

## **Rural Entrepreneurship in a Time of Recession**

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### **Abstract**

Economic recessions increase costs, risk, stress, uncertainty, and business failures while decreasing the availability of employment. Individuals who seek to become self-employed in recessionary times, whether out of need or for opportunity reasons, face difficult and unique circumstances. We use cross-section time-series rare events logistic regression to model the effects that living in rural America and changes in the economy have on the probability of individuals engaging in necessity or opportunity entrepreneurial activities both before the recession (2005–2007) and during the recession (2008–2010). Key findings indicate that before the recession, individuals living in rural metro and nonmetro counties were more likely to engage in opportunity-driven entrepreneurial activities when compared to individuals living in more urban counties. Positive employment growth rates before the recession also increased the probability that individuals in rural areas would engage in opportunity entrepreneurship. The recession marked a shift in the motivation of individuals in rural America to become self-employed. There is a clear decline in opportunity entrepreneurship and an increase in necessity entrepreneurship. In all rural and mixed-rural counties, college education positively predicts opportunity entrepreneurship, whereas individuals with incomes below \$50,000 or working in a part-time job are more likely to engage in entrepreneurship driven by need.

**KEYWORDS:** recession, necessity entrepreneurship, opportunity entrepreneurship, rural, logistic regression, Global Entrepreneurship Monitor

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## Introduction

It is clear that entrepreneurship is a key generator of innovation, employment, and economic development (Acs et al., 2004; Audretsch & Keilbach, 2004; Kelley et al., 2011; Van Stel et al., 2005). In rural America, entrepreneurs lead communities to locally rooted employment generation, and to create value, wealth and opportunity (Henderson, 2002). As highly motivated individuals, entrepreneurs identify and boost key local resources to attract investment and generate sustained development. Henderson (2002) claims that entrepreneurs also connect local economies to opportunities in the global market. Economic recessions, nonetheless, limit the availability of resources and employment in rural areas. Constrained access to capital and availability of local demand limits the opportunities that rural communities offer to entrepreneurs.

There are mixed findings in the literature regarding how entrepreneurs react and contribute to economic growth during a recession. Some studies conclude that the primary goal of entrepreneurs during hard economic times is to take advantage of opportunities, whereas others suggest that it is unemployment or underemployment that really drives individuals to seek self-employment. Moreover, entrepreneurs that are driven by need are seen as creators of lower income firms, whereas opportunity-driven entrepreneurs are identified as producers of high-income firms (Fairlie, 2009). The Kauffman Index of Entrepreneurial Activity published in 2009 provided early evidence that the recession led to an increase in necessity entrepreneurship and a decrease in opportunity entrepreneurship (Fairlie, 2009; Spors, 2009).

In this study, we contribute an empirical analysis of early-stage necessity and opportunity entrepreneurship in the U.S. before and during the recent economic recession. In particular, we focus on observing the effects of living in rural America and changes in employment availability on the likelihood that entrepreneurs engage in entrepreneurial activities as a result of either 'push' or 'pull' motivations. We examine entrepreneurship using the Global Entrepreneurship Monitor (GEM) definition for early-stage entrepreneurial activity. As such, entrepreneurs in this study are individuals who are at the time of the survey setting up a business or operating a business that is younger than 42 months (Bosma, 2007).

This study set out to address the following questions: What impact has the recent recession had on the primary motivations for entrepreneurship – the pursuit of opportunity or the need for employment? And is there any significant difference in these motivations across different levels of rurality? The expectations were that there would be a shift towards necessity-driven entrepreneurship and that perhaps this shift would be greater in areas with higher degrees of rurality. Given the increasing importance of entrepreneurship as a

central component of economic development in rural America, the findings of the study provide useful empirical underpinning for policy and practice.

In the section that follows, we start by delineating the relationship between recessions and entrepreneurship from previous studies. We further discuss the distinction between necessity and opportunity entrepreneurs, and the role that residence in rural America plays in boosting entrepreneurial activity. In the third section, we describe the data and method used for the analyses. Section four discusses the results of the analyses, and section five presents our conclusions and policy implications.

## **Review of literature**

### *Recessions and entrepreneurship*

Economic recessions are typically associated with a decline in employment (af Ursin, 1998; Bryson, 1996), an increase in risk and uncertainty (Egan & Tosanguan, 2009; Meece, 2009), and stress (Brennan & McHugh, 1993; Meece, 2009; Shohet & Jenner, 2008). The recent ‘Great Recession’ started at the end of 2007 (Anderson, 2009; Lahm & Buck, 2009; Reddy, 2009) and even though the economy was officially recovering mid-year 2009, 2010 was marked by continuing economic turbulence. The recession involved a classic bubble in which the widespread use of financial instruments increased the real value of assets beyond their growth in productivity (Johnson, 2009).

The 2007-2009 global financial crisis is the worst (Elliott, 2008; Stangler, 2009) and the longest (Anderson, 2009; van Putten & Green, 2009) since the Great Depression that hit the U.S. in 1929 and continued through much of the 1930’s. Bureau of Labor Statistics (BLS) employment data for 2005-2010 indicate that annual employment growth was positive before the recession hit (i.e., 2005-2007) and negative during the recession (i.e., 2008-2010)<sup>1</sup>. In fact, the average job growth rate in 2009 shows a decrease of three percent with respect to 2008, the largest decline of the three years.

A recessionary economy, among other factors, pushes production processes in an economy to be reorganized to better satisfy clients’ needs in increasingly competitive global markets (Bryson, 1996; Johnson, 2009). Firms find themselves urged to be flexible (Baker, 1993), and to adapt or transform their strategies in order to remain efficient and competitive. Johnson (2009) explains that during an economic recession “...production declines, the least competitive firms are displaced, low productivity jobs disappear, and lower skilled workers are unemployed first” (p. 8).

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<sup>1</sup> Average job growth rate in the U.S. using BLS employment data: 1.12% for 2005, 1.54% for 2006, 0.25% for 2007, -0.36% for 2008, -3.07% for 2009, and -0.88% for 2010.

Contrary to what one would expect, however, the widespread effects of a recession do not seem to discourage entrepreneurs from starting new businesses. In a study conducted by Stangler (2009) at the Ewing Marion Kauffman Foundation, he finds that more than half of the Fortune 500 companies for 2009 and almost half of the *Inc.* fast growing companies for 2008 started at times when the economy was in recession or experiencing a bear market<sup>2</sup>. Some of the successful public companies that started during a recession are Microsoft, Southwest Airlines, Morgan Stanley, Allstate, among many others (Kedrosky, 2008). Recessions seem to offer bigger windows of opportunity (i.e., increased availability of human capital that results from higher unemployment in the economy and weaker competition) to start-ups of only a few employees (Stangler, 2009) which, in the long run, contribute to increasing the national job growth rate.

Furthermore, wages and salaries do not decrease during economic turmoil (Bewley, 1999). Wages and salaries data from the Bureau of Labor Statistics shows that total employment compensation continued to increase in the US across sectors in the years of the recession (2008-2010). In a study of UK business service firms, Bryson (1996) found that most companies do not create new jobs in times of recession, but instead try to keep their current number of employees and wage levels. Keynesian economists claim that wage rigidity in turbulent times is statistically supported, whereas their neoclassical counterparts suggest wages are still flexible and market-driven (Bewley, 1999).

