Mise en Place: Rural Entrepreneurship and the Role of the Community

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Forthcoming in ***Small Business Economics***

This is a pre-peer review version of the manuscript. The published version can be found at:

https://link.springer.com/article/10.1007/s11187-025-01172-6

Abstract The Silicon Valley entrepreneurship model has shaped academic and policy ideas but does not work for every region. In this study, we theorize that rural entrepreneurship differs from the Silicon Valley model in several ways. We predict entrepreneurship will be lower in rural areas than in urban ones. We also expect that community factors will support rural entrepreneurship. Using US business registration data for 2,768 counties from 2005-2014, we find that rural counties have higher—not lower—business registration rates than urban counties. We also find that this difference grows as community social and human capital increase. Our study helps us understand how rural entrepreneurship differs and offers new ideas for theory and practice.

Plain English Summary The Silicon Valley approach has influenced academic and policy discussions but does not apply to every region. In this study, we argue that rural entrepreneurship differs from Silicon Valley in several ways. Examining data from 2,768 counties in the US between 2005 and 2014, we found that rural counties had more business registrations than urban ones,

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especially when community connections and skills improved. This study highlights the uniqueness of rural entrepreneurship and offers valuable insights for both practice and theory.

Keywords: entrepreneurship · ecosystem · regions · rural

JEL Classifications: L26, L53, M13, O18

1. INTRODUCTION

Silicon Valley has become a global role model for success (Audretsch, 2021). The Silicon Valley Model (SVM) emphasizes growth and innovation through technology, funding, and new ideas, which are key elements of a successful entrepreneurial environment (Spigel, 2017; Audretsch, 2021; Wurth et al., 2022). Because of its success, many policymakers have tried to copy the SVM in other parts of the U.S. and worldwide (Audretsch et al., 2015; Kwon and Sorenson, 2023; Stephens et al., 2019).

However, an emphasis on mimicking the SVM ignores the local factors influencing entrepreneurship. Instead of a top-down method, a bottom-up approach allows for policies that consider the specific needs of each area (Baker and Welter, 2024; Welter, 2011). This is important because entrepreneurship varies by country, state, and region, and the local context affects both opportunities and challenges for business owners (Audretsch et al., 2019; Fitz-Koch et al., 2018; Obschonka et al., 2020; Wyrwich et al., 2016). Focusing too much on the SVM can overlook the potential for entrepreneurship in less urban areas, such as rural regions (Audretsch, 2015; Pato and Teixeira, 2016).

Despite the growing literature on rural entrepreneurship (Miles and Morrison, 2020; Muñoz and Kimmitt, 2019), few studies compare rural entrepreneurship to urban ones in a comprehensive and empirical manner (Mayer and Motoyama, 2020; Pahnke and Welter, 2019). Instead, most research has focused on specific areas, like Rural West Virginia, or has provided

conceptual models (Conroy and Low, 2022; Hill and Mudambi, 2010; Muñoz and Kimmitt, 2019). We know that entrepreneurship is important for economic growth (Ataei et al., 2020; Steiner and Atterton, 2015) (Ataei, Karimi & Ghadermarzi, 2020; Steiner & Atterton, 2015), but we still lack information on what supports or hinders entrepreneurship in rural areas (Hunt et al., 2021).

The purpose of our paper is to explore how rural entrepreneurship differs from urban areas and to understand the role of the local community in supporting rural entrepreneurs. We begin by hypothesizing that rural areas will have lower entrepreneurship rates than urban ones. We also hypothesize that three community factors—social capital, human capital, and economic freedom—will support rural entrepreneurship. We analyze US business registration data from 2,768 counties between 2005 and 2014 to test our hypotheses. Our results show that rural counties have higher rates of entrepreneurship than urban areas. We also find that strong community ties and local skills help boost rural entrepreneurship. However, while economic freedom supports entrepreneurship overall, it does not help or hinder rural entrepreneurs specifically.

Our study makes three main contributions to the field of entrepreneurship. First, we found that rural areas have higher rates of entrepreneurship than expected, suggesting they might have more potential than researchers and policymakers realize. This indicates that we should pay more attention to the differences in entrepreneurship between rural and urban areas. While urban areas may have more venture capital, other types of entrepreneurship might thrive in rural regions (Fritsch and Wyrwich, 2021). Second, drawing on community-level regional and urban studies (Barraket et al., 2019), our research highlights the importance of community factors—like social and human capital—for rural entrepreneurship, addressing the criticism that researchers often focus too much on places like Silicon Valley (Audretsch, 2021). Our study, therefore, moves beyond a description of rural entrepreneurship in rural areas to a quantitative analysis of rural entrepreneurship. Lastly,

our findings have important implications for policymakers. Because social capital and human capital support rural entrepreneurship, it would be beneficial for rural policymakers to strengthen community ties, invest in education, and retain talented individuals in the area. A vibrant community can enhance rural entrepreneurship.

2. THEORY AND HYPOTHESES DEVELOPMENT

2.1 The Silicon Valley and Rural Entrepreneurship: Does one size fit all?

The SVM features abundant new ideas, a flourishing startup environment, and sources of risk capital like venture capital and finance (Audretsch, 2021). Entrepreneurs in the Silicon Valley model engage in business activities that focus on profit-driven operations in global markets. They also work with startups that lean more radical than incremental (Dunlap-Hinkler et al., 2010). The region's success in high-tech innovation evolved from traditional industries like agriculture, extractives, and transportation to the development of transistors, semiconductors, and integrated circuits (Adams, 2021; Klepper, 2010).

Despite its successes in promoting innovation and economic growth, the SVM has faced challenges in addressing social and financial problems in other, more rural areas without the same set of institutions and resources. For instance, this model has been ineffective in addressing wealth and spatial disparities typical in rural areas, making it challenging for the SVM to generate economic growth in such regions (Audretsch, 2021). Attempts to replicate Silicon Valley in areas without the necessary cultural and institutional frameworks, like Akademgorodok in Russia, have been unsuccessful, demonstrating that regional success cannot be engineered by copying successful models without considering local conditions (Hospers, 2006). Similar failures have occurred in regions like Sardinia and the Ruhr Area in Germany, where large-scale industrial projects were introduced without considering the local community (Hospers, 2006).

Focusing on emulating successful models like Silicon Valley can overshadow rural areas' unique characteristics and needs (Roundy, 2019). Policies that work in one region may be ineffective in another due to different economic structures and cultural contexts, neglecting local priorities (Fritsch and Wyrwich, 2018; Naldi et al., 2020). Although informal organizations sometimes step in, they cannot typically provide adequate support, contributing to a weaker entrepreneurial ecosystem that struggles to address financial and social issues. To overcome these limitations, we must look more closely at models suited to rural entrepreneurship—not Silicon Valley—to solve the distribution and spatial disparities.

We define rural entrepreneurship as starting and operating businesses in rural areas. It encompasses various economic activities beyond traditional agriculture (Galvão et al., 2020; Pato and Teixeira, 2016). Rural entrepreneurs face challenges related to access to educated labor, insufficient financial capital (Liedtke et al., 2021) and infrastructure (Yu and Artz, 2019; Miles and Morrison, 2020), inadequate government support programs, reduced access to essential services, and a lack of social mobility (Monsen et al., 2012) compared to urban areas (Dias et al., 2019; Galvão et al., 2020; Aguilar, 2021). These obstacles have resulted in a suboptimal number of entrepreneurs and a lack of innovations generated from spillovers (Block et al., 2018; Dvouletý et al., 2021; Nelson and Monsen, 2014). Despite these challenges, rural entrepreneurship remains an economic development tool (del Olmo-García et al., 2023). Entrepreneurs use resources to help enhance and grow the local economy (Korsgaard et al., 2015; Eschker et al., 2017; Gaddefors and Anderson, 2019). If harnessed correctly, rural entrepreneurs can leverage their uniqueness for business opportunities like agriculture or tourism (Aguilar, 2021) and combine this with the availability of local resources such as natural landscapes (Müller and Korsgaard, 2018). The local

involvement and reliance on community members contribute to rural ventures' sustainability (Barraket et al., 2019).

