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ENTREPRENEURSHIP IN RURAL AMERICA ACROSS TYPOLOGIES, GENDER AND MOTIVATION

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This study examines the effect of rurality on early-stage necessity and opportunity entrepreneurship among women and men in America from three rural typology perspectives. To achieve this objective, we build a dataset that combines GEM U.S. individual data for 2005—2010 and county economic characteristics from the Bureau of Labor Statistics and the Census Bureau. We use three typologies to define rurality and compare the results, the OMB metro-nonmetro classification system (2003), Isserman (2005) and county population density. We further analyze this data in subsamples by gender using cross-section time-series rare events logistic regression with clustered robust errors and year fixed effects. Key findings indicate the three rural typologies show similar results in magnitude, direction and significance, although population density shows sensitivity to the rurality variable and subsamples. Also, compared to women in OMB metro counties in America, women who live in OMB nonmetro counties have a higher probability of engaging in opportunity entrepreneurship. This probability increases with college education and decreases if the woman lives alone or is retired. Among men, living in OMB nonmetro or Isserman rural counties also increases their probability of engaging in opportunity entrepreneurship. College education and being African American also increases this probability. Predictors of necessity entrepreneurship are having an income below 50,000 among women and being employed part time among men.

Keywords: Entrepreneurship; rural; rural typology; opportunity entrepreneurship; necessity entrepreneurship; GEM.

1. Introduction

Female and male entrepreneurs launch and manage new businesses differently. Several studies show that women and men target different sectors and markets using different strategies and goals (Brush, 1992; Carter *et al.*, 1997; Chaganti and Parasuraman, 1996; Fisher *et al.*, 1993; Verheul, 2003). For instance, women's increased participation in the work force and subsequent higher engagement in entrepreneurial activities (Center for Women's Business Research, 2004) has turned the attention of researchers toward female entrepreneurship and its effect on national economies. In 2004, the Organization for Economic Cooperation and Development (OECD, 2004) identified female entrepreneurs as a latent source of economic growth. Nonetheless, few studies have looked at the probability of women engaging in entrepreneurial activities (Langowitz and Minniti, 2007). Most research to date has explored the relationship between socio-demographic characteristics and women's entrepreneurial behavior (Langowitz and Minniti, 2007). However, little attention has been given to the effect of living in rural America on the probability of women engaging in self-employment, either out of need or for opportunity reasons, and how they compare to men. As a result, the contribution of female entrepreneurship to innovation, job generation and wealth creation, especially in rural America, is still "vastly understudied" (de Bruin *et al.*, 2006). In fact, the overall research on female entrepreneurs represents only ten percent of the entrepreneurship literature (Brush and Cooper, 2012).

This paper addresses the need for research that explores the effects of living in rural America on women's likelihood to start and manage a new business, compared to men, by using three alternative typologies. As Brush (2006) explains, female and male entrepreneurs do not act in similar ways. Thus, this study contributes to the need for understanding the effects of entrepreneurship by gender at the macro level (i.e. context), a need several studies have previously emphasized (de Bruin *et al.*, 2007). It also opens up questions for future research that could explore effects at the micro level from a feminist theory approach. This paper also addresses the need for comparative research that analyzes these results from different rurality perspectives. Several rural-urban typologies exist and researchers adopt one or another depending on data accessibility and familiarity. However, to the best of our knowledge there is no single study that compares results from different typologies. Thus, we also contribute to the literature by testing and comparing three rural-urban typologies available in the literature.

Our first typology is the Office of Management and Budget (OMB) metro-nonmetro classification system from 2003. Although this approach is widely used in social science research, it doesn't precisely translate into urban and rural because the definition of metropolitan area itself includes both rural and urban populations. For our second typology we use the cross-tabulation of metro-nonmetro rural-urban classification systems proposed by Isserman (2005). This typology combines insights from two official rural-urban county classifications to offer a more comprehensive cross-tabulation approach that considers rural-urban separation and rural-urban integration from an integrative functional perspective. Although this typology has not been widely applied yet, it offers a thorough classification of different levels of rurality based on multiple characteristics. We also use

population density as a third typology to observe differences. This latter approach is often used to differentiate urban and rural areas by their level of population concentration. In fact, the OECD and the European Commission use population density as a measurement of rurality by defining as rural those areas with "less than 150 and 100 inhabitants per square kilometer" respectively (European Commission, 1997; OECD, 1996).

Finally, we study entrepreneurship from two perspectives, necessity and opportunity, because recent changes in the economy may have influenced the motivation to become self-employed. As Verheul *et al.* (2006) explain, the Schumpeterian effect of entrepreneurship is positively or negatively related to employment depending on the motivation to pursue it. Opportunity entrepreneurship occurs when an individual identifies an opportunity and decides to start a business. Necessity entrepreneurship, in contrast, occurs when an individual engages in self-employment to offset income loss because of unemployment or underemployment. The reason for distinguishing opportunity entrepreneurs from necessity entrepreneurs is the expectation that opportunity entrepreneurs are more likely to create new firms that contribute to higher economic growth and new jobs (Acs and Varga, 2005).

Thus, we contribute to the literature in three ways. First, we study the role of rurality in boosting or reducing the probability of entrepreneurship in America, compared to urban America. We use and compare the results from three rural-urban typologies available in the literature. Second, we analyze these results by separating the dataset into female and male subsamples and comparing the results. Finally, we design the models from two perspectives, necessity and opportunity, to observe differences related to motivation.

The structure of the paper is as follows. In Sec. 2, we present a review of literature that explores the distinctions between opportunity and necessity entrepreneurship, the particular characteristics of entrepreneurship among women and men in America and the effects of rurality on entrepreneurial activity. In Sec. 3, we discuss the data and method used followed by Sec. 4, where we present the results of the study, which consider the overall effects of rurality and compare them with similar results from the female and male subsamples. The overall sample and subsamples are studied comparing the three rural typologies previously described and the motivation to pursue entrepreneurship (necessity or opportunity). Section 5 presents conclusions and policy implications.

2. Literature Review

2.1. *Opportunity and necessity entrepreneurship*

Block and Wagner (2010) argue that entrepreneurship occurs when a business opportunity is discovered and exploited. In fact, a number of scholars have identified alertness to opportunities as the essential factor defining the entrepreneur (Eckhardt and Shane, 2003; Shane and Venkataraman, 2000). The exploitation of opportunities provides the entrepreneur with profits from introducing and selling goods or services at higher prices than the cost of producing them (Casson, 1982; Shane and Venkataraman, 2000).

However, in 2001 the Global Entrepreneurship Monitor (GEM) Consortium identified two types of entrepreneurs in their national surveys — opportunity and necessity entrepreneurs (Reynolds *et al.*, 2002a). What makes the two types different from each other is

their motivation for engaging in entrepreneurial activity. In essence, an opportunity entrepreneur is someone who decides, with little provocation, to set up a business, in some cases by giving up their position as a paid employee. A necessity entrepreneur, on the other hand, refers to someone who engages in entrepreneurship because no other (or better) external sources of income are readily available. As Verheul *et al.* (2006) explain, negative employment growth leads to a higher number of necessity entrepreneurs, who are pushed to start a business because of the lack of other options available.

The distinction between opportunity and necessity entrepreneurship was utilized in the 2004 GEM Executive Report by Acs *et al.* (2005) to explain the U-shaped relationship between entrepreneurship and economic development in a study of developing and developed economies. In the report, Acs and colleagues find higher levels of entrepreneurship in both low and high-income countries, and conclude this is because of necessity in the case of developing economies (need-based) and opportunity in developed countries (opportunity and innovation-based).

Maritz (2004) defines a necessity entrepreneur as someone who considers entrepreneurship because there are no better options in the market. In his study of New Zealand necessity entrepreneurs, Maritz (2004) found positive relationships between these entrepreneurs and economic growth (real GDP growth rate) and immigration. In contrast, a study conducted by Cowling and Bygrave (2003) shows that necessity entrepreneurship occurs as a response to unemployment or when outside alternatives in the labor market are absent or unsatisfactory (Williams, 2009). A recent study by Figueroa-Armijos *et al.* (2012) found that the recent Great Recession shifted individuals' motivation in America to pursue entrepreneurial activities from opportunity driven to necessity driven.

Among women, the effects of negative employment levels may be even higher than for men because they are more likely to take part-time jobs (Verheul *et al.*, 2006). Orhan and Scott (2001) identified several "push" necessity factors that are particularly common among female entrepreneurs. These are insufficient family income, dissatisfaction with salaries offered for employment, difficulty finding a job and schedule inflexibility to accommodate household responsibilities. Hisrich and Brush (1985) also mention lack of promotion opportunities and recognition as push factors. "Pull" opportunity factors, on the other hand, are higher schedule flexibility and control (Mattis, 2004), independence, self-fulfillment and higher income (Bennett and Dann, 2000; Walker and Webster, 2007). This, paralleled to our literature review on rurality and entrepreneurship by gender below, leads us to the first set of hypotheses.

H1a. Men in rural America are more likely to engage in opportunity entrepreneurship than women in rural America.

H1b. Women in rural America are more likely to engage in necessity entrepreneurship than men in rural America.

2.2. *Gender differences in entrepreneurship*

Since the 1970s, women's participation in the labor market has increased in most countries (Verheul *et al.*, 2002; OECD, 1998b). Between 1987 and 1996, the growth in number and

sales of women-owned businesses was nearly two times the overall growth in number and sales of businesses in the United States (Kourilsky and Walstad, 1998). Recent evidence shows women are majority owners of almost one-third of all private firms in the United States (de Bruin *et al.*, 2006; Minniti *et al.*, 2006, 2005; Wilson *et al.*, 2004). Such growth positions female entrepreneurs as important contributors of jobs, innovation and productivity to the national economy (Allen *et al.*, 2007). Although increased female participation in the labor force does not automatically mean women will engage in more entrepreneurial activity, higher activity might be expected to increase the motivation among women to start new ventures, although some scholars suggest the opposite (Uhlaner *et al.*, 2002; Verheul *et al.*, 2006).

