A Spatial Model of the Impact of Bankruptcy Law on Entrepreneurship[1]

Abstract

This paper employs spatial econometrics techniques to estimate the impact of bankruptcy regulation on small firm formation. The estimation of the model is computationally challenging due to the joint appearance of a lagged endogenous variable and the unobserved heterogeneity which requires modeling of initial conditions as described in Heckman (1981). We test for the joint significance of the state dummy variables in a way that can be viewed as an interesting alternative to the Hausman procedure. This was important for our analysis since as sometimes happens in finite samples, the estimated variance-covariance matrix was not positive semi-definite. We find that the predicted probability of starting a business is 25 percent higher in states with *higher* bankruptcy exemptions than their neighbors relative to states with lower exemptions than their neighbors.

JEL Classification: M13, C3, K1

Keywords: Entrepreneurship, Spatial Econometrics, Probit Model

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1. Introduction

Small firms represent more than 95 percent of all enterprises in the US. Every year the country produces approximately 1 million new small firms. To explain this phenomenon, most previous studies have examined the importance of the earnings differential between entrepreneurship and paid employment, taxation, liquidity constraints, and intergenerational transfers.[1] More recently, papers such as Fan and White (2003) and Georgellis and Wall (2002) have tried to explain inter-state differences in entrepreneurship in terms of differences in personal bankruptcy law. Using data from US states, they argue that states with more pro-debtor bankruptcy laws are significantly more likely to experience entry of small firms relative to states with stricter bankruptcy laws. However, while these latter papers are closely related to our study, neither of them considers the impact of spillovers from competing locations on small business formation. In our paper, we model the small business start-up decision across US states, incorporating the impact of business conditions in neighboring states.

One of the key factors explaining the geographic dispersion of entrepreneurship, as captured by new firm formation in our model, is US personal bankruptcy law. The US personal bankruptcy system functions as a bankruptcy system for small businesses as well as consumers. If a firm fails, the entrepreneur has an incentive to file for bankruptcy under Chapter 7, since both business debts and the entrepreneur's personal debts are discharged.[2] The entrepreneur must give up assets above a fixed dollar exemption level for repayment to creditors. However, future earnings are entirely exempt.[3] Bankruptcy exemption levels are set by the states (since the Federal Bankruptcy Code of 1978) and vary widely across states and over time. They can be either homestead exemptions i.e. exemptions against equity in owner occupied homes, or personal property exemptions for items like motor vehicles, jewellery etc. For example, in 1996 the homestead exemption in Alabama was $10,000, while in Arizona was $100,000.[4] The effect of high exemptions, as documented in the literature, is potentially two-fold. Fan and White (2003) have shown that the wealth insurance effect of exemptions encourages entrepreneurship (since entrepreneurs' can retain some assets like their homes while filing for bankruptcy), while Berkowitz and White (2004) find that small firms are more likely to be denied credit if they are located in states with high or unlimited exemptions.

Taken more broadly, our paper fits into the larger literature on the impact of institutions on entrepreneurship, pioneered by Baumol (1990). An institutional approach to entrepreneurship shifts attention away from the personal traits and backgrounds of individual entrepreneurs, and towards how institutions or the 'rules of the game' shape entrepreneurial opportunities and actions. Baumol (1990) hypothesizes that entrepreneurial individuals channel their effort in productive or unproductive activities depending on the quality of prevailing economic, political and legal institutions. Sobel (2008) tests this hypothesis and finds that U.S. states with the best institutions, such as those with the best protection of property rights, low tax rates and labor market freedom, see the highest rates of entrepreneurial activity. This theory helps explain why government programs aimed at subsidizing entrepreneurial inputs, such as government loan and educational programs have shown little success in actually promoting entrepreneurship. Increasing inputs has little impact on outcomes when the rules of the game are poor. Bankruptcy rules legislated by state governments are an important part of the economic and legal structure within with entrepreneurs operate. Statistical evidence suggests that failure rates for small businesses are extremely high.[5] Hence focusing on bankruptcy regulation is critical to providing the proper institutional environment to allow unproductive enterprises to exit the market and reallocate resources to more productive uses. This allows the Schumpeterian process of creative destruction to proceed smoothly. This idea is also put forward in Sobel, Clark and Lee (2007) who argue that the right economic institutions not only encourage entry and success of entrepreneurs, but also provide them the freedom to fail.

We extend this line of research on entrepreneurship by using spatial econometrics techniques to answer the following question: Do entrepreneurs take account of bankruptcy regulations and business conditions in other (competing) locations, such as neighboring states, when deciding to start a business in their current state of residence? To test for this, in our estimation equation we include apart from the entrepreneur's home state bankruptcy exemption and tax rates, (population and distance) weighted averages of exemptions and tax rates in *neighboring* states. Including these "spatial" variables in the traditional regressions yields significant results. The evidence suggests that entrepreneurs account for business conditions in neighboring states to the extent that they tend to start a business in their current state of residence when conditions are relatively good. In particular, if neighboring states have *lower* (average) bankruptcy exemptions than the entrepreneurs' current state of residence, then this significantly *increases* the entrepreneur's likelihood of starting a business. By our calculation, the predicted probability of starting a business is 25 percent higher for states with more favorable exemptions than their neighbors' compared to states with worse exemptions than their neighbors. Further, we find that including these spatial variables (such as average exemptions in neighboring states), reduces the significance of home state exemptions. This suggests that the estimated coefficients on home state exemptions obtained by Fan and White (2003) and Georgellis and Wall (2002) may be biased upwards due to exclusion of these variables from the regression equation. Furthermore, we find only a modest impact of the recent cap on the maximum exemption limit at 125,000.

The fact that business conditions in neighboring states matter could be driven by entrepreneurial mobility. In particular, if entrepreneurs are mobile and can consider moving to the better business climate states to take advantage of the variability of bankruptcy exemptions, and other business conditions, this could be a possible factor causing them to not start a business in their current state. We find some evidence of this in the data. In the dataset that we use, we find that out of all individuals who had relocated to other states, about 1 percent started businesses in these new states, and 55 percent of *these* moves were exemption-increasing. Other studies also suggest that this hypothesis may be true. Elul and Subramanian (1999) find that considerations of bankruptcy laws have a minor but significant influence on interstate migration. They estimate that roughly 1 percent of moves to states with higher exemption limits are motivated by considerations of differences in bankruptcy laws. Results for the U.S. from Silva (2007) suggest that entrepreneurs are 4.5 percent less mobile than dependent workers, which indicates that while entrepreneurial mobility is low, it is not inconsequential. There are other papers that study firm, rather than household relocation, as a function of business conditions.[6]

While our paper suggests that mobility could be a possible reason for our findings, we would like to assert that our analysis is not deep enough to confirm or reject this hypothesis. In particular, we do not model the moving decision or the economic decision making process and therefore do not claim that bankruptcy regulations and other business conditions cause small businesses to relocate.[7]

Apart from the addition of the spatial effects, our paper contributes to the literature on entrepreneurship in a number of ways. First, we consider variables that have not been considered in previous literature. To the extent that some individuals move from unemployment to starting a business, the level of unemployment benefits will be important, and we account for this. Similarly, Self-Employment Assistance (SEA) programs for unemployed people are found to play a role in an individual's decision to start a business in a particular state.[8] Second, we examine if the cost of health insurance for the entrepreneur has an impact on the decision to start a business. In addition, since we use micro data, we are able to analyze factors that may be more relevant at the individual level, such as family wealth, the age of the entrepreneur and so on. Georgellis and Wall (2002) use aggregate data, and thus are not able to account for all these factors. [9]

Third, we formulate a panel data probit model. In our model we have an intercept along with 16 state-level variables whose values change over the years. We further allow individual random effects and a lagged endogenous variable. The lagged endogenous variable controls for the possibility that individuals who owned a business in the past may be more likely to start a business today.

The contribution of the paper is also methodological. As described in detail in Appendix A.1, the estimation of a probit model containing random effects, a lagged endogenous variable and state-level variables, with a large number of cross sectional units and a relatively short time dimension, requires special manipulations for empirical implementation. The likelihood approach is described in the Appendix. This approach is similar to that described in Greene (edition 5), except that the model considered in Greene (edition 5) does not contain a lagged endogenous variable, while our model does. The joint appearance of the lagged endogenous variable and unobserved heterogeneity (the random effect) requires modeling of initial conditions, which further complicates the estimation procedure.

The plan of the paper is as follows. Section II presents a theoretical model of the entrepreneurship decision. Section III provides details of the empirical methodology. Section IV discusses the data and provides sample summary statistics. Section V presents random effects probit estimation results. Section VI explains different specification and robustness checks that we conducted. Concluding comments are provided in Section VII.

II. Theoretical Model

In this section, we present a theoretical model which uses the basic framework in Fan and White (2003) as a starting point. However, unlike that paper, our model considers business conditions and demand conditions in a neighboring state. The model relates to an individual who is considering whether to start up a new business in his home state, h, or to locate in another neighboring state, n. Production costs are assumed to be the same in each location. We assume, however, that there is a cost of moving from the home state to the neighboring state, which is proportional to the distance moved.