2.2 Rural Communities and Entrepreneurship

Rural entrepreneurs often balance the pursuit of profit with the well-being of their community, recognizing that strong relationships and mutual care are essential for long-term business survival and success (Bosworth, 2012). Due to limited access to financial capital and economic assets (Rooks et al., 2016), rural entrepreneurs may be less inclined to take bold entrepreneurial steps that could lead to business growth and innovation and less aware of their management capabilities (Garg et al., 2024).

We propose that rural communities will have less entrepreneurial activity than urban communities. One explanation for the lower entrepreneurship rates in rural counties could be the limited opportunities for wage work in rural areas, leading individuals to turn to entrepreneurship as an alternative. Opportunity-driven entrepreneurship tends to be less prevalent in rural areas than urban ones due to a less developed economy and lower market potential (Backman and Karlsson, 2021; Brünjes and Diez, 2013). As a result, necessity-driven entrepreneurship often dominates—individuals are more likely to become entrepreneurs out of necessity rather than due to pursuing business opportunities (Artz et al., 2018).[2] Rural areas in the United States have lower levels of formal education, older age profiles, and limited access to financial capital, contributing to lower rates of entrepreneurship. These challenges hinder the ability of individuals in rural counties to start and sustain businesses effectively (Deller et al., 2019). This way, we hypothesize:

Hypothesis 1: Compared to urban counties, rural counties will have lower rates of entrepreneurship.

[2] Sohns & Diez (2018) found that, in a multilevel analysis of rural areas of emerging markets, the individual level dominates when explaining both opportunity- and necessity-driven entrepreneurship. Nevertheless, the regional level significantly impacts opportunity-driven entrepreneurship, albeit only.

2.3 The Moderating Role of Community Social Capital

Although we have hypothesized that rural counties will have less entrepreneurial activity than urban counties, it is important to discuss the local community's role in promoting rural entrepreneurship. The emphasis on local resources and community engagement in rural entrepreneurship encourages innovative approaches to business development (del Olmo-García et al., 2023). We contend that social norms like trust, altruism, and reciprocity will benefit rural entrepreneurs more than urban ones.

2.3.1 Social Norms in Rural Communities Lessen Asymmetric Information Problems

In the presence of asymmetric information, lenders will often ration credit offerings. They will do so by either lending less to each borrower than requested (Type I) or lending to fewer borrowers (Type II) (Bernhardt, 2000; Stiglitz and Weiss, 1981). However, in rural communities, social norms like social trust are important in solving credit rationing and related problems in lending, like adverse selection and moral hazard. In the case of adverse selection, lenders do not know the *type* of borrower (i.e., credit-worthy or not). In the absence of information on the borrower type, lenders can check sources within the community to help reveal whether the borrower is credit-worthy and thus solve asymmetric information problems.

Informal verification is more challenging in urban areas due to limited access to information, where anonymity is more prevalent (Nguyen and Canh, 2021). Moral hazards often arise after loans, as borrowers may take risks at the lender’s expense, knowing their losses are capped, but gains can be large (Parker, 2018) and borrowers may also default or choose not to repay. To mitigate this risk, lenders typically require collateral. In contrast, rural communities face fewer asymmetric information issues in lending, given their close-knit nature to monitor borrowers

and discourage misbehavior. Social norms, including the threat of ostracism, help maintain community reputation and promote responsible behavior, fostering entrepreneurship and market transactions.

2.3.2 Rural Communities Strengthen Social Networks

Social networks allow entrepreneurs access to finance, mentors, and new partnerships (Beaudoin et al., 2014). Although social networks help entrepreneurs in urban communities, we argue that they will be more beneficial in rural communities. They allow rural entrepreneurs to overcome common deficits in these communities, such as knowledge, finance, and lack of experience.

A key factor for entrepreneurial activity is the entrepreneurs' engagement with their community's local, social, and cultural features (Hunt et al., 2021). In rural communities, the strong bonds between community members create a conducive atmosphere for collaboration, idea-sharing, and resource mobilization. These social connections support the development of business networks, increasing commitment among entrepreneurs within the community (de Guzman et al., 2020; Ring et al., 2010). Social capital, including intangible resources such as social networks, community support, and the business networks formed by this social capital, drives community development trajectories and promotes entrepreneurship in rural areas (Barraket et al., 2019; Rivera et al., 2019). These networks enable individuals to access economic resources, and such initiatives empower rural entrepreneurs to overcome challenges and realize their business goals (Beugelsdijk and Van Schaik, 2005). Strong reciprocal relationships with the community contribute to the development and growth of their ventures (Ring et al., 2010; Brewton et al., 2010; Freire-Gibb and Nielsen, 2014; Müller and Korsgaard, 2018; Neumeyer et al., 2019).

Therefore, through positive social connections and word-of-mouth referrals, entrepreneurs build credibility and trust, which is essential for attracting customers, investors, and business

partners. This increased visibility can lead to greater opportunities for business growth and success (Cooke et al., 2005; Richter, 2019; Shrivastava and Kumar Dwivedi, 2021). Bonding social capital through shared experiences and mutual trust among community members enables entrepreneurs to access support networks, resources, and knowledge, and it leads to reciprocal commitments that aid entrepreneurs in achieving their goals and creating a supportive environment for business growth (Barber et al., 2021). Bridging and linking social capital provides access to critical complementary resources such as funding, expertise, and market opportunities, which are essential for overcoming market constraints in rural economies (Ring et al., 2010; Woodhouse, 2006).

In sum, we contend that social capital has a stronger effect on entrepreneurship in rural communities than in urban ones. This is because rural communities help lessen asymmetric problems in lending and strengthen social networks. Although these mechanisms are present in urban areas, they are more salient in rural communities. Therefore, we hypothesize that:

Hypothesis 2: Compared to urban counties, the association between rural counties and entrepreneurship will strengthen as community social capital increases.

2.4 The Moderating Role of Community Human Capital

One important aspect of human capital is that it is correlated with entrepreneurial activity (Ahn and Winters, 2023) since it provides individuals with the necessary skills, knowledge, and technical expertise to start and manage businesses (Cheng and Smyth, 2021). In addition to the effects of productivity, human capital also signals their abilities in the labor market (Van Der Sluis et al., 2008). Human capital enhances traits and skills crucial for entrepreneurship, such as self-efficacy, creativity, risk-taking propensity, market awareness, and flexibility (Guerrero et al., 2021), enabling individuals to identify opportunities, innovate, adapt to changing market conditions, and effectively manage risks (Bae et al., 2014; Oosterbeek et al., 2010).

2.4.1 Community Human Capital and Rural Entrepreneurship

Rural communities tend to suffer from low levels of human capital. One of the leading causes of this phenomenon is the widespread tendency of the younger and better-educated generation to migrate to urban areas. Work experience tends to be a particularly relevant process of human capital formation in this context because work usually replaces the lack of formal education (Meccheri and Pelloni, 2006).

In the occupational choice model, human capital increases earnings. This decreases the likelihood of individuals choosing entrepreneurship as they may opt for more secure employment opportunities instead. However, this effect is not universal and depends on the availability of entrepreneurial opportunities. Urban areas typically offer a greater variety of opportunities due to their larger markets, networks, and resources. In contrast, rural areas often have fewer opportunities for traditional employment, which may incentivize individuals with greater human capital to pursue entrepreneurship to create their own opportunities (Yu and Artz, 2019).

Community human capital initiatives in rural areas have successfully stimulated local entrepreneurial talent. It is, therefore, vital to understand the importance of community institutions' influence on entrepreneurs' success rates (Gladwin et al., 1989). These initiatives can provide aspiring entrepreneurs with the knowledge and skills needed to succeed in starting and running their businesses, thus reducing failures and costs for potential entrepreneurs. Community education programs help reduce poverty, address economic disadvantages, and promote economic growth and development in rural and urban settings by increasing educational attainment and entrepreneurship involvement (Figueroa-Armijos and Johnson, 2013). Community education stimulates local entrepreneurial talent, creating jobs and adding value to specific regions in rural areas (Galvão et al., 2020).

In rural communities, educated individuals may find it more feasible to pursue entrepreneurship as a viable career option. This emphasizes the significance of human capital in rural areas as a catalyst for entrepreneurial development (Xiao and Wu, 2021). Therefore, we hypothesize that:

Hypothesis 3: Compared to urban counties, the association between rural counties and entrepreneurship will strengthen as community human capital increases.