Studies on entrepreneurship that do not distinguish differences between males and females are considered "gender-blind" (Goffee and Scase, 1985) or "gender-neutral" (Ahl, 2004, 2006; Beasley, 1999) because they fail to recognize women and men are motivated distinctively and behave quite differently in the business world (Schwartz, 1976). More recent work emphasizes the critical role gender plays in self-employment (de Bruin *et al.*, 2007; Gupta *et al.*, 2008; Marlow *et al.*, 2009; Taylor and Marlow, 2010). For instance, Brush (1992) suggests women identify self-employment as a life strategy to balance relationships and networks rather than for generating profits only.

Furthermore, a previous study by Wilson *et al.* (2007) found entrepreneurship education has higher effects among female MBA students than among male MBA students. Their focus on the impact of curricula to build self-efficacy in potential female entrepreneurs shows that pedagogical approaches need to be tailored to the specific entrepreneurial motivations by gender. Ahl and Marlow (2011) support a similar conclusion that entrepreneurship is gender-specific. Research conducted in Turkey by Cetindamar *et al.* (2012) found that "for women, higher education…facilitates entry into entrepreneurship." Another study by Orser *et al.* (2012) also found that woman-to-woman mentoring plays a critical role in addressing career barriers among female entrepreneurs in the high-tech sector. Accordingly, more in-depth research that captures the 'essence' of female entrepreneurship, especially in rural economies, is justified.

Among the incentives that motivate women to start self-employment is the greater schedule flexibility business ownership offers (Buttner and Moore, 1997), which allows them to balance work and household responsibilities (McGowan *et al.*, 2012; Mattis, 2004; Goffee and Scase, 1983). Other incentives for female entrepreneurship are the desire for new career challenges and financial independence, and also the need posed by life changing events such as divorce (Taylor, 1988) or pregnancy (McGowan *et al.*, 2012). In addition, a Vermont study by Sullivan *et al.* (1997) found that entrepreneurship could serve as a means to alleviate poverty among women in rural America. The self-determination and empowerment business ownership offers (Sullivan *et al.*, 1997) can enhance women's self-awareness, personal preferences and human capital (Minniti and Arenius, 2003), thus motivating higher involvement in economic activity.

Furthermore, several studies show women face disadvantages when deciding to start a business, compared to men. For instance, Jianakoplos and Bernasek (1998) provide evidence that women are more risk averse than men when it comes to financial decisions. In a

study about size differences between men and women-led businesses, Cliff (1998) found women are more concerned than men about fast growing businesses and are more likely to establish a growth threshold that limits risk-bearing. Scherer *et al.* (1990) suggest women's decision to start a new venture also depends on their self-confidence and perception of success for the new venture. This may explain the lower growth rates of companies where they are identified as the owner (Johnson and Powell, 1994) and the smaller size for ventures started and managed by women (Cliff, 1998).

Several studies also suggest women relate better than men to nonmonetary factors (Acs and Szerb, 2007; Bird and Brush, 2002; Burke *et al.*, 2002) and to social capital (Acs and Szerb, 2007), which may be influenced by women's role as the household's core (Winn, 2004) or "emotional nurturer and housekeeper" (Unger and Crawford, 1992). Previous studies also suggest women are most frequently found in service businesses (Orser *et al.*, 2006; Cowling, 2008) or part time jobs — this last one especially if they have children (Verheul and Thurik, 2001; Verheul *et al.*, 2006). Additionally, research on self-efficacy and entrepreneurial intentions among teen girls shows race and ethnicity also create significant differences at a young age (Marlino and Wilson, 2003; Wilson *et al.*, 2004).

Consequently, the combination of household and/or family responsibilities (Loscocco and Robinson, 1991), financial constraints (Carter and Rosa, 1998; Carter *et al.*, 1997), lack of access to capital (Cetindamar *et al.*, 2012) through formal financial institutions (Carter, 2000; Carter and Cannon, 1992; Hisrich and Brush, 1987; Riding and Swift, 1990; OECD, 1998b), "exclusion from male-dominated networks," lack of role models at top executive levels (McGowan *et al.*, 2012) and the lack of self-confidence (Chen *et al.*, 1998; Kirkwood, 2009) because of less familiarity (than men) with the business world are some of the 'extra' disadvantages women face when deciding to start a business.

Thus, even though the entrepreneurial differences between men and women are in decline (Minniti and Arenius, 2003), female self-employment rates (as a percentage of female labor force) are still lower when compared to self-employment rates of men (Bais *et al.*, 1995; Driga *et al.*, 2009; Gupta and York, 2008; OECD, 1998b; Verheul *et al.*, 2006). In 1994, the Small Business Administration projected that women-owned businesses would represent half of all U.S. businesses by 2002 (SBA, 1994). By 2003, however, the actual rate was only thirty percent (Minniti and Arenius, 2003). Based on this evidence and the lack of research on rural settings, we raise the question *is this also true among female entrepreneurs in rural America*?

2.3. *Rurality and entrepreneurship by gender*

Even though there has been an increase in female entrepreneurship research at the national and cross-country levels (Aidis *et al.*, 2007; Du Rietz and Henrekson, 2000; Langowitz and Minniti, 2007; Orhan and Scott, 2001; Petridous and Glaveli, 2008; Terjesen and Amorós, 2010; Verheul *et al.*, 2006), there is a lack of studies that consider female entrepreneurial activity in the context of rural America (de Bruin *et al.*, 2007; Gupta and York, 2008). In fact, only a few studies have looked at small business success in rural areas by gender (Bird *et al.*, 2001; Bird and Sapp, 2004; Driga *et al.*, 2009; Tigges and Green,

1994), leaving a void in our understanding of the role location plays in the early stages of firm creation and survival (Cooper and Folta, 2000).

Ahl (2006) finds the role of the entrepreneur is stereotyped as belonging to men. This conception seems to be especially true for rural areas (Campbell and Bell, 2000). Chiappe and Flora (1998) argue that the stereotype of women in rural areas, held by both men and women, is that the role of women is in domestic and reproductive activities. Driga *et al.* (2009) suggest that because "men and women share these stereotypical beliefs, rural women might believe they are less well suited for entrepreneurial activities." Similarly, Gupta and York (2008) suggest:

> "These obstacles and challenges are even greater for women in poor regions where people may have more limited access to education and technology, views about women's participation in the labor force tend to be more traditional and opportunities for economic advancement are fewer (Sullivan *et al.*, 1997)".

This leads us to the second set of hypotheses.

H2. Rural America affects negatively the likelihood of entrepreneurial activity compared to metro/urban areas.

H2a. Women in rural America are less likely to engage in entrepreneurial activities than women who reside in metro/urban areas.

H2b. Men in rural America are less likely to engage in entrepreneurial activities than men who reside in metro/urban areas.

By referring back to our section on gender differences in entrepreneurship, we also hypothesize the following

H3a. Women in rural America are less likely than men in rural America to engage in entrepreneurial activity.

H3b. Women in urban America are less likely than men in urban America to engage in entrepreneurial activity.

3. Data and Methods

3.1. *Data selection*

The analysis here is primarily based on data from the USA GEM database for years 2005 through 2010. The GEM, a partnership between the London Business School and Babson College, is the largest single study of entrepreneurial dynamics across countries. For fourteen years the GEM has been exploring the role of entrepreneurship in national economic growth, and today is still the most detailed database on the world's entrepreneurs that is comparable across over 70 nations and contexts. The original GEM dataset differentiates between necessity and opportunity entrepreneurs based on a number of survey indicators. The national (U.S.) GEM team utilizes several response variables from the national survey to differentiate and classify entrepreneurs by two types of motivation

(i.e. necessity or opportunity). The GEM's methodology is described in detail by Reynolds *et al.* (2005). Scholars from multiple disciplines and countries undertake empirical studies that use GEM data (Eden and Cruickshank, 2004; Elam and Terjesen, 2010; Koellinger and Minniti, 2006; Lee and Wong, 2004; Lafuente *et al.*, 2007; Levie and Autio, 2008).

The sample for this study uses the U.S. GEM's random adult population survey for 2005 through 2010, which includes individuals from both rural and urban areas. Although the GEM has USA data for 1999–2004 as well, those years could not be used in this study because their databases do not have an origin identification variable (i.e. zip code). The initial GEM sample contains 21,502 observations from U.S. individuals for 2005–2010 with zip code identifiers. We match the GEM individual survey information with characteristics of the individual's county of origin, such as rurality, population density and employment by following two steps.

First, we merge the GEM 2005–2010 dataset with a dataset from the U.S. Census Bureau that contains all USA zip codes and corresponding FIPS codes.[a] Second, this merged dataset is merged again with a dataset of county level characteristics (i.e. Isserman codes, OMB codes, population density, job growth rate) that identifies U.S. counties by FIPS codes. This latter dataset includes information from the OMB (2003) and Isserman (2005) (rurality), U.S. Census Bureau (population) and Bureau of Labor Statistics (employment for control variable job growth rate). The resulting "overall" dataset contains 19,849 individual observations from 2,421 counties, with an average of 8.2 observations per county (maximum of 370 observations per county and minimum of 1 observation per county). This dataset is further reduced to 10,496 observations to create the "female subsample" dataset. This dataset contains observations from 2,036 counties, with an average of 5.15 observations per county (maximum of 175 observations per county and minimum of 1 observation per county). In contrast, the "male subsample" has 9,343 observations from 1,911 counties, with an average of 4.89 observations per county (maximum of 195 observations per county and minimum of 1 observation per county).

The primary (overall) dataset is also reduced to subsamples by rural typology to define a "rural only" (Tables 8 and 9) and "urban only" setting (Tables 10 and 11) to study female necessity and opportunity entrepreneurship compared to men in the same rural or urban context. The OMB 2003 rural subsample has 4,302 observations, the Isserman (2005) rural subsample has 9,294 observations, and the population density rural subsample (counties with less than 1000 persons per square mile) has 13,798 observations. The urban OMB (2003) subsample has 15,523 observations, the Isserman (2005) subsample has 10,351 observations, and the population density urban subsample (counties with more than 1000 persons per square mile) has 6,027 observations.

