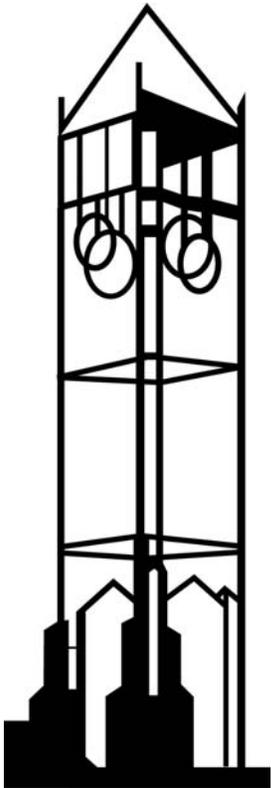


Migration and Rural Entrepreneurship

Li Yu and Georgeanne M. Artz



Working Paper No. 09017
July 2009

IOWA STATE UNIVERSITY
Department of Economics
Ames, Iowa, 50011-1070

Iowa State University does not discriminate on the basis of race, color, age, religion, national origin, sexual orientation, gender identity, sex, marital status, disability, or status as a U.S. veteran. Inquiries can be directed to the Director of Equal Opportunity and Diversity, 3680 Beardshear Hall, (515) 294-7612.

Migration and Rural Entrepreneurship

Li Yu^a
Georgeanne M Artz^b

Iowa State University^a
University of Missouri – Columbia^b

July 2009

Abstract

This paper investigates entrepreneurship of migrants and their location choice in attempt to draw connections between migration and economic development, especially the role of business formation in rural development. Rural entrepreneurship is firstly attempted to be better understood from perspectives of individual people's migration, human capital, social capital and family background. The study uses a recent survey on alumni of Iowa State University. We find that social capital and social networks established in one's home region are shown to be a strong factor in location choice of entrepreneurs. Entrepreneurs from rural origins tend to choose to start their businesses in rural areas in general and half of entrepreneurs migrate back to their home in particular to take local comparative advantages. Rural entrepreneurs are also more likely to obtain financial support from family members, friends and local banks to start a business.

We gratefully acknowledge financial and in-kind support from the Iowa State Foundation, the Iowa State Alumni Association, the Iowa State Registrar's Office, the Pappajohn Center for Entrepreneurship, and the Iowa State Agricultural Entrepreneurship Program.

I Introduction

Rural areas have been experiencing out-migration of young, educated adults, or “brain drain,” for a long time. Lack of appropriate job opportunities is a major barrier for rural born, well educated migrants seeking to return home or relocate to a rural place. One way to overcome the lack of job opportunities is to create their own - start a business. Increasingly, rural entrepreneurship and small business ventures have been seen as a strategy for rural development (Hoy, 1996). Rural entrepreneurship is defined by Wortman (1990) as “the creation of a new organization that introduces a new product, serves or creates a new market, or utilizes a new technology in a rural environment”. While traditional strategies of recruiting plants and relocating businesses to rural areas are not enough to boost rural economic growth, starting and growing new businesses in rural areas can stimulate local economies by creating local jobs, providing an expanded variety of products and services, and increasing quality of life in rural areas.

However, there are obstacles to rural entrepreneurship. Low population density and remoteness result in limited local demand and make it difficult to access educated labor, sufficient capital and infrastructure (Reynolds, *et al*, 1995). It has been found that firm entry rate is generally lower in rural areas than urban areas (Plummer and Headd, 2008, Yu, *et al*, 2008). What motivates an entrepreneur to relocate to a rural area? At the present, most studies in rural entrepreneurship rely on macrodata from the US Census Bureau or similar data bases (Wortman, 1990, Henderson, 2002) or case study methods (for example, Gladwin, *et al*, 1989 for North Florida). Therefore, little is known about the personal characteristics of rural entrepreneurs, how they differ from those of an urban

entrepreneur, or why they choose to locate their businesses in rural areas (Wortman, 1990; Henderson, 2007).

Certainly, the type and nature of the businesses is an important factor to be considered. Not all industries arise in all locations and entrepreneurs are not equally likely to enter in all industries. Some industries are conducive in rural areas while others are more productive in populated areas. The personal traits of the entrepreneur will also influence business location decisions. While on average, the level of human capital increases the likelihood of starting a business, it reduces the probability of residing in a rural location (Ucbasaran, et al, 2008; Arenius and DeClercq, 2005; Mills and Hazarika, 2002; Huang et al. 2002). Yet, the connection of human capital and knowledge of the resources that can be exploited in local areas is important. Michelacci and Silva (2007) found that compared to workers, entrepreneurs tend to be local. Family background and social factors affect entrepreneurs' location decision making. The experience of growing up in a particular community with a certain entrepreneurial climate or culture can impact both an individual's decision to become an entrepreneur and their decision about business location. Rural residency experience may shape attitudes toward rural entrepreneurship and provide rural entrepreneurial role models. This suggests a possible link between rural entrepreneurship and return migrant entrepreneurship which has to date been overlooked in the rural development research area. Our survey can fill in the blanks by investigating rural entrepreneurs' personal traits and their location decisions and return migration decisions.

The objective of the paper is to investigate entrepreneurship of migrants and their location choice in attempt to draw connections between migration and economic

development, especially the role of business formation in rural development. In addition to traditional economic factors, social factors are also emphasized in business location choices. We use a unique dataset of more than 5000 survey responses from Iowa State University (ISU) alumni graduating with a Bachelor's degree between 1982 and 2006. Numerous studies have shown that rural development and migration are closely related because migrants obtain skills, access and carry new technologies, and in some cases are able to use savings to self finance a new business and therefore stimulate their local economy. But the role played by the mobility of graduate human capital is generally ignored in studies of differences in regional entrepreneurial development. Because mobility has been found to be related with their subsequent location choices, students migrated to attend ISU are included in the dataset while students from Story County where ISU is located are excluded. Individuals in the dataset migrated at least once.