There are two periods. In period 1, the individual invests in a project that has a cost of I. The potential entrepreneur's initial wealth is given by W, which he invests in the project in period 1, and he incurs a fixed amount of debt $B>0$. The debt is unsecured, has an interest rate r_i (where i

indexes the state), and is due in period 2. The return on the project is realized in period 2 and is uncertain at the time of investment due to uncertain demand conditions in period 2. The inverse demand function for period 2 is given by

$$p_{2i} = a - bq_{2i} + u_{2i} \qquad i=h,n \quad u_{2i} \sim f(u) \qquad (3.1.1)$$

where p_i and q_i denote price and quantity in location i, a is a positive constant, and

$u \in [\underline{u}, \overline{u}]$ is a stochastic demand component. $f(u)$ is the density of u_{2i}, with $E[u]=0$ and $var[u]=v$. We assume that the moving decision is made prior to the realization of demand shock, u_{2i}. We also allow that $\underline{u}<X_i$, where X_i is the bankruptcy exemption in state i.

The cost of production is given by

$$C_{2i} = cq_{2i} \qquad i=h,n \qquad (3.1.2)$$

Firms will not produce if $p_{2i} < c$.

Let $\pi_{2i} = (a-bq_{2i}+u_{2i} - c)\, q_{2i}$ denote the level of profits. $(3.1.3)$

The value of q_{2i} that maximizes this profit function is given by

$$q_{2i}^{*} = \frac{a + u_{2i} - c}{2} \qquad (3.1.3a)$$

This is monotonically increasing in u_{2i}.

If the entrepreneur files for bankruptcy then the debt of $B(1+r_i)$ will be discharged but he has to give up all assets above the fixed exemption limit X_i, as repayment to creditors.[10]

Let

$$\theta_{2i} = W - I + B + \pi_{2i} - fd_i \qquad (3.1.4)$$

represent the realized gross wealth of the individual at the end of period 2 . Note from *(3.1.3a)* that both the maximized level of profits, $\pi_{2i}(q_{2i}{*})$, and θ_{2i} are monotonically increasing in u_{2i}. fd_i represents the cost of moving, which is zero if the individual does not move.

From this point on, for ease of notation, we will omit the '2' subscript, since it is understood that we are referring to values in period 2.

The entrepreneur's net wealth at the end of period 2 is θ_i-$B(1+r_i)$ if he does not file for bankruptcy, and X_i if he does. Thus the level of gross wealth at which he is indifferent between filing and not filing is given by

$$\overline{\theta_i} = X_i + B(1+r_i) \tag{3.1.5}$$

Hence if $\theta_i < \overline{\theta_i}$ the individual will file for bankruptcy. Given this, the entrepreneur's net wealth is determined both by the decision to file for bankruptcy, as well as the exemption level. If the individual files for bankruptcy *and* his wealth is greater than the exemption level, he will be left with exactly the exemption amount. If he files and his wealth is less than the exemption level, he will be left with his actual wealth. Summarizing, the entrepreneur's net wealth is

$$\theta_i \ if\, \theta_i < X_i \tag{3.1.6}$$

$$X_i \ if\, X_i \le \theta_i \le \overline{\theta_i} \tag{3.1.7}$$

$$\theta_i - B(1+r_i) \text{ if } \theta_{\text{i}} > \overline{\theta_i} \tag{3.1.8}$$

Since θ_i is monotonically increasing in u, corresponding to $\overline{\theta_i}$ is a unique realization of u_i, which we denote by u_i*. Thus if u_{2i} is less than u_i^*, the individual will file for bankruptcy, and if it is higher than u_i^*, he will not. Further, if the individual does file for bankruptcy, conditions *(3.1.6)* and *(3.1.7)* indicate that he can either be left with the exemption amount, or his actual wealth. There is a unique realization of u_i, such that $\theta_i = X_i$, which we denote by $\hat{u}_{\text{i}}$. If $u_i < \hat{u}_i$, the level of wealth is below X_i and the individual is left with exactly θ_i, and if $u_i > \hat{u}_{\text{i}}$, the individual is left with X_i.

CREDIT MARKET

The lenders in the credit market are assumed to be risk neutral. They face a fixed opportunity cost of funds denoted by r_f, and they are willing to lend as long as they earn zero expected profits. If the realization of u_i is between $\hat{u}_i$ and u_i^*, the individual files for bankruptcy and the lenders receive $(\theta_i - X_i)$, while if $u_i < \hat{u}_i$, lenders receive nothing. Thus the lenders' zero profit condition is given by

$$L \equiv \int_{\hat{u}_i}^{u_i^*} (\theta_i - X_i) f(u) du + \int_{u_i^*}^{\bar{u}} B(1+r_i) f(u) du - B(1+r_f) = 0 \quad i = h,n \qquad (3.1.9)$$

Lenders set the interest rate to satisfy this equation, otherwise they do not lend. To study the effect of changes in exemptions on the rate of interest charged by creditors, we take the total derivative of *(3.1.9)* to get[11]

$$\frac{dr_i}{dX_i} = -\frac{-\int_{\hat{u}_i}^{u_i^*} f(u) du}{\int_{u_i^*}^{\bar{u}} Bf(u) du} > 0 \qquad i=h,n \qquad (3.1.10)$$

Hence lenders will charge higher rates of interest on loans as exemptions increase, since the amount that they can reclaim in case of bankruptcy is lower.

INDIVIDUALS

The individual chooses whether to start a business at home, to start a business in the neighboring state, or to start no business and receive U(W`). The expected utility from starting a business in state *i* is given by,

$$\int_{\underline{u}}^{\hat{u}_i} U(\theta_i) f(u) du + \int_{\hat{u}_i}^{u_i^*} U(X_i) f(u) du + \int_{u_i^*}^{\bar{u}} U(\theta_i - B(1+r_i)) f(u) du \qquad i=h,n$$

(3.1.11)

where the limits are as defined before.

The individual will be willing to move if the expected utility from moving *(EU_M)* is greater than U(W') and greater than the expected utility from not moving *(EU_{NM})*. Assuming that entrepreneurship is more attractive than wage employment, the individual moves if

$\Delta EU = EU_M - EU_{NM}$

$$= \int_{\underline{u}}^{\hat{u}_n} U(\theta_n) f(u)du + \int_{\hat{u}_n}^{u_n*} U(X_n) f(u)du + \int_{u_n*}^{\overline{u_n}} U(\theta_n - B(1+r_n)) f(u)du -$$

$$\int_{\underline{u}}^{\hat{u}_h} U(\theta_h) f(u)du + \int_{\hat{u}_h}^{u_h*} U(X_h) f(u)du + \int_{u_h*}^{\bar{u}} U(\theta_h - B(1+r_h)) f(u)du > 0 \qquad (3.1.12)$$

Note that the cost of moving is included in the definition of θ_n .Next we consider how changes in the exemption level in the neighboring state affect the attractiveness of moving, given by ΔEU. To do this, we take the total derivative of *(3.1.12)* and substitute for $\frac{dr_i}{dX_i}$ from *(3.1.10)* and find, [12]

$$\frac{d\Delta EU}{dX_n} = \int_{\hat{u}_n}^{u_n*} U'(X_n) f(u)du - \int_{u_n*}^{\bar{u}} U'(\theta_n - B(1+r_n)) f(u)du \frac{\int_{\hat{u}_n}^{u_n*} f(u)du}{\int_{u_n*}^{\bar{u}} f(u)du} \qquad (3.1.13a)$$

Similarly for the home state:

$$\frac{d\Delta EU}{dX_h} = -(U'(X_h) \int_{\hat{u}_h}^{u_h*} f(u)du - \int_{u_h*}^{\bar{u}} U'(\theta_h - B(1+r_h)) f(u)du \frac{\int_{\hat{u}_h}^{u_h*} f(u)du}{\int_{u_h*}^{\bar{u}} f(u)du}) \qquad (3.1.13b)$$

The signs on these expressions are, respectively, the signs of

$$U'(X_n) - \frac{\int_{u_n*}^{\bar{u}} U'(\theta_n - B(1+r_n)) f(u) du}{\int_{u_n*}^{\bar{u}} f(u) du} > 0 \qquad (3.1.14a)$$

$$-(U'(X_h) - \frac{\int_{u_h*}^{\bar{u}} U'(\theta_h - B(1+r_h)) f(u) du}{\int_{u_h*}^{\bar{u}} f(u) du}) < 0 \qquad (3.1.14b)$$

The effect of neighbor's exemption on the attractiveness of moving is positive. The expression *(3.1.14a)* equals the entrepreneur's marginal utility of wealth when he files for bankruptcy and keeps X_n minus his average marginal utility of wealth when he avoids bankruptcy and keeps $\theta_n - B(1+r_n)$. For risk averse entrepreneurs, this expression must be positive, since wealth when filing for bankruptcy is lower than wealth when avoiding bankruptcy, so the marginal utility of wealth must be higher when filing for bankruptcy. Thus as long as credit is available, an increase in the neighbor's exemption level increases the attractiveness of becoming a business owner in the neighboring state, even though credit is more expensive when the exemption limit is higher. In other words, individuals are less likely to start businesses in their own state if business conditions in neighboring state are better. At the same time, expression *(3.1.14b)* suggests that an increase in home state exemptions reduces the attractiveness of moving.

III. Empirical Model and Explanatory Variables

We model the probability of a business start as a function of bankruptcy exemptions and other business and demographic conditions. We adopt a probit formulation with a latent variable specification, allowing for individual random effects. Model estimation is computationally challenging due to the large number of cross-sectional units, the joint appearance of the lagged endogenous variable and the unobserved heterogeneity (the random effect) which requires modeling of initial conditions as described in Heckman (1981). Model estimation is discussed in detail in the Appendix.

We first present our model algebraically and then discuss it.