In a study of the US economy over the last two decades, Johnson (2009) found that productivity growth was highest during recessions and especially during the early stages of recovery. He points out that in 2001-2002 "...productivity growth during the recession was 4.1%, the highest level during the decade from 1997 to 2006. More recent data indicates that productivity growth during the third quarter of 2009 was a staggering 9.5% (USBLS, 2009)." He attributes this to the creative destruction (Schumpeter, 1972) process led by entrepreneurs as they create more competitive firms and jobs, and to the production of higher valued products.

"Entrepreneurs historically have led the nation out of hard times" (Hopkins, 2004, p.1). In a White House event in March of 2009, President Obama identified entrepreneurship as the key to the nation's prosperity (Anderson, 2009). Segran (2009) suggests that social entrepreneurs identify opportunities during recessions that would otherwise not be so visible. As his research shows, the constrained spending habits of socially responsible enterprises become an asset when the economic conditions constrain the spending of other businesses as well. Similarly, Bryson (1996) finds that opportunity recognition and development, and

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<sup>2</sup> "A bear market is commonly defined as a period of time during which a stock index, such as the Dow Jones Industrial Average or Standard & Poor's 500, falls 20 percent or more." (Stangler, 2009, p.4 footnote 10).

job limitations advanced as motivations of founders of market research firms in the UK during the 1990's recession. Anderson (2009) claims that this opportunistic attitude is also visible in the US, where entrepreneurs take control of their destiny during a crisis and decide not to wait for an outside income source.

In spite of the promising role of entrepreneurship during economic downturn, the entrepreneur's strategic decision-making process must contend with increased risk and uncertainty during an economic recession (Egan & Tosanguan, 2009). The reduced availability of resources and rising costs also increase substantially the stress on entrepreneurs (Brenan & McHugh, 1993; Shohet & Jenner, 2008), even if entrepreneurs are indifferent to the state of the economy (Stangler, 2009). In a study of medium and large-size management consulting companies in the UK, Bryson (1996) finds that most of the 71 percent of firms in this category looked for survival more than growth during recession years. In a study of small and medium-size firms in Thailand, Egan and Tosanguan (2009) found that about half of the entrepreneurs surveyed had applied strategies to seek higher revenues, although they were pessimistic about the effects of the recession on their enterprises, expecting an average reduction in their sales of about 53 percent.

#### *Necessity and opportunity entrepreneurs*

The boom in the number of small and medium size firms in the 1990's turned policymakers' attention toward the entrepreneur (Henderson, 2002) such that entrepreneurship is currently one of the most active topics in economic literature (Audretsch, 2007). Individuals who choose to become self-employed over other employment options are recognized today as a key source of economic growth and development. As a consequence of the increased amount of research on entrepreneurship in the last two decades, academics and policymakers have crafted a variety of definitions of entrepreneurship and have identified several types of entrepreneurs. In this study, we focus on 'necessity' and 'opportunity' entrepreneurs who are 'pushed' or 'pulled' into entrepreneurial behavior (Bosma et al., 2007; Schaper & Volery, 2007). Reynolds and colleagues (2002) identified these two types of entrepreneurs in 2001 while working on the annual report of the Global Entrepreneurship Monitor (GEM).

According to Baron (2006), opportunity entrepreneurs are actively seeking entrepreneurial opportunities. He suggests that these entrepreneurs use prior knowledge and experience to support their search. Hechavarria and Reynolds (2009) describe this type of entrepreneur as someone who becomes self-employed to exploit a promising opportunity, "to improve (not just maintain) their income" (Kelley et al., 2011, p. 29). As such, opportunity entrepreneurs are those who are motivated by "pull" factors to engage in a new business.

In contrast, necessity entrepreneurs are those who are pushed into self-employment by their economic circumstances. They can also be called accidental entrepreneurs, unintended entrepreneurs, forced entrepreneurs (Meece, 2009) or low-ability entrepreneurs (Deli, 2011). Block and Koellinger (2008) and Dabson (2007) identify necessity entrepreneurs as those who seek to become self-employed because no better opportunities are available or because of persistent unemployment. Several scholars suggest that unsatisfactory sources of employment also push individuals into necessity entrepreneurship (Acs, 2006; Hechavarria & Reynolds, 2009; Williams, 2009). Goetz and colleagues (2009) even mention desperation and local economic decline as potential motivations. Furthermore, Thompson (2011) points out that necessity entrepreneurs generally create less successful businesses than opportunity entrepreneurs.

Global survey data shows that 66 percent of entrepreneurs classify themselves as opportunity entrepreneurs, whereas the remaining 33 percent self-report as necessity entrepreneurs (Hechavarria & Reynolds, 2009). Acs (2006) notes that opportunity entrepreneurs voluntarily choose to become self-employed, whereas necessity entrepreneurs believe they have little choice.

Stangler (2009) argues that both opportunistic and necessity entrepreneurs introduce innovations that create jobs and market opportunities that boost productivity and economic growth in the long run. Yet, several authors have argued that policy should support opportunity entrepreneurs, and not necessity entrepreneurs, to spur growth and economic development (Acs, 2006; Callard, 2011; Pereira, 2011). In a cross-national study of 11 countries using national GEM data, Acs and Varga (2005) find that opportunity entrepreneurs are positively linked to economic development while necessity entrepreneurs have little or even negative effects on growth. Thompson (2011) finds that necessity entrepreneurs create businesses that “yield lower initial earnings, grow more slowly, and are more likely to fail” (p.1). Necessity entrepreneurs create jobs for themselves, while opportunity entrepreneurs address market needs and create jobs for others as well (Pereira, 2011).

### *Rurality and entrepreneurship*

“Information about factors contributing to successful entrepreneurship may reduce failures and costs for those who would be entrepreneurs. More needs to be known about [...] the influence of community institutions on the success rate of entrepreneurs, about the types of business that are sustainable in rural areas, and about the potential of entrepreneurs to make rural communities viable” (Gladwin et al., 1990, p. 1).

Major economic transitions affecting rural areas in the last decades have forced community leaders to look for innovative ways to rebuild their economic base and improve the quality of life for their residents, foremost among these being entrepreneurship and small business development (Walzer, 2007). Entrepreneurship and rural entrepreneurship policy have increasingly been recognized as the most effective catalyst and strategy, respectively, to revitalize rural America (Dabson, 2003; Edgcomb, Kansas City Federal Reserve, 2001; Klein, & Black, 2008; Macke & Markley, 2006; Pages & Markley, 2004).

The New Rural Development Paradigm identifies entrepreneurship as a means for stimulating diversified and endogenous growth in rural development policy (OECD, 2006). Acs and Armington (2003) also suggest that regions with multiple entrepreneurial businesses accumulate wealth and reach long-term employment growth. Similarly, Driga and colleagues (2009) argue that entrepreneurship in rural areas promotes business creation, diversifies and complements local services, and supports their populations “in a viable and integrated manner” (p.71). Thus, entrepreneurship policies in rural areas have become strategic tools to achieve long-term development by addressing some of the main obstacles facing rural entrepreneurs—limited economies of scale, human and financial capital (Henderson et al., 2007), and knowledge spillovers (Goetz et al., 2009).