Rural communities benefit from entrepreneurial activities in multiple ways, consistent with recent studies of the extraordinarily important role played by rural entrepreneurship in rural development (Gladwin et al, 1989, Hoy, 1996, Henderson, 2002). Firstly, rural firms are smaller, having 5 full time employees on average than urban firms, which have 12 employees on average. However, rural entrepreneurs have made a significant impact in creating new ventures and increasing employment in rural areas. Though urban entrepreneurs graduating from ISU created 124,603 full time jobs from 1982 to 2007, rural entrepreneurs created 16,087 full time jobs according to our survey. Business and job creation helps prevent outflow of local skilled labor and can even attract outside labor to rural areas. Secondly, new businesses raise local income and wealth. Not only do entrepreneurs themselves earn more than wage earners on average,

local workers may shift from existing low-income occupations to new high-income jobs created by entrepreneurs. We find that among ISU alumni, rural residents are equally likely as urban residents to be employed as managers or chief executives in finance, human resource management, industrial production and information systems. Thirdly, in addition to the economic contributions entrepreneurs have made to their rural communities, they also influence community development from their social, culture and educational contributions. About half of entrepreneurs in our survey have provided financial or technical assistance in community development and planning to their local communities. In particular, the majority of entrepreneurs have donated to local schools or youth programs in their communities with a quarter reporting they make local donations often or very often. They also support local bond issues to finance community improvement projects. Rural entrepreneurs are more active in providing education bond issue related services to their local communities than are urban entrepreneurs.

Last but not the least, attracting business is an initial step toward rural development. Success and high growth of rural businesses will provide even bigger benefit to regional economic development. Businesses with high growth are larger, highly visible and more valuable than general firms, contributing their communities through creating more jobs, more income and more tax income and supporting education and community services (Henderson, 2002). It is found in our survey that rural businesses tend to survive longer than urban businesses but the difference is not statistically significant. 73.4% of rural entrepreneurs and 72.5% of urban entrepreneurs still had ownership on their businesses by the end of 2007. Among successful entrepreneurs, 85.3% stayed in the same place until the end of 2007. 22.3% were still living in rural

areas. In contrast, 54.9% of those who lost the ownership of their businesses stayed in the same place until the end of 2007. 19.8% were currently in rural areas. After business closure, they migrate to other places, with more migrating to urban areas.

II Data

The sample of alumni analyzed throughout this study is drawn from Iowa State University bachelor's degree recipients between 1982 and 2006. The sampling population consisted of 84,917 alumni. The sampling rate was approximately 24 percent. The total sample drawn was 25,025. We received 5,416 usable surveys for a response rate of 21.6 percent. However, we exclude students from the sample who were from Story County and did not actually migrate to attend ISU. Economic studies have shown that a prior migration experience increases subsequent mobility (for example, Faggian, *et al*, 2007). After exclusion, all individuals in our sample have migrated at least once. In this way, we control for the differential impact of previous mobility on the subsequent migration choices. In total, there are 4,963 usable observations.

There are four advantages of using our dataset to study rural entrepreneurship. First, the survey asked alumni's current locations at the time of survey. If a student has ever started a business after graduating from ISU, he or she is asked to provide information about their business location. At the same time, according to their unique identity in the dataset, we are able to match student information from the database in the Registrar's Office, which includes hometown location before attending ISU. This allows us to discern migration patterns of alumni in general and entrepreneurs in particular. Second, we can assess the influence of a variety of personal characteristics on the

likelihood of starting a business in a rural location. Third, research on rural entrepreneurship either only focuses on rural firms without comparison to urban firms or only includes agricultural and manufacturing firms. Our survey includes both rural and urban businesses from a broader spectrum of industries. Fourth, growth rates of rural firms have been found to be positively related with human capital of entrepreneurs (Variyam and Kraybill, 1994). Individuals in our dataset are well educated as they have at least a Bachelor's degree and it potentially makes these businesses more valuable to rural development in the long run.

We choose county as a unit to study location choices and rural entrepreneurship. We use Rural-Urban Continuum Codes (RUCC) from the USDA distinguishes metropolitan (metro) counties by the population size of their metro area, and nonmetropolitan (nonmetro) counties by degree of urbanization and adjacency to a metro area or areas¹. These codes were originally established in 1974 and are revised with each decennial census. We define a county as rural if its RUCC is between 6 and 9. A county is defined as urban if its RUCC is between 0 and 5².

Because alumni's graduation years span more than two decades, the rural status of their home county could change over time. For example, given the population growth surrounding the Des Moines metropolitan area, a metro adjacent county such as Madison County would be classified as rural (a RUCC of 6) in 1983, but urban (a RUCC of 2) in 2003. To reflect the nature of an alumni's home county about the time of their graduation from high school, we use 1993 RUCCs to identify rural status of home county for alumni

¹ <http://www.ers.usda.gov/briefing/rurality/ruralurbcon/>

² Alternatively, we define non-metropolitan areas (RUCC ranging from 4 to 9) as rural areas and metropolitan areas (RUCC ranging from 0 to 3) as urban areas. It will generate qualitatively similar results, though with different magnitude.

who were born before 1981 and RUCCs in 2003 for alumni who were born after 1981. Business entrepreneurs were asked where their most successful business was located³. We use RUCC in 1993 to classify the rural or urban location of business.

Throughout the study, sample weights are used to correct for differences in probability of response between survey years and between alumni within survey years. Weights are constructed so as to relate the number of respondents in each college-cohort cell to the number in the universe⁴. The weighted data are used to obtain consistent estimators of population. In addition, the dataset includes additional information on demographics, family background, extra-curricular activities, and college major. This information is important for us to analyze how personal traits, including human capital, social capital and family background, affect rural entrepreneurship. Statistical summaries of variables of interest are shown in Table 1 and will be depicted in the next section.

