graduates, 2000	0.239	0.045
COLLEGE	% College graduates	0.144	0.057
MEDAGE	Median age, 2000	38.21	4.01
FEMLABOR	Female labor force participation rate, 2000	0.457	0.022
BLACKS	% African Americans, 2000	7.78	14.82
HISPANICS	% Hispanics, 2000	6.08	12.67
ETHNIC	Ethnic diversity index, 2000	0.240	0.208
MARRIED	% married households	56.23	5.38
EDUEXP	Per capita gov't expenditure on education, 2002	1.47	0.52
HWYEXP	Per capita gov't expenditure on highways, 2002	0.234	0.193
FAMASST	Per capita gov't expenditure on AFDC/TANF, 2000	35.20	38.45
LOCTAX	Per capita local taxes, 2000	0.959	0.805
AMENITY	Natural amenity index	-0.057	2.252
SOCCAP	Social capital index, 1997	0.119	1.380
MAINAD	% religious adherents – Mainline, 2000	15.87	12.83
EVANAD	% religious adherents – Evangelicals, 2000	24.73	17.81
CATHAD	% religious adherents – Catholics, 2000	13.01	14.90
JEWAD	% religious adherents – Jewish, 2000	0.042	0.320
NENG	New England counties	0.016	0.127
MEST	Midwest counties	0.034	0.182
GLAK	Great lakes counties	0.132	0.338
PLNS	Plains counties	0.252	0.434
SEST	Southeast counties	0.304	0.460
SWST	Southwest counties	0.136	0.343
RKMT	Rocky Mountain counties	0.085	0.279

Table 2. OLS Estimation results

	Specification 1		Specification 2		Specification 3	
Variable	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat
Constant	-0.119	2.69	-0.004	0.49	-0.095	2.42
WAGE	-0.004	13.05	-0.001	10.75	-0.003	13.24
RECEIPTS	0.0003	2.45	0.00004	1.18	0.0003	2.20
URATE	0.136	3.10	0.033	4.02	0.084	2.03
RISK1	-0.061	4.17	-0.008	2.57	-0.054	4.02
RISK2	0.009	0.90	-0.001	0.23	0.013	1.52
TOTINC	-0.00003	1.56	-0.00001	3.41	0.0000	1.03
INCGRWTH	-0.002	0.15	-0.005	2.40	0.004	0.39
HOMEOWN	0.002	8.26	0.0002	3.07	0.002	8.89
MEDIANHV	0.0003	5.65	0.0001	4.68	0.0003	5.69
DEPOSITS	-0.0003	2.54	0.00003	0.92	-0.0003	2.50
WALMART	-0.007	4.97	-0.0004	1.47	-0.008	5.62
HIGHSCH	-0.066	2.31	-0.017	2.97	-0.051	1.95
COLLEGE	0.062	2.08	0.022	3.02	0.031	1.24
MEDAGE	0.003	7.07	0.001	13.26	0.002	5.59
FEMLABOR	0.099	1.76	-0.019	1.74	0.104	2.06
BLACK	0.0002	1.49	0.0001	2.90	0.0002	1.45
HISPANICS	0.0003	2.31	-0.00002	0.92	0.0004	2.69
ETHNIC	-0.043	4.31	0.001	0.41	-0.047	5.06
MARRIED	0.001	2.65	0.000	1.03	0.001	3.45
EDUEXP	-0.003	1.47	-0.001	1.20	-0.003	1.39
HWYEXP	-0.002	0.42	0.001	0.48	-0.001	0.27
FAMASST	0.0001	1.98	0.000001	0.11	0.0001	2.38
LOCTAX	0.001	0.26	0.0003	0.96	0.001	0.50
AMENITY	0.003	5.71	0.0005	3.69	0.003	5.41
SOCCAP	-0.003	2.61	0.001	2.21	-0.003	3.78
MAINAD	-0.0004	4.51	0.00002	1.24	-0.0005	5.10
EVANAD	0.0001	1.06	0.00001	0.89	0.0001	1.45
CATHAD	-0.0002	2.24	0.00002	1.83	-0.0001	2.30
JEWAD	-0.003	0.53	-0.001	0.58	-0.002	0.47
NENG	0.063	8.33	0.004	2.89	0.057	8.26
MEST	0.034	5.82	0.001	0.86	0.031	5.84
GLAK	0.032	6.35	0.003	2.26	0.028	6.18
PLNS	0.026	5.22	0.002	1.37	0.024	5.24
SEST	0.024	4.88	-0.002	2.01	0.026	5.96
SWST	0.026	4.71	-0.003	2.53	0.030	6.28
RKMT	0.016	3.54	0.004	3.44	0.011	2.97
Adjusted R^2						
Log L						