The general form of our model is;

$$Y_{ist}^{*} = X_{ist}B_1 + (W_{ist}.Z_{st})B_2 + (Y_{ist-1,2})B_3 + \varepsilon_{ist} \qquad i = 1,....,N_t, t = 3,..,t, s = 1,..,40$$

$$Y_{ist} = 1 \text{ if } \mathrm{Y}_{\mathrm{ist}}^{*} > 0$$

$$Y_{ist} = 0 \text{ if } \mathrm{Y}_{\mathrm{ist}}^{*} \leq 0 \qquad (3.2.1a)$$

$$\varepsilon_{ist} = \alpha_i + v_s + u_{ist}$$

where Y_{ist}^{*} is the latent variable and our observed dependent variable is Y_{ist}. Y_{ist} relates to a cross sectional unit *i's* decision to start a business in year *t* in state *s*. In particular, $Y_{ist} = 1$ if the *i*th cross sectional unit starts a business in year *t*, and 0 otherwise. The remaining notation will become evident and is discussed in detail below. For the years t=1,2 observations on the lagged variable $Y_{ist-1,2}$ are not available. Our model specification for these two earlier years is described below.

In the above formulation, the subscript *i* relates to the cross sectional unit. The subscript *t* relates to the time period and the subscript *s* refers to the state in which the unit resides. A general specification for v_s would allow for it to be random and spatially correlated. In this case, the error term ε_{ist} would also be spatially correlated. However, since we will conditionalize on v_s, it is of no consequence in our estimation procedure if these terms which represent state effects are in fact random and spatially correlated.

With this in mind, we re-write our model as:

$$Y^*_{ist} = \delta_{0t} + \delta_{1t} D_{i1t} + \delta_{2t} D_{i2t} + ... + \delta_{23t} D_{i23t} + X_{ist} B_1 + (W_{ist.} Z_{st}) B_2 + Y_{ist-1,2} B_3 + \varepsilon_{ist}$$

$$i = 1,....,N_t, t = 3,..,t, s = 1,..,40$$

$$Y_{ist} = 1 \text{ if } Y^*_{ist} > 0$$

$$Y_{ist} = 0 \text{ if } Y^*_{ist} \leq 0 \qquad (3.2.1.b)$$

$$\varepsilon_{ist} = \alpha_i + u_{ist}$$

For years $t=1,2$, data on $Y_{ist-1,2}$ are not available. For these observations, we specify:

$$Y^*_{ist} = \gamma_{0t} + \gamma_{1t} D_{i1t} + \gamma_{2t} D_{i2t} + ... + \gamma_{23t} D_{i23t} + X_{ist} B_4 + (W_{ist.} Z_{st}) B_5 + \varepsilon_{ist}$$

$$Y_{ist} = 1 \text{ if } Y^*_{ist} > 0$$

$$Y_{ist} = 0 \text{ if } Y^*_{ist} \leq 0$$

$$\varepsilon_{ist} = \alpha_i + u_{ist}$$

In each year, our sample consists only of people who did not own a business at the beginning of year t. The lagged dependent variable $Y_{ist-1,2}$ indicates whether the household owned a business at some point in the preceding two years.[13] Our dependent variable Y_{ist} is explained in terms of the latent variable Y^*_{ist}, which in turn is explained by the various state-level and demographic variables contained in X_{ist} and Z_{st}.

D_{ijt} is a state dummy variable whose value is 1 if at time t the ith cross sectional unit resides in state j. $W_{ist.}Z_{st}$ is a weighted sum of observable neighboring state economic variables which influence Y^*_{ist}. The value of neighboring state economic variables changes over time. ε_{ist} is the corresponding disturbance term which is formulated in an error-components fashion allowing for an individual specific error term. We now proceed to discuss these variables in greater detail.

X_{ist} is the vector of explanatory variables relating to cross sectional unit i in year t. B_1 is a coefficient vector.[14] X_{ist} includes the following:

Bankruptcy Exemptions: These relate to the exemptions against homes and personal property that a household can claim at the time of filing for bankruptcy. We use the sum of the homestead exemption as well as the personal property exemption. The homestead exemption varies widely among states, with some states having no exemption and seven states having unlimited exemptions. The exemption levels have changed over time in many states. For instance between 1993-1998, 28 states effected changes to their homestead and/or property exemptions. These exemptions provide partial wealth insurance to entrepreneurs, and are therefore expected to encourage entrepreneurship.[15]

State per capita income: This variable has been changing over time for all states. High state incomes may be associated with high demand, encouraging entrepreneurship. At the same time, this may mean higher incomes for current job earners, and thus transitions to entrepreneurship may be reduced.

The top marginal state income tax rate: This refers to the top income tax rate that a person could face in any given state. High personal taxes encourage tax avoidance which is easier for business owners than for salary workers. This has changed over time for 25 states in the period 1993-1998. Most studies find that high personal taxes encourage transitions to entrepreneurship, except for Georgellis and Wall (2002), who find the relationship to be U-shaped.[16]

State unionization rate, state unemployment rate and the proportion of population in non farm employment: High state unionization rates may discourage entrepreneurship as wages may be higher in more unionized states. Higher unemployment rates could have two effects. One, they may push people towards self-employment due to lack of job opportunities. Second, they may discourage transitions to self-employment if people believe that it may be tougher to find a job in case the business fails. Different studies find differing effects of unemployment rates. [17]

The self employment or unemployment assistance benefits: For the unemployment benefits, we consider the replacement rate (the ratio of the average unemployment benefit paid out to the average weekly wage) in each state. This variable varies over time for 25 states in the sample. The data are available from the US Department of Labor. We have no priors about the expected sign on this coefficient. On the one hand, the availability of generous benefits may discourage any kind of movement out of unemployment, but at the same time, the financial assistance provided may encourage transitions to entrepreneurship. This variable is included since several papers suggest that more generous unemployment benefits may lead to fewer transitions out of unemployment. For example, see Nickell (1997).

Individual and family level variables: These include marital status, age, race, health insurance coverage, employment status and education level, as well as family income from wealth and whether the family owns their home. Previous literature cited earlier (for instance, Fan and White (2003)) finds a significant impact of each of these variables on the decision to be a small firm owner. For example, younger individuals are more likely to start businesses (Meyer, 1990) while family wealth has a significant positive impact on the decision to start a business (Holtz-Eakin et al, 1994).

Z_{st} is a 40xK matrix of observations on K state-level macroeconomic variables. These variables vary across time and state, and include

1. *The bankruptcy exemption variable*
2. *Per capita income*
3. *The maximum marginal state income tax rate*

Finally, we define the Nx40 weights matrix, $W_t=[W'_{1t},\ldots\ldots,W'_{Nt}]'$, where $W_{it}=[W_{i1t}\ldots\ldots W_{i40\,t}]$.[2] At any time t, the ith row of the matrix W_{it} specifies "neighborhood sets" for each observation i $(i=1,..,N)$ located in state $j(j=1,..,40)$. The ij-th element of W_{it}, namely, $w_{ij,t}$, is positive if j is a "neighbor" of i, and is zero otherwise. As a starting point, we assume that the ith unit will not

[2] For a discussion of weighting matrices in spatial econometric analysis, see Anselin (1988) and Kelejian (2005)

consider moving to states that are not adjacent, and so there are corresponding zeroes in the weighting matrix.[18]

In our spatial model, we consider two weighting matrices. One is based on distance and the other on population. The intuition for this is that the more distant the state, the less we would expect it to matter in the entrepreneur's decision process. However, the more populous the state, the greater the likelihood that the individual would move to that state and hence a higher weight should be assigned to business variables in that state.

In somewhat more detail, the *ijth* element of the weighting matrix W_t based on population at time t, is,

$$w_{ijt} = \frac{pop_{ijt}}{\sum_k pop_{ikt}}$$

where the sum in the denominator is over neighboring states for individual i.

The weighting matrix based on (inverse of the) distance is defined in a similar manner. By convention, a cross sectional unit is not a neighbor to itself, so that the diagonal elements of W_t are all zero i.e $w_{ii,t}=0$.

The model specification in (3.2.1b) allows for state dummy variables, captured by D_{ijt}. A detailed explanation for why there are only 23 state dummy variables and our methodology for testing the significance of these state dummy variables in a regression including the 16 state-level economic variables is left till Section V. Suffice it to say here that the results of our test revealed the state dummy variable coefficients to be insignificant in a specification including the state-level economic variables, such as the state tax rate or the state bankruptcy exemption. In other words, our 16 state-level economic variables are sufficient to account for all of the state effects. Hence our baseline model is specified and estimated without the state dummy variables.

Finally, ε_{ist} is the disturbance term in the latent variable formulation. ε_{ist} varies with the individual i, state s and time t. This disturbance term has an error components structure which entails three components. $\{\alpha_i\}$ is a random component which relates to the individual specific effect. As described above, $\{v_s\}$ relates to the state specific effect which we conditionalized on. $\{u_{ist}\}$ is an innovation term which relates to individuals, states and time. We assume that the processes $\{\alpha_i\}$ and $\{u_{ist}\}$ are independent, α_i is $i.i.d.N(0,\sigma_\alpha^2)$ and u_{ist} is $i.i.d.N(0,\sigma_u^2)$ over *i,s* and *t.*

IV. Data Source and Description

IV.A. Data

We use longitudinal data available from the Survey of Income and Program Participation (SIPP), published by the Census Bureau for the period 1993-1995 and 1996-1998. We present results for the pooled panel 1993-98. SIPP is a multi-panel longitudinal survey of adults, measuring their economic and demographic characteristics over a period of approximately three years. Persons selected into the SIPP sample continue to be interviewed once every four months over the three years of the panel as part of four different rotation groups. Each rotation group is interviewed in a different month. Four rotation groups constitute one cycle, or wave, of interviewing for the entire panel. For instance, the 1993 panel has 9 waves or 36 months of data. At the time of the interview, individuals are asked questions relating to the previous four months. Thus the data are available monthly for each person in the panel. For instance, the 1993 SIPP panel consists of approximately 120,000 individuals who were interviewed in 1993, 1994 and 1995.