III Distribution of characteristics for rural entrepreneurs and urban entrepreneurs

As is commonly known, businesses located in rural areas will suffer from less local demand, infrastructure, or supportive assistance than in the urban areas, but will benefit from lower land rents and wages. Starting a business in rural or urban area is an

³ Alumni may start more than one business. However, only the location of their most successful business is available. The location information of the other businesses is not available. 75.3% of entrepreneurs started only one business.

⁴ Let N_t be the total number of alumni who graduated from Iowa State University with a Bachelor's degree in year t . There are six colleges at ISU: Agricultural & Life Sciences, Business, Design, Engineering, Human Sciences and Liberal Arts & Sciences. Let n_{jt} be the number of alumni who graduated from college j in year t . The proportion of these alumni out of the graduates from ISU in year t is n_{jt} / N_t . The corresponding number of alumni in our sample who graduated from college j in year t is s_{jt} . Each individual in our sample is then assigned with a sampling weight n_{jt} / s_{jt} such that the weight will represent the number of total alumni from college j in year t .

important but complex decision to make. Multiple dimensions deserve attention in rural entrepreneurship and rural development: business nature, human capital and expertise, family background and social capital.

Business nature is a most important factor. Some industries are conducive to entrepreneurship and have low entry barriers or low start-up costs. Agricultural production and research are typically located in sparsely populated areas with plenty of land and much lower land prices while some other industries provide many opportunities for new businesses in populated areas because they produce a broader range of products. For example, firms in retail industry would like to be in urban areas to secure high demand and provide diversity or niche in their products and services (Henderson, 2002). As is shown in Table 1, more agricultural businesses started by entrepreneur alumni are located in rural areas than in urban areas. In contrast, distribution of businesses in entertainment, recreation, communications, and information technology tend to shift to urban areas. In sum, all industries do not arise in all locations and entrepreneurs are not equally likely to enter in all industries.

Similarly, expertise matters. The majority of entrepreneurs started a business in an industry where they can utilize knowledge learned in their particular degrees. College distribution of rural entrepreneurs differs from that of urban entrepreneurs. As shown in Table 1, more rural entrepreneurs were from college of Agricultural and Life Sciences but fewer from College of Design. In contrast, colleges where urban entrepreneurs graduated tend to be evenly distributed.

Educational achievement plays a role in skills and knowledge that are necessary to start and sustain a business (Bates, 1990). Advanced degrees and professional degrees,

which can be regarded as specific human capital (Becker, 1993) may reflect individual's more cognitive ability that helps entrepreneurs to catch, identify or utilize new information in a specific field, but may also relate to skills and knowledge that are believed to have narrower applications. For example, it is found that technical entrepreneurs tend to be well educated, having at least a master's degree (Cooper, 1973). Furthermore, as discussed above, advanced degrees are related to the degree of expertise of entrepreneurs, which is again related to where the knowledge could be optimally used. As shown in Table 1, fewer rural entrepreneurs have an advanced degree than urban entrepreneurs, though they are all well educated, having a Bachelor's degree.

Family background has been adopted by both sociologists and economists to attempt to understand career selection in general and entrepreneurship in particular. Entrepreneurial parents, relatives, and even friends could directly set up an "entrepreneurial role model" or indirectly influence individual's attitude and desirability toward self-employment (Matthews and Human, 2004). For example, entrepreneurship is regarded as a "transmission of parental self-employment" because entrepreneurial parents impart to their offspring entrepreneurial skills and they may be willing and able to transfer financial wealth to their offspring (Dunn and Holtz-Eakin, 2000, Matthew and Human, 2004). According to our survey, if parents had ever started a business, their children did so with a probability of 18.7%. If parents had never started a business, the entrepreneurship rate is only 13.4%. In the context of rural entrepreneurship, whether parents have ownership on farms seems even more relevant. As shown in Table 1, nearly 40% of rural entrepreneurs' parents have had a farm, which is six times higher than urban entrepreneurs' parents. There is no significant difference in distributions of friends'

entrepreneurship for the two types of entrepreneurs. In addition, gender, ethnicity, parent education, number of siblings and whether individuals were raised in a two-parent-family are also included as family background factors.

Social capital, “connected to entrepreneurship both as a recourse for action and as preference for, e.g. an ‘entrepreneurial lifestyle’” (Westlund and Bolton, 2003 for an overview), has been integrated into economic models for decades. As Becker (1996) says, “The utility function at any moment depends not only on the different goods consumed but also on the stock of personal and social capital at that moment”. Social capital can not be distinctively or exclusively differentiated from family background factors.

However, we include a variable to measure social capital which is particularly related to rural entrepreneurship: rural origin of the undergraduates. There is little evidence in the literature showing that rural residency experience influences rural entrepreneurship. We expect that individuals who came from rural regions have a greater probability than those from urban regions in acquiring entrepreneurial ideas specific to rural businesses.

Considering rural origin as a complex index, it may represent entrepreneurial climate or culture in people’s rural communities. The rural residency experience matters in the effect of rural entrepreneurship role models and in attitudes toward geographically-specific economic and social change and toward rural entrepreneurship. It acts as part of the rural entrepreneurship related “resource endowment” (Westlund and Bolton, 2003).

For example, entrepreneurial parents of individuals with rural origin tend to have experience and resources especially in the rural context to pass on to their entrepreneurial offspring. We find that entrepreneurs who were from rural hometowns are more likely to start their businesses in rural areas. Table 1 shows that 70% of rural entrepreneurs were

from rural hometowns. In contrast, less than a third of urban entrepreneurs were from rural origin.