2.5 The Moderating Role of Economic Freedom

Institutions that ensure economic freedom, such as low taxation, independent legal systems, protection of private property, and minimal government intervention, create incentives for individuals to engage in entrepreneurship (Bennett, 2021; Bjørnskov and Foss, 2008; Boudreaux et al., 2019; Boudreaux and Nikolaev, 2019; Bradley and Klein, 2016; McMullen et al., 2008). In regions with higher levels of economic freedom, entrepreneurs are more likely to thrive due to the conducive environment for business growth and innovation. Additionally, lower bureaucratic quality and regulations associated with new firms tend to decrease entrepreneurship. Entry regulations, in particular, negatively affect entrepreneurship and new firm formation (Angulo-Guerrero et al., 2017; Nyström, 2008).

2.5.1 Lower Regulatory Burdens Help Rural Communities Overcome Constraints

Urban areas have higher population densities, more diverse economic activities, and stricter regulations due to complex social and economic interactions (Audretsch et al., 2019). Rural communities, conversely, have lower population densities, fewer regulatory burdens, and a focus on traditional industries, such as agriculture and forestry (Wiggins and Proctor, 2001). One consequence is that the cost of living in rural areas is typically lower compared to urban areas, enabling individuals to start businesses with lower overhead costs (Goetz et al., 2010). Despite this lower cost of living, rural areas typically have limited access to resources such as capital, skilled

labor, and markets, which hinders entrepreneurship. These resource constraints make it difficult for rural entrepreneurs to attract talent from urban areas and manage operations effectively (Tim et al., 2021).

Economic freedom enables rural communities to overcome these resource constraints, encouraging entrepreneurship in rural areas with more pronounced constraints (Goetz and Rupasingha, 2009). Entrepreneurs face fewer regulatory burdens in regions with greater economic freedom (Cebula and Clark, 2014). This institutional environment alleviates financial constraints by reducing the starting and operational costs and enabling entrepreneurship (Campbell et al., 2012). Due to fewer regulatory barriers, rural entrepreneurs will find starting and operating businesses easier (Caffyn and Dahlström, 2005). For these reasons, we hypothesize that:

Hypothesis 4: Compared to urban counties, the association between rural counties and entrepreneurship will strengthen as economic freedom increases.

3. METHODS

3.1 Sample and Data Description

To examine rural entrepreneurship (Romero-Castro et al., 2023), we merge data from different sources. First, we gathered business registration data from the US Census Bureau's Business Formation Statistics (BFS). The BFS provides timely and high-frequency information on new business applications and formations in the United States[3]. Next, we gathered economic and demographic data from the USDA Economic Research Service[4], which compiles unemployment and labor force data from the U.S. Department of Labor, Bureau of Labor Statistics, and Local Area Unemployment Statistics. The USDA Economic Research Service also compiles data on educational attainment from the U.S. Department of Commerce, Census Bureau, and American

[3] https://www.census.gov/econ/bfs/index.html
[4] https://www.ers.usda.gov/data-products/county-level-data-sets/county-level-data-sets-download-data/

Community Survey 5-year period county-level estimates. We follow the USDA's ERS rural classifications coding[5] for adults aged 25 and older from the USDA[6]. Figure 1 presents a U.S. County map displaying the geography of rural and urban counties, and Figure 2 presents a U.S. County map displaying the geography of business registrations per capita.

[Insert Figure 1 about here]

[Insert Figure 2 about here]

A visual inspection of the two U.S. County maps illustrates the importance of examining the heterogeneity in entrepreneurship between rural and urban counties. On the one hand, Figure 1 shows a high concentration of rural areas in places such as North Dakota, South Dakota, Nebraska, Montana, and Wyoming. These areas have a high rate of business registrations per capita, according to Figure 2. On the other hand, states like Florida and New Jersey have few rural areas but high business registrations per capita rates. These figures illustrate that it is not as simple as urban or rural areas with higher entrepreneurship rates. Instead, these figures suggest we should consider these relationships in greater detail.

3.2 Measures

3.2.1 Dependent variable.

Our dependent variable is the *business registration rate (ln).* It is the natural logarithm of the number of business registrations registered in the county annually divided by the population of that county. We use the rate rather than the total number of business registrations because of large variations in county sizes. Moreover, we use the natural logarithm of the business registration rate because of skewness in the distribution's right tail. More specifically, some countries have many more business registrations than others. This results in a violation of the normal distribution of the

[5] https://www.ers.usda.gov/topics/rural-economy-population/rural-classifications/
[6] https://www.ers.usda.gov/topics/rural-economy-population/rural-classifications/what-is-rural/

residuals required by ordinary least squares estimation. After the log transformation, the residuals are normally distributed, and heteroskedasticity becomes less of a concern. Figure 3 illustrates these differences.

[Insert Figure 3 about here]

3.2.2 Explanatory variable.

Our key variable of interest is the dummy variable, *rural.* To compare rural and urban areas, we create a binary indicator coded 1 if a county is rural and 0 if not. We use the USDA's ERS definition, which sorts counties into 9 categories based on populations and commuting zones. We follow their classification of rural as non-metro counties. The USDA uses two criteria in the definition:

1. Central counties with one or more urbanized areas; urbanized areas (described in the next section) are densely settled urban entities with 50,000 or more people.
2. Outlying counties are economically tied to the core counties as measured by labor-force commuting. Outlying counties are included if 25 percent of workers living in the county commute to the central counties or if 25 percent of the employment in the county consists of workers coming out from the central counties—the so-called "reverse" commuting pattern.

Therefore, rural counties do not meet these criteria. We follow the USDA's definitions and code a county as rural if the USDA classifies it as non-metro, receiving a score of 6 through 9:

6 = non-metro – population of 2,500-19,999, adjacent to a metro area.

7 = non-metro – population of 2,500-19,999, not adjacent to a metro area.

8 = non-metro – completely rural or less than 2,500 population, adjacent to a metro area.

9 = non-metro - completely rural or less than 2,500 population, not near a metro area.

We use this measure, as opposed to alternative measures such as population density, because it adjusts for commuting zones into the classification of rural and urban areas. Therefore, even if a county has a low population density, it might be more accurate to classify it as urban due to its proximity to a metro area through the commuting zone. In additional robustness checks, we use alternative definitions of rural. Refer to Section 5.3 for more details.

3.2.3 Moderators

We include three moderating variables—social capital, human capital, and economic freedom—to examine the role of community drivers of rural entrepreneurship. We use the social capital index constructed by Rupasingha and Goetz (2006) to measure social capital. Their social capital index measures social capital at the U.S. County level. They use two measures of social norms (i.e., voter turnout in presidential elections and the census response rate). They also use two measures of network density (i.e., the number of social and civic associations in the county and the number of NGOs excluding those with an international focus). They normalize the network density measures by the population. Rupasingha and Goetz (2006) conducted a principal component analysis of the four measures and used the first factor to measure social capital. Their data are available for 1990, 1997, 2005, 2009, and 2014. Following prior research, we linearly interpolate these data to fill in the years between (Boudreaux et al., 2024; Hilary and Hui, 2009; Jha et al., 2018).

To measure human capital, we use data on the percentage of individuals in a county with at least a bachelor's degree (i.e., completion of tertiary education)(Moretti, 2004; Winters, 2014). We gathered bachelor's degree attainment data from the USDA's ERS, which compiled the data based on the U.S. Census Bureau, the Census of the Population, and the American Community Survey. These data are available for 2000, 2008, and 2017. We linearly interpolate these data to fill in the missing years.

To measure economic freedom, we gather data from the Economic Freedom of North America (Stansel and Tuszynski, 2017). We use the subnational measure of economic freedom, comprising three components: government spending, taxes, and labor market freedom. These data are unavailable at the county level. As a result, we gathered these data at the state level.

3.2.4 Control variables

We also gather data on the economy to control for economic differences between rural and urban counties. We collect unemployment and income per capita data to capture the county's economic vitality. We gather these data from the Bureau of Labor Statistics and the Bureau of Economic Analysis.