Leaders in entrepreneurship research and policy identify entrepreneurs as the *only* engine to maintain US leadership or “heroes” (Economist magazine, 2009) in the increasing global economy (Schramm, 2006). Rural areas, however, are “weak” and face multiple obstacles to producing and maintaining high-value entrepreneurs (Low et al., 2005). Markley and colleagues (2005) define rural America as “less prosperous, economically and socially challenged, and sometimes in chronic decline”. Dabson (2001) suggests that the remoteness and low population density that characterizes rural America implies that potential entrepreneurs in rural areas would be at a disadvantage with constrained proximity to support networks, markets, resources, services, capital, and infrastructure. Bais and colleagues (1995) even suggest that geographically dispersed areas that have low population density can have a negative effect on entrepreneurial activity.

On the contrary, Smallbone (2009) notes that “urban-rural contrasts do not always show rural areas to be disadvantaged in comparison with their urban counterparts, as far as entrepreneurship is concerned. Indeed, there are wide differences in economic performance between rural areas...” (p. 162). In a study of new business survival rates in Arkansas, Maine, and North Dakota, Buss and Lin (1990) find that survival rates among new businesses in rural areas are as high as those in urban areas, even across industrial sectors. Furthermore, a study by Macke and Markley (2006) shows that “rural regions with higher levels of

entrepreneurship achieve higher levels of economic vitality” (p. 3). They argue that an inviting community environment characterizes prosperous rural areas, supported by a strong history of entrepreneurial leadership and committed entrepreneurial development organizations.

The contradictory findings regarding prosperity in rural America are partially a reflection of inconsistencies in definitions of rural (Isserman, 2005; Smallbone, 2009), the locational characteristics of rural regions (degree of peripherality) within the national economy, and their inherent characteristics in terms of density, proximity to urban areas, demographics, and their main economic drivers and assets (Dabson, 2007; Low, Henderson & Weiler, 2007).

## **Data and method**

### *Dataset components*

Our study combines several sources of data. The first source is the USA Global Entrepreneurship Monitor (GEM)’s random adult population survey for the years 2005-2010. The GEM initiative started in 1999 and today collects entrepreneurial activity information from 59 countries around the world (GEM consortium, 2011). The GEM consortium’s national teams conduct an annual survey of a random sample of adults in the 59 countries, sharing similar principles and methodologies. In 2010, the GEM consortium covered “over 52% of the world’s population and 84% of the world’s GDP” (Kelley et al., 2011, p. 7). As such, it provides valuable information for policymakers and academics around the world (Vaillant & Lafuente, 2007). There are several published empirical studies based on GEM data (Eden & Cruickshank, 2004; Elam & Terjesen, 2010; Koellinger & Minniti, 2006; Lafuente et al., 2007; Lee & Wong, 2004; Levie & Autio, 2008).

As an indicator of change in the economy before and during the recession, we use employment data from the Bureau of Labor Statistics (BLS) to calculate county level job growth rate. Finally, we use the cross tabulation of urban-rural and metro-nonmetro systems developed by Isserman (2005), which considers rural-urban integration and rural-urban separation to classify US counties into seven categories (Table 1). In a comparative study of women entrepreneurship, Figueroa-Armijos and Johnson (forthcoming) find that the metropolitan-nonmetropolitan classification system (US Office of Management and Budget, 2003), the typology proposed by Isserman (2005), and population density produce similar results in magnitude and significance. We use Isserman’s typology in this study because it combines population density and rural-urban populations to provide a clearer picture of rural-urban interdependence and separation.

Table 1. Rural typology of reference - Cross tabulation of urban-rural and metro-nonmetro systems\*

Category	Type	Number of counties	Population	Percentage in rural	Rural	Percentage of US rural population
1	Urban metro	171	125,926,501	2	3,000,617	5
2	Mixed urban metro	147	40,931,317	15	6,081,653	10
3	Mixed urban nonmetro	11	175,003	21	36,328	0
4	Mixed rural metro	467	59,132,936	27	15,974,876	27
5	Mixed rural nonmetro	555	27,291,697	47	12,700,651	22
6	Rural metro	304	6,589,186	78	5,132,955	9
7	Rural nonmetro	1486	21,375,266	75	16,134,287	27

Notes\*:

**Urban county.-** (1) The county’s population density is at least 500 people per square mile, (2) 90 percent of the county population lives in urban areas, and (3) the county’s population in urbanized areas is at least 50,000 or 90 percent of the county population.

**Mixed urban county.-** (1) The county meets neither the urban nor the rural county criteria, and (2) its population density is at least 320 people per square mile.

**Mixed rural county.-** (1) The county meets neither the urban nor the rural county criteria, and (2) its population density is less than 320 people per square mile.

**Rural county.-** (1) The county’s population density is less than 500 people per square mile, and (2) 90 percent of the county population is in rural areas or the county has no urban area with a population of 10,000 or more.

\*Adapted from typology proposed by Isserman (2005)

We build the dataset for this study in two steps. First, we merge the USA 2005-2010 GEM dataset with a zip code-FIPS codes dataset from the US Census Bureau<sup>3</sup>. Second, we merge this combined dataset with one that classifies counties according to Isserman’s seven rural categories and FIPS code. The resulting database contains 19,849 individual observations from 2,421 US counties, with an average of 8.2 observations per county (a maximum of 370 individual observations and a minimum of 1 observation per county). We refer to this dataset as the “overall sample”. We divide this dataset into two subsamples, “before recession” and “during recession”. The former has 6,676 observations from 1,722 counties and corresponds to years 2005, 2006, and 2007 (this last survey conducted between May and October of 2007); the latter has 13,149 observations from 2,154 counties from years 2008, 2009, and 2010.

In order to compare differences related to the rurality of entrepreneurs, we also run analyses on a series of rural subsamples. We identify three levels of

<sup>3</sup> Zip codes/FIPS dataset available at: <http://www.census.gov/geo/www/tiger/zip1999.html>

rurality for these analyses. Level 1 is a broader definition that includes all rural and mixed rural counties (categories 4, 5, 6, and 7 from Table 1). Level 2 is a subsample of level 1 that includes rural metro and rural nonmetro counties only (categories 6 and 7 from Table 1). Level 3 is a subsample of level 2 that includes the most rural counties, only rural nonmetro (category 7 from Table 1). The control groups are for level 1 (categories 1, 2, and 3), for level 2 (categories 1 through 5), and for level 3 (categories 1 through 6). Table 2 compares the number of observations and counties per level of rurality analyzed.

Table 2. Levels of rurality, before and during the recession\*\*

Level of rurality studied	Type	Number of observations in dataset			Number of counties in dataset		
		Full rural subsample	Before the recession	During the recession	Full rural subsample	Before the recession	During the recession
Level 1	Mixed rural and rural	9304	3322	5982	2096	1416	1834
Level 2	Rural metro and Rural nonmetro only	2516	902	1614	1116	610	905
Level 3	Rural nonmetro only	1967	712	1255	897	482	724

\*\*Level 1 is a broader level that includes counties from categories 4, 5, 6, and 7 from Table 1. Level 2 is a subsample of level 1 that includes only those counties classified as rural metro or rural nonmetro, categories 6 and 7 from Table 1. Level 3 is a subsample of level 2 that includes only those counties classified as rural nonmetro, category 7 from Table 1. The control groups are for level 1 (categories 1, 2, and 3), for level 2 (categories 1 through 5), and for level 3 (categories 1 through 6)

*Method and variables*

We choose cross-section time-series rare events logistic regression with clustered robust errors and year fixed effects as our method to model the log odds of an individual engaging in early-stage necessity or opportunity entrepreneurial activity. We select rare events logistic regression over traditional logit or probit models because in our dataset necessity and opportunity entrepreneurs are relatively “rare events,” that is, they produce far fewer observations than non-entrepreneurs (i.e., opportunity 5.42% and necessity 1.18% of the sample). King and Zeng (1999) developed the rare events logit model method to control for the

underestimation of the parameter estimates in rare events datasets<sup>4</sup>. This method generates a lower root square mean error to produce logit coefficients with lower bias and variance (King & Zeng, 1999). Other empirical studies use this method (Figuroa-Armijos & Johnson, forthcoming; Lafuente et al., 2007; Vaillant & Lafuente, 2007; Wagner, 2004).