In addition, entrepreneurs differ in the ways they finance their start-ups. As can be seen from Table 2, the majority of both rural entrepreneurs and urban entrepreneurs self financed their new businesses. But rural entrepreneurs are significantly less likely to be self financed than their urban counterparts, perhaps due to lower income and savings in rural areas. Instead, rural entrepreneurs are more likely to finance new businesses through local banks or borrowing from friends and family members, which suggests that social networks in rural communities are especially helpful in the funding phase of business start-ups.

IV Models and findings

In this section, we examine individual entrepreneurs' choices about where to locate their businesses and the interplay between entrepreneurs' migration and business location decisions. Lastly, we more broadly model choices about self-employment versus working for someone else and migration after college.

We define individuals' utility function as $U(R, B, X, O)$ with a series of key variables discussed in the previous section: R is a dummy decision variable, equal to one if entrepreneur chooses to start a business in a rural area, zero if in an urban area. Assume that entrepreneurs maximize their utility by choosing business locations R , conditional on observed attributes B, X, O . In particular, B indicates business nature or its industry types. X are individual specific social economic characteristics. O is rural status of origin, which is equal to one if individual was from a rural hometown before attending ISU.

Rural entrepreneurship

Rural location choice can be econometrically depicted by a probit model

$R^* = f(B\beta_b^R, X\beta_x^R, O\beta_o^R) + \varepsilon_R$, where R^* is a continuous latent variable with its observed binary choice R . β_b^R , β_x^R and β_o^R are corresponding coefficients of regressors B , X , O .

Unobserved characteristics ε_R are normally distributed across entrepreneurs by assumption. Regression results are shown in the second column of Table 3.

Web-based businesses, that is, businesses that operate and provide goods and services primarily via the Internet are significantly biased toward urban areas.

Entrepreneurs have strong preference to start their businesses in finance or insurance in urban areas. However, businesses in agriculture industries, as expected, are significantly more likely to be started in rural counties. Manufacturing firms are also likely to be in rural areas, but the trend is only significant at 10% level.

Entrepreneurs' fields of study at ISU also matter. Graduates from Agricultural & Life Sciences College or Business College tend to be rural entrepreneurs, though the trend is not significant. Engineering entrepreneurs tend to be urban entrepreneurs.

Education level of entrepreneurs before business start is not an important factor affecting their location decision, even though general individual's education level has been found to be related with entry of businesses.

Family background and social capital, which have been documented to be relevant to business entry in the literature, are also shown to be closely related with rural entrepreneurship. Entrepreneurs who are married or have more siblings are more likely to locate their businesses in rural areas. Whether parents had a farm is positively related

with rural business start but it is not significant. Entrepreneurs from rural hometowns are significantly more likely to start a rural business than from urban hometowns.

Rural entrepreneurship and return migration

Recent studies find that entrepreneurs tend to be local. Local residents tend to become entrepreneurs either due to their comparative advantages over other places and well established social networks which promote entrepreneurial activities or due to lack of employment opportunities in their communities of origin. Entrepreneurs embedded in a diverse social network are also found to be more likely to start a business and to be more successful after entry (Brüderl and Preisendörfer, 1998). Because there are more region-specific-collateral and local social network for local residents, they facilitate access to credit and help gain access to information and customers and suppliers and broadening founding ways, which would be lost if they had to set up their business in a different place. Locals may also “have a greater probability than nonlocals of acquiring entrepreneurial ideas specific to the sector where the region has its natural advantage” (Michelacci and Silva, 2007). Therefore, whether to return to their home communities or to migrate to other places after graduation is another important decision relevant to location choice.

49.2% of entrepreneurs returned to the state where they were from after graduation. Define H^* as a continuous latent variable, representing utilities specific to return migration pattern. H is equal to one if an entrepreneur started a business in their home state, zero otherwise. The bi-variate model of simultaneous location and return migration decision is the following:

$$R^* = f(B\beta_b^R, X\beta_x^R, O\beta_o^R) + \varepsilon_R$$

$$H^* = g(B\beta_b^H, X\beta_x^H, O\beta_o^H) + \varepsilon_H$$

where ε_R and ε_H are assumed to have a joint normal distribution with correlation coefficient of ρ^{RH} . The estimation results are shown in the last two columns of Table 3. Significantly positive ρ^{RH} means that rural entrepreneurs tend to start their businesses in their home state. In particular, it is found above that entrepreneurs with rural origin tend to stay in rural areas. It is true even after controlling unobservables related to return migration decisions. Moreover, entrepreneurs from rural origin tend to return to their home state⁵.

Entrepreneurship and migration

In this small section, we draw back from focusing only on entrepreneurs such that we can obtain a bigger picture of simultaneous entrepreneurship and migration decisions. Apparently, students face two dimensional choices after graduation: where to live and whether to be self-employed or to be employed. According to our survey, a fifth of entrepreneurs started their businesses in rural areas, but only a tenth of non-entrepreneurs live in rural areas. Factors affecting people's choices to live in urban areas with a job and factors affecting people's choices to live in rural areas with their own businesses may not be equally weighted. As shown in the contingency Table 4(a), even though nearly a third of alumni were from rural counties, only one quarter of them were living in rural areas by

⁵ Alternatively, we define the return migration narrowly as returning to home county, instead of home state. 23.3% of entrepreneurs returned to their hometowns after graduation. The bivariate probit regression estimation using this narrow definition is consistent with that using the broader definition. ρ^{RH} is 0.3, significantly positive.

the time when the survey was conducted. However, there is no big difference in entrepreneurship rates between rural born and urban born alumni, as shown in Table 4(b).