Table 3. General spatial estimation results

	Specification 1		Specification 2		Specification 3	
Variable	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat
Constant	-0.111	3.42	-0.005	1.05	-0.088	2.89
WAGE	-0.004	16.85	-0.001	15.25	-0.003	16.03
RECEIPTS	0.0003	2.74	0.00004	1.63	0.0003	2.45
URATE	0.140	3.70	0.031	4.34	0.091	2.59
RISK1	-0.056	4.28	-0.008	3.14	-0.049	4.01
RISK2	0.005	0.56	-0.001	0.56	0.009	1.10
TOTINC	-0.00004	1.60	-0.00001	2.96	-0.00002	1.16
INCGRWTH	-0.003	0.36	-0.005	2.86	0.001	0.13
HOMEOWN	0.002	10.03	0.0002	5.38	0.002	8.82
MEDIANHV	0.0003	9.97	0.0001	10.35	0.0003	8.15
DEPOSITS	-0.0003	2.91	0.00003	1.16	-0.0003	3.22
WALMART	-0.008	4.73	-0.0004	1.27	-0.008	5.31
HIGHSCH	-0.066	2.23	-0.016	2.81	-0.053	1.93
COLLEGE	0.059	2.44	0.021	4.59	0.032	1.40
MEDAGE	0.003	8.54	0.001	15.18	0.002	6.71
FEMLABOR	0.073	1.68	-0.020	2.41	0.075	1.88
BLACK	0.0002	1.91	0.0001	3.48	0.0002	1.86
HISPANICS	0.0003	2.77	-0.00001	0.58	0.0004	3.24
ETHNIC	-0.044	4.87	0.0003	0.18	-0.048	5.73
MARRIED	0.001	3.66	0.0001	1.64	0.001	4.30
EDUEXP	-0.003	1.88	-0.001	1.77	-0.003	1.73
HWYEXP	-0.003	0.69	0.0004	0.39	-0.002	0.38
FAMASST	0.0001	2.04	0.000001	0.03	0.0001	2.60
LOCTAX	0.0002	0.17	0.0003	1.46	0.001	0.74
AMENITY	0.003	5.99	0.0004	4.25	0.003	5.55
SOCCAP	-0.003	2.93	0.001	3.65	-0.003	4.13
MAINAD	-0.0004	3.97	0.00003	1.41	-0.0004	4.59
EVANAD	0.0001	1.07	0.00002	1.27	0.0001	1.37
CATHAD	-0.0002	2.35	0.00002	1.79	-0.0001	2.41
JEWAD	-0.003	1.42	-0.001	1.70	-0.002	1.03
NENG	0.061	7.60	0.004	2.62	0.056	7.38
MEST	0.032	4.80	0.001	0.95	0.028	4.55
GLAK	0.030	5.35	0.003	2.48	0.027	5.05
PLNS	0.024	4.44	0.001	1.41	0.021	4.26
SEST	0.023	4.31	-0.002	2.24	0.025	5.06
SWST	0.025	4.53	-0.003	2.94	0.030	5.70
RKMT	0.014	2.78	0.003	3.58	0.010	2.17
rho	0.025	72.88	0.086	136.99	0.013	52.02
lambda	0.124	165.58	0.053	106.97	0.148	181.62
Adjusted R^2	0.53		0.57		0.52	
Log L	4906		8208		5067	

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