3.3 Estimation Methods

We use random effect regression methods to test the hypotheses. Random effect models, also known as mixed-effects, multi-level models, or hierarchical linear models (HLM), are helpful when data contain multiple levels of analysis or clustering (Estrin et al., 2022). In our study, we have repeated observations on counties over time. Random effects models are helpful for datasets with potentially unobserved heterogeneity across county, time, and individual dimensions (Epure et al., 2023). These regression models assume that the groups stem from a larger population (Autio et al., 2013; Boudreaux et al., 2019; Peterson et al., 2012), and standard techniques in the presence of clustered data increase the possibility of Type 1 errors due to underestimated standard errors (Hofmann et al., 2000). Our regression model includes a county-level random intercept to adjust for the clustering. We also use the Variance Inflation Factor (VIF) to check for multicollinearity between independent and dependent variables. The VIFs for the independent variables ranged from 1.42 to 5.11, which is less than the rule of thumb of 10. This indicates that there is no severe multicollinearity problem with the data (Greene, 2003).

Our baseline regression model is the following:

$$B_{it} = \alpha + \beta_1 R_{it} + \beta_2 SC_{it} + \beta_3 HC_{it} + \beta_4 EF_{it} + \beta_5 (SC_{it} \times R_i) + \beta_6 (HC_{it} \times R_i) + \beta_7 (EF_{it} \times R_i) + X'\delta + \lambda_t + u_i + \varepsilon_{it} \quad (1)$$

where i and t index county-level and year observations, respectively. B_i is the dependent variable. The business registration rate is the logarithm of business registrations per capita. R, SC, HC, EF, and X are the vectors of rural counties, social capital, human capital, economic freedom, and controls, respectively. λ_t is a set of time dummies (year-fixed effects) used to account for time trends. We will estimate the parameters β_1 - β_7, and δ. Lastly, u_i represents the random part of the equation and measures the county-level residuals. ε_{it} is the model's disturbance term.

Our econometric strategy uses the random effects regression model to estimate the association between rural counties and entrepreneurship as measured by the business registration rate. We expect $\beta_1 < 0$ (H1). We also examine whether there are statistically significant interactions between social capital and the business registration rate $\beta_5 > 0$ (H2), human capital and the business registration rate $\beta_6 > 0$ (H3), and economic freedom and the business registration rate $\beta_7 > 0$ (H4). Because rural counties correlate with other variables, we include several control variables to adjust for these correlations. Therefore, our model relies on the assumption of conditional mean independence (Wooldridge, 2015) (i.e., conditional on controlling for other relevant variables in the model, we rural counties to be uncorrelated with the model's disturbance term). Finally, we caution that we interpret our model's results as correlations rather than causation.

4. RESULTS AND ANALYSIS

4.1 Descriptive Statistics and Correlations

Table 1 provides the summary statistics. First, comparing business activity as measured by the rate of new business registrations, rural and non-rural areas demonstrate similar rates, averaging

between 0.006 and 0.007. This suggests a comparable level of entrepreneurial activity in both rural and urban areas.

[Insert Table 1 about here]

Rural counties show a slightly higher average unemployment rate than urban ones in terms of employment indicators. Rural counties have an average unemployment rate of 6.867%, while urban counties are lower at 6.847%. This slight difference could indicate these regions' varying economic conditions or labor market dynamics.

In terms of income, the differences are larger. Urban counties have a higher income per person, with an average of $36,014, compared to $32,937 in rural counties. This difference suggests that individuals living in urban areas have higher earnings due to differences in job opportunities, industries, or cost of living.

Community human capital, as measured by bachelor's degree (%) attainment in the county, also differs between rural and urban counties. Urban counties have more community human capital at 23% of the population compared to 16% in rural counties. This suggests that educational resources may be more concentrated or accessible in urban areas.

Community social capital is greater in rural counties than in urban ones. Social capital, which captures community trust and cooperation, is 0.392 in rural counties and -0.376 in urban ones. This is about 58% of a one standard deviation difference[7]. In contrast, there is little difference in economic freedom between rural and urban counties.

Table 2 provides the correlations. A negative correlation exists between rural counties and entrepreneurship, as measured by the business registration rate (r = -0.069). This is consistent with the smaller business registration rate in rural counties than in urban ones presented in Table 1.

[7] The difference in social capital is 0.392 – (-0.376) = 0.768. A SD of social capital for the entire sample is 1.314. Therefore, the difference is 58.45% of 1 SD (0.768/1.314).

However, the negative correlation is small and requires further examination to control for other omitted factors. We also observe positive correlations between the business registration rate and our three community factors—bachelor's degree (r = 0.402), social capital (r = 0.210), and economic freedom (r = 0.132). Lastly, the economy has a strong relationship with entrepreneurship. There is a negative correlation between business registration rates and unemployment (r = -0.265) and a positive correlation with income per capita (r = 0.423).

[Insert Table 2 about here]

4.2 Regression Results

Table 3 reports our regression estimates. We begin by testing hypothesis 1—rural counties will have lower entrepreneurship rates than urban ones. Contrary to our expectations, we find that rural counties have higher business registration rates. Model 1 of Table 3 indicates that rural counties have 2.2% (β = 0.0221; p = 0.055) more business registrations than urban ones on average.[8] This finding does not support hypothesis 1.

[Insert Table 3 about here]

Next, we test hypothesis 2—the association between rural counties and entrepreneurship will strengthen as community social capital increases. Model 2 of Table 3 indicates that rural counties have 3% (β = 0.0294; p = 0.015) more business registrations than urban ones on average. However, this relationship depends on the community's social capital. In those communities with above-average amounts of social capital (i.e., 1 SD above the mean), the interaction results (β = 0.049; p = 0.000) suggest that rural counties would have 9.8% more business registrations than urban ones[9]. Conversely, in communities with below-average amounts of social capital (i.e., 1 SD

[8] We interpret the coefficients as percentages because the model is log-linear of the form $\ln(y)=x\beta+e$. Therefore, $y=\exp(\beta)$, and we take the difference from 1 to arrive at our coefficient estimate.

[9] According to Table 1, 1 standard deviation of social capital is 1.314. Therefore, rural counties have 0.0294 + (1.314 x 0.0487) = 0.0934 and exp (0.0934) = 1.0978 – 1 = 0.0978 or 9.78%.

below the mean), the model suggests that rural counties would have 3.4% *fewer* business registrations than urban ones. Therefore, the association between rural counties and entrepreneurship strengthens as community social capital increases. This supports hypothesis 2.

We now test hypothesis 3—the association between rural counties and entrepreneurship will strengthen as community human capital increases. Model 3 of Table 3 indicates that rural counties have 2.8% ($\beta = 0.0281$; $p = 0.026$) more business registrations than urban ones on average. However, in more educated communities (i.e., 1 SD above the mean), the interaction results ($\beta = 0.003$; $p = 0.058$) suggest that rural counties would have 5.7% more business registrations than urban ones.[10] Conversely, in less educated communities (i.e., 1 SD below the mean), rural counties would have only 0.05% fewer business registrations than urban ones. Therefore, the association between rural counties and entrepreneurship strengthens as community human capital increases. This supports hypothesis 3.

Lastly, we test hypothesis 4— the association between rural counties and entrepreneurship will strengthen as economic freedom increases. Model 4 of Table 3 tests this hypothesis. We find no statistically significant relationship between rural counties and entrepreneurship or any statistically significant interaction between rural counties and economic freedom. Therefore, we do not find any evidence to support hypothesis 4.

Models 5 and 6 of Table 3 provide an alternative means to examine the moderating hypotheses. In these models, we split the sample into rural and urban counties and explore the relationship between business registrations and social capital, human capital, and economic freedom. Suppose social capital and human capital have larger associations with entrepreneurship in rural counties, as we expect. In that case, we should observe larger coefficients on these variables

[10] According to Table 1, 1 standard deviation of bachelor's degree is 8.398. Therefore, rural counties have 0.0281 + (8.398 x 0.00328) = 0.0556 and exp (0.0556) = 1.0572 – 1 = 0.0572 or 5.7%.

in rural counties than in urban ones. This is precisely what we observe in Table 3. Social capital, human capital, and economic freedom all have larger coefficients in model 5 than in model 6. However, we must use a z-test to account for the variance in the parameter estimates to see if these differences are statistically and significantly different.[11] Using this *z*-test, we find the differences are statistically significant for community social capital but not for human capital. The *z*-test indicates that economic freedom has a stronger association in rural counties than in urban ones, and the difference is statistically significant.