Table 1 shows that the "overall" dataset has 19,849 observations, with almost equal numbers of females (10,496 observations, or 52.88%) and males (9,353 observations or 47.12%). It also contains 15,547 observations from OMB metro counties (78.33%), 10,545 from Isserman's urban and mixed urban counties (53.13%), 4,302 from OMB non-metro counties (21.67%), 9,304 from Isserman's rural and mixed rural counties (46.88%),

[a]Zip codes/FIPS dataset available at: http://www.census.gov/geo/www/tiger/zip1999.html

Table 1. Description year, dependent and independent variables.

Variable	Type	Overall sample		Female subsample		Male subsample	
		n	%	*n*	%	*n*	%
Total		19849	100	10496	100	9353	100
Year							
2005	Fixed effects	1856	9.35	944	8.99	912	9.75
2006	Fixed effects	2854	14.38	1467	13.98	1387	14.83
2007	Fixed effects	1990	10.03	1009	9.61	981	10.49
2008	Fixed effects	4546	22.9	2707	25.79	1839	19.66
2009	Fixed effects	4916	24.77	2430	23.15	2486	26.58
2010	Fixed effects	3687	18.58	1939	18.47	1748	18.69
Necessity entrepreneurship							
Yes	Binary	234	1.18	100	0.95	134	1.43
No	Binary	19615	98.82	10396	99.05	9219	98.57
Opportunity entrepreneurship							
Yes	Binary	1075	5.42	446	4.25	629	6.73
No	Binary	18774	94.58	10050	95.75	8724	93.27
Female							
Yes	Binary	10496	52.88	10496	100	0	0
Male	Binary	9353	47.12	0	0	9353	100
OMB metro-nonmetro							
Non metro counties	Binary	4302	21.67	2311	22.03	1991	21.29
Metro counties	Binary	15547	78.33	8185	77.98	7362	78.71
Isserman rural-urban							
Rural and Mixed rural counties	Binary	9304	46.87	4958	47.24	4346	46.47
Urban and Mixed urban counties	Binary	10545	53.13	5538	52.76	5007	53.53
Population density (thousands)	Continuous	19849	100	10496	100	9353	100

1,075 opportunity entrepreneurs (5.42%), and 234 necessity entrepreneurs (1.18%). In turn, the female subsample has 10,496 observations, and contains 8,185 from OMB metro counties (77.98%), 5,538 from Isserman's urban and mixed urban counties (52.76%), 2,311 from OMB non-metro counties (22.03%), 4,958 from Isserman's rural and mixed rural counties (47.24%), 446 female opportunity entrepreneurs (4.25%), and 100 female necessity entrepreneurs (0.95%). The male subsample has 9,353 observations, and contains 7,362 from OMB metro counties (78.71%), 5,007 from Isserman's urban and mixed urban counties (53.53%), 1,991 from OMB non-metro counties (21.29%), 4,346 from Isserman's rural and mixed rural counties (46.47%), 629 male opportunity entrepreneurs (6.73%), and 134 male necessity entrepreneurs (1.43%).

3.2. *Defining rurality*

To distinguish between rural and urban counties, we use and compare three typologies. The first typology is the Office of Management and Budget's metropolitan (metro) and non-metropolitan (non-metro) counties classification (2003). Under this typology, we define OMB nonmetro counties as rural ($x = 1$) and OMB metro counties as urban ($x = 0$).

An alternative typology is a cross tabulation of metro-nonmetro and urban-rural classification systems developed by Isserman (2005). It offers a more concise classification of the rural-urban interface that considers rural-urban separation and rural-urban integration. We define all rural and mixed rural categories as rural ($x = 1$) and urban and mixed urban categories as urban ($x = 0$). We also use population density from the U.S. Census Bureau as a continuous indicator of urbanity.

3.3. *Dependent variable*

As in previous studies in other countries (Driga *et al.*, 2009; Vaillant and Lafuente, 2007; Wagner, 2004) this study uses early-stage entrepreneurial activity as the dependent variable. Early-stage entrepreneurial activity is defined as that carried out by adult individuals who are currently engaged in setting up a business by themselves or with the help of a sponsor (Reynolds *et al.*, 2005). Early-stage entrepreneurship also includes the ongoing activity of young businesses (i.e. less than 3.5 years old)[b] carried out by individuals. Thus, this measure includes entrepreneurial activity of all sizes and purposes, including self-employment, family businesses and part-time entrepreneurial activities. It excludes entrepreneurs of established businesses that have been in the market for more than 42 months. In this study, early-stage (opportunity and necessity) entrepreneurial activity is a binary variable equal to 1 if the surveyed individual has engaged in early-stage (opportunity or necessity) entrepreneurial activity and 0 otherwise. Thus, we model the log-odds and the first differences (or attributable risks) in the probability of an individual engaging in early-stage entrepreneurial activity. This probability is defined as:

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

where $\text{Prob}(Y_{ij})$ is the probability of the individual i in county j of engaging in early-stage entrepreneurial activity given the average proportion of similar entrepreneurial activity in county j. Because the nature of the dependent variable restricts the modeled probabilities to values between zero and 1, the proportions in this equation are transformed into a logit scale (Khattab, 2006). Therefore, we use the ratio of the probability of engaging in entrepreneurial activity to the probability of not engaging in it as follows.

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

where η_{ij} is the log-odds that individual i in county j will engage in entrepreneurial activity versus not engaging in it. Thus, η_{ij} is the dependent variable in this study.

Parameters estimated from the cross-section time-series rare events logistic regression model indicate the direction of the effect of each explanatory variable on the response probability of becoming entrepreneurial. To interpret the magnitude of these results, we also calculate the first differences or attributable risks of the predicted values. 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 and Zeng, 1999). For instance, in the case of dummy

[b]A firm older than 3.5 years is considered an established firm (Reynolds *et al.*, 2005).

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

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

3.4. *Independent variables*

First, the variable female takes the value 1 for females and 0 for males for the overall sample. Second, rurality is defined based on each of three typologies, one at a time. In this study, rural is a binary variable, equal to 1 if the county is rural, and 0 if urban. For the first typology, rural is defined as nonmetro counties. Urban is defined as metropolitan counties. For the second typology, rural counties include those identified by Isserman (2005) as mixed rural metro, mixed rural nonmetro, rural metro and rural nonmetro (original Isserman categories 4 to 7). Thus, urban includes counties classified as urban metro, mixed urban metro and mixed urban nonmetro (original Isserman categories 1 to 3). For the third model we use population density (thousands of inhabitants per square mile) as the indicator for rurality. Population density is a continuous variable equal to the number of inhabitants per square mile in the county. Information on population density was collected from the U.S. Census Bureau; information on the OMB typology was collected from the USDA ERS website and the Isserman typology was acquired from the Rural Policy Research Institute (RUPRI). In the rural subsamples presented in Tables 8 to 11, counties with population density of more than 1000 persons per square mile are considered urban, whereas counties with population density of less than 1000 persons per square mile are considered rural. This is based on the official rural definition and classification by USDA ERS.[c]

We use year fixed effects to control for differences because of economy-wide contextual differences in a year within the 2005–2010 period. Thus, the variables for each year equals 1 if the individual was surveyed that year and zero otherwise. The base year of comparison is 2005.

3.5. *Control variables*

To control for individual characteristics, we include individuals' age, education, ethnicity, employment status, household income and household size. Information on these control variables comes from the U.S. GEM dataset for 2005–2010. We also use county job growth rate as a control variable. Job growth rate is a continuous variable that indicates the annual percentage change in employment in the county. Job growth rate per county per year is calculated from employment data collected from the Bureau of Labor Statistics.[d] We use employment data to build job growth rates instead of unemployment data because employment data is a more precise proxy for job availability (i.e. not everyone unemployed files for unemployment). Finally, we use clustered robust errors to control for spatial autocorrelation between survey respondents from the same county and year fixed effects.

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[c]Retrieved April 2013. Available online at: http://www.ers.usda.gov/topics/rural-economy-population/rural-classifications/what-is-rural.aspx
[d]Available online at: http://www.bls.gov/lau/#tables

3.6. *Method and models*

In this study, we examine the effect of being female and the implications of living in a rural county on the change in the probability that individuals (overall) and women (female subsample -compared to a male subsample) in America engage in early-stage (opportunity or necessity) entrepreneurial activity. We analyze the data using cross-section time-series rare events logistic regression with clustered robust errors and year fixed effects. Rare events logistic regression is selected over logit and probit because of the low incidence of the dependent variables (5.42% for opportunity and 1.18% for necessity entrepreneurs in the overall sample; 4.25% for opportunity and 0.95% for necessity in the female subsample; 6.73% for opportunity and 1.43% for necessity in the male subsample). King and Zeng (1999) argue this method corrects for data with rare events in the dependent variable, thus generating unbiased estimates of logit coefficients. The model includes control variables for individual and county characteristics (please see Table 3). We run two sets of regressions (necessity and opportunity separately) on the three datasets. The "overall" dataset includes both women and men whereas the "female subsample" and "male subsample" datasets consider only those observations in which the respondent is a woman or a man, respectively. We also run regressions on "rural only" and "urban only" datasets where urban and rural counties are dropped, respectively, to observe effects across genders within the same setting (i.e. rural only or urban only). The "overall" model is as follows:

$$\eta_{ij} = \beta_{0ij} + \beta_1 \text{Female}_{ij} + \beta_2 \text{Rural}_{ij} + \delta \text{ year} + \alpha \text{ controls}_{ij} + \varepsilon_{ij}$$

where η_{ij} = log-odds of individual i in county j of engaging in early-stage entrepreneurial activity.

The model for the "female subsample" is as follows:

$$\eta_{ij} = \beta_{0ij} + \beta_1 \text{Rural}_{ij} + \delta \text{ year} + \alpha \text{ controls}_{ij} + \varepsilon_{ij}$$

where η_{ij} = log-odds of woman i in county j of engaging in early-stage entrepreneurial activity.

The model for the "male subsample" is as follows:

$$\eta_{ij} = \beta_{0ij} + \beta_1 \text{Rural}_{ij} + \delta \text{ year} + \alpha \text{ controls}_{ij} + \varepsilon_{ij}$$

where η_{ij} = log-odds of man i in county j of engaging in early-stage entrepreneurial activity.