We use early-stage necessity and opportunity entrepreneurial activity as our dependent variables. The GEM consortium defines early-stage entrepreneurial activity as that conducted by individuals on their own or with the help of a sponsor (Reynolds et al., 2005). This definition also includes individuals carrying out businesses that are younger than 42 months. Firms that are older than 42 months are not considered “early-stage”, but instead established firms (Reynolds et al., 2005). In our study, necessity and opportunity entrepreneurial activity are binary variables that equal 1 if the surveyed individual is currently starting a business or is engaged in a new venture that has existed for less than 3.5 years, and 0 if the surveyed individual is not engaged in early-stage entrepreneurial activity. This probability is defined in the following equation.

$$\text{Prob}(Y_{ij}) = (1/B_j)\phi_{ij}$$

where  $\text{Prob}(Y_{ij})$  is the probability of the individual  $i$  in county  $j$  engaging in early-stage entrepreneurial activity given the average proportion of similar entrepreneurial activity in county  $j$ . Logistic regression models transform this probability into the ratio, engaging in entrepreneurial activity ( $y=1$ ) over not engaging in it ( $y=0$ ) as follows.

$$\text{Logit } \phi_{ij} = \ln (\phi_{ij})/(1-\phi_{ij}) = \eta_{ij}$$

where  $\eta_{ij}$  is the log-odds that individual  $i$  in county  $j$  will engage in entrepreneurial activity versus not engaging in it. As such,  $\eta_{ij}$  represents individuals’ engagement in necessity or opportunity entrepreneurial activity in the US, our dependent variables in this study. We further calculate the first differences of the predicted parameter coefficients to facilitate easier interpretation of results<sup>5</sup>. The first differences indicate the change in the probability of becoming entrepreneurial given some change in the independent variable of interest, while holding other independent and control variables at their means (King & Zeng, 1999). For example, in the case of dummy independent

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<sup>4</sup> Logit estimates would overestimate the probability of  $Y=0$  and underestimate the probability of  $Y=1$  in our dependent variables (King & Zeng, 2001).

<sup>5</sup> Available upon request, not included due to space constraints. First difference (or risk difference) is “the change in probability as a function of a change in a covariate, such as  $\text{Pr}(Y = 1|X = 1) - \text{Pr}(Y = 1|X = 0)$ ” (King & Zeng, 2001, p. 698)

variables, this probability is observed as a result of a discrete change from zero to one in the independent variable, as follows (Wooldridge, 2006):

$$\gamma_x = \Pr(\gamma = 1/X=1) - \Pr(\gamma=1/X=0)$$

Our two main independent variables are job growth rate and rurality. Job growth rate is a continuous variable that is calculated as the rate of change in employment between two years. A positive value indicates that employment has increased from one year to the next, whereas a negative value indicates the opposite. We run separate models for each of our three levels of rurality. The first level includes all rural and mixed rural counties as defined by Isserman (2005) (see Table 1), which includes 2,812 counties and covers 85 percent of the US rural population according to the 2000 census. The second level includes only those 1,790 counties identified as rural metro and rural nonmetro, and contains 36 percent of the US rural population. Finally, the third level of rurality includes only rural nonmetro counties, which account for 27 percent of the US rural population in 1,486 counties.

Table 3. Description year, dependent and independent variables

Variable	Type	Overall sample	
		Number Observations	Percent
<b>Total</b>		19849	100
<b>Year</b>			
Overall (2005-2010)	Effect coding	19849	100
Before the crisis (2005-2007)	Effect coding	6700	33.75
During the crisis (2008-2010)	Effect coding	13149	66.25
<b>Necessity entrepreneur</b>			
Yes	Binary	234	1.18
No	Binary	19615	98.82
<b>Opportunity entrepreneur</b>			
Yes	Binary	1075	5.42
No	Binary	18774	94.58
<b>Gender</b>			
Female	Binary	10496	52.88
Male	Binary	9353	47.12
<b>Isserman rural</b>			
Urban and Mixed urban countie	Binary	10545	53.13
Rural and Mixed rural counties	Binary	9304	46.88
Rural metro and rural nonmetro	Binary	2516	12.68
Rural nonmetro	Binary	1967	9.91
<b>Job growth rate</b>	Continuous	19825	99.88

To control for differences across individuals we include age of the respondent, household income, household size, educational attainment, employment status, and ethnicity variables in all models. Age of respondent is a continuous variable ranging from 18 to 97 years. Household income is classified into four categories: below \$50,000, between \$50,000 and \$100,000, between \$100,000 and \$200,000 and over \$200,000. The last variable is the variable of comparison. Household size is divided into two categories: household size of 1 and household size of two or more. Educational attainment includes three categories: no high school education, high school education, and some college or more. The variable of comparison is no high school education. Employment status includes three variables: employed full time, employed part time, and other occupation. The variable of comparison is employed full time. Ethnicity includes White, African-American, and Other. The variable of comparison is White. To control for year differences, we include a year fixed effect element in the models by applying effect coding. Each year equals 1 if the individual was surveyed in that year and 0 otherwise. To control for county differences and spatial correlation in the error terms, we use clustered robust errors.

## Findings

This section discusses the findings from the cross-section time-series rare events logistic regression models that analyze the rates of necessity and opportunity early-stage entrepreneurial activity before and during the recession. We run these analyses on an “overall” sample that includes urban and rural counties, and also on subsamples for the three levels of rurality described in the data and method section. Table 1 presents the rural typology used for reference in this study, the cross tabulation of urban-rural and metro-nonmetro systems developed by Isserman (2005). Table 2 describes the levels of rurality used in the analyses with corresponding number of observations and counties. Table 3 offers a description of the main dependent and independent variables for all models. Table 4 shows descriptive statistics for all the variables used in the different models of analysis. Tables 5 and 6 offer the results of the rare events logistic regression models for necessity and opportunity entrepreneurship, respectively. Tables 7 and 8 present the results for the rural subsample, considering three levels of rurality: all rural and mixed rural, rural metro and nonmetro, and rural nonmetro counties.

In the years before the recession, individuals living in rural metro and rural nonmetro counties in America were more likely to engage in opportunity-driven entrepreneurial activities when compared to individuals living in more urban counties (p-value < .05). Also, employment growth rates were positively related to the probability of individuals in both overall America, and in all rural and mixed rural counties engaging in opportunity entrepreneurship (p-value < .05

and  $p$ -value  $< .10$ ). Not having a full time or part time job and living alone negatively influenced individuals' likelihood of seeking business opportunities and starting new ventures ( $p$ -values  $< .001$  and  $< .05$ , respectively). These last findings are similar to those for all rural and mixed rural counties ( $p$ -values  $< .001$  and  $.10$ , respectively).

