Aging America: Essays on Population Aging and the Physical and Economic Landscapes in the United States

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ABSTRACT

Major population shifts shape both economic and physical landscapes of nations because demographic and economic drivers are inextricably linked. This study follows a three essay approach focused on the impact of population aging on two broad categories, physical and economic development in the United States. Specifically, this dissertation investigates later life entrepreneurship, elder housing choices and the impact of aging on rural prosperity.

It appears that age is a factor in later life labor force participation choices, with 61 to 70 year olds and those over 70 years of age exhibiting a greater tendency toward self-employment than their 50 to 60 year old counterparts. However, individuals over age 60 are more likely to retire than transition to self-employment. Still, economic developers should consider small business development programs that include even those ahead of the baby boomer cohort.

Amongst recent mover households, age influences dwelling selection. Households headed by 50 to 69 year olds are more likely to move to single family dwellings of 1,000 to just under 3,000 square feet. Conversely, households headed by individuals aged 70 years or more, are more likely to select multi-family dwellings and in particular, smaller units (under 1,000 square feet). Thus, oldest individuals are more likely to relocate to the smallest, highest density units even after controlling for increased housing costs, shocks, income and children. These results suggest that older households are not homogenous in their housing preferences.

As expected, population aging impacts rural prosperity. The effect is not significant for the proportion of the population aged 70 to 79 years. However, the greater the percentage of the population that is 50 to 59 years of old or 60 to 69 years old, the less likely a rural county is to be prosperous. Contrary to this finding, the greater the proportion of the population that is 80 years of age or older, the greater the likelihood of rural prosperity. It was originally hypothesized that rural areas may fall short of prosperity because of a mismatch between an aging labor force and the prevalence of physically demanding occupations - this is likely not the case.

DEDICATION AND ACKNOWLEDGMENTS

For God did not give us a spirit of timidity, but a spirit of power, of love and of self-discipline. 2 Timothy 1:7

My time as a Virginia Tech student is coming to a close but one thing will remain forever true…I am a Hokie. Through challenging times and even unimaginable tragedy, the community that is Virginia Tech remains steadfast and prevails. It is that spirit which first drew me here and has left an indelible mark on me. I dedicate this dissertation to the Virginia Tech family and the memories of those we lost all too soon.

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CHAPTER 1. INTRODUCTION

Population aging is a pressing issue as it is certain to greatly impact developed nations. In 1950, only 12 percent of the population in the developed world was 60 or older (United Nations, 2001). By 2000, that figure had increased to nearly 20 percent and estimates indicate that by 2050, a third of the population in developed regions is likely to be 60 or older. Projections also indicate that by 2050 it is likely that close to 1 in every 4 persons will be 65 or older (United Nations, 2001). Global population aging in the developed world is the result of significant gains in life expectancy coupled with decreasing fertility rates (Mitchell et al., 2006). Because neither of these trends can be easily halted, marked population aging is very real and will impact many facets of life in the developed world for several decades to come.

Aggregate consumption, savings, labor supply and social programs are all affected by changing demographics and population aging (Bakshi and Shen, 1994). Dependency in the context of the human life cycle can be dissected into two major stages (Lee, 1994). According to this model, childhood and old age are two stages in life during which individuals are dependent on the surplus production of those individuals in the intermediate age range. Resources flow through family, public sector and financial market channels and as aging of the population occurs the pressures exerted on each of these avenues change. The public sector is particularly sensitive to such changes and as public transfers to older individuals tend to be costly, policymakers in industrialized nations, which often provide a great quantity of services for elders, place keen interest in the impacts of the rapid aging of the population expected over the next few decades (Lee, 1994).

Public provision of services targeted toward older individuals is prominent in the U.S. as is the case in many of the world's most developed nations. Projected strains on government-

sponsored programs concerned with the welfare of the elderly (Social Security and Medicare) are expected to be substantial as the labor force replacement rate struggles to support these pay-as-you-go systems. While this potential crush should be closely monitored and examined, the possibility that the aging of America may not be entirely negative should also be considered. Ultimately, many questions remain regarding the impact of population aging. This dissertation seeks to move beyond the narrowed field concerned with the impact of population aging on U.S. government-sponsored programs. This study will utilize a three essay approach and the focus of this research has been narrowed into two broad categories, physical and economic development impacts. More specifically, this dissertation investigates entrepreneurship in later life, the housing choices of older individuals, and the impact of aging on rural prosperity in a domestic context. The proposed research will not engage in a full accounting of all of the potential costs and benefits associated with the aging U.S. population. Rather, the present analysis seeks to answer three very specific questions, with the goal of gaining greater understanding of potential physical and economic development impacts associated with the behaviors of older Americans.