The model for the "rural only" subsample is as follows:

$$\eta_{ij} = \beta_{0ij} + \beta_1 \text{Female}_{ij} + \delta \text{ year} + \alpha \text{ controls}_{ij} + \varepsilon_{ij}$$

where η_{ij} = log-odds of individual i in rural county j of engaging in early-stage entrepreneurial activity.

The model for the "urban only" subsample is as follows:

$$\eta_{ij} = \beta_{0ij} + \beta_1 \text{Female}_{ij} + \delta \text{ year} + \alpha \text{ controls}_{ij} + \varepsilon_{ij}$$

where η_{ij} = log-odds of individual i in urban county j of engaging in early-stage entrepreneurial activity.

To facilitate interpretation of results, we calculate the first differences in the probability of being involved in early-stage entrepreneurial activity for all regressions. The results for the three models for the three typologies for rurality are presented in Table 4 (necessity entrepreneurship) and Table 6 (opportunity entrepreneurship). Their corresponding first differences are illustrated in Tables 5 and 7. The results for the "rural only" and "urban only" subsamples are presented in Tables 8 and 10 respectively. Their corresponding first differences are illustrated in Tables 9 and 11.

4. Findings

This section discusses the findings of the cross-section time-series rare events logistic regression models described above. Table 1 presents a summary of the main variables in the models. Tables 2(a) and 2(b) present the OMB metro-nonmetro classification system (2003) and the cross-tabulation of urban-rural and metro-nonmetro systems proposed by Isserman (2005), respectively. Table 3 shows descriptive statistics for all variables in the models. Table 4 summarizes the results for the first model, which predicts early-stage

Table 2a. OMB metro-nonmetro classification system 2003.

	Number of counties	2010 population
Metro counties	1090	232,579,940
Nonmetro counties	2052	48,841,966

Source: USDA ERS (2003). Based on 2000 census, last updated May 2012. http://www.ers.usda.gov/topics/rural-econ-omy-population/rural-classifications/what-is-rural.aspx.

Table 2b. Isserman's typology, Cross tabulation of urban-rural and metro-nonmetro systems.*

Category	Type	Number of counties	Population	Percentage in rural	Density	Rural	Percentage of US rural
1	Urban metro	171	125,926,501	2	1,560	3,000,617	5
2	Mixed urban metro	147	40,931,317	15	446	6,081,653	10
3	Mixed urban nonmetro	11	175,003	21	593	36,328	0
4	Mixed rural metro	467	59,132,936	27	109	15,974,876	27
5	Mixed rural nonmetro	555	27,291,697	47	42	12,700,651	22
6	Rural metro	304	6,589,186	78	36	5,132,955	9
7	Rural non-metro	1486	21,375,266	75	11	16,134,287	27

*In this study Isserman rural counties are categories 4–7. Isserman urban counties are categories 1–3.
Source: Isserman (2005), Table 4, p.476 (based on 2000 census).

Table 3. Descriptive Statistics.

Variable	Obs.	Mean	(SD)	Min	Max
			Overall sample		
Female	19849	0.529	(0.499)	0	1
Necessity	19849	0.012	(0.108)	0	1
Opportunity	19849	0.054	(0.226)	0	1
OMB nonmetro	19849	0.217	(0.412)	0	1
Isserman rural	19849	0.469	(0.499)	0	1
Population density	19849	1.619	(5.571)	0	71.063
Job growth rate	19849	−0.541	(2.815)	−20.702	22.656
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 50,000–200,000	19849	0.281	(0.449)	0	1
Income over 200,000	19849	0.28	(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
African-American	19849	0.046	(0.209)	0	1
Other ethnicity	19849	0.045	(0.208)	0	1
Ages 18 to 64	19849	0.707	(0.455)	0	1
Ages 65 to 99	19849	0.293	(0.455)	0	1
			Female subsample		
Female	10496	1.000	(0.000)	1	1
Necessity	10496	0.009	(0.097)	0	1
Opportunity	10496	0.042	(0.202)	0	1
OMB nonmetro	10496	0.220	(0.414)	0	1
Isserman rural	10496	0.472	(0.499)	0	1
Population density	10496	1.567	(5.298)	0	71.063
Job growth rate	10482	−0.504	(2.756)	−17.258	18.395
No high school degree	10496	0.100	(0.301)	0	1
High school degree	10496	0.269	(0.444)	0	1
Some college or higher	10496	0.615	(0.487)	0	1
Employed full time	10496	0.312	(0.463)	0	1
Employed part time	10496	0.118	(0.323)	0	1
Other occupation	10496	0.467	(0.498)	0	1
Income below 50,000	10496	0.264	(0.441)	0	1
Income 50,000–200,000	10496	0.258	(0.438)	0	1
Income over 200,000	10496	0.019	(0.137)	0	1
Household size 1	10496	0.255	(0.436)	0	1
Household size 2 or more	10496	0.745	(0.436)	0	1
White	10496	0.636	(0.481)	0	1
African-American	10496	0.048	(0.214)	0	1
Other ethnicity	10496	0.041	(0.198)	0	1
Ages 18 to 64	10496	0.691	(0.462)	0	1
Ages 65 to 99	10496	0.309	(0.462)	0	1

Table 3. (*Continued*)

Variable	Obs.	Mean	(SD)	Min	Max
		Male subsample			
Female					
Necessity	9353	0.014	(0.119)	0	1
Opportunity	9353	0.067	(0.250)	0	1
OMB nonmetro	9353	0.213	(0.409)	0	1
Isserman rural	9353	0.465	(0.499)	0	1
Population density	9353	1.677	(5.863)	0.000	71.063
Job growth rate	9353	−0.583	(2.879)	−20.702	22.656
No high school degree	9353	0.101	(0.301)	0	1
High school degree	9353	0.240	(0.427)	0	1
Some college or higher	9353	0.646	(0.478)	0	1
Employed full time	9353	0.443	(0.497)	0	1
Employed part time	9353	0.062	(0.241)	0	1
Other occupation	9353	0.383	(0.486)	0	1
Income below 50,000	9353	0.202	(0.401)	0	1
Income 50,000–200,000	9353	0.306	(0.461)	0	1
Income over 200,000	9353	0.037	(0.189)	0	1
Household size 1	9353	0.202	(0.401)	0	1
Household size 2 or more	9353	0.798	(0.401)	0	1
White	9353	0.609	(0.488)	0	1
African-American	9353	0.043	(0.202)	0	1
Other ethnicity	9353	0.050	(0.218)	0	1
Ages 18 to 64	9353	0.726	(0.446)	0	1
Ages 65 to 99	9353	0.274	(0.446)	0	1

necessity entrepreneurship for the three rural typologies, the OMB metro-nonmetro classification (2003), Isserman's classification (2005) and population density. Table 5 illustrates the first differences of the results in Table 4, which indicate the change in the probability of becoming a necessity entrepreneur. Table 6 presents the results for the second model, which predicts early-stage opportunity entrepreneurship for the three rural typologies. Table 7 illustrates the first differences for Table 6. The results from Tables 4–7 are presented for the overall sample, the female subsample and the male subsample.

Table 8 presents the results across genders in rural only settings using the three typologies. Table 9 reports the first differences for Table 8. Table 10 presents the results across genders in urban only settings using the three typologies. Table 11 reports the first differences for Table 10.

In general, for both necessity and opportunity models, we observe there is not a notable difference among the three rural typologies analyzed. The results in Tables 4 through 7 illustrate that the three typologies produce results with the same sign, and similar magnitude and significance levels. Nonetheless, population density as a typology is sensitive to the variable that indicates rurality. Also, Tables 8 through 11 suggest that when a particular setting is selected (rural only or urban only), although fairly consistent, some differences across the three typologies emerge.

Table 4. Rare events logistic regression models on early-stage necessity entrepreneurship in the USA 2005–2010.

Necessity entrepreneurship	OMB nonmetro	Isserman rural	Pop density (thousands)
	Overall		
Female	−0.488****	−0.488****	−0.487****
	(0.132)	(0.132)	(0.132)
Rural	0.171	0.042	0.005
	(0.145)	(0.129)	(0.005)
Job growth rate	0.023	0.021	0.022
	(0.032)	(0.032)	(0.033)
High school degree	0.440*	0.439*	0.439*
	(0.246)	(0.245)	(0.245)
Some college or more	0.345	0.335	0.329
	(0.241)	(0.241)	(0.240)
Employed part time	0.754****	0.754****	0.752****
	(0.209)	(0.210)	(0.210)
Other occupation	0.397**	0.395**	0.395**
	(0.176)	(0.176)	(0.176)
Income below 50,000	0.606***	0.619***	0.632***
	(0.227)	(0.228)	(0.229)
Income 50,000–200,000	−0.020	−0.019	−0.014
	(0.232)	(0.232)	(0.232)
Household size 1	−0.156	−0.160	−0.164
	(0.172)	(0.172)	(0.172)
African-American	0.057	0.045	0.029
	(0.256)	(0.254)	(0.257)
Other ethnicity	−0.059	−0.067	−0.078
	(0.293)	(0.293)	(0.295)
Ages 65 to 99	−1.941****	−1.940****	−1.940****
	(0.282)	(0.281)	(0.282)
Intercept	−4.502****	−4.474****	−4.453****
	(0.344)	(0.344)	(0.333)
Wald (X2)	124.13****	126.6****	128.48****
Pseudo R2	0.057	0.057	0.057
Log pseudolikelihood	−1198.43	−1198.94	−1198.96
Observations	19825	19825	19825
Number of clusters (counties)	2419	2419	2419
Control for year	Yes	Yes	Yes
Controls for individuals	Yes	Yes	Yes
Controls for county	Yes	Yes	Yes
Clustered-robust standard errors	Yes	Yes	Yes
	Female subsample		
Female			
Rural	0.247	−0.161	0.015
	(0.213)	(0.189)	(0.012)
Job growth rate	0.073	0.077	0.075
	(0.058)	(0.063)	(0.061)
High school degree	0.556	0.549	0.547
	(0.376)	(0.375)	(0.375)
Some college or more	0.248	0.212	0.223
	(0.359)	(0.359)	(0.357)