Table 4. Descriptive statistics

Variable	Number of observations	Mean (SD)	Min	Max
Necessity entrepreneur	19849	0.012 (0.108)	0	1
Opportunity entrepreneur	19849	0.054 (0.226)	0	1
Job growth rate	19825	-0.541 (2.815)	-20.70	22.66
Female	19849	0.529 (0.499)	0	1
Isserman rural and mixed rural	19849	0.469 (0.499)	0	1
Isserman rural metro and nonmetro	19849	0.127 (0.333)	0	1
Isserman rural nonmetro	19849	0.099 (0.299)	0	1
No high school degree	19849	0.100 (0.301)	0	1
High school degree	19849	0.256 (0.436)	0	1
Some college or higher	19849	0.629 (0.483)	0	1
Employed full time	19849	0.373 (0.484)	0	1
Employed part time	19849	0.092 (0.289)	0	1
Other occupation	19849	0.427 (0.495)	0	1
Income below 50,000	19849	0.235 (0.424)	0	1
Income 50,000-100,000	19849	0.186 (0.389)	0	1
Income 100-200,000	19849	0.094 (0.292)	0	1
Income over 200,000	19849	0.028 (0.164)	0	1
Household size 1	19849	0.230 (0.421)	0	1
Household size 2 or more	19849	0.769 (0.421)	0	1
White	19849	0.623 (0.485)	0	1
Black	19849	0.046 (0.209)	0	1
Other	19849	0.038 (0.192)	0	1
Ages 18 to 64	19849	0.707 (0.455)	0	1
Ages 65 to 97	19849	0.293 (0.455)	0	1

Compared to July of 2008, both women and men in the overall sample were more likely to engage in early-stage necessity entrepreneurship ( $p$ -value  $< .05$  and  $p$ -value  $< .01$ , respectively) in 2009 and 2010. In the rural subsample, only 2010 was significantly different from zero for all rural and mixed rural counties ( $p$ -value  $< .10$ ). These relationships are negative when analyzing early-stage opportunity entrepreneurship for overall and rural America ( $p$ -value  $< .001$ ), which indicates that the years of the recession mark a shift in the type of

entrepreneurial activity people are likely to engage in. Furthermore, during the recession, having an income below \$50,000 or being employed part-time increased the probability of an individual (p-value < .01) engaging in need-based entrepreneurship. These results are similar for the rural subsamples. Being employed part time also increases this probability, which holds for all rural and mixed rural counties (p-value < .01) and rural metro and nonmetro counties (p-value < .05). In addition, having an income below \$50,000 decreases this probability in rural and mixed rural counties (p-value < .05).

When considering early-stage opportunity entrepreneurship during the recession, individuals who hold at least some college education, those who are employed part time, and African-Americans are more likely to identify opportunities and start new businesses (p-values < .05, .10 and .01 respectively). However, having an income up to \$100,000 is negatively associated with the likelihood that an individual will engage in opportunity entrepreneurship (p-value < .01). In rural and mixed rural counties we observe similar results, except that being African-American or being employed part-time are not significant.

Being female or a retiree (i.e., ages 65 or up) is generally negatively related to necessity and opportunity entrepreneurship. However, when observing the rural subsamples for necessity entrepreneurship, the negative relationship for females does not hold for rural metro and nonmetro counties, either before or during the recession. Women are less likely than men to engage in opportunity entrepreneurial activity in all three definitions of rurality studied. However, during the recession this effect is not observed in rural metro and nonmetro counties. Similarly, the negative effect for retirees is not observed in rural metro and nonmetro counties during the recession.

## **Conclusions and policy implications**

This study offers empirical results that indicate that the recent recession indeed marked a clear shift in the entrepreneurial motivations of individuals. Necessity entrepreneurship increased in the U.S. from approximately 16.3 percent of the U.S. Total Early-stage Entrepreneurial Activity (TEA) in 2007 (Tozzi, 2010) to 23.2 percent in 2009 (Ali et al., 2010) to 28 percent in 2010 (Kelley et al., 2011).

In rural areas this phenomenon was also observed, despite the increases in market commodity prices for food, fiber and energy that benefited some parts of rural America. The results of this study show a clear decline in opportunity entrepreneurship during the recession across all definitions of rurality. An increase in necessity entrepreneurship was driven by individuals in part-time employment and those with an annual household income of less than \$50,000. In rural metro and rural nonmetro counties, living alone also motivated more individuals to start a business out of necessity.

On the other hand, even though college education during the recession increased the probability of individuals becoming opportunity entrepreneurs, living in rural and mixed rural counties and having a household income up to \$100,000 decreased the probability to engage in opportunity-driven entrepreneurship during the years of the recession. Kedrosky (2008) argues that one of the reasons to expect that a lower number of companies would start during a recession is the entrepreneurs' aversion to leave their paid jobs to take on a risk when the economy is weak and provides an uncertain future.

As Figueroa-Armijos and Johnson (forthcoming) found in a recent study, women and retirees in America are, in general, less likely to engage in entrepreneurship, either for necessity or opportunity reasons, than men and non-retirees respectively. This study confirms that during the recession this effect was also observed for women in the overall sample. However, rural metro and nonmetro counties do not show any effect during the recession. These results suggest that the recession may be causing changes in women's entrepreneurial behavior that warrant further exploration and analysis.

Positive employment growth rates before the recession motivated individuals in rural America to identify and exploit entrepreneurial opportunities. During the recession, however, employment growth rates had no significant effect on opportunity-driven entrepreneurial behavior. These results suggest that entrepreneurs are motivated to exploit opportunities when the economy shows signs of positive change but when these changes are negative, entrepreneurs react quite differently. Regarding necessity entrepreneurship, Tozzi (2010) and Macke (2011) argue that most necessity entrepreneurs would take a job if offered one, but may choose to keep their small start-up operating as a side-line. Perhaps this is evidence of a two-dimensional (opportunistic and necessity) entrepreneur (Giacomin et al., 2011)?

The analysis has several implications for rural economic development policy. Current national policy is rightfully focused on the short-term stimulation of the economy to reduce unemployment. On the other hand, the long-term strategies for economic development and competitiveness should not be overlooked. As several studies have indicated, recessions create unique opportunities to fundamentally transform economies. The findings of this research challenge the frequent bias in policy against necessity entrepreneurship in favor of opportunity and growth-oriented entrepreneurship. All types of entrepreneurship offer a partial remedy to short-term unemployment, by increasing self-employment thus reducing the unemployment rate, and long-term economic development by increasing the rate of innovation and creative destruction. This study found that the 2007-2009 recession tended to erase the deficit in rural female entrepreneurship relative to rural males, and increased the rate of entrepreneurship among African Americans. This offers policy makers an

opportunity to permanently increase entrepreneurial involvement of these historically under-represented groups.

Considering the intractable decline and out-migration that rural America has been experiencing for decades, rural development strategies must be reexamined. Increased support for necessity-driven self employment not only offers a way of improving the incomes of rural residents without requiring them to migrate, but it also provides an opportunity to create more overall entrepreneurial activity following the recession. In addition to policies focused on developing opportunity entrepreneurs directly, programs should focus on improving the success rate and growth potential of necessity entrepreneurs.