A bi-variate probit model is imposed to depict simultaneous decisions. M^* and E^* are continuous latent variables, representing utilities from migration and employment choices respectively. M is a binary variable, equal to one if individual lived in a rural area after graduation, E is equal to one if individual were an entrepreneur by the time of survey, zero otherwise⁶.

$$E^* = h(X\beta_x^E, O\beta_o^E) + \varepsilon_E$$

$$M^* = k(X\beta_x^M, O\beta_o^M) + \varepsilon_M$$

ε_E and ε_M are assumed to have a joint normal distribution with correlation coefficient of ρ^{EM} .

Table 5 shows the estimation results. Even though more people moved to live in urban areas no matter wheter they were from rural or urban, ρ^{EM} is significantly positive, meaning that conditional on other observed covariates, entrepreneurs have a weaker preference than non-entrepreneurs to migrate to urban areas. At the same time, non-entrepreneurs have stronger preference to live in urban areas.

Last but not least, level of education, one of the most widely used control variables in entrepreneurship research, is relevant to rural development. Education level

⁶ Samples here include both entrepreneurs and non-entrepreneurs. The residency location of entrepreneurs is identified by their business locations. The residency location of non-entrepreneurs was identified by their address by the time of survey. Entrepreneurship in this model means starting a business at some point and still had ownership in their businesses by the time of survey, such that migration location and entrepreneurship decisions are kept in the same time frame. Alternatively, we do a similar regression by defining entrepreneurship as who had ever started a business, no matter whether it is successful or not, and identifying their migration location at the time of entry. This generates same qualitative results

may not significantly affect business location decision by entrepreneurs, but numerous studies have found that education level is positively related with the probability of starting a business in general. However, there is not much of evidence in the literature to compare self-employment among people with advanced degrees in detail. Apparently, the opportunity cost of being entrepreneurs increases with level of education, therefore reduces probability of entrepreneurship. Recently, Lazear (2005) proposes that skill breadth is much more important for entrepreneurs than skill depth. Entrepreneurs may not be experts in their fields but must be “Jack-of-all-trades”. As indicated in Table 5, alumni with advanced degrees are less likely to start a business and it is particularly significant for those with a master degree, either because more educated people have higher entry barrier in opportunity cost or because they are more of specialists than “Jack-of-all-trades”.

Individuals with advanced degrees tend to migrate to urban areas. As shown in Table 5, people with master degrees are less likely to choose to live in rural places than those with only Bachelor’s degrees, which creates a brain drain issue in rural areas. Apparently, one of the reasons is that wages in cities are higher than wages in suburbs for the same job. At the same time, rural communities do not provide a broad spectrum of jobs to attract the highly educated. For married couples, it is even more difficult to find satisfactory jobs for both of them in the rural areas which most likely have unbalanced distribution of industries. That makes the issue of rural entrepreneurship even more important in preventing brain drain across the country.

V Conclusion

This paper is a first attempt to better understand rural entrepreneurship by combining individual people's migration, human capital, social capital and family background. The recent survey on alumni of Iowa State University used in our paper makes it feasible for us to study the behaviors of rural entrepreneurs. We find that entrepreneurs from rural origins tend to choose to start their businesses in rural areas. Social capital and social networks established in one's home region are shown to be a strong factor in location choice of entrepreneurs. Half of entrepreneurs migrate back to their home state after graduation from ISU, likely to take advantage of local networks or to due to familiarity with local comparative advantages. Rural entrepreneurs are also more likely to obtain financial support from family members, friends and local banks to start a business, which can compensate for their relatively lower earnings (?) savings.

Consistent with previous literature, we find that family background, specifically parental business experiences, are relevant to self-employment decisions. However, individuals do not necessarily start businesses in rural areas simply because their parents had a farm. Other factors, such as type of business and fields of entrepreneurs' expertise are also important factors.

Our findings suggest a link between rural entrepreneurship and rural brain drain that to date has been overlooked. We find that college-educated entrepreneurs are less likely to migrate to urban areas than are their peers who choose to work for someone else. This may be due in part to established social networks and entrepreneurial role models which make it easier to start businesses locally. While brain drain policies have tended to focus on providing college scholarships to increase the supply of educated workers, our findings suggest that an important complement to these strategies may involve post-

graduation policies to help graduates use their education to create businesses, particularly in their home regions. Given the relatively few job opportunities for college graduates in rural areas, entrepreneurship opportunities provide a potential alternative that not only benefits the individual, but also the larger community. Entrepreneurs can create jobs, increase residents' income and attract financial, technological and human resources to rural communities, all factors which are for igniting regional growth in the long run.

Reference

- [1] Arenius, Pia and Dirk DeClercq. A network-based approach to opportunity identification. *Small Business Economics* 24 2005: 249-265.
- [2] Backes-Gellner, Uschi and Petra Moog. Who chooses to become an entrepreneur? The jacks-of-all-trades in Social and human capital *University of Zurich Institute for Strategy and Business Economics Working Paper No. 76*. Feb, 2008.
- [3] Becker, Gary. Accounting for tastes, Cambridge. MA: Harvard University Press. 1996.
- [4] Becker, Gary. Nobel Lecture: The economic way of looking at behaviour. *The Journal of Political Economy* 101 1993: 385-409.
- [5] Bates, Timothy. Entrepreneur human capital inputs and small business longevity. *The Review of Economics and Statistics* 4 1990: 551-559.
- [6] Brüderl Josef and Peter Preisendörfer. Network support and the success of newly founded businesses. *Small Business Economics* 10 1998: 213-225.
- [7] Dunn, Thomas and Douglas Holtz-Eakin, Financial Capital, Human Capital, and the Transition to Self-Employment: Evidence from Intergenerational Links, *Journal of Labor Economics*, 18(2), 2000: 282-305.
- [8] Evans, David S. and Linda S. Leighton. Some Empirical Aspects of Entrepreneurship. *American Economic Review*. 79(3) 1989:519-535.
- [9] Faggian, Alessandra and Philip McCann. Human capital, graduate migration and innovation in British regions. *Cambridge Journal of Economics* 33 2009: 317-333.
- [10] Faggian, Alessandra, Philip McCann and Stephen Sheppard. Some evidence that women are more mobile than men: gender difference in U.K. graduate migration