To visualize our interpretations, we report the predictive margins illustrating the moderating effects of community social capital, human capital, and economic freedom. Figure 4 reports the moderating effects of community social capital. These findings indicate that community social capital matters. When community social capital is weak, urban counties have higher business registration rates than rural ones. The opposite occurs when community social capital is strong. Thus, whether rural counties have less entrepreneurship than urban ones depends on community social capital. Figure 5 reports the results for community human capital. The results also suggest that rural counties have higher rates of business registration when community human capital increases. The results in Figure 6 indicate that the relationship between rural counties and entrepreneurship does not depend on economic freedom.

[Insert Figures 4-6 about here]

4.3 Robustness Checks

As robustness checks, we use two alternative definitions of rural. The definition of rural used in the study follows the USDA's ERS classification of receiving a score greater than or equal to 6 (see section 3.2.2 above). As our first alternative definition, we recode rural as receiving a score

[11] More specifically: z-test = $\frac{\beta_1 - \beta_2}{\sqrt{SE_1^2 + SE_2^2}}$ (Clogg et al., 1995).

of 8 or 9 based on the USDA's ERS classification. That is, we restrict the rural counties to those with less than 2,500 population, but the county could either be adjacent or not adjacent to a metro area. Table 4 reports these results. The results are similar, yet they indicate that rural counties have even higher business registration rates than urban ones using this definition. Specifically, the results in model 1 of Table 4 suggest that rural counties have 8.7% ($\beta = 0.0868$; $p = 0.000$) more business registrations compared to urban ones on average, and this estimate increases as community social capital and community human capital increase.

[Insert Table 4 about here]

As our second alternative definition, we recode rural as receiving a score of 7 or 9 based on the USDA's ERS classification. This definition restricts rural counties to those with a population of less than 19,999 and those not adjacent to a metro area. Therefore, using this definition, the area could be larger in population but not near a metro area. Table 5 reports these results. Model 1 of Table 5 indicates that rural counties have 6.1% ($\beta = 0.0608$; $p = 0.000$) more business registrations compared to urban ones on average, and this estimate increases as community social capital and community human capital increase. These robustness checks indicate that our findings are not sensitive to the classification of rural areas and whether it depends on population, proximity to a metro area, or both.

[Insert Table 5 about here]

5. DISCUSSION

Our study investigated the differences in entrepreneurship between rural and urban areas. We also examined whether this difference depended on community factors such as social capital, human capital, and economic freedom.

To summarize our findings: Contrary to our expectations, rural counties had higher—not lower—entrepreneurship rates than urban counties. We also found that community factors were vital in fostering rural entrepreneurship. Although rural counties had higher rates of entrepreneurship than urban ones, this difference increased as community social capital and human capital increased. Our findings also indicated that rural areas would have less entrepreneurship than urban ones without a supportive social and human capital community. These findings suggest that entrepreneurship activity depends on the presence of community factors. They should, therefore, be given more emphasis in the literature and policy. We discuss these implications below.

5.1 Contributions to and implications for the entrepreneurship literature

Our study contributes to the entrepreneurship literature in several ways. First, building on several studies that examined rural entrepreneurship (Mayer and Motoyama, 2020; Pahnke and Welter, 2019; Pato and Teixeira, 2016), our findings suggest that rural areas have higher entrepreneurship rates than urban ones. This result ran counter to our expectations. We expected rural areas to have lower rates of entrepreneurship because this environment has fewer opportunities, less developed markets, and inadequate resource access. Yet, this logic might be more applicable to some types of entrepreneurial activity than others (e.g., venture capital). Either way, our findings suggest that researchers should give more attention to the differences in entrepreneurship between rural and urban areas.

One potential explanation for the higher entrepreneurship rates in rural communities is that few wage and salary work opportunities exist. This is especially true for those with greater investments in human capital. We argued that rural markets are less developed, with fewer entrepreneurial opportunities. However, suppose there are fewer opportunities for wage and salary workers. In that case, this suggests they have two choices: Relocate to another area with greater

work opportunities or remain in the area and start a business. Therefore, the people who stay in rural areas might be more likely to become entrepreneurs, not less likely.

Second, in addition to these findings, our results also shed light on previously unexplored relationships. Our findings demonstrate that community factors such as social capital and human capital support rural entrepreneurship. Moreover, our findings suggest that rural areas would have *less* entrepreneurship than urban ones without a supportive social and human capital community. These findings indicate the importance of context—when rural communities have abundant social and human capital, they only have more entrepreneurship than urban communities. As such, our hypothesis that rural counties would have less entrepreneurship than urban ones is supported only if we ignore the role of community factors.

These findings also address the criticism that entrepreneurship scholars have overlooked other contexts besides mainstream ones, like Silicon Valley (Audretsch, 2021). However, although we expected that economic freedom would also support rural entrepreneurship, the evidence did not support this hypothesis. One explanation for this is that, while economic freedom has the potential to help rural entrepreneurship, it can support urban entrepreneurship too. Therefore, economic freedom is important for both rural and urban entrepreneurship. Our study, thus, moves beyond a description of rural entrepreneurship in rural areas to a quantitative analysis of rural entrepreneurship.

5.2 Implications for Policy

Our findings also have policy implications. We find that entrepreneurship activity can flourish in rural areas. We also find that community-level factors like social capital and human capital help to support rural entrepreneurship. Thus, policymakers in rural areas might consider identifying ways to increase social capital, invest in education, and retain talented individuals. Such

a vibrant community will help to support rural entrepreneurship. Policymakers could also look to encourage economic freedom in their local community. Although we did not find that economic freedom is more beneficial for rural communities, the evidence did suggest that economic freedom is beneficial for all communities. Therefore, rural governments might consider investing in a supportive environment for entrepreneurship that will attract and retain talent (Faria et al., 2023).

5.3 Limitations and Suggested Directions

Our findings are subject to a few limitations that future research could address. One limitation is that we do not examine the causal impact of ruralness on entrepreneurship activity. In other words, we do not ask forward causal questions (King et al., 2021). For instance, if x increased by one unit, how much do we expect y to change? In our case, such a setting would mean that if a county changed from rural to urban, we would expect business registration rates to increase by an amount. This setting does not apply because counties typically do not convert from rural to urban areas.

Nevertheless, there are some possibilities for future research to consider. One limitation is that we only examine the business registration rate as our measure of entrepreneurship. However, although this allows us to explore the quantity of entrepreneurship in a country, it does not allow us to examine the *quality* of entrepreneurship. Some new ventures will have more job creation and growth potential than others. Future research might investigate whether rural entrepreneurs produce less intellectual property or acquire less venture capital than urban ones. We conjecture that they would. However, our analysis suggests that researchers should not discount the community's role, as entrepreneurs in rural counties with supportive social and human capital can indeed produce high-quality entrepreneurship.