There are several advantages to using this dataset. First, the dataset asks detailed questions on income, assets and liabilities which make it a better dataset for the purposes of our study than other household surveys such as the Current Population Survey (CPS).[19] Second, the longitudinal nature of SIPP enables us to track individuals over time as well as across locations. An important feature of the dataset is its ability to track individuals and households as they move.

If original sample members 15 years of age or older move from their original addresses to other addresses, they are interviewed at the new addresses. This is a particularly important consideration for our study since we would like to be able to track individuals as they move across state lines, especially if they start a business in the new state or if they had owned a business in the previous state. Clearly if sample attrition were to arise – i.e., observations were lost as a result of this movements across state lines, this could lead to a sample selection problem which could bias our results. Fortunately, this is not the case in the SIPP data set. Interviewers rely on several sources of information to locate movers. At the first interview, the interviewer obtains the name, address, and telephone number of a person who could furnish the new address should the entire household move. If necessary, interviewers may contact neighbors, employers, mail carriers, real estate companies, rental agents, or postal supervisors to locate original sample members who have moved. Hence for every person in the sample, we can track which state they were located in at every point of time, and if they changed locations. This enables us to collect other relevant information such as whether the individual owned a business in a different state prior to moving to the current state. In fact, the lagged dependent variable included in the model specification relies on this kind of information being available for all individuals in the sample.

The lagged dependent variable captures whether the business owner had prior business experience. Since the longitudinal data for any particular individual are available only for a three year period in any panel, this lagged dummy variable will take on a value of 1 only if the business owner owned a business at any point in the previous two years, and a value of zero otherwise. To an extent, this variable accounts for only a relatively short history. Again, this is a data constraint. However, in the real world, as noted by several authors, new businesses are re-started fairly quickly after the failure or closure of existing businesses. For instance, Sullivan, Warren and Westbrook (1999) found that within a year to eighteen months of filing for bankruptcy, 13 percent of businesses had been restarted and another 11 percent were in the planning stages to do so.[20] Therefore, within reason, the relatively short two-year nature of this variable should not be a problem.[21]

A final point we wish to make about the data are that while we start with a balanced panel, including in our sample all those who are interviewed and have information for all three years of the panel, the final sample used in the regressions is not balanced. As explained earlier, the sample for any year *t* includes all those who did not own a business at the beginning of the year. Hence it drops from the sample those who started a business at any point in years *t-1* or *t-2* and continued to own that business at the beginning of year t. This unbalanced nature of the sample does not pose a problem for estimation since observations are available on all of the variables involved in the model specification.

IV.B. Summary Statistics

The summary statistics in Table 1 present sample characteristics for the period 1993-98. SIPP interviews all individuals above 15 years of age in the sampled household. The sample has a larger proportion of Whites, with Blacks forming 13 percent of the sample. About 30 percent of the sample has attended college, while about 38 percent are married. About 59 percent of the overall sample (and 70 percent of the business owners) own a home, thus justifying the use of the homestead exemption as an important factor in the analysis. Over the entire period, about 1.5 percent of the sample started a business.[22]

V. Regression Results

In this section, we present empirical results based on maximum likelihood estimation of our random effects probit model described. Details relating to the likelihood function are described in the appendix.

The dependent variable is a dummy variable whose value is equal to one if the cross sectional unit did not own a business at the beginning of the year, but does own a business at some point during the current year, and zero otherwise. The sample is thus restricted to all individuals who did not own a business at the beginning of the year.[23] Table 2 presents results including the lagged dependent variable and the health insurance variables, but excluding the spatial variables. Table 3 presents results with the spatial variables for the pooled 1993-98 panel.[24] The sample size is 312,845 for the pooled panel.

The results presented in the tables refer to the marginal effects rather than the probit maximum likelihood estimates of the coefficients. The marginal effects are calculated as $\partial \Pr(y = 1 | x) / \partial x_j$ i.e. the effect of an infinitesimal change in x_j on the probability of a positive outcome. These are evaluated at the means of the independent variables, using STATA software.[25]The default calculation for an indicator or dummy variable is the discrete change in the probability when the indicator is switched from 0 to 1.

The model specified in (3.2.1b) contains state dummy variables, as well as 16 economic state variables whose values only depend upon the state the unit resides in. We now describe how we tested for the marginal significance of the state dummy variables, given our economic state-level variables. As a preview, the state dummy variables are not significant; their lack of significance implies that our state economic variables adequately account for all state level effects.

The SIPP data set allows for the identification of 40 state units only, because it groups together some of the smaller states. Hence in our model, all "state effects" in a given year can be completely captured by 40 state dummy variables. Our hypothesis is that our 16 state-level economic variables (which include the state tax rate and the state bankruptcy exemption etc) are sufficient to account for all the state effects. We test this hypothesis in the following way. In our model, we include the 16 state economic variables as well as a constant. Therefore, in each year of the panel, we considered 40-17=23 state dummy variables—i.e. taken together, the intercept, the 16 state variables and the 23 state dummies completely account for all possible state effects since these variables are not multicollinear. Since the values of the state economic variables change over time, we allow the coefficients of the state dummy variables, as well as the intercept, to also change over time. Hence, in the three year panel data model, we have 23x3=69 state dummy variables. We test the hypothesis that the 16 state economic variables are sufficient to account for all the state effects by doing a joint test of significance on the 69 state dummies. The results from the test suggested that the state dummy variables are not significant. Again, the implication is that our 16 state economic variables are sufficient to capture all state effects. Therefore the final specification of the model includes the 16 time varying state economic variables as well as the time varying intercept, but not the state dummy variables.

As a point of interest, at an earlier stage of the study, we considered a Hausman type test to test for the significance of the state dummy variables. However, that test could not be properly carried out because, as sometimes happens in finite samples, the estimated VC matrix involved was not positive semi-definite (as given by the STATA program). That is the reason we used the above procedure, which can be viewed as an interesting alternative to the Hausman procedure.

A further test of the model involved testing for equality of the coefficients on these state-level variables in 1995 and 1993-1994. The chi square statistic was small, and we could not reject the null hypothesis that these coefficients are identical. These tests were repeated for the 1996-1998 panel separately, and also at the time of pooling the two panels, with similar results. Therefore the baseline model allows for similar coefficients on the state-level variables across the two panels.

We first estimate the model without the spatial variables, as shown in Table 2. The coefficient on exemptions is significant and positive at the 1 percent level, similar to Fan and White (2003) and Georgellis and Wall (2002). An increase in the exemption limit by $50,000 increases the predicted probability of a business start by 19 percent. We further analyzed the impact of the recent bankruptcy reform bill which set a cap on the maximum homestead exemption limit of $125,000.[26] When we allowed the maximum homestead exemption limit for each state to be $125,000 (instead of 250000), the predicted probability of a business start went down by less than 0.5 percent. A possible reason for this could be that only about 25 percent of the sampled population lives in states with unlimited or high exemptions, and their assets may be well below the high exemption levels set by the state.

We get significant coefficients for the lagged dependent variable (positive and significant), as well as the health insurance variables. Since the latter results are similar in the model with spatial variables, we discuss these in greater detail in the following section.

Results including the spatial variables are presented in Table 3. The model performs well, in that it confirms previous findings on the demographic variables, and also produces significant estimates of the spatial variables. The explanatory variables include whether the individual is male, has attended college and is married, all of which have a positive and significant impact on business formation. We include race and ethnicity effects, which confirm earlier results (Meyer, 1990) that Blacks and other ethnic minorities are less likely to start businesses. The positive linear and negative quadratic terms in age imply that the effect of age is inverted U-shaped. Younger individuals (less than 44 years) are more likely to start businesses. The effect of family wealth is positive and significant, suggesting that high wealth reduces credit constraints that the business owner may face (Holtz-Eakin et al, 1994, Evans and Jovanovic, 1989). Individuals who have high earnings from current jobs may be less likely to switch to starting a business (Evans and Leighton, 1989). At the same time, individuals with high incomes may have the financial means to start a business. This coefficient is significant and positive. Fan and White (2003) surprisingly do not find a statistically significant effect of earnings or wealth on entrepreneurship.

This paper finds interesting and previously undocumented results on the role of health insurance in entrepreneurship. If a person is in a wage and salary occupation and receives employer insurance, he is less likely to move towards self-employment, whereas if the individual has self-purchased insurance, he is more likely to start a business. Holtz-Eakin et al (1996) did not find a statistically significant impact of health insurance variables on transitions to entrepreneurship, using SIPP 1984, 1986 and 1987 panels.[27] The marginal effects suggest that employer insurance reduces the probability of transition by 5 percent, whereas having own insurance increases the likelihood by nearly 1 percent.[28] If the person is unemployed, he is significantly less likely to start a business. We defined a dummy for whether the person was unemployed, and interacted that dummy with the average unemployment benefit for that state *and* a dummy for whether the state had a Self Employment Assistance (SEA) program. The coefficient on the interaction term is insignificant, but the coefficient on SEA is positive and significant at 15 percent, providing some evidence on the effectiveness of these programs in transitions to entrepreneurship out of unemployment. The above mentioned results are robust to different specifications.