- behavior. *Journal of Regional Science* 47(3) 2007: 517-539.
- [11] Gladwin, C., Long, B., Babb, E., Beaulieu, L., Moseley, A., Mulkey, D., Zimet, D.
Rural entrepreneurship: one key to rural revitalization. *American Journal of Agricultural Economics* 1989: 1305-14.
- [12] Henderson Jason. Building the rural economy with high-growth entrepreneurs.
Economic Review- Federal Reserve Bank of Kansas City: Third Quarter, 2002.
- [13] Henderson Jason. Understanding rural entrepreneurs at the county level: data challenge. Presented at the Frameworks for Entrepreneurship Research in Food, Agricultural and Rural Development Workshop. *Federal Reserve Bank of Kansas City. 2007.*
- [14] Holtz-Eakin, Douglas, David Joulfaian and Harvey S. Rosen. Sticking It Out: Entrepreneurial Survival and Liquidity Constraints. *Journal of Political Economy.* 102(1) 1994: 53-75.
- [15] Hoy, Frank. Entrepreneurship: A strategy for rural development. *Rural Development Research.* 1996: 29-46.
- [16] Huang, Tzu-Ling, Peter F. Orazem and Darin Wohlgemuth.. Rural Population Growth, 1950-1990: The Roles of Human Capital, Industry Structure and Government Policy. *American Journal of Agricultural Economics* 84 2002: 615-627.
- [17] Lazear, Edward. Entrepreneurship. *Journal of Labor Economics* 23(4) 2005: 649-680.
- [18] Matthews, Charles and Sherrie Human. Family Background, Chapter 8. Handbook of Entrepreneurial Dynamics, the Profess of Business Creation. Sage Publications. London. 2004.

- [19] Michelacci, Claudio and Olmo Silva. Why So Many Local Entrepreneurs? *The Review of Economics and Statistics*. 89(4) 2007: 615-633.
- [20] Mills, Bradford and Gautam Hazarika. 2001. "The Migration of Young Adults From Non-Metropolitan Counties." *Amer. J. Agr. Econ.* 83:329-340.
- [21] Plummer, Lawrence and Brian Headd. Rural and urban establishment births and deaths using the U.S. Census Bureau's business information tracking series. An Office of Advocacy Working Paper. February, 2008.
- [22] Reynolds, Paul, Brenda Miller and Wilbur Maki. Explaining regional variation in business births and deaths: U.S. 1976-88. *Small Business Economics* 7 1995: 389-407.
- [23] Ucbasaran Deniz, Paul Westhead and Mike Wright. Opportunity identification and pursuit: Does an entrepreneur's human capital matter? *Small Business Economics* 30, 2008: 153-173.
- [24] Variyam, Jayachandran and David Kraybill. Managerial inputs and the growth of rural small firms. *American Journal of Agricultural Economics* 76 1994: 568-575.
- [25] Westlund Hans and Bolton Roger. Local social capital and entrepreneurship. *Small Business Economics* 21 2003: 77-13.
- [26] Wortman, Max, Jr.. Rural entrepreneurship research: An integration into entrepreneurship field. *Agribusiness* 6(4) 1990: 329 – 344.

Table 1 Characteristics of rural and urban entrepreneurs and businesses

Variables	Statistics: mean [std dev]		
	Urban	Rural	Mean difference
Rural Origin	0.189[0.019]	0.568[0.045]	0.379(7.74)***
Male	0.633[0.025]	0.609[0.043]	-0.025(-0.50)
Ethnicity	0.100[0.015]	0.050[0.002]	-0.051(-2.02)**
Married	0.123[0.017]	0.184[0.032]	0.062(1.69)*
Master degree	0.118[0.015]	0.142[0.030]	0.024(0.70)
Doctor degree	0.016[0.007]	0.039[0.028]	0.023(0.80)
Professional degree	0.091[0.016]	0.025[0.014]	-0.066(-3.19)***
Father's education	5.082[0.085]	4.585[0.164]	-0.497(-2.69)***
Mather's education	4.611[0.080]	4.679[0.134]	0.068(0.43)
Raised by two parents	0.884[0.017]	0.909[0.025]	0.025(0.82)
Number of siblings	2.456[0.087]	2.613[0.142]	0.157(0.94)
Parents started a business	0.518[0.026]	0.655[0.042]	0.137(2.79)***
Parents had started a business & it is a farm	0.142[0.017]	0.332[0.04]	0.190(4.43)***
Close friends started a business	0.292[0.024]	0.313[0.04]	0.021(0.45)
<i>Colleges</i>			
Agriculture & Life Sciences	0.221[0.023]	0.156[0.035]	-0.065(-1.57)
Business	0.124[0.016]	0.354[0.040]	0.230(5.27)***
Design	0.149[0.017]	0.189[0.033]	0.04(1.07)
Engineering	0.136[0.020]	0.097[0.036]	-0.039(-0.95)
Human Sciences	0.201[0.017]	0.102[0.021]	-0.098(-3.71)***
Liberal Arts & Sciences	0.169[0.021]	0.101[0.027]	-0.068(-2.01)**
<i>Graduation years</i>			
1982-1986	0.289[0.024]	0.305[0.041]	0.016(0.34)
1987-1991	0.270[0.024]	0.190[0.036]	-0.080(-1.85)*
1992-1996	0.206[0.020]	0.183[0.034]	-0.022(-0.57)
1997-2001	0.137[0.016]	0.202[0.035]	0.066(1.69)*
2002-2006	0.099[0.014]	0.119[0.026]	0.021(0.71)
<i>Industry types</i>			
Business is web based	0.117[0.016]	0.027[0.012]	-0.090(-4.44)***
Agriculture	0.080[0.014]	0.357[0.040]	0.277(6.50)***