Table 4.   (*Continued*)

Necessity entrepreneurship	OMB nonmetro	Isserman rural	Pop density (thousands)
Employed part time	0.405	0.402	0.399
	(0.301)	(0.301)	(0.302)
Other occupation	0.327	0.323	0.322
	(0.246)	(0.245)	(0.245)
Income below 50,000	1.039***	1.110***	1.082***
	(0.381)	(0.378)	(0.385)
Income 50,000–200,000	0.245	0.256	0.249
	(0.412)	(0.409)	(0.411)
Household size 1	0.002	−0.027	−0.021
	(0.246)	(0.246)	(0.248)
African-American	0.159	0.101	0.108
	(0.358)	(0.359)	(0.356)
Other ethnicity	−0.334	−0.389	−0.380
	(0.599)	(0.605)	(0.599)
Ages 65 to 99	−1.984****	−1.981****	−1.980****
	(0.414)	(0.414)	(0.414)
Intercept	−5.245****	−5.082****	−5.182****
	(0.559)	(0.556)	(0.541)
Wald (X2)	84.38****	86.54****	82.25****
Pseudo R2	0.069	0.069	0.069
Log pseudolikelihood	−525.57	−525.75	−525.89
Observations	10482	10482	10482
Number of clusters (counties)	2036	2036	2036
Control for year	Yes	Yes	Yes
Controls for individuals	Yes	Yes	Yes
Controls for county	Yes	Yes	Yes
Clustered-robust standard errors	Yes	Yes	Yes
		Male subsample	
Female			
Rural	0.127	0.198	0.003
	(0.204)	(0.175)	(0.014)
Job growth rate	−0.012	−0.014	−0.014
	(0.032)	(0.031)	(0.032)
High school degree	0.309	0.308	0.309
	(0.339)	(0.338)	(0.339)
Some college or more	0.394	0.406	0.384
	(0.333)	(0.331)	(0.331)
Employed part time	1.199****	1.202****	1.196****
	(0.291)	(0.290)	(0.291)
Other occupation	0.494**	0.492**	0.494**
	(0.235)	(0.234)	(0.235)
Income below 50,000	0.188	0.167	0.205
	(0.299)	(0.301)	(0.299)
Income 50,000–200,000	−0.177	−0.187	−0.172
	(0.278)	(0.278)	(0.278)
Household size 1	−0.253	−0.252	−0.254
	(0.243)	(0.243)	(0.242)
African-American	−0.025	0.000	−0.039
	(0.425)	(0.421)	(0.427)

Table 4. (*Continued*)

Necessity entrepreneurship	OMB nonmetro	Isserman rural	Pop density (thousands)
Other ethnicity	0.126	0.145	0.122
	(0.345)	(0.343)	(0.348)
Ages 65 to 99	−1.958****	−1.957****	−1.958****
	(0.395)	(0.395)	(0.396)
Intercept	−4.276****	−4.355****	−4.239****
	(0.411)	(0.418)	(0.402)
Wald (X2)	60.37****	60.40****	63.68****
Pseudo R2	0.061	0.062	0.061
Log pseudolikelihood	−658.91	−658.44	−659.03
Observations	9343	9343	9343
Number of clusters (counties)	1911	1911	1911
Control for year	Yes	Yes	Yes
Controls for individuals	Yes	Yes	Yes
Controls for county	Yes	Yes	Yes
Clustered-robust standard errors	Yes	Yes	Yes

Note: Standard errors are in parenthesis. *, **, ***, **** means significant at the 0.10, 0.5, 0.01, and 0.001 levels, respectively.

Hypothesis 1a proposed that men in rural America are more likely to engage in opportunity entrepreneurship than women in rural America. As shown in Table 6, we find that men in rural America are indeed more likely to engage in opportunity entrepreneurship, when compared to women in rural America. This result is significant and consistent across the OMB and Isserman typologies ($p < 0.05$). Thus, this hypothesis is supported.

Hypothesis 1b, in contrast, proposed that women in rural America are more likely to engage in necessity entrepreneurship than men in rural America. Results in Table 4 show no effect in the female subsample compared to the male subsample. Therefore, this hypothesis is not supported.

Hypothesis 2 proposed that rural America triggers smaller levels of entrepreneurial activity given its limited economic conditions. Results in Table 6 indicate the opposite, that rurality does in fact trigger significantly higher levels of opportunity entrepreneurship. For the female subsample, only the OMB typology is marginally significant ($p < 0.10$). However, the male subsample shows significant results ($p < 0.05$) for the OMB and Isserman typologies. Furthermore, the overall sample, which includes both women and men, presents highly significant results ($p < 0.01$) for the rurality variable. Thus, hypothesis 2 is not supported for opportunity entrepreneurship. We found no effects for necessity entrepreneurship.

Hypotheses 2a and 2b proposed that women and men who live in rural America are less likely to engage in entrepreneurship (either necessity or opportunity) than women and men, respectively, who reside in metro/urban areas. As shown in Table 4, we found no effects for necessity entrepreneurship, for either women or men. However, as Table 6 illustrates, we found rurality increases the rate of opportunity entrepreneurship among women who live in OMB nonmetro counties ($p < 0.10$) and among men who reside in OMB nonmetro and Isserman rural counties ($p < 0.05$ for both). The overall sample for

Table 5. Rare events logistic models on early-stage necessity entrepreneurship in the USA 2005–2010: First differences.

Necessity entrepreneurship	OMB nonmetro	Isserman rural	Popdensity (thousands)
	Overall		
Female	**−0.0042**	**−0.0042**	**−0.0042**
Rural	0.0016	0.0004	0.0045
Job growth rate	0.0117	0.0111	0.0112
High school degree	**0.0043**	**0.0043**	**0.0043**
Some college or more	0.0028	0.0027	0.0026
Employed part time	**0.0091**	**0.0091**	**0.0091**
Other occupation	**0.0035**	**0.0035**	**0.0035**
Income below 50,000	**0.0063**	**0.0064**	**0.0066**
Income 50,000–200,000	−0.0001	−0.0001	−0.0000
Household size 1	−0.0012	−0.0012	−0.0013
African-American	0.0008	0.0007	0.0005
Other ethnicity	−0.0002	−0.0002	−0.0003
Ages 65 to 99	**−0.0127**	**−0.0127**	**−0.0127**
	Female subsample		
Female			
Rural	0.0019	−0.0011	0.0188
Job growth rate	0.0390	0.0443	0.0414
High school degree	0.0047	0.0046	0.0046
Some college or more	0.0016	0.0013	0.0014
Employed part time	0.0036	0.0035	0.0035
Other occupation	0.0023	0.0023	0.0022
Income below 50,000	**0.0098**	**0.0105**	**0.0103**
Income 50,000–200,000	0.0020	0.0021	0.0021
Household size 1	0.0001	−0.0001	−0.0000
African-American	0.0016	0.0012	0.0012
Other ethnicity	−0.0012	−0.0015	−0.0014
Ages 65 to 99	**−0.0107**	**−0.0107**	**−0.0107**
	Male subsample		
Female			
Rural	0.0015	0.0021	0.0084
Job growth rate	−0.0059	−0.0067	−0.0069
High school degree	0.0039	0.0038	0.0039
Some college or more	0.0038	0.0039	0.0037
Employed part time	**0.0229**	**0.0229**	**0.0229**
Other occupation	**0.0056**	**0.0055**	**0.0056**
Income below 50,000	0.0024	0.0022	0.0026
Income 50,000–200,000	−0.0016	−0.0017	−0.0016
Household size 1	−0.0023	−0.0023	−0.0023
African-American	0.0005	0.0008	0.0004
Other ethnicity	0.0021	0.0023	0.0020
Ages 65 to 99	**−0.0152**	**0.0151**	**−0.0152**

Notes: The first differences or attributable risks estimate the change in the probability of $Y[\Pr(Y = 1)]$ given a discrete change in the independent variable (x), holding other variables at their means, i.e. $Yx = \Pr(Y = 1/X = 1) - \Pr(Y = 1/X = 0)$.

Table 6. Rare events logistic regression models on early-stage opportunity entrepreneurship in the USA 2005–2010.

Opportunity entrepreneurship	OMB nonmetro	Isserman rural	Pop density (thousands)
		Overall	
Female	−0.439****	−0.439****	−0.438****
	(0.065)	(0.065)	(0.065)
Rural	0.229***	0.178***	−0.002
	(0.081)	(0.068)	(0.006)
Job growth rate	0.022	0.017	0.018
	(0.016)	(0.016)	(0.016)
High school degree	−0.084	−0.083	−0.084
	(0.140)	(0.140)	(0.140)
Some college or more	0.358***	0.358***	0.335**
	(0.130)	(0.129)	(0.129)
Employed part time	0.148	0.150	0.146
	(0.106)	(0.105)	(0.106)
Other occupation	−0.565****	−0.565****	−0.564****
	(0.095)	(0.095)	(0.095)
Income below 50,000	−0.438***	−0.443***	−0.409***
	(0.128)	(0.128)	(0.128)
Income 50,000–200,000	−0.267***	−0.274***	−0.261***
	(0.097)	(0.097)	(0.098)
Household size 1	−0.155	−0.155	−0.163*
	(0.095)	(0.095)	(0.094)
African-American	0.409***	0.418***	0.388***
	(0.140)	(0.141)	(0.141)
Other ethnicity	0.079	0.081	0.066
	(0.159)	(0.159)	(0.159)
Ages 65 to 99	−1.104****	−1.103****	−1.102****
	(0.124)	(0.124)	(0.124)
Intercept	−2.306****	−2.334****	−2.229****
	(0.154)	(0.154)	(0.152)
Wald (X2)	511.55****	512.73****	509.64****
Pseudo R2	0.064	0.064	0.063
Log pseudolikelihood	−3907.08	−3907.57	−3911.17
Observations	19825	19825	19825
Number of clusters (counties)	2419	2419	2419
Control for year	Yes	Yes	Yes
Controls for individuals	Yes	Yes	Yes
Controls for county	Yes	Yes	Yes
Clustered-robust standard errors	Yes	Yes	Yes
		Female subsample	
Female			
Rural	0.232*	0.162	−0.019
	(0.121)	(0.101)	(0.013)
Job growth rate	0.004	−0.001	0.001
	(0.024)	(0.024)	(0.025)
High school degree	−0.228	−0.229	−0.231
	(0.207)	(0.207)	(0.207)
Some college or more	0.369*	0.369*	0.353*
	(0.189)	(0.189)	(0.189)