The United States has not experienced population aging on the magnitude of some Western European nations or Japan. However, the global aging trend impacts the United States. Many associate aging in America with the prevalence of the baby boomers. In fact, members of the baby boom generation and aged Americans are often thought to be synonymous. While the sheer number of older Americans owed to the baby boom experienced following World War II has contributed to the aging of America, baby boomers form only part of the story. In reality, Census estimates reveal that in 2010 just under 13 percent of the population was born prior to the baby boom (U.S. Census Bureau, 2008). Furthermore, the baby boom cohort is not evenly distributed across the birth years of the generation. While, most demographers consider

individuals born between 1946 and 1964 to be baby boomers, the birthrate actually began to decline in 1957 (Schott, 2008). The terms "old" and "elder" are relative measures. Therefore it is necessary to define the age at which we begin to categorize an individual as being old.

In the broadest sense, older adults or elders are thought to be over the age of 50. The American Association of Retired Persons (AARP) defines an older adult as an individual over 50, the U.S. Department of Housing and Urban Development (HUD) considers anyone aged 55 years or more to be a senior, gerontologists traditionally focus on those 60 years and older, while age 65 is the U.S. federal government's trigger for Social Security and Medicare full benefits (the Social Security definition is gradually being increased up to 67 for persons born after 1959) (Souare and Lloyd, 2008). Depending on the definition used, the baby boom generation could fit relatively neatly into the category of "older adult" or it could be split in one of several ways. For example, those individuals born at the beginning of the baby boom will not be captured under the Social Security and Medicare full benefit definition until next year, in 2012. In sharp contrast, application of the AARP definition currently captures all of the baby boomers except those born in the very latest cohort birth years. While some individuals would not be captured under the AARP definition, the proportion lost would likely be relatively small because, as previously noted, the birthrate began to decline in 1957. Ultimately, selection of the age group to be examined must reasonably fit the lens of the study conducted and the benchmarks used have varied greatly. This dissertation investigates the impact of population aging in the United States. The definition and examination of "older" individuals could be truncated at a number of points (i.e. 50, 60, 65, etc.). In an attempt to capture a substantial portion of the baby boom generation - a significant and unique factor in the U.S. context – the analyses in this dissertation examine the behaviors and impacts of the age 50 and over segment within the U.S. population.

In selecting the point at which the "older population" begins, sample size becomes a major consideration. The cutoff point identified must allow for the creation of a large enough sample to allow for the comparison of older age population sub-segments amongst each other.

Beyond the selection of a cutoff point defining the older population, an expanded exploration of the behavior and associated impacts of the older populations requires disaggregation within the older cohort. Prior research, based upon a variety of reasons, has identified a number of older age sub-segments. For instance, Neugarten (1974) has been recognized for the contribution of the conventions known as young old (ages 55 to 74) and old old (aged 75 years or more). Neugarten's (1974) analysis focused primarily on the young old, a group that was identified because its members were found to be "relatively healthy, relatively affluent, relatively free from traditional responsibilities of work and family, and who are increasingly well-educated and politically active." The gerontology literature has evolved, defining the young-old and old-old chronologically wherein the young-old include either those individuals between 65 and 74 years of age, or those between 65 and 84 years old, with the old-old defined as those 75, or 85 years old and older (Settenstock and Mayer, 1997). The present analysis departs from these more commonplace definitions, instead choosing more narrowed older age categories in keeping with the exploratory nature of the research focus. Gaining a more in-depth perspective requires a greater disaggregation of the population aged 50 years or more. Relative to the analyses conducted by Neugarten (1974) and Settenstock and Mayer (1997) the analyses conducted as part of the present study utilize more recent data that allows for a greater number of age-based sub-segments due to a greater presence of persons aged 50 year or more. Additionally, Neugarten (1974) noted that the individuals comprising the young old (55 to 74 year old) cohort are not likely to be homogenous. Thus, it is reasonable to conclude that a

more detailed level of examination afforded by more than two classifications of the old. Each of the three analyses that constitute this dissertation include three or more age-based sub-segments within the 50 years old and older population.