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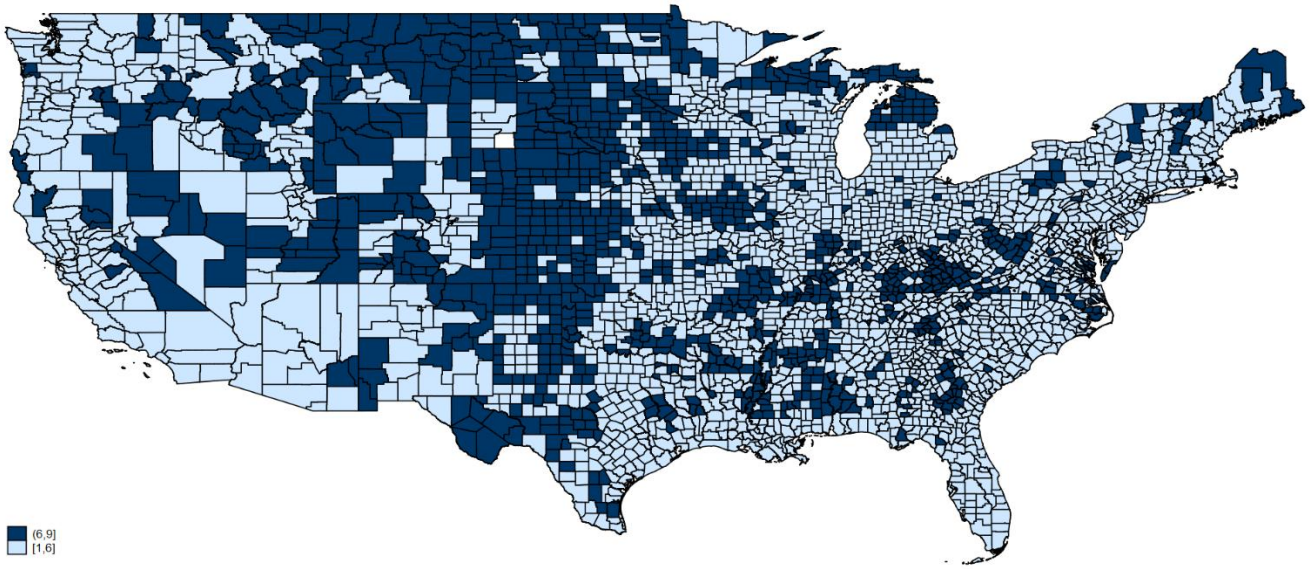

Figure 1. Rural and Urban Counties in the United States in 2013.

Notes: Rural counties are dark blue, and urban counties are light blue.

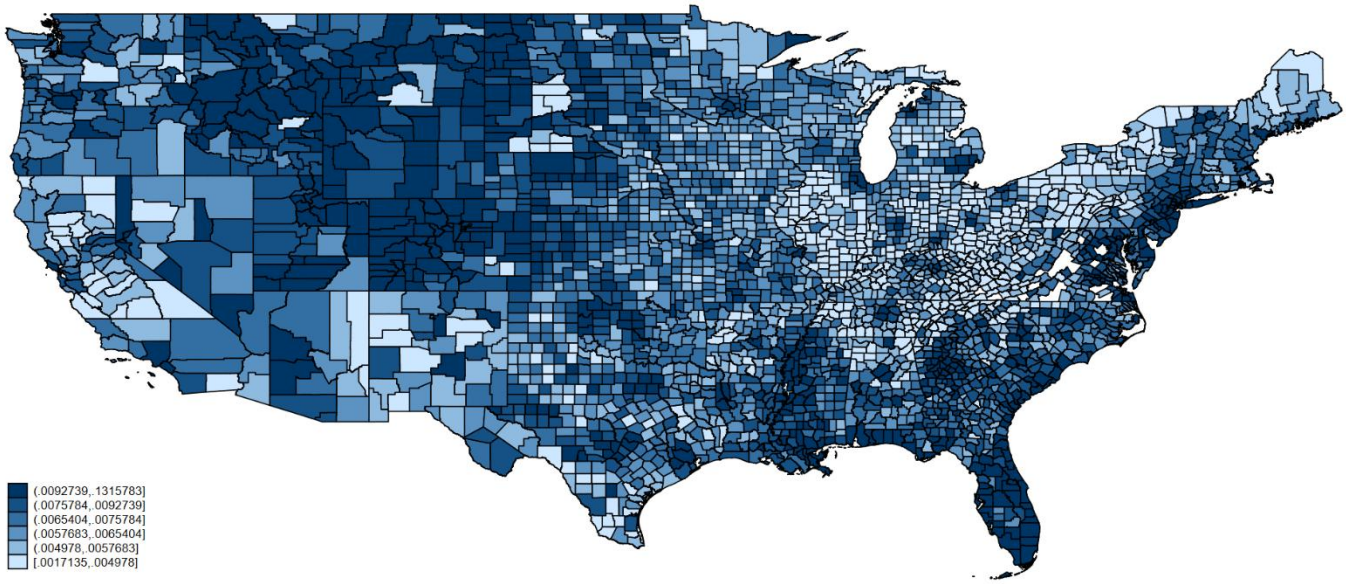

Figure 2. Business Registrations by US County, 2005-2022

Notes: Darker areas indicate a higher rate of business registrations per capita.

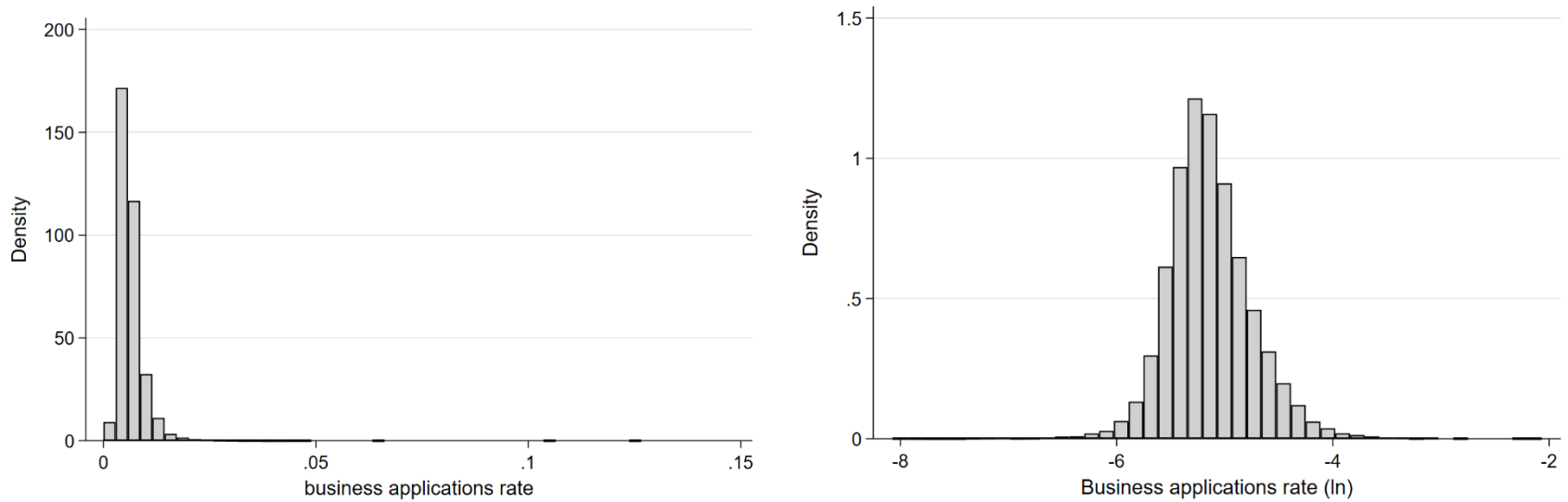

Figure 3. Distribution of dependent variables before and after log transformation.