Table 6.   (*Continued*)

Opportunity entrepreneurship	OMB nonmetro	Isserman rural	Pop density (thousands)
Employed part time	0.162	0.166	0.163
	(0.143)	(0.143)	(0.143)
Other occupation	−0.573****	−0.575****	−0.576****
	(0.139)	(0.139)	(0.139)
Income below 50,000	0.182	0.182	0.200
	(0.183)	(0.182)	(0.181)
Income 50,000–200,000	0.126	0.119	0.127
	(0.158)	(0.158)	(0.158)
Household size 1	−0.426***	−0.428***	−0.429***
	(0.148)	(0.148)	(0.148)
African-American	0.117	0.123	0.119
	(0.251)	(0.252)	(0.251)
Other ethnicity	0.197	0.188	0.192
	(0.234)	(0.233)	(0.234)
Ages 65 to 99	−0.931****	−0.927****	−0.929****
	(0.179)	(0.179)	(0.179)
Intercept	−2.707****	−2.723****	−2.611****
	(0.239)	(0.238)	(0.236)
Wald (X2)	233.51****	230.36****	235.30****
Pseudo R2	0.056	0.056	0.056
Log pseudolikelihood	−1740.46	−1741.01	−1740.68
Observations	10482	10482	10482
Number of clusters (counties)	2036	2036	2036
Control for year	Yes	Yes	Yes
Controls for individuals	Yes	Yes	Yes
Controls for county	Yes	Yes	Yes
Clustered-robust standard errors	Yes	Yes	Yes
		Male subsample	
Female			
Rural	0.226**	0.188**	0.004
	(0.106)	(0.089)	(0.006)
Job growth rate	0.033	0.029	0.029
	(0.021)	(0.021)	(0.021)
High school degree	−0.004	−0.003	−0.000
	(0.184)	(0.183)	(0.184)
Some college or more	0.331*	0.335*	0.309*
	(0.171)	(0.171)	(0.171)
Employed part time	0.128	0.127	0.124
	(0.181)	(0.181)	(0.181)
Other occupation	−0.543****	−0.542****	−0.536****
	(0.125)	(0.125)	(0.125)
Income below 50,000	−0.991****	−0.997****	−0.957****
	(0.179)	(0.179)	(0.179)
Income 50,000–200,000	−0.525****	−0.533****	−0.515****
	(0.129)	(0.130)	(0.131)
Household size 1	0.031	0.032	0.021
	(0.115)	(0.114)	(0.114)
African-American	0.646***	0.656***	0.607***
	(0.193)	(0.192)	(0.193)

Table 6.   (*Continued*)

Opportunity entrepreneurship	OMB nonmetro	Isserman rural	Pop density (thousands)
Other ethnicity	0.006	0.014	−0.012
	(0.207)	(0.207)	(0.206)
Ages 65 to 99	−1.191****	−1.193****	−1.189****
	(0.168)	(0.168)	(0.168)
Intercept	−2.314****	−2.352****	−2.248****
	(0.190)	(0.191)	(0.188)
Wald (X2)	227.37****	229.09****	229.65****
Pseudo R2	0.067	0.067	0.066
Log pseudolikelihood	−2148.69	−2148.58	−2150.81
Observations	9343	9343	9343
Number of clusters (counties)	1911	1911	1911
Control for year	Yes	Yes	Yes
Controls for individuals	Yes	Yes	Yes
Controls for county	Yes	Yes	Yes
Clustered-robust standard errors	Yes	Yes	Yes

Note: Standard errors are in parenthesis. *, **, ***, **** means significant at the 0.10, 0.5, 0.01, and 0.001 levels, respectively.

opportunity entrepreneurship in Table 6 also shows that OMB nonmetro counties and Isserman rural counties are positively and significantly associated with opportunity entrepreneurship ($p < 0.01$). Thus, this second set of hypotheses is significantly rejected for men and only marginally rejected for women for entrepreneurial activity driven by opportunity. We found no effects for entrepreneurial activity driven by necessity.

Regarding comparison across genders in the same setting (either rural or urban), hypothesis 3a proposed that women in rural America are less likely than men in rural America to engage in entrepreneurship. Table 8 indicates that women in rural America are indeed less likely to engage in necessity or opportunity entrepreneurship when compared to men in rural America ($p < 0.01$). Thus, this hypothesis is supported. Similarly, hypothesis 3b proposed that women in urban America are less likely than men in urban America to engage in entrepreneurship. Table 10 indicates that indeed women in urban America are also less likely than men in urban America to engage in opportunity entrepreneurship ($p < 0.01$). For necessity entrepreneurship, this same result is statistically significant for OMB metro counties ($p < 0.01$), but only marginally for Isserman urban counties ($p < 0.10$), and no effect occurs when population density is used as a typology. Thus, hypothesis 3b is supported for opportunity entrepreneurship across the three typologies. Regarding necessity entrepreneurship, hypothesis 3b is only supported for OMB metro counties and marginally for Isserman urban counties.

The control variables for the necessity and opportunity entrepreneurship models show significant results worthy of discussion. Regarding necessity entrepreneurship among women, we found that having an income below $50,000 ($p < 0.01$) is a positive predictor, whereas retirement ($p < 0.001$) is a negative predictor. Among men, we found that being employed part time ($p < 0.01$) or having another occupation (i.e. not full time or part time employment) ($p < 0.05$) are positive predictors of necessity entrepreneurship.

Table 7. Rare events logistic models on early-stage opportunity entrepreneurship in the USA 2005–2010: First differences.

Opportunity entrepreneurship	OMB nonmetro	Isserman rural	Popdensity (thousands)
	Overall		
Female	**−0.0178**	**−0.0178**	**−0.0178**
Rural	**0.0097**	**0.0071**	−0.0016
Job growth rate	0.0417	0.0327	0.0354
High school degree	−0.0031	−0.0031	−0.0031
Some college or more	**0.0136**	**0.0136**	**0.0128**
Employed part time	0.0064	0.0065	0.0063
Other occupation	**−0.0218**	**−0.0218**	**−0.0219**
Income below 50,000	**−0.0156**	**−0.0157**	**−0.0147**
Income 50,000–200,000	**−0.0099**	**−0.0102**	**−0.0098**
Household size 1	−0.0059	−0.0058	**−0.0062**
African-American	**0.0197**	**0.0203**	**0.0186**
Other ethnicity	0.0037	0.0038	0.0031
Ages 65 to 99	−0.0368	−0.0368	−0.0369
	Female subsample		
Female			
Rural	**0.0081**	0.0053	−0.0213
Job growth rate	0.0057	−0.0009	0.0024
High school degree	−0.0068	−0.0068	−0.0069
Some college or more	**0.0115**	**0.0115**	**0.0109**
Employed part time	0.0058	0.0059	0.0059
Other occupation	**−0.0185**	**−0.0186**	**−0.0186**
Income below 50,000	0.0064	0.0064	0.0070
Income 50,000–200,000	0.0044	0.0042	0.0045
Household size 1	**−0.0125**	**−0.0125**	**−0.0126**
African-American	0.0049	0.0051	0.0049
Other ethnicity	0.0078	0.0074	0.0076
Ages 65 to 99	−0.0262	−0.0261	−0.0261
	Male subsample		
Female			
Rural	**0.0119**	**0.0093**	0.0206
Job growth rate	0.0833	0.0729	0.0747
High school degree	0.0002	0.0003	0.0004
Some college or more	**0.0155**	**0.0157**	**0.0146**
Employed part time	0.0073	0.0072	0.0071
Other occupation	**−0.0254**	**−0.0253**	**−0.0252**
Income below 50,000	**−0.0382**	**−0.0384**	**−0.0373**
Income 50,000–200,000	**−0.0236**	**−0.0239**	**−0.0233**
Household size 1	0.0018	0.0018	0.0012
African-American	**0.0428**	**0.0437**	**0.0398**
Other ethnicity	0.0012	0.0016	0.0003
Ages 65 to 99	−0.0479	−0.0479	−0.0479

Notes: The first differences or attributable risks estimate the change in the probability of $Y[\Pr(Y = 1)]$ given a discrete change in the independent variable (x), holding other variables at their means, i.e. $Yx = \Pr(Y = 1/X = 1) - \Pr(Y = 1/X = 0)$.

Table 8. Rare events logistic regression models on early-stage entrepreneurship in the USA 2005–2010: Rural subsample.