Thus, in response to our framing questions, we are able to confirm that indeed the recession led to the expected shift in motivations from opportunity-driven to necessity-driven entrepreneurship. However, our findings show that rural metro and nonmetro counties before the recession were more opportunity-driven than urban areas, and that the shift in motivation during the recession was less pronounced than expected. This raises new research questions as to the nature of opportunity entrepreneurship in rural areas and how this shows resilience in a time of recession.

Field (2003) proposes that the years of the Great Depression “were, in the aggregate, the most technologically progressive of any comparable period in U.S. economic history” (p. 1399). In his view, the Great Depression boosted creativity, adoption, and implementation of new technologies and practices that led to the higher productivity growth observed one and two decades later. Without the stressful socio-economic conditions of the Depression years, these innovative techniques would have remained under-exploited. Therefore, we can expect that the higher rates of necessity entrepreneurship recently observed during the ‘Great Recession’ may prove transformative in the long run. From both short-term and long-term perspectives, policy must exploit this rare opportunity to bring about improvements in rural economies.

Appendix

Table 5. Early-stage necessity entrepreneurship in the USA, before and during the recession

Necessity Entrepreneurship	Overall			Before the recession			During the recession		
	All rural and mixed rural	Rural metro and nonmetro only	Rural nonmetro only	All rural and mixed rural	Rural metro and nonmetro only	Rural nonmetro only	All rural and mixed rural	Rural metro and nonmetro only	Rural nonmetro only
Female	<b>-0.358**</b> (0.180)	<b>-0.543****</b> (0.142)	<b>-0.555****</b> (0.139)	<b>-0.847**</b> (0.368)	<b>-0.927***</b> (0.292)	<b>-0.945***</b> (0.283)	-0.162 (0.224)	<b>-0.391**</b> (0.168)	<b>-0.394**</b> (0.166)
Rural (varies by model)	0.123 (0.175)	-0.131 (0.282)	-0.332 (0.334)	0.223 (0.345)	0.030 (0.487)	-0.343 (0.598)	0.142 (0.229)	-0.213 (0.379)	-0.237 (0.413)
Job growth rate	0.053 (0.048)	0.026 (0.036)	0.029 (0.035)	0.103 (0.097)	0.010 (0.055)	0.006 (0.054)	0.062 (0.057)	0.038 (0.045)	0.038 (0.045)
Ages 65 to 99	<b>-1.936****</b> (0.281)	<b>-1.941****</b> (0.281)	<b>-1.943****</b> (0.282)	<b>-1.216**</b> (0.511)	<b>-1.220**</b> (0.510)	<b>-1.222**</b> (0.511)	<b>-2.147****</b> (0.334)	<b>-2.154****</b> (0.335)	<b>-2.156****</b> (0.335)
High school degree	<b>0.438*</b> (0.245)	<b>0.439*</b> (0.246)	<b>0.444*</b> (0.246)	0.549 (0.535)	0.552 (0.536)	0.555 (0.536)	0.321 (0.280)	0.323 (0.281)	0.322 (0.281)
Some college or more	0.332 (0.241)	0.328 (0.240)	0.326 (0.240)	0.053 (0.540)	0.058 (0.534)	0.040 (0.536)	0.398 (0.270)	0.389 (0.271)	0.391 (0.271)
Employed part time	<b>0.752****</b> (0.211)	<b>0.752****</b> (0.210)	<b>0.751****</b> (0.210)	0.598 (0.422)	0.608 (0.415)	0.598 (0.414)	<b>0.829****</b> (0.253)	<b>0.832****</b> (0.252)	<b>0.832****</b> (0.252)
Other occupation	<b>0.395**</b> (0.176)	<b>0.395**</b> (0.177)	<b>0.399**</b> (0.177)	0.007 (0.379)	0.011 (0.377)	0.017 (0.378)	<b>0.519**</b> (0.203)	<b>0.521**</b> (0.204)	<b>0.524**</b> (0.204)
Income below 50,000	<b>0.619***</b> (0.228)	<b>0.631***</b> (0.229)	<b>0.634***</b> (0.228)	NA	NA	NA	<b>0.625***</b> (0.231)	<b>0.635***</b> (0.233)	<b>0.631***</b> (0.232)
Income 50,000-100,000	0.081 (0.245)	0.091 (0.246)	0.093 (0.245)	NA	NA	NA	0.086 (0.247)	0.093 (0.247)	0.092 (0.246)
Income over 100,000	-0.209 (0.308)	-0.201 (0.308)	-0.206 (0.308)	NA	NA	NA	-0.208 (0.310)	-0.204 (0.311)	-0.204 (0.311)
Household size 1	-0.163 (0.172)	-0.158 (0.173)	-0.157 (0.173)	-0.244 (0.339)	-0.236 (0.339)	-0.233 (0.339)	-0.127 (0.199)	-0.122 (0.201)	-0.119 (0.200)
African-American	0.047 (0.254)	0.041 (0.256)	0.034 (0.257)	-0.064 (0.744)	-0.086 (0.736)	-0.108 (0.736)	0.094 (0.276)	0.084 (0.279)	0.085 (0.280)
Other	-0.157 (0.339)	-0.151 (0.339)	-0.154 (0.339)	0.045 (0.717)	0.031 (0.708)	0.016 (0.708)	-0.175 (0.413)	-0.169 (0.415)	-0.167 (0.414)
2006	-0.311 (0.302)	-0.302 (0.302)	-0.299 (0.302)	-0.141 (0.318)	-0.125 (0.318)	-0.118 (0.316)			
2007	-0.058 (0.328)	-0.054 (0.327)	-0.050 (0.327)	0.131 (0.372)	0.161 (0.381)	0.163 (0.382)			
2008	-0.509 (0.329)	-0.517 (0.329)	-0.514 (0.329)						
2009	0.071 (0.555)	0.034 (0.356)	0.045 (0.355)				<b>0.625**</b> (0.249)	<b>0.604**</b> (0.251)	<b>0.604**</b> (0.253)
2010	0.178 (0.307)	0.167 (0.308)	0.174 (0.308)				<b>0.701***</b> (0.211)	<b>0.699***</b> (0.212)	<b>0.699***</b> (0.213)
Wald (X2)	131.15	124.94	128.68	35.81	34.28	37.81	104.65	101.89	101.64
Pseudo R2	0.058	0.058	0.058	0.043	0.042	0.043	0.069	0.069	0.069
Log pseudolikelihood	-1197.87	-1198.191	-1197.47	-367.73	-368.03	-367.54	-824.49	-824.89	-824.68
Observations	19825	19825	19825	6676	6676	6676	13149	13149	13149
Control for year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls for individuals	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls for county	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered-robust standard errors	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: Standard errors are in parenthesis. \*, \*\*, \*\*\*, \*\*\*\* means significant at the .10, .05, .01, and .001 levels, respectively.