According to Census Bureau projections for 2010, just over 31 percent of the U.S. population is aged 50 or more years (U.S. Census Bureau, 2008). Looking even further ahead, the Census Bureau predicts that by 2015, the year after the last of the baby boomers has reached their 50th birthday, the proportion of the population that is 50 or older will be nearly 34 percent -- by 2050, that figure is expected to be over 36 percent (U.S. Census Bureau, 2008). While the total U.S. population is projected to increase 56 percent from 2000 to 2050, the 50 and over cohort is expected to increase by more than 109 percent.[1] These figures further illustrate the importance of examining older age cohorts irrespective of the baby boom's influence. In 2050, the youngest of the baby boomers will be 86 years old. At that point, roughly less than 5 percent of the population will be 85 and older, and yet over 36 percent of the total population will be 50 and over. To recount the United Nations sentiment - population aging is unprecedented, pervasive, and enduring with profound implications for many aspects of humanity (United Nations, 2001).

Older Americans in the Knowledge Economy

The U.S. economy of the 21st century has shifted away from its roots in production toward a more knowledge and information driven base (Karoly and Panis, 2004). New technologies have given rise to new products and industries, transforming firm organization and labor use for existing industry (Karoly and Panis, 2004). Further technological advances will continue to mold the domestic economy as they dictate what is produced, how inputs are combined, how and where work is conducted and even who is available for employment

[1]Author's calculations using U.S. Census Bureau (2008) and U.S. Census Bureau (2009) data.

(Karolyand Panis, 2004). Older Americans will likely encounteropportunities for labor force engagement later in life within the nation's relatively young knowledge economy. Individuals will react to the opportunities presented in a variety of ways as not all older individuals are created equal in terms of potential labor force participation. Some will continue to be employed in their career occupation beyond the time when they first become eligible to retire, and some will continue to participate in the industry sector in which they held their career occupation albeit in modified form through consultant arrangements and bridge employment. Others may become entrepreneurs or self-employed sole proprietors who call upon their years of traditional labor force participation and extensive networks in the conduct of their own venture, while still others may retire but still contribute to the needs of their communities through volunteerism and social entrepreneurship. Furthermore, these individuals are unique as they are likely not tied to a specific location because they may not be engaged in traditional labor force participation in the same manner that most individuals in younger cohorts are.

The labor force behavior of older individuals has evolved in recent decades. Structural changes including the elimination of the retirement earnings test for those age 65 and older and gradual increases in the age at which Social Security full benefits eligibility begins (among other changes made to the Social Security system to encourage prolonged labor force participation) have served to increase age at retirement (Pynoos and Liebig, 2009). Yet another significant structural change likely to have influenced older workers to remain in the workforce longer is the evolution of the private pension system following the passage of the Employee Retirement Income Security Act (ERISA) in 1974 (Gale, Papke and VanDerhei, 1999). In the just over three decades since ERISA, defined benefit plans (i.e. pensions) have largely disappeared in favor of defined contribution plans including 401K, thrift savings and other employee

contribution-employer sponsored contribution matching plans (Gale, Papke and VanDerhei, 1999). Eschtruth and Gemus (2002) note that the increasing number of older workers may be owed, at least in part, to this movement from [pension] plans which are tied to a specific retirement age those [defined contribution plans] which are indifferent to retirement age. With this change, workers who entered the labor force with the expectation of high levels of pension support in retirement are now faced with the need to bolster their relatively new defined contribution plans accounts to ensure an adequate retirement nest egg; many older workers are likely working toward this goal.

The traditional association of aging with labor force departure and deterioration must also be scrutinized as both longevity and health in later life have markedly improved in the past two decades (Rice and Fineman, 2004; Crimmins, 2004). As of 2006, less than a quarter of 55 to 64 year olds, and 65 to 74 year olds, were characterized as having limitations in activity due to chronic conditions (Center for Health Statistics, 2007). In addition to gains in health status over recent decades, older Americans have begun to buck the early retirement trend observed up until a floor in the 1980s (Quinn, 1999; Purcell, 2007).