	OMB nonmetro[1]	Isserman rural[2]	Pop density < 1000 per sq mile (thousands)[3]
	Necessity entrepreneurship		
Female	−0.384	−0.641***	−0.560***
	(0.262)	(0.190)	(0.163)
Job growth rate	0.056	−0.002	0.022
	(0.050)	(0.040)	(0.035)
High school degree	0.847*	0.709**	0.459
	(0.493)	(0.354)	(0.290)
Some college or more	0.658	0.521	0.260
	(0.492)	(0.347)	(0.279)
Employed part time	0.790*	0.867***	0.942***
	(0.413)	(0.303)	(0.259)
Other occupation	0.524*	0.525**	0.546***
	(0.305)	(0.234)	(0.208)
Income below 50,000	1.326*	0.967**	0.798**
	(0.719)	(0.404)	(0.318)
Income 50,000–200,000	0.451	0.225	0.302
	(0.805)	(0.424)	(0.334)
Household size 1	−0.126	−0.219	−0.124
	(0.346)	(0.247)	(0.213)
African-American	−0.587	−0.514	−0.803
	(1.028)	(0.590)	(0.588)
Other ethnicity	−0.578	−0.178	−0.175
	(1.015)	(0.529)	(0.415)
Ages 65 to 99	−3.022***	−2.369***	−2.422***
	(1.017)	(0.470)	(0.407)
Intercept	−5.395***	−4.663***	−4.340***
	(0.867)	(0.506)	(0.379)
Wald (X2)	75.81***	110.96***	132.85***
Pseudo R2	0.115	0.084	0.074
Log pseudolikelihood	−279.73	−575.59	−828.38
Observations	4302	9294	13798
Number of clusters (counties)	1426	2094	2325
Control for year	Yes	Yes	Yes
Controls for individuals	Yes	Yes	Yes
Controls for county	Yes	Yes	Yes
Clustered-robust standard errors	Yes	Yes	Yes
	Opportunity entrepreneurship		
Female	−0.379***	−0.410***	−0.396***
	(0.138)	(0.096)	(0.077)
Job growth rate	0.020	0.011	0.016
	(0.023)	(0.019)	(0.017)
High school degree	−0.057	−0.117	−0.209
	(0.250)	(0.175)	(0.149)
Some college or more	0.414*	0.274*	0.215
	(0.227)	(0.161)	(0.139)
Employed part time	0.101	0.137	0.114
	(0.226)	(0.154)	(0.126)

Table 8.   (*Continued*)

	OMB nonmetro[1]	Isserman rural[2]	Pop density < 1000 per sq mile (thousands)[3]
Other occupation	−0.626***	−0.672***	−0.590***
	(0.206)	(0.143)	(0.115)
Income below 50,000	−0.574**	−0.515***	−0.397***
	(0.265)	(0.181)	(0.154)
Income 50,000–200,000	−0.134	−0.408**	−0.336**
	(0.248)	(0.171)	(0.138)
Household size 1	−0.150	−0.259*	−0.268**
	(0.201)	(0.136)	(0.110)
African-American	0.119	−0.062	0.183
	(0.409)	(0.305)	(0.224)
Other ethnicity	−0.290	−0.510	−0.095
	(0.434)	(0.310)	(0.200)
Ages 65 to 99	−1.074***	−1.102***	−1.188***
	(0.250)	(0.180)	(0.143)
Intercept	−2.325***	−2.084***	−2.073***
	(0.286)	(0.192)	(0.163)
Wald (X2)	135.48***	261.10***	374.25***
Pseudo R2	0.078	0.073	0.069
Log pseudolikelihood	−868.99	−1844.43	−2713.68
Observations	4302	9294	13798
Number of clusters (counties)	1426	2094	2325
Control for year	Yes	Yes	Yes
Controls for individuals	Yes	Yes	Yes
Controls for county	Yes	Yes	Yes
Clustered-robust standard errors	Yes	Yes	Yes

Notes: [1]Includes only counties classified by OMB (2003) as nonmetro (categories 4 to 9). [2]Includes only counties classified by Isserman (2005) as mixed rural metro, mixed rural nonmetro, rural metro and rural nonmetro (categories 4 to 7). [3]includes only counties that have a population density of less than 1000 persons per square mile.

Table 9. Rare events logistic models on early-stage entrepreneurship in rural America 2005–2010: First differences.

	OMB nonmetro[1]	Isserman rural[2]	Pop density (thousands)[3]
	Necessity entrepreneurship		
Female	−0.0031	**−0.0053**	**−0.0044**
Job growth rate	0.0229	−0.0006	0.0079
High school degree	**0.0084**	**0.0069**	0.0041
Some college or more	0.0054	0.0040	0.0019
Employed part time	**0.0096**	**0.0107**	**0.0112**
Other occupation	**0.0043**	**0.0044**	**0.0043**
Income below 50,000	**0.0162**	**0.0105**	**0.0079**
Income 50,000–200,000	0.0062	0.0025	0.0029
Household size 1	−0.0009	−0.0015	−0.0008
African-American	−0.0014	−0.0025	−0.0038
Other ethnicity	−0.0014	−0.0003	−0.0007
Ages 65 to 99	**−0.0180**	**−0.0143**	**−0.0141**
Observations	4302	9294	13798

Table 9.   (*Continued*)

	OMB nonmetro[1]	Isserman rural[2]	Pop density (thousands)[3]
	Opportunity entrepreneurship		
Female	**−0.0159**	**−0.0165**	**−0.0157**
Job growth rate	0.0287	0.0179	0.0247
High school degree	−0.0019	−0.0043	−0.0077
Some college or more	**0.0171**	**0.0107**	0.0082
Employed part time	0.0051	0.0061	0.0049
Other occupation	**−0.0254**	**0.0260**	**−0.0225**
Income below 50,000	**−0.0210**	**−0.0182**	**−0.0140**
Income 50,000–200,000	−0.0046	**−0.0141**	**−0.0118**
Household size 1	−0.0056	**−0.0095**	**−0.0097**
African-American	0.0084	−0.0009	0.0087
Other ethnicity	−0.0080	−0.0153	−0.0029
Ages 65 to 99	**−0.0377**	**−0.0367**	**−0.0389**
Observations	4302	9294	13798

Notes: The first differences or attributable risks estimate the change in the probability of $Y[\Pr(Y = 1)]$ given a discrete change in the independent variable (x), holding other variables at their means, i.e. $Yx = \Pr(Y = 1/X = 1) - \Pr(Y = 1/X = 0)$.

Furthermore, like in the case for women, retirement among men negatively effects engagement in entrepreneurship driven by need ($p < 0.001$).

Regarding opportunity entrepreneurship, we found having college or higher levels of education is a positive factor among women and men ($p < 0.10$). In the female subsample, women who live in a household of 1 are less likely to start a new venture ($p < 0.01$). In the male subsample, having an income below \$50,000 or between \$50,000 and \$200,000 ($p < 0.001$ for both) decreases the likelihood of men engaging in opportunity-driven entrepreneurship. Furthermore, being African-American increases the likelihood of men engaging in entrepreneurial activity driven by opportunity ($p < 0.01$). As in the model for necessity entrepreneurship, being 65 or older decreases the likelihood of engaging in opportunity entrepreneurship for both women and men ($p < 0.001$ for both).

In rural America specifically, positive factors for necessity entrepreneurship are being employed part time ($p < 0.01$), having an income below \$50,000 ($p < 0.05$) and having a high school degree ($p < 0.10$). A negative factor for necessity entrepreneurship is being 65 or older ($p < 0.01$). A positive predictor of opportunity entrepreneurship in rural America is having college education or higher ($p < 0.10$), whereas negative predictors include having incomes below \$200,000 ($p < 0.05$), living alone ($p < 0.10$), or being 65 or older ($p < 0.01$).

In urban America specifically, positive predictors of necessity entrepreneurship include being employed part time ($p < 0.01$) or being African American ($p < 0.01$), whereas being 65 or older is a negative factor ($p < 0.01$). Positive predictors of opportunity entrepreneurship include having college education or higher ($p < 0.05$) and being African American ($p < 0.01$). Negative predictors of opportunity entrepreneurship in urban America include having incomes below \$200,000 ($p < 0.01$) or being 65 or older ($p < 0.01$).

Table 10. Rare events logistic regression models on early-stage entrepreneurship in the USA 2005–2010: Urban subsample.

	OMB metro[1]	Isserman urban[2]	Pop density > 1000 per sq mile (thousands)[3]
		Necessity entrepreneurship	
Female	−0.521***	−0.323*	−0.321
	(0.153)	(0.183)	(0.222)
Job growth rate	−0.004	0.083	0.030
	(0.043)	(0.053)	(0.090)
High school degree	0.256	0.055	0.308
	(0.285)	(0.342)	(0.451)
Some college or more	0.189	0.043	0.426
	(0.277)	(0.335)	(0.483)
Employed part time	0.739***	0.654**	0.355
	(0.244)	(0.289)	(0.337)
Other occupation	0.338	0.250	0.059
	(0.213)	(0.262)	(0.321)
Income below 50,000	0.411	0.284	0.433
	(0.254)	(0.303)	(0.373)
Income 50,000–200,000	0.025	0.007	−0.207
	(0.260)	(0.311)	(0.387)
Household size 1	−0.161	−0.098	−0.226
	(0.195)	(0.236)	(0.304)
African-American	0.259	0.425	0.753***
	(0.264)	(0.288)	(0.283)
Other ethnicity	0.129	0.139	0.273
	(0.306)	(0.341)	(0.406)
Ages 65 to 99	−1.626***	−1.503***	−1.045***
	(0.299)	(0.358)	(0.397)
Intercept	−4.106***	−4.164***	−4.557***
	(0.369)	(0.448)	(0.724)
Wald (X2)	77.64***	59.63***	45.99***
Pseudo R2	0.048	0.044	0.045
Log pseudolikelihood	−908.67	−614.68	−359.98
Observations	15523	10531	6027
Number of clusters (counties)	993	325	178
Control for year	Yes	Yes	Yes
Controls for individuals	Yes	Yes	Yes
Controls for county	Yes	Yes	Yes
Clustered-robust standard errors	Yes	Yes	Yes
		Opportunity entrepreneurship	
Female	−0.459***	−0.464***	−0.524***
	(0.074)	(0.089)	(0.125)
Job growth rate	0.025	0.028	0.020
	(0.021)	(0.029)	(0.040)
High school degree	−0.103	−0.037	0.428
	(0.170)	(0.235)	(0.357)
Some college or more	0.324**	0.461**	0.855***
	(0.158)	(0.219)	(0.323)
Employed part time	0.169	0.174	0.237
	(0.119)	(0.144)	(0.192)

Table 10.   (*Continued*)

	OMB metro[1]	Isserman urban[2]	Pop density > 1000 per sq mile (thousands)[3]
Other occupation	−0.545***	−0.459***	−0.497***
	(0.107)	(0.127)	(0.164)
Income below 50,000	−0.380***	−0.380**	−0.531**
	(0.146)	(0.186)	(0.234)
Income 50,000–200,000	−0.373***	−0.283**	−0.306
	(0.123)	(0.144)	(0.189)
Household size 1	−0.154	−0.082	0.051
	(0.108)	(0.131)	(0.174)
African-American	0.466***	0.628***	0.645***
	(0.151)	(0.166)	(0.199)
Other ethnicity	0.159	0.365*	0.302
	(0.174)	(0.201)	(0.274)
Ages 65 to 99	−1.105***	−1.091***	−0.891***
	(0.144)	(0.174)	(0.244)
Intercept	−2.214***	−2.427***	−2.838***
	(0.179)	(0.244)	(0.358)
Wald (X2)	405.37***	277.12***	176.59***
Pseudo R2	0.062	0.060	0.058
Log pseudolikelihood	−3032.08	−2053.73	−1186.14
Observations	15523	10531	6027
Number of clusters (counties)	993	325	178
Control for year	Yes	Yes	Yes
Controls for individuals	Yes	Yes	Yes
Controls for county	Yes	Yes	Yes
Clustered-robust standard errors	Yes	Yes	Yes

Notes: [1]Includes only counties classified by OMB (2003) as metro (categories 4 to 9). [2]Includes only counties classified by Isserman (2005) as urban metro, mixed urban metro, mixed urban nonmetro (categories 1 to 3). [3]Includes only counties that have a population density of more than 1000 persons per square mile.