Arts, Entertainment & Recreation	0.084[0.014]	0.043[0.017]	-0.041(-1.86)*
Construction	0.091[0.014]	0.101[0.028]	0.010(0.32)
Finance/Insurance	0.07[0.013]	0.037[0.014]	-0.032(-1.70)*
Hospitality	0.018[0.007]	0.018[0.013]	0.001(0.04)
Manufacturing	0.038[0.010]	0.045[0.015]	0.007(0.41)
Real estate	0.066[0.012]	0.023[0.012]	-0.043(-2.64)**
Social services	0.022[0.008]	0.023[0.016]	0.001(0.06)
Transportation & Utilities	0.029[0.007]	0.034[0.014]	0.005(0.30)
Accommodation & food services	0.011[0.005]	0.024[0.015]	0.013(0.84)
Communications	0.071[0.013]	0.026[0.013]	-0.044(-2.42)**
Education	0.033[0.010]	0.011[0.007]	-0.021(-1.75)*
Government/Military	0.011[0.005]	0.004[0.004]	-0.007(-1.06)
Legal	0.028[0.008]	0.033[0.028]	0.006(0.19)
Medicine/Health care	0.064[0.013]	0.045[0.021]	-0.019(-0.75)
Retail	0.119[0.017]	0.107[0.026]	-0.011(-0.36)
Information technology	0.127[0.017]	0.047[0.016]	-0.080(-3.42)***

Note: Numbers in the bracket are the standard deviations and numbers in the parenthesis are t-values. ***, **, * represent the significance at 1%, 5%, and 10% respectively.

Table 2 Proportion of entrepreneurs who select different ways to finance new businesses by rural and urban entrepreneurs

Ways	Rural	Urban	Difference (Rural-Urban)
Self financed	71.36% [0.004]	85.53% [0.017]	-14.17% (-3.43)
Loan or gift from family members	22.83% [0.003]	6.95% [0.012]	15.88% (4.35)
Loan from a local bank	36.84% [0.004]	14.82% [0.017]	22.03% (4.96)
Loan from a non-local bank	6.97% [0.001]	4.24% [0.009]	2.73% (1.30)
Finance from outside investors	4.07% [0.001]	6.70% [0.012]	2.63% (-1.35)
Government grants	2.10% [0.001]	2.65% [0.009]	0.55% (-0.39)
Other ways	5.57% [0.001]	4.39% [0.010]	1.19% (0.53)

Note: The statistics are based on the information of the most successful businesses created by alumni. Numbers in the bracket are the standard errors and numbers in the parenthesis are t-values.

Table 3 Probit model of location choices and bi-probit model of return migration and rural location by entrepreneurs

Variables	Probit	Bi-probit	
	Rural location	Return migration	Rural location
Rural Origin	0.981 (6.65)***	0.334 (2.35)**	1.037 (6.91)***
Male	-0.217 (-1.33)	0.207 (1.43)	-0.146 (-0.90)
Ethnicity	-0.155 (-0.50)	0.065 (0.26)	-0.186 (-0.59)
Married	0.438 (2.48)**	0.098 (0.56)	0.421 (2.40)**
Master degree	-0.065 (-1.41)	-0.255 (-1.43)	0.478 (2.11)**
Doctor degree	0.053 (1.07)	-1.515 (-2.95)***	0.68 (1.20)
Professional degree	0.014 (0.06)	-0.413 (-1.58)	-0.655 (-1.98)**
Father's education	0.011 (0.29)	-0.004 (-0.09)	-0.086 (-1.77)*
Mather's education	-0.296 (-1.35)	-0.006 (-0.14)	0.062 (1.25)
Raised by two parents	0.157 (1.03)	0.156 (0.79)	0.070 (0.28)
Number of siblings	0.396 (1.77)*	-0.019 (-0.51)	-0.003 (-0.09)
Parents had a farm	0.697 (1.17)	0.133 (0.72)	-0.412 (-1.88)*
Close friends started a business	-0.596 (-1.74)*	0.118 (0.88)	0.106 (0.71)
<i>Colleges</i>			
Agriculture & Life Sciences	0.352 (1.38)	0.385 (1.74)*	0.32 (1.28)
Business	0.371 (1.59)	0.215 (1.02)	0.266 (1.14)
Design	-0.133 (-0.46)	0.245 (0.97)	-0.28 (-0.92)
Engineering	-0.438 (-1.68)*	0.119 (0.58)	-0.549 (-2.06)**
Human Sciences	-0.377 (-1.30)	0.012 (0.05)	-0.459 (-1.59)
<i>Graduation years</i>			
1987-1991	0.053 (0.26)	0.230 (1.33)	0.095 (0.47)
1992-1996	0.059 (0.32)	0.450 (2.59)**	0.049 (0.25)
1997-2001	0.307 (1.40)	0.182 (0.95)	0.338 (1.55)
2002-2006	-0.147 (-0.67)	0.601 (2.91)***	-0.207 (-0.92)
<i>Industry types</i>			
Business is web based	-0.868 (-2.96)***	-0.232 (-1.09)	-0.984 (-3.37)***
Agriculture	0.873 (4.42)***	0.464 (2.21)*	0.946 (4.64)***
Arts, Entertainment & Recreation	-0.244 (-0.90)	0.326 (1.32)	-0.248 (-0.92)
Construction	0.236 (0.90)	0.087 (0.38)	0.426 (1.68)*
Finance/Insurance	-0.636 (-2.44)**	0.024 (0.10)	-0.636 (-2.35)**
Hospitality	0.334 (0.57)	0.451 (1.00)	0.325 (0.56)
Manufacturing	0.495 (1.68)*	-0.123 (-0.38)	0.481 (1.59)