Apart from the demographic variables, we control for the level of state per capita income (PCI), which serves as an indicator of demand conditions, and for the maximum marginal state income tax rate. The sign on the tax coefficient is positive, though insignificant, which is in accordance with Bruce (2000), who finds that high tax rates induce individuals towards self-employment due to the tax avoidance incentive. State income is positive in all specifications, indicating that better economic conditions induce transitions to entrepreneurship. We use state unemployment rates, state unionization rates and nonfarm employment as additional controls. In most specifications, the state unemployment rate is positive, suggesting that a lack of job opportunities may push people towards entrepreneurship.

The main variables of interest are the bankruptcy exemptions in one's current state of residence as well as in neighboring states. To study the effect of own state exemptions, we use the sum of the actual homestead and personal property exemption level, by setting a value of 250000 for the unlimited homestead exemption. This value is sufficiently high to not be binding. We now examine the spatial variables more closely.

We define the variable, AVGNBEX, as a weighted average of exemptions of all states that are *immediate* neighbors to the individual's state of residence. High average exemptions in neighboring states may have two opposing effects on entrepreneurship. First, there appears to be some clustering of states across different exemption ranges. So high average neighbor exemptions imply that the individual's own state is likely to be located in a "high exemption" region, and this has a positive effect on entrepreneurship. This effect could be captured by the own state exemptions as well. However, at the same time, the individual could presumably be better off moving to a neighboring state with *higher* exemptions than in own state, which lowers the probability that the entrepreneur will start a business in his own state. To capture the second effect clearly, we define a separate dummy variable, DUMAVEX, for whether the average exemption of the neighboring states is higher than one's own state exemption. In principle, as our theoretical model suggests, holding all else constant, an increase in neighbor exemptions should reduce the probability of a business start in the home state. However, given both the physical and psychological costs associated with moving, which we cannot fully capture here, this effect in practice is likely to be highly significant only if the neighbor exemption is (significantly) higher than in the home state.

In Column 1, we report results for the full set of state variables, using the pooled 1993-98 panel. The own state exemption is insignificant in this specification. DUMAVEX is significant and negative at 5 percent, suggesting that if the average neighbor exemption is higher than one's own, this significantly lowers entrepreneurship in one's own state. The predicted probability of starting a business goes up from .04 percent in states with DUMAVEX=1 to .05 percent in states with DUMAVEX=0, thus the predicted probability goes up by 25 percent. In terms of the total number of business starts of *small firms* in the US in 2000, which is approximately 1.23 million, this implies that if entrepreneurs' were to relocate to states where DUMAVEX=0, there would be approximately 307,500 more business starts every year.

We also put in dummy variables, DUMAVPC and DUMAVTX, which equal one if the average neighbor PCI is higher, or tax rate is *lower*, respectively, than in one's own state. DUMAVTX and DUMAVPC are the right sign i.e. lower taxes in neighbor states discourage transitions to entrepreneurship in current state, while higher average incomes in neighbor states as opposed to own also discourage such moves. However, these coefficients are insignificant.

In Column 1, we control for distance weighted averages of conditions in neighbor states. The distance between any two states is defined as the geographic distance between their respective capital cities.[29] The greater the distance between neighboring states, the lower will be the effect of high exemptions in that state on entrepreneurship in one’s own state due to the higher transportation costs associated with moving. Distance weighted AVGNBEX is insignificant. Other spatial variables included in the model are average neighbor per capita incomes, AVGNBPC, and average neighbor tax rates, AVGNBTX. AVGNBPC is negative and significant at 10 percent, indicating that high average incomes in neighboring states reduce entrepreneurship in one’s own state. AVGNBTX is the right sign, but insignificant.

Results in Column 1 suggest that controlling for DUMAVEX reduces the significance of own state exemptions. In Column 2 we keep all the other variables in the model, but drop the own state exemption. The estimated marginal effect for DUMAVEX does not change and is negative, but the significance level improves to 1 percent. Estimates of other variables are similar to those in Column 1.

In Column 3, we introduce the own state exemption variable, EXEMPTION, into the model, but remove AVGNBEX. DUMAVEX is still negative and significant, but EXEMPTION is not. Thus even controlling for own state exemptions does not reduce the significance of DUMAVEX. AVGNBPC is negative and significant as in Column 1. The last specification that we tried included the distance weighted AVGNBEX and the own state exemption. In this case, AVGNBEX is insignificant, while EXEMPTION is positive and only marginally significant at 10 percent. This result is not shown here.

In Column 4, we present results using population weighted averages of neighbor conditions. Results are similar to those outlined in Column 1. Population weights capture the idea that individuals are more likely to move to more populous states (since in general these are also the states with more job opportunities, larger markets, etc). The signs on the demographic variables do not change. The coefficient on the exemption level is not significant, but DUMAVEX is negative and significant as before.

Summarizing the results on the effect of exemptions, it is interesting to note that when the spatial variables are included in the model of Table 2, the impact of own state exemptions is lowered. Thus it appears that while own state exemptions are important to entrepreneurs, they seem to also care about the *relative* exemption in their state vis-à-vis the neighboring states. This is plausible since small firms are subject to high failure and closure rates, and risk averse entrepreneurs would make the optimal choice among competing locations.

A plausible conjecture in our model is that states are most likely to be affected by their closest neighbor. Hence the greater the distance between two states (their capital cities), the less significant should be the impact on each other. Therefore, in other specifications not shown here, we defined a different grouping for states whose farthest contiguous neighbor is less than 200 miles, and one whose farthest contiguous neighbor is less than 300 miles. This also takes care of the problem of distinguishing between the really big states like California, where the impact of neighboring states may be expected to be less, and the small states like New Jersey that have very close neighbors. The marginal effects on the spatial variables are larger for the states with less distant neighbors.[30] Another way we tested for the effect of distance is by first defining a dummy for all states whose closest neighbor was less than 200 miles away, and interacting that dummy with the average neighbor exemption variable. The interaction term is negative and significant.

Finally, we present results for the lagged dependent variable, LAGBSTRT. This is a dummy variable equal to 1 for those individuals who owned a business at some point in the previous two years. This coefficient is positive and significant, suggesting that people who have owned a business before are nearly 20 percent more likely to start a business today. This is consistent with the recent study of small business owners by Sullivan et al (1998) which finds that business owners who file for bankruptcy have a higher likelihood of starting new businesses within the next year. Note that this variable is not defined for the years 1993, 1994, 1996 and 1997, since lagged information is not available for these years.

VI. Specification tests

We estimated several alternative specifications of the above model. We divided the own state exemptions into five categories, as in Fan and White (2003), to allow for the possibility of a non-monotonic relationship between exemptions and entrepreneurship.[31] We found no significant effect of own state exemption variables. The spatial variables remained significant and had the same signs. We also tried adding a quadratic term (along with the linear term) in the own state exemption variable, as in Georgellis and Wall (2002), and found that the quadratic was not significant.

We redefined the business ownership variable to include only those businesses whose owner spent more than 35 hours per week on his business. Further, we allowed for the exemption variable to have different effects depending on whether the business owner was a renter or a homeowner. The estimated coefficients on own state exemptions were larger for homeowners.

As a final check, we imposed equality of all coefficients across the two panels, and estimated the model by introducing time-invariant state dummies into the pooled 1993-98 model. The results did not change.

The main conclusion that can be drawn from these results is that spatial variables are significant predictors of small business formation across states. States must recognize that entrepreneurs account for business conditions in that they tend to start a business in their current state of residence when conditions are relatively good. Thus states must follow policies that are competitive with at least their immediate neighbors, since a possible reason for this finding is entrepreneurial mobility and much of the inter-state migration happens between neighboring states. While some existing studies have looked at tax competition between competing jurisdictions, e.g Brueckner et al (2001), this is the first paper to study the effect of differences in state policies and their impact on small business formation among US states.

VII. Summary and Conclusion

This paper fits into the larger literature relating institutions and entrepreneurship. An institutional approach to entrepreneurship shifts attention away from the personal traits and backgrounds of individual entrepreneurs which has been the focus of the traditional literature, and towards how institutions or the ‘rules of the game’ shape entrepreneurial opportunities and actions. This paper has provided empirical evidence on the effect of one particular feature of the institutional framework in which businesses operate, which is personal bankruptcy law. We find that an increase in the dollar value of the entrepreneur’s own state exemptions by 50,000 would increase the probability of a business start by nearly 20 percent. Using the dataset, we were also able to analyze the impact of the recent bankruptcy reform bill, which put a cap on the maximum homestead exemption limit at $125000. We found that such a change by itself would lead to a modest 0.5 percent drop in the predicted probability of a business start.

The paper tested for the effect of business conditions in surrounding states on the decision to set up a business in the entrepreneur’s current state of residence. The results suggest entrepreneurs are nearly 25 percent more likely to start businesses in states that have *better* conditions than their neighbors, than in states with *worse* conditions than their neighbors. Including these spatial exemption variables, reduces the significance of own state exemptions. Thus an implication of this paper is that states must follow policies that are competitive with at least their immediate neighbors’, in order to retain and encourage entrepreneurship in their own state.