Table 6. Early-stage opportunity entrepreneurship in the USA, before and during the recession

Opportunity Entrepreneurship	Overall			Before the recession			During the recession		
	All rural and mixed rural	Rural metro and nonmetro only	Rural nonmetro only	All rural and mixed rural	Rural metro and nonmetro only	Rural nonmetro only	All rural and mixed rural	Rural metro and nonmetro only	Rural nonmetro only
Female	<b>-0.459****</b> (0.089)	<b>-0.443***</b> (0.069)	<b>-0.444****</b> (0.069)	<b>-0.413***</b> (0.148)	<b>-0.465****</b> (0.109)	<b>-0.464****</b> (0.107)	<b>-0.478****</b> (0.111)	<b>-0.415****</b> (0.091)	<b>-0.418****</b> (0.089)
Rural	<b>0.158*</b> (0.089)	0.168 (0.130)	0.194 (0.144)	0.218 (0.163)	<b>0.440**</b> (0.189)	<b>0.439**</b> (0.204)	0.044 (0.131)	0.079 (0.207)	0.101 (0.229)
Job growth rate	0.017 (0.024)	0.0137 (0.018)	0.015 (0.018)	0.032 (0.055)	<b>0.066**</b> (0.029)	<b>0.058**</b> (0.029)	0.012 (0.029)	-0.017 (0.024)	-0.015 (0.024)
Age 65 to 99	<b>-1.103****</b> (0.124)	<b>-1.105****</b> (0.124)	<b>-1.106****</b> (0.124)	<b>-1.385****</b> (0.223)	<b>-1.384****</b> (0.223)	<b>-1.384****</b> (0.223)	<b>-0.976****</b> (0.157)	<b>-0.975****</b> (0.156)	<b>-0.978****</b> (0.156)
High school degree	-0.081 (0.141)	-0.085 (0.141)	-0.085 (0.141)	-0.113 (0.228)	-0.111 (0.229)	-0.114 (0.229)	-0.086 (0.168)	-0.089 (0.168)	-0.088 (0.168)
Some college or more	<b>0.362***</b> (0.129)	<b>0.349***</b> (0.130)	<b>0.348***</b> (0.129)	0.252 (0.211)	0.252 (0.213)	0.244 (0.214)	<b>0.408**</b> (0.159)	<b>0.389**</b> (0.159)	<b>0.390**</b> (0.159)
Employed part time	0.154 (0.105)	0.148 (0.106)	0.147 (0.106)	0.032 (0.178)	0.028 (0.178)	0.029 (0.178)	<b>0.221*</b> (0.131)	0.207 (0.131)	0.206 (0.132)
Other occupation	<b>-0.564****</b> (0.095)	<b>-0.564****</b> (0.095)	<b>-0.564****</b> (0.094)	<b>-0.742****</b> (0.169)	<b>-0.746****</b> (0.169)	<b>-0.746****</b> (0.169)	<b>-0.486****</b> (0.119)	<b>-0.489****</b> (0.119)	<b>-0.487****</b> (0.119)
Income below 50,000	<b>-0.448***</b> (0.129)	<b>-0.423****</b> (0.128)	<b>-0.425****</b> (0.128)	NA	NA	NA	<b>-0.470****</b> (0.133)	<b>-0.448****</b> (0.132)	<b>-0.455****</b> (0.132)
Income 50,000-100,000	<b>-0.325***</b> (0.109)	<b>-0.308****</b> (0.109)	<b>-0.308****</b> (0.109)	NA	NA	NA	<b>-0.305****</b> (0.111)	<b>-0.291****</b> (0.109)	<b>-0.293****</b> (0.109)
Income over 100,000	-0.191 (0.118)	-0.191 (0.118)	-0.191 (0.118)	NA	NA	NA	-0.153 (0.119)	-0.156 (0.119)	-0.156 (0.119)
Household size 1	-0.154 (0.095)	<b>-0.162*</b> (0.095)	<b>-0.162*</b> (0.095)	<b>-0.279*</b> (0.143)	<b>-0.283**</b> (0.144)	<b>-0.284**</b> (0.144)	-0.051 (0.122)	-0.060 (0.122)	-0.057 (0.122)
African-American	<b>0.418***</b> (0.141)	<b>0.396***</b> (0.140)	<b>0.397***</b> (0.139)	0.371 (0.314)	0.345 (0.312)	0.346 (0.312)	<b>0.045***</b> (0.163)	<b>0.437***</b> (0.161)	<b>0.439***</b> (0.161)
Other	0.204 (0.166)	0.198 (0.166)	0.198 (0.166)	0.287 (0.325)	0.264 (0.328)	0.264 (0.327)	0.193 (0.192)	0.194 (0.193)	0.198 (0.193)
2006	-0.103 (0.121)	-0.102 (0.121)	-0.103 (0.121)	-0.059 (0.128)	-0.063 (0.128)	-0.063 (0.128)			
2007	<b>-0.288**</b> (0.146)	<b>-0.288*</b> (0.146)	<b>-0.287**</b> (0.146)	-0.220 (0.167)	-0.210 (0.167)	-0.212 (0.167)			
2008	<b>0.240*</b> (0.137)	0.218 (0.137)	0.218 (0.137)						
2009	<b>-0.281*</b> (0.167)	<b>-0.297*</b> (0.166)	<b>-0.297*</b> (0.167)				<b>-0.559****</b> (0.119)	<b>-0.601****</b> (0.121)	<b>-0.599****</b> (0.121)
2010	<b>-0.256*</b> (0.152)	<b>-0.269*</b> (0.151)	<b>-0.269*</b> (0.151)				<b>-0.498****</b> (0.101)	<b>-0.503****</b> (0.099)	<b>-0.502****</b> (0.099)
Wald (X2)	515.82	510.64	510.19	187.84	182.23	182.25	325.80	316.10	315.20
Pseudo R2	0.065	0.064	0.065	0.064	0.065	0.064	0.061	0.060	0.060
Log pseudolikelihood	-3904.863	-3906.75	-3906.54	-1581.84	-1581.44	-1581.93	-2347.12	-2348.09	-2347.58
Observations	19825	19825	19825	6676	6676	6676	13149	13149	13149
Control for year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls for individuals	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls for county	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered-robust standard errors	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: Standard errors are in parenthesis. \*, \*\*, \*\*\*, \*\*\*\* means significant at the .10, .05, .01, and .001 levels, respectively.

Table 7. Rural subsample, necessity entrepreneurship before and during the recession