Table 11. Rare events logistic models on early-stage entrepreneurship in urban America 2005–2010: First differences.

	OMB metro[1]	Isserman urban[2]	Pop density > 1000 per sq mile (thousands)[3]
		Necessity Entrepreneurship	
Female	**−0.0047**	**−0.0029**	−0.0034
Job growth rate	0.0003	0.0927	0.0517
High school degree	0.0026	0.0008	0.0041
Some college or more	0.0015	0.0002	0.0036
Employed part time	**0.0092**	**0.0084**	0.0049
Other occupation	0.0031	0.0023	0.0007
Income below 50,000	0.0043	0.0031	0.0056
Income 50,000–200,000	0.0004	0.0003	−0.0016
Household size 1	−0.0013	−0.0007	−0.0020
African-American	0.0029	0.0052	**0.0115**
Other ethnicity	0.0016	0.0019	0.0039
Ages 65 to 99	**−0.0111**	**−0.0109**	**−0.0087**
Observations	15523	10531	6027

Table 11.   (*Continued*)

	OMB metro[1]	Isserman urban[2]	Pop density > 1000 per sq mile (thousands)[3]
		Opportunity entrepreneurship	
Female	**−0.0185**	**−0.0189**	**−0.0222**
Job growth rate	0.0485	0.0621	0.0527
High school degree	−0.0037	−0.0009	0.0219
Some college or more	**0.0121**	**0.0168**	**0.0305**
Employed part time	0.0074	0.0078	0.0114
Other occupation	**−0.0209**	**−0.0178**	**−0.0198**
Income below 50,000	**−0.0135**	**−0.0134**	**−0.0186**
Income 50,000–200,000	**−0.0132**	**−0.0102**	−0.0113
Household size 1	−0.0058	−0.0030	0.0025
African-American	**0.0229**	**0.0332**	**0.0353**
Other ethnicity	0.0073	**0.0177**	0.0155
Ages 65 to 99	**−0.0365**	**−0.0365**	**−0.0313**
Observations	15523	10531	6027

Notes: The first differences or attributable risks estimate the change in the probability of $Y[\Pr(Y=1)]$ given a discrete change in the independent variable (x), holding other variables at their means, i.e. $Yx = \Pr(Y = 1/X = 1) - \Pr(Y = 1/X = 0)$.

Finally, we found no effect between job growth rate and necessity or opportunity entrepreneurship. This result is consistent across typologies and across the overall sample, female and male subsamples, and rural and urban subsamples.

5. Conclusions and Policy Implications

Despite the increasing interest in entrepreneurship research, little is known about differences in the probability of engaging in entrepreneurial activity between rural and urban areas and between women and men. Contributions of entrepreneurship to economic performance differ across contexts (rural or urban/metro or nonmetro), gender and motivation (necessity and opportunity). This study aimed to examine the effects of rurality on early-stage necessity and opportunity entrepreneurship among women and men in America, using alternative models. To explore these relationships, we created a dataset that combined individual GEM U.S. survey responses with corresponding county characteristics from OMB (2003), Isserman (2005), BLS and the U.S. Census Bureau for 2005–2010. We used cross-section time-series rare-events logistic regression with year fixed effects and clustered robust errors for the analyses.

Key findings in this study suggest there is not a notable difference among the three typologies compared, the metro-nonmetro OMB classification system, Isserman's cross tabulation of metro-nonmetro urban-rural classification systems (2005) and population density. The results of the models using each typology are substantially similar in magnitude, direction and significance for most variables, other than the rural variable, which is logical given this is where the distinction is the greatest. The OMB and Isserman codes generate similar results but the population density basis is much less discerning. Population density ignores the concentration of population within counties and is sensitive to the

geographic size of counties. Thus, this research would suggest caution in the use of this basis for classifying counties as rural. However, the slight differences between the OMB and Isserman rural-urban typologies may not significantly alter the results of empirical studies. Nevertheless, our rural and urban subsamples illustrate small differences in the significance levels across the typologies for some of the key and control variables, suggesting that, in practice, some differences might occur depending on which typology is used. Scholars need to consider these differences and perhaps compare results across typologies, if appropriate and plausible, to confirm their hypotheses and suggest policy changes.

Another key conclusion of the study is that living in rural America does not decrease the likelihood of men and women engaging in entrepreneurship as some studies suggest. In the case of opportunity entrepreneurship, both women and men who live in OMB non-metro counties (and also men in Isserman rural counties) have a higher probability of engaging in opportunity entrepreneurship than their urban counterparts after controlling for other contextual economic, demographic and educational differences. Thus, despite the widely known disadvantages for entrepreneurship rural America offers (i.e. lower demand, lower knowledge spillover, less access to markets, financial capitals, suppliers and transportation accessibility), rural areas do spawn operating networks and competitive firms (Acs and Malecki, 2003), which are indicative of increasing levels of entrepreneurial activity. In fact, wide disparities exist among rural areas themselves (Smallbone, 2009) such that it would not be surprising to find some rural areas contain thriving businesses while others do not. Overall, we conclude that rural residents have at least as much ability and incentive to start successful businesses once differences in local economic conditions and personal characteristics are taken into account.

Furthermore, our results confirm that women are indeed less likely to engage in entrepreneurial activity, either for necessity or opportunity reasons, than men in both rural and urban settings. These results confirm the abundant evidence that suggests men are more likely to become entrepreneurs. The comparative nature of our results across genders confirms this is true across contextual settings (urban or rural) and motivation (necessity or opportunity). Nevertheless, there are important differences between male and female entrepreneurs. Unlike male entrepreneurship, which tends to be greatest among those with incomes between $50,000 and $200,000, women engage in entrepreneurship across the income spectrum. This suggests increases in support for entrepreneurs may disproportionately benefit lower income women.

More importantly, college or higher levels of education is positively related to opportunity entrepreneurship in both the female and male subsamples. In rural America, high school education is positively related to necessity entrepreneurship and college education is positively related to opportunity entrepreneurship. In urban America, college education is important for opportunity entrepreneurship, but we observe no effect of high school education on necessity entrepreneurship.

Our findings regarding gender differences and the critical role of education have important policy implications for education and mentoring programs that aim to boost women involvement in entrepreneurship in rural America. As indicated in the literature review section on female entrepreneurship, motivations for female entrepreneurship are

distinctly different from those of men. Also, women seem to capture better the effects of entrepreneurship education. Thus, considering the critical role of education (i.e. high school education for necessity entrepreneurship in rural America and college education for opportunity entrepreneurship in both rural and urban America) to make a difference in empowering entrepreneurs, customized educational and mentoring programs in rural America hold potential for raising female participation in entrepreneurship and reducing the entrepreneurship gap with respect to men. Previous studies suggest increased involvement in entrepreneurial activities by women would contribute to reducing poverty in rural America. Hence, pairing the complementary effects of increased levels of educational attainment and higher entrepreneurship involvement to address economic disadvantages in both rural and urban America offer practical opportunities to achieve higher levels of economic growth and development.

Other findings in this study suggest being African American increases men's probability of pursuing a business opportunity, and higher rates of necessity (just marginally significant at $p < .10$) and opportunity entrepreneurship in urban America. This supports previous research that suggests entrepreneurial activity among African Americans "is about 50 percent higher than for whites" (Reynolds *et al.*, 2002b). Further research focused on race differences should explore characteristics of these entrepreneurs and the potential for entrepreneurship to help this minority group overcome underrepresentation in the business world and elsewhere.

Retirees in America, both women and men, are not engaging in business venturing in significant numbers. This result is consistent across genders and across settings, indicating a clear trend worthy of discussion. This finding opens up opportunities for further research that looks into the investment portfolio of American retirees. Some scattered case studies in the practitioner world illustrate examples of retirees who invest their savings as venture capitalists or small business owners in their local economies; however, these retirees might represent only a small fraction of the universe such that our large dataset cannot capture it significantly. Retirees might in fact represent an untapped resource of entrepreneurship that interested researchers could explore.

Living alone negatively affects the probability of women engaging in opportunity entrepreneurship in rural America. Previous studies suggest women are more likely to start a firm with their husband or their family, which may be because of the presence of dual incomes or family support. More research is needed to understand the constraints and incentives facing single or unmarried individuals and what would be needed to increase their engagement in entrepreneurial activity.

This paper suggests the need for additional research, particularly for studies that look at the impact of rurality, college education, household size (or marital status), income and retirement on opportunity-based female entrepreneurship and on the emergence of entrepreneurial activity in rural America. The results of this study suggest, other things equal, living in a rural area may actually increase the likelihood that both women and men will start new ventures, especially driven by opportunity motivations. This finding contradicts previous studies, which find entrepreneurship is lower in rural areas. By controlling for local economic conditions and differences in demographic and other characteristics of the

population, we suggest it may be these factors that lead to lower levels of entrepreneurship. This suggests policies designed to increase rural entrepreneurship should address these contextual issues as to tailor programs to the special demographic and educational characteristics of rural populations. It also suggests the need to focus more research on the nature of constraints faced by rural entrepreneurs. The payoff for such research is the potential that a better understanding of the role of entrepreneurship in the current and future economic development of rural communities can improve the results of policy.

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