Appendix

A.1 Maximum Likelihood Estimation

In the model with a lagged dependent variable, the initial value of the dependent variable may be correlated with the random effects term. One solution for this is to specify a separate equation for the initial value of the dependent variable (Heckman, 1981). Our procedure is explained in detail below.

Consider the model

$$Y_{it}^{*} = x_{it}'\beta + \gamma Y_{it-1,2} + \varepsilon_{it} \qquad i = 1,....,N_t; t = 3,....,T \qquad (1)$$

$$Y_{it} = 1 \; if \; Y_{it}^{*} > 0 \qquad (1a)$$

$$Y_{it} = 0 \; otherwise \qquad (1b)$$

$$\varepsilon_{it} = \alpha_i + u_{it} \qquad (1c)$$

where x_{it} is an exogenous vector and where α_i and u_{it} are random elements. We assume that the processes $\{\alpha_i\}$ and $\{u_{it}\}$ are independent, α_i is $i.i.d.N(0,\sigma_{\alpha}^2)$) and u_{it} is $i.i.d.N(0,\sigma_u^2)$ over both *i* and *t*. In the model specified above, (1) is defined for *t=3,..,T*. The reason for including the lagged value $Y_{it-1,2}$, is to capture "state dependence". We allow the unit to have owned a business in the previous two years. For *t=1,2* we assume that Y_{it}^{*} is generated by a similar process, except that there is no lagged dependent variable. Hence we allow the coefficients to be different for these years. This is similar to the formulation by Arulampalam (2000), although unlike that model, our model involves joint estimation based on $(Y_{i1},....,Y_{iT})$ so that the likelihood function includes the initial years. Therefore, when *t=1,2*, we assume

$$Y_{it}^{*} = x_{it}'\lambda + \varepsilon_{it} \qquad i = 1,.....,N_t \qquad (2)$$

$$Y_{it} = 1 \text{ if } Y_{it}^{*} > 0 \qquad (2a)$$

$$Y_{it} = 0 \text{ otherwise} \qquad (2b)$$

$$\varepsilon_{it} = \alpha_i + u_{it} \qquad (2c)$$

where x_{it} is exogenous, the processes $\{\alpha_i\}$ and $\{u_{it}\}$ are independent, and u_{it} is $i.i.d. N(0,\sigma_u^2)$. Thus combining specifications, u_{it} is $i.i.d. N(0,\sigma_u^2)$ for $i=1,..,N_t$ and $t=1,..,T$.

Let $G_{i,(1,T)}(y_{i1},....,y_{iT} \mid \alpha_i)$ be the joint density of $(Y_{i1},....,Y_{iT})$ conditional on α_i, and the sequence $x_{i1},...,x_{iT}$. The dependence on the entire sequence of *x'*s is the reason for the subscript *(1,T)* in the joint density. Then recalling that u_{it} is *i.i.d*. over *t=1,..,T* and using evident notation,

$$G_{i,(1,T)}(y_{i1},....,y_{iT} \mid \alpha_i) = g_{i1}(y_{i1} \mid \alpha_i) g_{i2}(y_{i2} \mid \alpha_i) g_{i3}(y_{i3} \mid y_{i1,2},\alpha_i) .... g_{iT}(y_{iT} \mid y_{iT-1,2},\alpha_i) \quad (3)$$

$$= \prod_{t=3}^{T} g_{it}(y_{it} \mid y_{it-1,2},\alpha_i) g_{i2}(y_{i2} \mid \alpha_i) g_{i1}(y_{i1} \mid \alpha_i) \quad (4)$$

Recalling that α_i is *i.i.d*., let $h(\alpha_i)$ be the density of α_i. Then the likelihood for the entire sample, which is not conditional on $\alpha_1,.....,\alpha_N$, is

$$L = \prod_{i=1}^{N_t} L_i \quad (5)$$

where

$$L_i(\beta,\lambda,\gamma,\sigma_\alpha,\sigma_u \mid y_{i2},.....,y_{iT},x_{it},....,x_{iT}) = \int_{-\infty}^{\infty} \prod_{t=3}^{T} g_{it}(y_{it} \mid y_{it-1,2},\alpha_i) g_{i2}(y_{i2} \mid \alpha_i) g_{i1}(y_{i1} \mid \alpha_i) h(\alpha_i) d\alpha_i \quad (6)$$

and where $y_{it} = 0,1$ for all $i = 1,..,N_t$ and $t = 1,...,T$.

Note that, $g_{it}(y_{it} \mid y_{it-1,2},\alpha_i)$, the density of Y_{it} conditional on $Y_{it-1,2}$ and α_i, can be expressed as follows,

$$g_{it}(y_{it} \mid y_{it-1,2},\alpha_i) = \Pr ob(\varepsilon_{it} > -x'_{it}\beta - \gamma y_{it-1,2}) \;\; for \; y_{it} = 1; i = 1,..,N_t; t = 3,..,T \quad (7)$$

and when *t=1,2*

$$g_{it}(y_{it} \mid \alpha_i) = \Pr ob\,(\varepsilon_{it} > -x'_{it}\lambda) \; for \; y_{it} = 1; i = 1,....,N_t \quad (8)$$

Similarly,

$$g_{it}(y_{it} \mid y_{it-1,2},\alpha_i) = \Pr ob(\varepsilon_{it} < -x'_{it}\beta - \gamma y_{it-1,2})$$

$$for \; y_{it} = 0; t = 3,...,T; i = 1,...,N_t \quad (9)$$

and, when *t=1,2*

$$g_{it}(y_{it} \mid \alpha_i) = \Pr ob(\varepsilon_{it} < -x'_{it}\lambda) \; for \; y_{it} = 0; i = 1,..,N_t \quad (10)$$

Now, note that $\varepsilon_{it} \mid \alpha_i \sim N(\alpha_i, \sigma_u^2)$ for all *t=1,..,T*. Therefore, the change of variable $z_{it} = \dfrac{\varepsilon_{it} - \alpha_i}{\sigma_u}$ in the probability expressions in (7)-(10) will yield probability statements based on the standard normal variable, z_{it}. For example, carrying out this substitution in (7) and (8) would yield the following,

$$g_{it}(y_{it} \mid y_{it-2}, \alpha_i) = \Pr ob(z_{it} > \frac{-x'_{it}\beta - \gamma y_{it-1,2} - \alpha_i}{\sigma_u}); t = 3,...,T \tag{11}$$

and, when *t=1,2*

$$g_{it}(y_{it} \mid \alpha_i) = \Pr ob(z_{it} > \frac{-x'_{it}\lambda - \alpha_i}{\sigma_u}) \tag{12}$$

Let F(.) denote the CDF of the standard normal variable. Then, using evident notation, (11) and (12), respectively can be expressed as follows. For *t=3,..,T*,

$$g_{it}(y_{it}|y_{it-1,2}, \alpha_i) = 1 - F(\frac{-x'_{it}\beta - \gamma y_{it-1,2} - \alpha_i}{\sigma_u}) \text{ for } y_{it} = 1; y_{it-1,2} = 0,1 \tag{13}$$

and, when *t=1,2*

$$g_{it}(y_{it}|\alpha_i) = 1 - F(\frac{-x'_{it}\lambda - \alpha_i}{\sigma_u}) \text{ for } y_{it} = 1 \tag{14}$$

Similarly, (9) and (10), respectively can be expressed as follows. For *t=3,..,T*,

$$g_{it}(y_{it}|y_{it-1,2}, \alpha_i) = F(\frac{-x'_{it}\beta - \gamma y_{it-1,2} - \alpha_i}{\sigma_u}) \text{ for } y_{it} = 0; y_{it-1,2} = 0,1 \tag{15}$$

and, when *t=1,2*

$$g_{it}(y_{it}|\alpha_i) = F(\frac{-x'_{it}\lambda - \alpha_i}{\sigma_u}) \text{ for } y_{it} = 0 \tag{16}$$

Therefore, substituting the expressions for $g_{it}(y_{it} \mid y_{it-1,2}, \alpha_i)$ and $g_{it}(y_{it} \mid \alpha_i)$ given in (13)-(16), in the expression for the likelihood function in (16), and using evident notation,

$$L_i(\beta, \lambda, \gamma, \sigma_\alpha, \sigma_u \mid y_{i2},.., y_{iT}, x_{i2},..x_{iT}) = \int_{-\infty}^{\infty} \prod_{t=1}^{T} \left[F(Up_{it}) - F(Low_{it})\right] \exp[-(\frac{\alpha_i^2}{2\sigma_\alpha^2})] \frac{1}{(2\pi)^{1/2}\sigma_\alpha} d\alpha_i$$

for all $i=1,...,N_t$ and *t=1,..,T* (17)

where, when *t=3,..,T*

$$for\ y_{it} = 1,[Low_{it} = (\frac{-x'_{it}\beta - \gamma y_{it-1,2} - \alpha_i}{\sigma_u} \mid y_{it-1,2}, \alpha_i) \text{ and } Up_{it} = \infty]; \qquad y_{it-1,2} = 0,1 \tag{18}$$

$$for\ y_{it} = 0,[Low_{it} = -\infty \text{ and } Up_{it} = (\frac{-x'_{it}\beta - \gamma y_{it-1,2} - \alpha_i}{\sigma_u} \mid y_{it-1,2}, \alpha_i)]; \quad y_{it-1,2} = 0,1 \tag{19}$$

and, when *t=1,2*

$$for\ y_{it} = 1,[Low_{it} = (\frac{-x'_{it}\lambda - \alpha_i}{\sigma_u} \mid \alpha_i) \text{ and } Up_{it} = \infty] \tag{20}$$

$$for\ y_{it} = 0,[Low_{it} = -\infty \text{ and } Up_{it} = (\frac{-x'_{it}\lambda - \alpha_i}{\sigma_u} \mid \alpha_i)] \tag{21}$$

Finally, using the substitution $w_i = \alpha_i / 2^{1/2}\sigma_\alpha$ in (17),

$$L_i(\beta,\lambda,\gamma,\sigma_\alpha,\sigma_u \mid y_{i2},..,y_{iT},x_{i2},..x_{iT}) = \frac{1}{\pi^{1/2}}\int_{-\infty}^{\infty}\prod_{t=1}^{T}\left[F(Up_{it}) - F(Low_{it})\right]\exp(-w_i^2)dw_i$$ for

all $i=1,\ldots,N_t$ and $t=1,..,T$ (22)

where in place of α_i, we substitute $\alpha_i = w_i 2^{1/2}\sigma_\alpha$ in the expressions for Up_{it} and Low_{it} in (18)-(21). This function is amenable to Gauss-Hermite quadrature, and can be computed using standard software.