Necessity Entrepreneurship	Full rural subsample			Before the recession			During the recession		
	All rural and mixed rural	Rural metro and nonmetro only	Rural nonmetro only	All rural and mixed rural	Rural metro and nonmetro only	Rural nonmetro only	All rural and mixed rural	Rural metro and nonmetro only	Rural nonmetro only
Female	<b>-0.641***</b> (0.190)	-0.181 (0.349)	0.178 (0.417)	<b>-0.926**</b> (0.368)	-0.473 (0.648)	-0.079 (0.816)	<b>-0.522**</b> (0.218)	-0.003 (0.440)	0.268 (0.486)
Job growth rate	-0.001 (0.039)	-0.001 (0.061)	0.004 (0.066)	-0.006 (0.055)	0.012 (0.049)	-0.009 (0.048)	0.002 (0.051)	-0.009 (0.074)	0.007 (0.082)
Ages 65 to 99	<b>-2.369****</b> (0.470)	<b>-2.599****</b> (0.994)	-	<b>-1.624**</b> (0.754)	-	-	<b>-2.580****</b> (0.595)	<b>-2.483**</b> (1.007)	-
High school degree	<b>0.708**</b> (0.354)	0.360 (0.535)	-	1.063 (1.038)	-	-	0.509 (0.388)	0.364 (0.611)	-
Some college or more	0.516 (0.347)	-0.006 (0.555)	-	0.653 (1.043)	-	-	0.432 (0.375)	-0.006 (0.644)	-
Employed part time	<b>0.868***</b> (0.303)	<b>1.407**</b> (0.547)	-	0.738 (0.678)	-	-	<b>0.911***</b> (0.344)	<b>1.487**</b> (0.673)	-
Other occupation	<b>0.527**</b> (0.234)	0.702 (0.434)	-	<b>0.825*</b> (0.447)	-	-	0.439 (0.268)	0.801 (0.554)	-
Income below 50,000	<b>0.969**</b> (0.404)	<b>0.966</b> (0.757)	-	NA	NA	NA	<b>0.973**</b> (0.405)	0.907 (0.759)	-
Income 50,000-100,000	0.224 (0.247)	0.069 (0.914)	-	NA	NA	NA	0.214 (0.427)	0.114 (0.921)	-
Income over 100,000	-0.124 (0.590)	-	-	NA	NA	NA	-0.143 (0.595)	-	-
Household size 1	-0.224 (0.247)	0.519 (0.407)	-	-0.506 (0.529)	-	-	-0.128 (0.292)	<b>0.826*</b> (0.475)	-
Black	-0.513 (0.590)	-	-	0.382 (1.099)	-	-	-0.604 (0.705)	-	-
Other	-0.319 (0.604)	-	-	0.278 (1.119)	-	-	-0.373 (0.729)	-	-
2006	-0.329 (0.459)	-0.371 (0.910)	-	-0.391 (0.462)	0.132 (0.871)	-	-	-	-
2007	0.368 (0.454)	0.031 (0.958)	-	0.252 (0.533)	0.593 (0.840)	-	-	-	-
2008	-0.515 (0.561)	-0.629 (1.094)	-	-	-	-	-	-	-
2009	-0.166 (0.604)	-0.474 (1.160)	-	-	-	-	0.369 (0.355)	0.133 (0.575)	0.444 (0.633)
2010	-0.026 (0.559)	-0.584 (1.094)	-	-	-	-	<b>0.509*</b> (0.305)	0.047 (0.595)	0.414 (0.644)
Wald (X2)	114.75	40.55	741.4	47.51	96.12	40.01	88.11	39.78	18.74
Pseudo R2	0.084	0.108	0.1045	0.068	0.043	0.101	0.097	0.129	0.080
Log pseudolikelihood	-575.251	-152.981	-107.4	-180.951	-49.364	-165.75	-391.29	-101.29	-79.18
Observations	9294	2516	1967	3312	902	712	5982	1614	1255
Control for year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls for individuals	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls for county	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered-robust standard errors	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: Standard errors are in parenthesis. \*, \*\*, \*\*\*, \*\*\*\* means significant at the .10, .05, .01, and .001 levels, respectively.

Table 8. Rural subsample, opportunity entrepreneurship before and during the recession

Opportunity Entrepreneurship	Full rural subsample			Before the recession			During the recession		
	All rural and mixed rural	Rural metro and nonmetro only	Rural nonmetro only	All rural and mixed rural	Rural metro and nonmetro only	Rural nonmetro only	All rural and mixed rural	Rural metro and nonmetro only	Rural nonmetro only
Female	<b>-0.411****</b> (0.096)	<b>-0.414**</b> (0.191)	<b>-0.409*</b> (0.216)	<b>-0.596****</b> (0.141)	<b>-0.789***</b> (0.264)	<b>-0.868***</b> (0.209)	<b>-0.253*</b> (0.131)	-0.158 (0.251)	-0.125 (0.266)
Job growth rate	0.011 (0.019)	0.017 (0.029)	-0.023 (0.030)	<b>0.050*</b> (0.028)	0.004 (0.041)	0.011 (0.043)	-0.019 (0.025)	0.023 (0.039)	0.024 (0.037)
Ages 65 to 99	<b>-1.101****</b> (0.179)	<b>-0.720**</b> (0.288)	<b>-0.623**</b> (0.316)	<b>-1.509****</b> (0.325)	-	-	<b>-0.905****</b> (0.222)	-0.579 (0.354)	-
High school degree	-0.117 (0.175)	0.104 (0.325)	-0.183 (0.353)	-0.222 (0.266)	-	-	-0.086 (0.234)	-0.049 (0.434)	-
Some college or more	<b>0.274*</b> (0.161)	0.489 (0.311)	0.341 (0.333)	0.028 (0.253)	-	-	<b>0.414**</b> (0.205)	0.391 (0.401)	-
Employed part time	0.136 (0.154)	0.106 (0.301)	0.148 (0.322)	0.153 (0.251)	-	-	0.139 (0.192)	0.338 (0.376)	-
Other occupation	<b>-0.673****</b> (0.143)	<b>-0.748***</b> (0.256)	<b>-0.740**</b> (0.299)	<b>-0.934****</b> (0.233)	-	-	<b>-0.556***</b> (0.181)	-0.431 (0.347)	-
Income below 50,000	<b>-0.516***</b> (0.181)	-0.294 (0.324)	<b>0.281</b> (0.526)	NA	NA	NA	<b>-0.522***</b> (0.180)	-0.391 (0.329)	-
Income 50,000-100,000	<b>-0.408**</b> (0.171)	0.115 (0.312)	0.743 (0.509)	NA	NA	NA	<b>-0.369**</b> (0.173)	0.135 (0.314)	-
Income over 100,000	-0.115 (0.208)	-	0.874 (0.611)	NA	NA	NA	-0.050 (0.214)	-	-
Household size 1	<b>-0.259*</b> (0.136)	-0.309 (0.269)	-0.236 (0.298)	<b>-0.384*</b> (0.214)	-	-	-0.142 (0.183)	-0.226 (0.369)	-
African American	-0.062 (0.305)	-	-	-0.063 (0.639)	-	-	-0.027 (0.340)	-	-
Other	-0.481 (0.323)	-	-	-0.672 (0.746)	-	-	-0.361 (0.354)	-	-
2006	-0.033 (0.161)	<b>0.569*</b> (0.328)	<b>0.682*</b> (0.380)	-0.003 (0.166)	0.362 (0.316)	0.456 (0.369)	-	-	-
2007	-0.186 (0.191)	0.271 (0.373)	0.429 (0.432)	-0.069 (0.198)	0.012 (0.361)	0.167 (0.411)	-	-	-
2008	<b>0.413**</b> (0.193)	<b>0.637*</b> (0.368)	0.306 (0.571)	-	-	-	-	-	-
2009	-0.204 (0.221)	-0.564 (0.447)	-0.831 (0.611)	-	-	-	<b>-0.687****</b> (0.165)	<b>-1.157****</b> (0.319)	<b>-1.165****</b> (0.328)
2010	-0.244 (0.212)	-0.131 (0.411)	-0.780 (0.707)	-	-	-	<b>-0.655****</b> (0.149)	<b>-0.756***</b> (0.283)	<b>-1.120****</b> (0.334)
Wald (X2)	261.32	79.98	736.57	103.19	44.09	40.01	162.25	45.92	43.63
Pseudo R2	0.073	0.087	0.105	0.078	0.096	0.101	0.066	0.078	0.091
Log pseudolikelihood	-1844.4	-480.27	-107.4	-791.71	-214.63	-165.75	-1044.57	-259.82	-210.92
Observations	9294	2516	1967	3312	902	712	5982	1614	1255
Control for year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls for individuals	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls for county	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered-robust standard errors	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: Standard errors are in parenthesis. \*, \*\*, \*\*\*, \*\*\*\* means significant at the .10, .05, .01, and .001 levels, respectively.

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