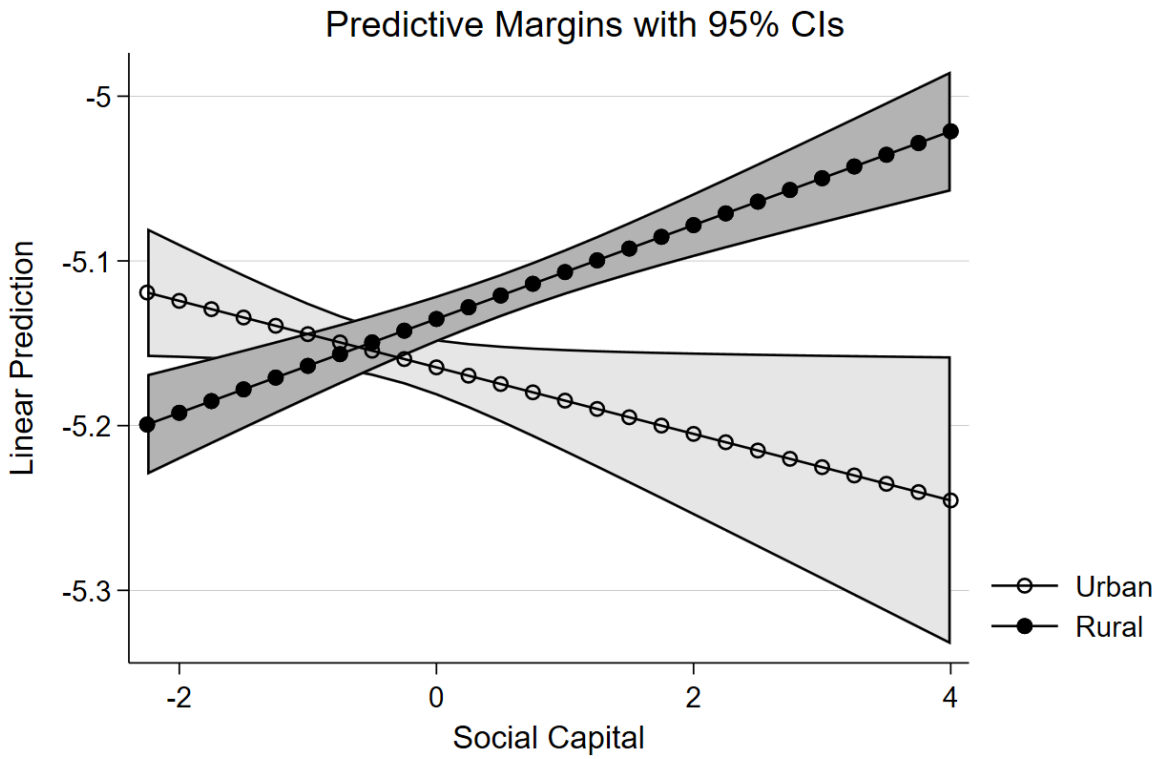

Figure 4. The relationship between social capital and business registrations for rural and urban counties.

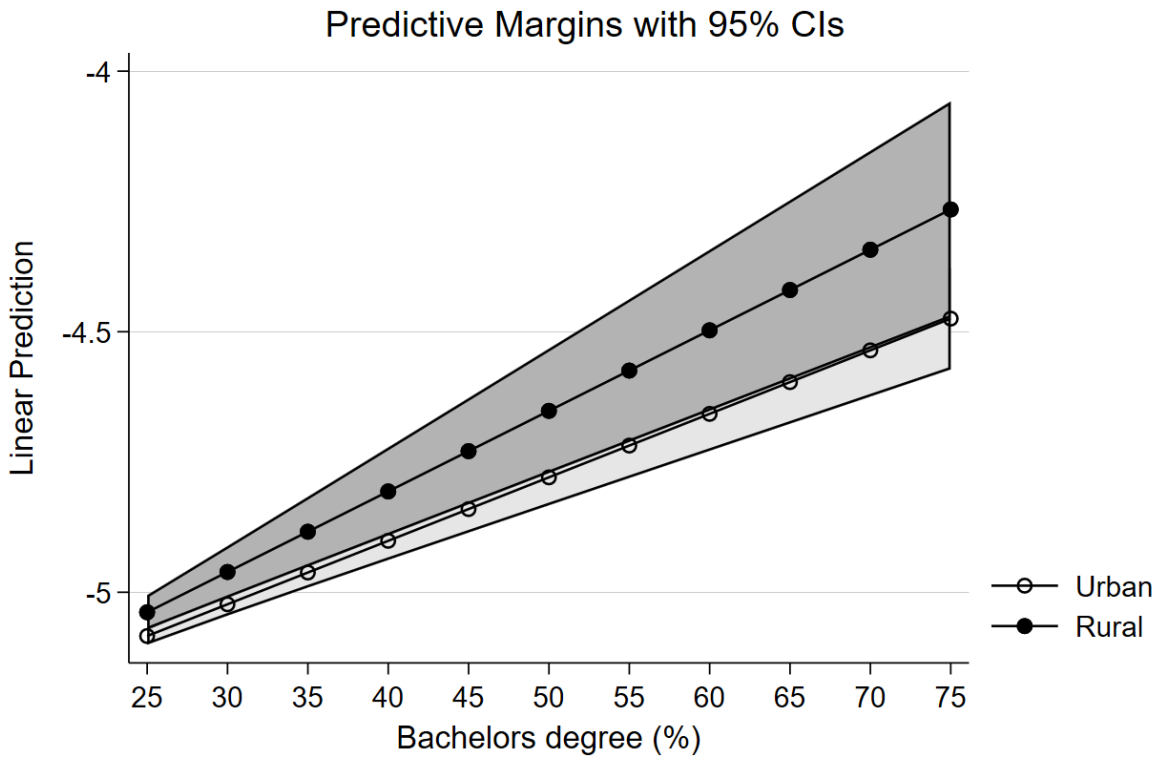

Figure 5. The relationship between education and business registrations for rural and urban counties.

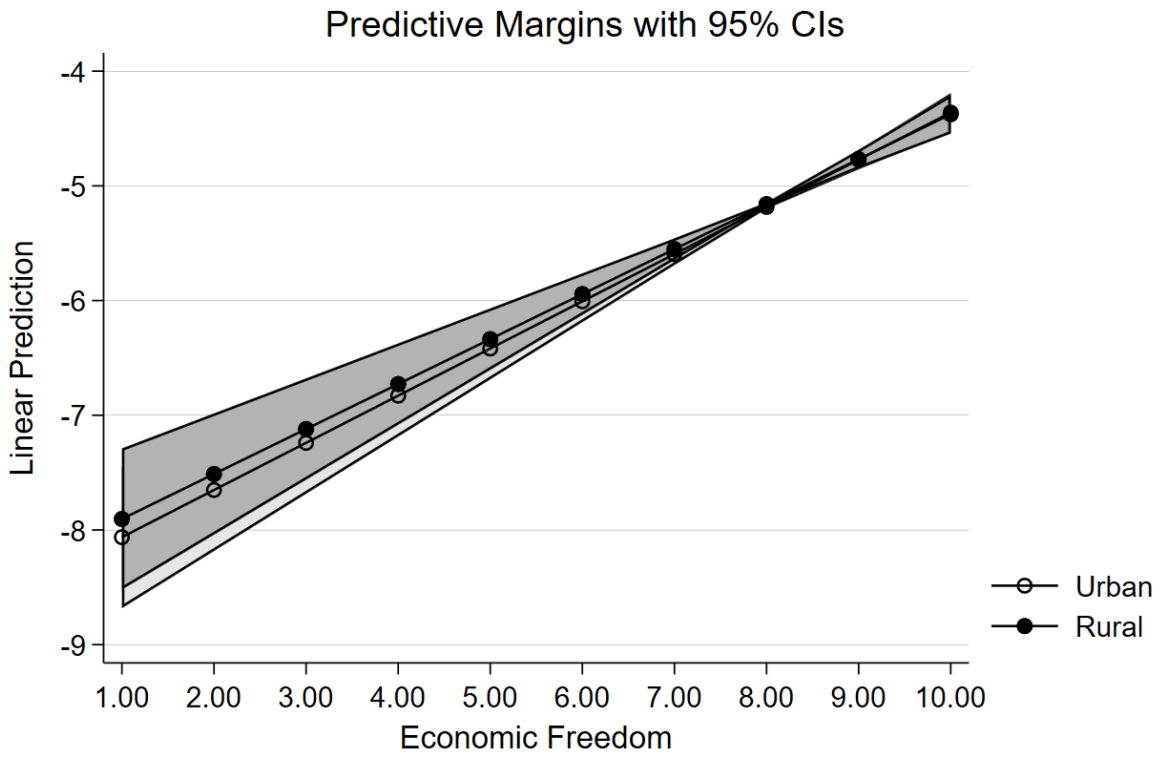

Figure 4. The relationship between economic freedom and business registrations for rural and urban counties.