Table 1

Sample Summary Statistics for SIPP 1993-1998

Variable	Mean	Std. dev
Males	.470	.499
Whites	.827	.377
Blacks	.128	.335
Mexican	.030	.171
Attended College	.306	.471
Married	.385	.486
Own house	.588	.492
Bankruptcy Exemptions		
(1)Homestead	68411.17	77215.65
(2)Property	10106.56	14832.59
State Income Tax Rate (percent)	5.06	3.09
State Per Capita Income	24398.36	3443.3
Number of business starts over whole panel	.0151	.122
Total	5268	
Correlation between exemptions and starts	.0139	
Change of state (movers)	.015	.107
Person monthly income	1257.58	1995.17
Family property income/month	140	492.76
Business Income /month	2300	4368
Persons with insurance coverage at time of business start (1993)		
(1)Own	.345	.475
(2)Employer	.266	.442
Average union percentage	14.59	6.47
Average unemployment rate	5.69	1.47

Note: Author's calculations using the SIPP 1993-95 panel combined with SIPP 1996-1998 panel.

Table 2: Regression without Spatial Effects

Selected Coefficients: 1993-98

Dependent Variable	Business Start Marginal Effects (p-value)
Self-insurance	.0001
	(.002)
Employer insurance	-.0007
	(.000)
Exemption	8.89e-10
	(.001)
Per Capita Income	6.40e-09
	(.530)
Tax Rate	7.91e-06
	(.263)
Lagged Variable	.0062
	(.000)
N	312,845

Note: All regressions are estimated with a time-varying intercept, all the demographic variables, and state variables like the proportion of nonfarm employment, unemployment rate and unionization rate.

Table 3: Random Effects Probit Regression: Marginal Effects

Dependent Variable: Y_{ist}=1 if individual starts business, 0 otherwise

Weights	Distance	Distance	Distance	Population
	(1)	(2)	(3)	(4)
Years	1993-98	1993-98	1993-98	1993-98
Male	.0006	.0006	.0006	.0006
	(.000)	(.000)	(.000)	(.000)
Black	-.0003	-.0003	-.0003	-.0003
	(.000)	(.000)	(.000)	(.000)
Mexican	-.0002	-.0002	-.0002	-.0002
	(.003)	(.003)	(.004)	(.005)
Family Wealth	1.47e-07	1.47e-07	1.48e-07	1.45e-07
	(.000)	(.000)	(.000)	(.000)
Person Income from	1.71e-08	1.71e-08	1.71e-08	1.94e-08
Job	(.006)	(.006)	(.007)	(.003)
College	.0002	.0002	.0002	.0002
	(.000)	(.000)	(.000)	(.000)
Unemployed	-.0004	-.0004	-.0004	-.0004
Dummy=1 if person is unemployed	(.000)	(.000)	(.000)	(.000)
Age	.0002	.0002	.0002	.0002
	(.000)	(.000)	(.000)	(.000)
Agesquare	-2.21e-06	-2.21e-06	-2.21e-06	-2.20e-06
	(.000)	(.000)	(.000)	(.000)
Married	.0002	.0002	.0002	.0002
	(.000)	(.000)	(.000)	(.000)
Own house	.00002	.00002	.00002	.0001
	(.565)	(.565)	(.562)	(.696)
Employer Insurance	-.0007	-.0007	-.0007	-.0007
	(.000)	(.000)	(.000)	(.000)
Self Insurance	.0001	.0001	.0001	.0001
	(.007)	(.007)	(.007)	(.005)
Unemployment Rate	.00002	.00002	.00002	.00001
	(.263)	(.269)	(.223)	(.454)
Unionization rate	-5.17e-06	-4.77e-06	-4.76e-06	-3.06e-06
	(.257)	(.236)	(.296)	(.490)

Table 3 (*continued*)				
Exemption	-8.58e-11		2.27e-10	7.39e-11
	(.849)		(.553)	(.850)
Average Neighbor Exemption	7.01e-10 (.193)	6.47e-10 (.158)		1.19e-08 (.185)
Dumavex	-.0001	-.00009	-.00008	-.00008
Dummy=1 if average Neighbor Exemption Higher	(.046)	(.009)	(.097)	(.088)
Tax Rate	.00001	.00001	.00001	8.27e-06
	(.283)	(.247)	(.207)	(.438)
Average Neighbor Tax	-3.01e-06 (.836)	-3.21e-06 (.824)	-1.75e-06 (.904)	1.19e-08 (.978)
Dumavtx	-.00005	-.00005	-.00004	-.00003
Dummy=1 if Average Neighbor Tax Lower	(.405)	(.395)	(.406)	(.551)
Per Capita Income	1.25e-08	1.15e-08	8.99e-09	2.76e-09
	(.420)	(.429)	(.556)	(.842)
Average Neighbor Per Capita Income	-2.42-08 (.085)	-2.29e-08 (.063)	-2.14e-08 (.122)	-1.38e-08 (.320)
Dumavpc	-.00005	-.00005	-.00006	-.00008
Dummy=1 for Average Neighbor Income higher	(.406)	(.387)	(.283)	(.175)
LAGBSTRT	.003	.003	.003	.003
	(.000)	(.000)	(.000)	(.000)
Unemployment benefit (avben)	.0006 (.242)	.0005 (.197)	.0003 (.509)	.0006 (.219)
SEA (*=1 if state had program)*	.0001 (.092)	.0001 (.077)	.0001 (.118)	.0001 (.090)
N	312,845	312,845	312,845	312,845

Note:

1. *All specifications use a time-varying intercept and control for other state variables such as nonfarm employment. p-values in parentheses.*
2. *This table presents the marginal effects associated with each independent variable which are calculated at the mean value of these variables.*

References

Anselin, Luc (1988) *Spatial Econometrics: Methods and Models,* (Dorddrecht: Kluwer Academic Publishers).

Arulampalam, Wiji, A.L. Booth and M.P Taylor (2000), "Unemployment Persistence," Oxford Economic Papers 52, 24-50.

Baumol, William (1990), "Entrepreneurship: Productive, Unproductive and Destructive," The Journal of Political Economy 98 (5), Part 1, 893-921

Berkowitz, Jeremy and Michelle White (2004) "Bankruptcy and Small Firms' Access to Credit," Rand Journal of Economics 35(1), 69-84

Bruce, Donald (2000), "Effects of the US Tax System on Transitions to Self-Employment," Labor Economics 7(5), 545-574.

Brueckner, Jan and Luz Saavedra (2001) "Do Local Governments engage in Strategic Property-Tax Competition?," National Tax Journal 54(2), 203-229

Cullen, Julie and Roger Gordon (2002),"Taxes and Entrepreneurial Activity," NBER Working Paper 9015.

Elul, Ronel and Narayanan Subramanian (2002), "Forum-Shopping and Personal Bankruptcy," Journal Of Financial Services Research 21(3), 233-255.

Evans, David and Boyan Jovanovic (1989), "An Estimated Model of Entrepreneurial Choice under Liquidity Constraints," Journal of Political Economy 97(4), 808-827.

Evans, David and Linda Leighton (1989), "Some Empirical Aspects of Entrepreneurship,"American Economic Review 79 (3), 519-535.

Fan, Wei and Michelle White (2003), "Personal Bankruptcy and the Level of Entrepreneurial Activity," Journal of Law and Economics 46(2), 543-568.

Figueiredo, Octavio, Paulo Guimaraes and Douglas Woodward (2002), "Home Field Advantage: Location Decisions of Portuguese Entrepreneurs," Journal of Urban Economics 52, 341-361

Georgellis, Yannis and Howard Wall (2002), "Entrepreneurship and the Policy Environment,"Federal Reserve Bank at St.Louis Working Paper 2002-019A.

Greene, William H. *Econometric Analysis,* Fifth Edition

Heckman, J.J (1981), "Statistical Models for Discrete Panel Data," in C.F Manski and D.McFadden (eds.), Structural Analysis of Discrete data with Econometric Applications, MIT Press, Cambridge MA.

Holmes, Thomas J (1998), "The Effect of State Policies on the Location of Industry: Evidence from State Borders," Journal of Political Economy 106(4), 667-705.

Holtz-Eakin, Douglas, David Joulfaian and Harvey Rosen (1994), "Entrepreneurial Survival and Liquidity Constraints," Journal of Political Economy 102(1), 53-75.