The trend is most pronounced for individuals who had already reached traditional retirement age as defined by Social Security and Medicare. Between 1977 and 2007, the number of employed persons aged 65 and older increased 101 percent while total employment increased only 59 percent. This trend is exclusive of the impact of baby boomer retirement as the oldest boomers were not yet 65 years old in 2007. The Bureau of Labor Statistics projects a continuing upward trend in older worker employment in most of the older age cohorts. Between 2006 and 2016, the proportion of workers aged 55 to 64 years is expected to increase nearly 37 percent while the proportion in the next oldest categories (65 to 74 and 75 and older) will likely increase

as much as 80 percent. By 2016, older workers may constitute as much as 6.1 percent of the labor force, up from just 3.6 percent in 2006 (BLS, 2008).

Chapter II explores the relationship between older individuals and labor force participation. More specifically, a central focus is placed on determining the likelihood that older individuals enter into self-employment. One outcome of this focus is the identification of factors which influence the decision to become self-employed in later life. Following previous literature that has examined labor force participation of older individuals, a two period multinomial logistic regression is employed. Results indicate that age plays a role in later life labor force participation choices, with middle old (ages 61 to 70) and older old (aged 70 years or more) individuals exhibiting a greater tendency toward self-employment than their young old counterparts. However, it is important to note that older individuals are still more likely to retire than they are to become self-employed.

Dwelling Choices in Later Life

A great deal of the housing literature has focused on the behaviors of older individuals. Researchers have examined housing demand, housing adjustment and life cycle theories, consumptive patterns, tenure choice, intergenerational transfers of housing wealth, household composition and location decisions. Despite the breadth of studies that have focused upon the housing behaviors associated with older cohorts, the specific housing unit characteristics tied to the housing unit choices of non-institutionalized older movers have not been explored in great detail. Tasked with the development of plans and ordinances that guide the built environment, planners are concerned with the specific characteristics desired by elder movers because they must anticipate how those demands will impact demand-driven residential development.

Whether older individuals choose to "age in place" or move in search of certain amenities, the type of housing they choose to reside in will impact the communities, urban and rural, in which they have settled. Those who 'age in place' will influence the average age of local housing stock while also potentially inhibiting rapid development of newer housing stock which better meets current demand. If even a small proportion of the population over age 50 chooses to move, the specific housing unit characteristics they seek to find will influence what the market offers and the impact of their demand for certain types of units is likely to be impactful given the sizeable number of individuals in this cohort. Thus, older Americans will also likely play a role in shaping the built environment.

Chapter III investigates the characteristics associated with the housing units chosen by older Americans who choose to relocate as well as the effect of age on the type of unit selected. A multinomial logit model is used to examine the relationship between age and the type of housing unit that older recent movers select as a residence. The results indicate that age does influence housing unit selection as it relates to the basic physical characteristics of a dwelling. The analysis is conducted using sub-segments of the 50 years old and older cohort. These sub-segments depart from an 'approximated' baby boomer base. In 2007, the period during which the most recent American Housing Survey (AHS) was conducted, baby boomers were 43 to 61 years of age. The present study excludes, as a cohort of focus, the 43 to 49 year old (as of 2007) baby boomers, because of the decrease in baby boomer births after 1957 and the research focus on the 50 years of age and older population. Two other age-based sub-segments, a 60 to 69 sub-segment (middle-aged old) and an age 70 and over sub-segment (oldest old), were also examined. Although these categories depart from aged-based sub-segments similarly coined within the political science and gerontology literatures, they were selected with exploratory

intentions. Sub-segmenting older individuals into more groups than the relative few commonly presented in the literature allows for a more in-depth examination of elder behavior and associated community impacts.

Results of this study indicate that the age of the householder amongst recent mover households with a head aged 50 years or more influences the dwelling unit selection. More specifically, recent mover households headed by individuals between the ages of 50 and 69 were found to be most likely to move to single family dwellings ranging size from 1,000 to just under 3,000 square feet. Conversely, recent mover households headed by individuals aged 70 years or more, were found to be more likely to select multi-family dwellings and in particular, smaller multi-family units (under 1,000 square feet). These findings run counter to the more polarized findings common in the planning literature. Older individuals appear to be more heterogeneous in their dwelling preference than has been posited.

Population Aging and Rural Economic Outcomes

The shift toward a more knowledge-based economy, as previously discussed, has taken hold for the U.S. overall, but not all geographies and industry sectors have experienced its impacts equivalently. Although a number of U.S. sectors and regions exhibit characteristics associated with developed knowledge-based economies, certain industries and the areas in which they are most commonly located still require a relatively high level of labor inputs.