Table 1: Descriptive Statistics

	Panel A: Overall Sample		Panel B: Rural[1] Counties		Panel C: Urban Counties	
	Mean	SD	Mean	SD	Mean	SD
Business registrations rate[2]	0.006	0.003	0.006	0.003	0.007	0.003
Unemployment rate (%)	6.857	2.898	6.867	3.160	6.846	2.560
Income per capita	34.349	9.712	32.937	9.973	35.993	9.098
Bachelor's degree (%)	19.653	8.398	16.552	5.671	23.264	9.537
Social capital	0.037	1.314	0.392	1.461	-0.376	0.965
Economic freedom	8.079	0.170	8.087	0.166	8.070	0.175
Rural counties	0.538	0.499	--	--	--	--
Number of observations		27,656		14,880 (53.8%)		12,776 (46.2%)

Notes: [1]We follow the USDA's ERS definition of rural defined as nonmetro counties where metro countries refer to 1. Central counties with one or more urbanized areas; urbanized areas are densely settled urban entities with 50,000 or more people; 2. Outlying counties are economically tied to the core counties as measured by labor-force commuting. Outlying counties are included if 25 percent of workers living in the county commute to the central counties or if 25 percent of the employment in the county consists of workers coming out from the central counties—the so-called "reverse" commuting pattern. Therefore, nonmetro counties do not meet these criteria.

[2] The business registration rate is the number of business registrations per capita.

Table 2: Correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Business registrations rate	1						
(2) Unemployment rate (%)	-0.265***	1					
(3) Income per capita	0.423***	-0.294***	1				
(4) Bachelor's degree (%)	0.402***	-0.257***	0.605***	1			
(5) Social capital	0.210***	-0.334***	0.326***	0.153***	1		
(6) Economic freedom	0.132***	-0.531***	-0.186***	-0.110***	0.006	1	
(7) Rural counties	-0.069***	0.004	-0.157***	-0.399***	0.291***	0.051***	1

Notes: $^{***}p < 0.000$.

Table 3: Regression Results

Dependent Variable:	Business Registrations Rate (ln)					
Sample:	Full Sample				Rural Counties	Urban Counties
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Rural	0.0221*	0.0294**	0.0281**	0.178		
	(0.012)	(0.012)	(0.013)	(0.147)		
Social Capital	0.0136***	-0.0202**	0.0119***	0.0134***	0.0340***	-0.00784
	(0.004)	(0.010)	(0.004)	(0.004)	(0.005)	(0.009)
Bachelor's degree	0.0130***	0.0130***	0.0122***	0.0130***	0.0137***	0.0118***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
Unemployment rate	-0.0127***	-0.0120***	-0.0125***	-0.0126***	-0.0158***	-0.00700***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Income Per Capita	0.0101***	0.0101***	0.0091***	0.0100***	0.0098***	0.00802***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Economic Freedom	0.402***	0.407***	0.400***	0.411***	0.426***	0.188***
	(0.044)	(0.043)	(0.044)	(0.045)	(0.063)	(0.048)
Interactions						
Rural x Social Capital		0.0487***				
		(0.011)				
Rural x Bachelors			0.00328*			
			(0.002)			
Rural x EF				-0.0192		
				(0.018)		
Constant	-8.901***	-8.964***	-8.865***	-8.980***	-9.077***	-7.075***
	(0.362)	(0.359)	(0.361)	(0.370)	(0.523)	(0.400)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Model fit statistics						
Observations	27,568	27,568	27,568	27,568	14,798	12,770
Counties	2,767	2,767	2,767	2,767	1,488	1,279
σ_u	0.242	0.237	0.242	0.242	0.216	0.257
σ_e	0.209	0.209	0.209	0.209	0.262	0.118
ICC	0.575	0.563	0.574	0.575	0.404	0.824

Notes: $^{*}\ p < 0.10$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$. The dependent variable is the natural logarithm of the number of business registrations per capita. We use hierarchical linear modeling (HLM) with observations clustered at the county level. All models include year dummies. Cluster-robust standard errors in parentheses. σ_u is the standard deviation of the random intercept and σ_e is the standard deviation of the model residual. ICC is the intra-cluster correlation.

Table 4: Regression Results Using Alternative Rural Measures

Dependent Variable:	Business Registrations Rate (ln)					
Sample:	Full Sample				Rural Counties	Urban Counties
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Rural	0.0868***	0.0675***	0.109***	0.327		
	(0.014)	(0.015)	(0.015)	(0.271)		
Social Capital	0.00882**	-0.00795	0.00686	0.00882**	0.0393***	-0.00498
	(0.004)	(0.005)	(0.004)	(0.004)	(0.008)	(0.006)
Bachelor's degree	0.0134***	0.0134***	0.0129***	0.0134***	0.0190***	0.0115***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.004)	(0.001)
Unemployment rate	-0.0124***	-0.0118***	-0.0121***	-0.0122***	-0.0222***	-0.00810***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.004)	(0.001)
Income Per Capita	0.0100***	0.0101***	0.00979***	0.00998***	0.00904***	0.0106***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Economic Freedom	0.392***	0.396***	0.386***	0.398***	0.124	0.314***
	(0.043)	(0.043)	(0.044)	(0.044)	(0.137)	(0.040)
Interactions						
Rural x Social Capital		0.0414***				
		(0.009)				
Rural x Bachelors			0.00715**			
			(0.003)			
Rural x EF				-0.0296		
				(0.034)		
Constant	-8.838***	-8.872***	-8.515***	-8.884***	-6.561***	-8.199***
	(0.361)	(0.359)	(0.359)	(0.364)	(1.123)	(0.336)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Model fit statistics						
Observations	27,568	27,568	27,568	27,568	5,708	21,860
Counties	2,767	2,767	2,767	2,767	579	2,188
σ_u	0.241	0.237	0.240	0.241	0.221	0.239
σ_e	0.209	0.209	0.209	0.209	0.359	0.145
ICC	0.573	0.563	0.569	0.572	0.274	0.730

Notes: $^{*}\ p < 0.10$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$. The dependent variable is the natural logarithm of the number of business registrations per capita. We code a county as rural if the USDA classifies it as 8 or 9 in the rural county codes (i.e., less than 2,500 population). We use hierarchical linear modeling (HLM) with observations clustered at the county level. All models include year dummies. Cluster-robust standard errors in parentheses. σ_u is the standard deviation of the random intercept and σ_e is the standard deviation of the model residual. ICC is the intra-cluster correlation.

Table 5: Regression Results Using a Second Alternative Rural Measure

Dependent Variable:	Business Registrations Rate (ln)					
Sample:	Full Sample				Rural Counties	Urban Counties
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Rural	0.0608***	0.0490***	0.0720***	0.193		
	(0.012)	(0.012)	(0.012)	(0.215)		
Social Capital	0.0105***	-0.00661	0.00887**	0.0105***	0.0357***	-0.00628
	(0.004)	(0.006)	(0.004)	(0.004)	(0.007)	(0.006)
Bachelor's degree	0.0131***	0.0130***	0.0126***	0.0131***	0.0160***	0.0115***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.001)
Unemployment rate	-0.0124***	-0.0119***	-0.0122***	-0.0123***	-0.0178***	-0.00836***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.001)
Income Per Capita	0.0100***	0.0100***	0.00985***	0.0100***	0.00908***	0.0105***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Economic Freedom	0.400***	0.400***	0.395***	0.404***	0.435***	0.283***
	(0.044)	(0.043)	(0.044)	(0.044)	(0.102)	(0.045)
Interactions						
Rural x Social Capital		0.0376***				
		(0.008)				
Rural x Bachelors			0.00490**			
			(0.002)			
Rural x EF				-0.0163		
				(0.027)		
Constant	-8.893***	-8.900***	-8.592***	-8.928***	-9.135***	-7.938***
	(0.361)	(0.360)	(0.359)	(0.364)	(0.839)	(0.374)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Model fit statistics						
Observations	27,568	27,568	27,568	27,568	7,481	20,087
Counties	2,767	2,767	2,767	2,767	755	2,012
σ_u	0.242	0.239	0.241	0.242	0.220	0.245
σ_e	0.209	0.209	0.209	0.209	0.302	0.160
ICC	0.574	0.568	0.572	0.574	0.347	0.700

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The dependent variable is the natural logarithm of business registrations per capita. We code a county as rural if the USDA classifies it as 7 or 9 in the rural county codes (i.e., less than 20,000 population and not adjacent to a metro area). We use hierarchical linear modeling (HLM) with observations clustered at the county level. All models include year dummies. Cluster-robust standard errors in parentheses. σ_u is the standard deviation of the random intercept and σ_e is the standard deviation of the model residual. ICC is the intra-cluster correlation.