Real estate	-0.399 (-1.29)	-0.488 (-1.80)*	-0.332 (-1.02)
Social services	0.166 (0.29)	0.432 (1.02)	0.220 (0.38)
Transportation & Utilities	-0.078 (-0.21)	-0.049 (-0.15)	-0.110 (-0.29)
Accommodation & food services	0.435 (0.96)	1.031 (2.21)**	0.353 (0.81)
Communications	-0.428 (-1.34)	0.059 (0.22)	-0.399 (-1.36)
Education	-0.439 (-1.01)	-0.077 (-0.20)	-0.460 (-1.13)
Government/Military	-0.477 (-0.77)	-0.412 (-0.69)	-0.572 (-0.96)
Legal	0.456 (0.82)	-0.255 (-0.69)	0.665 (1.38)
Medicine/Health care	-0.379 (-0.78)	0.236 (0.80)	-0.282 (-0.66)
Retail	0.060 (0.26)	0.271 (1.24)	0.083 (0.36)
Information technology	-0.326 (-1.16)	-0.264 (-1.25)	-0.313 (-1.15)
Constant	-1.183 (-2.49)***	-0.706 (-1.72)*	-1.012 (-2.03)**
Observation	699	698	
ρ^{RH}		0.277[0.08]***	
Log pseudolikelihood	-280.6	-11837.8	

Note: Numbers in the bracket are the standard deviations and numbers in the parenthesis are t-values. ***, **, * represent the significance at 1%, 5%, and 10% respectively. Regressions are based on migrants.

Table 4(a) Contingency table of alumni migrants' rural status in both origin and current residency

	Current Residency		
Origin	<i>Urban</i>	<i>Rural</i>	<i>Total</i>
<i>Urban</i>	66.58%	2.83%	69.41%
<i>Rural</i>	22.69%	7.89%	30.59%
<i>Total</i>	89.27%	10.73%	100.00%

Note: 4699 observations.

Table 4(b) Contingency table of alumni's rural status in origin and entrepreneurship rate

	Entrepreneurship		
Origin	<i>Never started a business</i>	<i>Started a business</i>	<i>Total</i>
<i>Urban</i>	58.51%	10.98%	69.49%
<i>Rural</i>	26.36%	4.15%	30.51%
<i>Total</i>	84.87%	15.13%	100.00%

Note: 4806 observations.

Table 5 A bi-probit analysis of choices of rural location and entrepreneurship

Variables	Model(1)		Model(2)	
	Rural Location	Entrepreneurship	Rural Location	Entrepreneurship
Rural Origin	0.875(13.65)***	-0.045(-0.66)	0.873(13.47)***	-0.037(-0.52)
Male	0.061(0.91)	0.147(2.24)**	0.064(0.95)	0.160(2.43)**
Ethnicity	-0.196(-1.16)	0.035(0.27)	-0.193(-1.15)	0.032(0.25)
Married	0.206(2.23)**	0.215(2.23)**	0.202(2.18)**	0.207(2.16)**
Master degree	-0.167(-2.06)**	-0.520(-6.51)***	-0.165(-2.05)**	-0.516(-6.46)***
Doctor degree	-0.210(-0.77)	-0.117(-0.58)	-0.222(-0.81)	-0.149(-0.74)
Professional degree	-0.214(-1.44)	0.198(1.70)*	-0.207(-1.40)	0.218(1.86)*
Father's education	-0.052(-2.45)**	0.034(1.56)	-0.051(-2.36)**	0.036(1.66)*
Mather's education	0.011(0.47)	-0.011(-0.47)	0.011(0.46)	-0.009(-0.39)
Raised by two parents	0.176(1.57)	0.041(0.40)	0.171(1.53)	0.028(0.27)
Number of siblings	0.027(1.66)*	0.009(0.51)	0.028(1.71)*	0.013(0.74)
Parents started a business & It is a farm			0.082(1.08)	0.151(1.78)*
Close friends started a business	-0.004(-0.07)	-0.279(-4.33)***	-0.007(-0.12)	-0.289(-4.50)***
<i>Colleges</i>				
Agriculture & Life	0.577(5.99)***	0.312(3.02)***	0.573(5.83)***	0.314(2.99)***
Business	-0.19(-1.79)*	-0.012(-0.12)	-0.187(-1.77)*	-0.004(-0.04)
Design	-0.132(-0.76)	0.424(3.30)***	-0.120(-0.68)	0.445(3.42)***
Engineering	-0.248(-2.46)**	0.084(0.88)	-0.245(-2.43)**	0.081(0.85)
Human Sciences	0.129(1.26)	0.088(0.79)	0.134(1.31)	0.105(0.96)
<i>Graduation years</i>				
1987-1991	0.038(0.35)	-0.032(-0.34)	0.035(0.32)	-0.034(-0.36)
1992-1996	0.113(1.13)	-0.179(-1.93)*	0.117(1.17)	-0.171(-1.84)*
1997-2001	-0.077(-0.74)	-0.277(-2.90)***	-0.073(-0.71)	-0.262(-2.76)***
2002-2006	0.090(0.95)	-0.539(-5.41)***	0.095(1.00)	-0.527(-5.33)***
Constant	-1.752(-8.75)***	-1.349(-7.15)***	-1.725(-8.72)***	-1.290(-6.97)***
Observation	4573		4589	
ρ^{EM}	0.364 [0.04]***		0.368[0.04]***	
Log pseudolikelihood	-48295.0		-48555.4	

Note: Numbers in the bracket are the standard errors and numbers in the parenthesis are t-values. ***, **, * represent the significance at 1%, 5%, and 10% respectively. Regressions are based on migrants.