Rural areas, relative to their urban counterparts, tend to be marked by a higher proportion of more basic industry employment. In contrast to urban areas, rural areas exhibit an overall higher proportion of older people (Couburn and Bolda, 1999; Warner, Roberts and Geernaert, 2008). Eighty percent of the land area in the U.S. lies within rural counties, but these counties only account for 20 percent of the population (Porter, Ketels, Miller and Bryden, 2004).

With much of the rural labor force engaged in more physically demanding occupations, it is not hard to conceive that more urbanized areas, characterized by a greater presence of sectors, which rely primarily upon human capital, can continue to enlist older workers more readily than rural labor markets in need of significant physical abilities. Thus, business growth may not be as great a challenge in more populated areas where both the pool of replacements and the pool of consumers are greater. For these reasons, it may be that rural economies are more likely to be significantly impacted by population aging than is case for more urbanized economies.

Population aging occurs at the intersection of several demographic trends. Rural counties, like many metropolitan areas in the U.S., face increases in life expectancy combined with decreases in fertility rates. Rural communities have experienced significant population losses in recent decades. Specifically, the out migration of young people exacerbates population aging in rural America. In addition, for some rural communities, the in migration of older retirement-age people further exacerbates this trend. For nearly four decades, it has generally been the case that smaller, resource-dependent communities reliant on basic industries including farming, logging, and mining have been hard-pressed to prevent both population and business decline (Bolender, 2010). At the same time, birth rates in rural areas are outpaced by death rates (Jones, Kandel and Parker, 2007). As a result, typecasts and characterizations including the "Rural Brain Drain" and "Hollowing out the Middle" have emerged in the literature (Artz, 2003; Carr and Kefalas, 2008)

Chapter IV investigates the impact of population aging on rural prosperity. A probit model with a dichotomous dependent variable is used to examine the relationship between population aging and prosperity at the county level. The results indicate that aging impacts whether or not a rural county is prosperous. The relationship is not consistent across older age

cohorts. Higher proportions of individuals in the young (ages 50 to 59) old and middle-aged (60 to 69) old cohorts negatively impact the likelihood that a rural county will be prosperous while increased proportions of the oldest (ages 85 and over) old exhibit the opposite impact.

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CHAPTER 2. ELDER ENTREPRENEURSHIP

This chapter investigates the likelihood of self-employment amongst older individuals and the factors influencing self-employment at various increments beginning at 50 years of age. A multinomial logit model is used to examine the relationship between age and other attributes and the decision to become self-employed during a period in life that is traditionally associated with departure from the labor force. The results indicate that aging impacts labor force participation and in particular, the likelihood of a transition from wage and salary employment into self-employment.

INTRODUCTION

As both the proportions of the population and of the labor force aged 50 or older increase, questions regarding the nature of older age employment naturally arise. Elder workers in the knowledge-based U.S. economy will likely find prolonged labor force participation more feasible than did previous generations, which faced challenges associated with aging and more basic, physically strenuous occupations. Furthermore, conventional wisdom regarding old age and labor force participation is changing. Longevity and health in later life have markedly improved in the past two decades (Rice and Fineman, 2004; Crimmins, 2004) and as a result, older Americans may find themselves more capable of extending the economically active period of their lives. The benefits of prolonged engagement in the labor force accrue to both older and younger workers. Older workers postpone wealth drawdown and are better able to maintain their current standard of living while society benefits from older workers' additional contributions to government-run programs including Social Security (Zhang, 2008). Individuals choosing to work later in life are likely concerned with more than the achievement of financial stability,

however; lifestyle is a significant factor influencing the employment decisions of older individuals.