Holtz-Eakin, Douglas, John Penrod and Harvey Rosen (1996), "Health Insurance and the Supply of Entrepreneurs," Journal of Public Economics 62(1-2), 209-235.

Karvel, George, Thomas Musil and Richard Sebastian (1998), "Minnesota Business Migration: Relocation, Expansion and Formation in Border States," American Experiment Quarterly, Summer 1998.

Kelejian, Harry (2005) *Lecture Notes in Spatial Econometrics*, Department of Economics, University of Maryland.

Lin, Emily Y. and Michelle White (2001), "Bankruptcy and the Market for Mortgage and Home Improvement Loans," Journal of Urban Economics 50(1), 138-162.

Meyer, Bruce (1990), "Why are there so few Black Entrepreneurs?," NBER Working Paper 3537.

Nickell, Stephen (1997), "Unemployment and Labor Market Rigidities: Europe versus North America," The Journal of Economic Perspectives 11(3), 55-74

Schutjen, Veronique and Erik Stam (2006), "Starting Anew: Entrepreneurial Realizations and Intentions Subsequent to Business Closure," Discussion Papers on Entrepreneurship, Growth and Public Policy 2006-10, Max Planck Institute of Economics, Group for Entrepreneurship, Growth and Public Policy, available at

http://econ.geo.uu.nl/peeg/peeg0605.pdf

Stam, E. (2007), "Why Butterflies Don't Leave. Locational Behavior of Entrepreneurial Firms," Economic Geography 83 (1), 27-50.

Silva, Olmo and Michelacci Claudio (2007), "Why So Many Local Entrepreneurs?," The Review of Economics and Statistics 89(4), 615-633

Sobel, Russell S. (2008), "Testing Baumol: Institutional Quality and the Productivity of Entrepreneurship," Journal of Business Venturing, forthcoming

Sobel, Russell S, J.R. Clark, Dwight R. Lee (2007), "Freedom, Barriers to Entry, Entrepreneurship and Economic Progress," The Austrian Review of Economics 20, 221–236.

Sullivan, Teresa, Westbrook, Jay and Elizabeth Warren (1999),"Financial Difficulties of Small Businesses and Reasons for their Failure," SBA Research Paper 188, available at http://www.sba.gov/ADVO/research/rs188.pdf.

Vesper, Karl (1990) *New Venture Strategies.* Englewood Cliffs, NJ: Prentice Hall.

[1] Holtz-Eakin, Joulfaian, Rosen (1994), Evans and Leighton (1989) and Evans and Jovanovic (1989) find that higher inheritances and liquid assets increase the likelihood of entrepreneurship. Cullen and Gordon (2002) and Bruce (2000), find a positive relationship between personal tax rates and entrepreneurship.

[2] The U.S. has separate bankruptcy procedures for individuals and corporations. However, individual or personal bankruptcy procedures also apply to small firms. When a firm is non-corporate, its debts are personal liabilities of the firm's owner, so that lending to the firm is legally equivalent to lending to its owner. If the firm fails, the owner can file for bankruptcy and his/her business and unsecured personal debts will be discharged. When a firm is a corporation, limited liability implies that the owner is not legally responsible for the firm's debts. However, lenders to small corporations often require that the owner guarantee the loan and may also require that the owner give the lender a second mortgage on his/her house. This wipes out the owner's limited liability for purposes of the particular loan and makes small corporate firms into corporate/non-corporate hybrids. Thus personal bankruptcy law applies to non-corporate firms and may also apply to small corporate firms. (Small businesses can also file under Chapter 13, which involves reorganization of the business and repayment out of future earnings. However, since most filers have few non-exempt assets, they prefer to file under Chapter 7) When unincorporated firms fail, their owners typically have high debt levels, much of which consists of debts of the failed firm. Owners have an incentive to file for bankruptcy, both because their unsecured personal and business debts will be discharged and because creditors must immediately terminate collection efforts and legal actions to obtain repayment. Under the Chapter 7 bankruptcy procedure, debtors' future earnings are completely exempt from the obligation to repay pre-bankruptcy debt, but they must turn over any assets they own above an exemption level

to the bankruptcy trustee, who uses these assets to repay debt. When debtors file under Chapter 7, they cannot file again for 6 years.

[3] Recent changes in the law (Bills HR333 and S420) make it harder for individuals above a certain median income to file for bankruptcy, and place a cap on the maximum exemption limit at $125,000.

[4] Our data on exemption levels are taken from state legislative records. They are supplemented with data in Stephen Elias, Albin Renauer, & Robin Leonard, How to File for Bankruptcy (4th ed. 1994), and other editions. We also used the list in Emily Y. Lin & Michelle J. White (2001).

[5] http://www.bls.gov/opub/mlr/2005/05/ressum.pdf

[6] Other studies relate to firm location. Karvel, Musil and Sebastian (1998) studied business *out* migration from Minnesota**.** Holmes (1998) further provides evidence that state policies play a role in the location of industry. In particular, the paper by Holmes (1998) and Karvel et al (1998) suggests that if firms relocate, they may do so just across the state border in a neighboring state.

[7] Other papers, such as Figueiredo at al. (2002), Stam (2007) and Silva (2007) conclude that entrepreneurs are more likely to start businesses in their home region because of their relatively better knowledge about their home regions. This is not necessarily in conflict with our findings. In terms of our econometric specification, this would imply that entrepreneurs place a higher weight on business conditions in their home regions (or their current state of residence) than in distant regions. Therefore accounting for both home conditions as well as non-local conditions (especially not too distant neighbors) is important in the regression analysis. The results suggest that controlling for all other factors, there is a direct effect of business conditions in neighboring states on the entrepreneurs decision to start a business in his current state of residence. Our analysis is not detailed enough to claim that entrepreneurs will therefore move to states with better business conditions and start businesses there. However, it does suggest that it reduces the

likelihood of starting a business in the current state of residence if conditions in neighboring states are better. We thank an anonymous referee for helping us make this point clear.

[8] Self-Employment Assistance programs offer dislocated workers the opportunity for early re-employment. The program is designed to encourage and enable unemployed workers to create their own jobs by starting their own small businesses. This is a voluntary program for States and, to date, fewer than 10 States have established and currently operate Self Employment Assistance programs. (Source: US Department of Labor)

[9] Previous research has shown that the probability of moving from a wage and salary occupation to owning a business is lower for union members (Bruce, 2000).

[10] Note that we can introduce a positive cost of filing for bankruptcy, without affecting the main analysis.

[11] It can be shown that other terms, involving derivatives of the limits, cancel out.

[12] Note that the total derivative involves other terms, like derivatives of the limits, which cancel out.

[13] Since the data are available monthly, we define as a business start when a person who did not own a business in January of that year, does own a business at some point during the year.

[14] For the grouped states, we use sample population weighted averages of these variables.

[15] Some states allow married couples to double their exemption amount, while some others allow individuals to choose between the state and the federal exemption. We account for these possibilities.

[16] Cullen and Gordon (2002), Bruce (2000)

[17] The nonfarm employment rate is entered to correct for the fact that bankruptcy law is different for farmers.

[18] In other specifications not shown here, we assigned a positive weight to all 39 states, but the results for the spatial variables were not significant in this case.

[19] The CPS relies on respondent recall of income earned in the previous year, when respondents are being interviewed in March of the current year.

[20] Stam and Schutjens (2006) and Vesper (1990) are other papers that suggest this notion of the "serial" entrepreneur.

[21] In a sense, this is revealed by the positive and significant coefficient on the lagged dependent variable in the regression results to be presented later, which strongly suggests that it is capturing relevant prior business experience.

[22] This matches closely the aggregate new firm births over the period 1993-1998 as a percentage of the population. For instance, using tables published by the SBA, Office of Advocacy (available at: http://www.sba.gov/advo/research/dyn_b_d8904.pdf), the total number of firm births over the period 1993-1998 was approximately 3,522,983. As a percentage of population in 1998, this was close to 1.2 percent.

[23] To define the state-level variables relevant for a particular individual, we use the state in which the individual resided at the beginning of the year. The dependent variable is 1 if the individual started a business in that same state during the year, and 0 otherwise. We have estimated the model coding the dependent variable as 1 even if the individual moved to a different state and started a business there in that same year. Results were similar.

[24] The estimated variances for the 1996-98 panel were larger than for 1993-95, hence pooling imposes the restriction of equal variances.

[25] If required, elasticities can also be calculated for the relevant variables at the variable means using STATA. In the interest of space, these are not presented here, but can be obtained upon writing to the author.

[26] The limit however only applies to individuals who owned their homes less than 3.3 years prior to a filing. So our results overstate the impact of this change to the law.

[27] They controlled for other job characteristics, like whether the job offered dental insurance, pension etc, and whether the spouse had insurance. We control for income from job, and whether the person was self-insured. SIPP 1993 panel does not specifically ask whether the spouse had insurance.

[28] For the 1993-95 panel, the corresponding value for employer insurance is 7 percent, and for self-purchased insurance, 6 percent.

[29] We experimented with defining the distance between two states as distance between their largest cities, rather than the capital cities. Results do not change.

[30] The coefficient on DUMAVEX is -.003 for states with neighbors less than 300 miles away, while DUMAVEX is -.007 for neighbors less than 200 miles away.

[31] The categories are: States with unlimited exemptions, states with exemptions in the range 95000 to 200000, states with exemptions in the range 60000 to 95000 and states with exemptions in the range 20000 to 60000.