REVIEW OF LITERATURE

Older Age and Labor Force Participation

From the turn of the 20th century through the 1980s, the labor force participation rate of men declined (Costa, 1998). Then during the 1980s, the rate of decline slowed and flattened for men ages 55-64 while the rate of decline for men 65 and older not only slowed but ultimately reversed in the 1990s (Maestas and Zissimopoulos, 2009). Male labor force participations have not changed in isolation; female labor force participation has also exhibited recent significant increases. Between 1950 and 2000, the labor force participation rate doubled from 35 to 70 percent for women aged 25-54 years while labor force participation among women aged 55-64 years also doubled increasing from roughly 25 to 50 percent (Maestas and Zissimopoulos, 2009). Older workers are not only staying in the workforce longer but they are increasingly doing so on a full time basis—throughout the year (Gendell, 2008). In general, older Americans have begun to buck the early retirement trend observed up until its bottom in the 1980s (Quinn, 1999; Purcell, 2005). In the thirty years between 1977 and 2007, the employment of those 65 and older increased 101 percent while the increase in employment as whole increased only 59 percent. This trend is exclusive of the impact of baby boomer retirement as the oldest boomers were not yet 65 years old in 2007 (BLS Spotlight on Statistics: Older Workers, 2008). The Bureau of Labor Statistics (BLS) projects continuing upward trends in older worker employment. Between 2006 and 2016, the proportion of workers 55 to 64 years of age is expected to increase nearly 37 percent while the proportion in the next oldest categories (65 to 74 and 75 and older) will likely increase as much as 80 percent. By 2016, older workers may constitute as much as 6.1 percent of

the labor force, up from just 3.6 percent in 2006 (BLS, Spotlight on Statistics: Older Workers, 2008).

Static entry into retirement appears to be a diminishing trend given the number of older workers transitioning into different jobs later in life and re-entering the labor force after their initial retirement exit (Cahill, Giandrea and Quinn, 2006). The explanation for this trend is likely due to a combination of factors including: the rise in longevity, which has meant that workers must plan for longer retirement periods; the potential need for very expensive long-term care as a result of longevity gains; the major shift from defined- benefit to defined-contribution pension plans across all sectors; Social Security program changes geared toward shifting the retirement age; and the movement from physically demanding manufacturing jobs to more knowledge-based service industry occupations (Friedberg and Owyang, 2004; Cahill, Giandrea and Quinn, 2008; Munnell, Muldoon and Sass, 2009; Gendell, 2008).In addition to increasing numbers of older workers remaining in or re-entering into the workforce during times of economic vitality, older Americans may be expected to seek workforce re-entry during economic downturns. Financial considerations shape the decisions of younger retirees, while the overall health of the economy motivates both younger and more middle-aged retirees (Cahill, Giandrea and Quinn, 2008). This is likely to be particularly true for workers who rely more heavily on stock market-based investments as a source of retirement income. A comparison between January 1999 and January 2009 Current Population Survey (CPS) data provides a cursory look into this trend during both a period of expansion and a period of contraction.

In January 1999, the U.S. economy remained in an expansionary period that had begun eight years prior in the first quarter of 1991. In contrast, January 2009 was marked by dismal market conditions and the continuation of a contractionary period that began more than a year

prior, in the fourth quarter of 2007 (National Bureau of Economic Research). Relative to January 1999, the percent of retired persons aged 60 to 64 seeking employment was 22 percent higher during the same month in 2009. For those aged 70 to 74, and 75 to 79, the relative change was 17 percent and 95 percent, respectively.

Although financial considerations appear significant to the decision to delay retirement or re-enter the labor force, such factors are not likely to be the only drivers of older workers' labor market participation decisions. Wages earned by older workers are often lower than younger counterparts' wages and their own past earnings, suggesting that reasons other than money motivate the decision to remain in the workforce (Haider and Loughran, 2001; Munnell, Muldoon and Sass, 2009). Additionally, Haider and Loughran (2001); Lahey, Kim, and Newman (2006); and Maestas (2005), found that financial pressures alone did not explain individuals' decision to return to work after retiring.

Understanding of Self-Employment

Self-employment, which is generally thought to be the most simple form of entrepreneurial activity (Branchflower, Oswald and Stutzer, 2001), has been a popular area of study for researchers in many fields including economics, decision sciences, sociology, economic development, business, finance and public policy. Thus, it is not surprising that a great many findings have been made regarding the determinants of self-employment as well as the determinants of the transition into self-employment. As the literature has developed, certain clear distinctions have emerged. In particular, many studies examine "pulls" toward self-employment while others focus on the "pushes" into self-employment.

Among the many veins of the self-employment literature, one area has specifically focused upon the reasons that motivate self-employment and transitions into and out of it. These

individual-level attributes are often thought of as "pulls" toward self-employment and have been found to play not only into the entrepreneurial decision but into the type of enterprise an individual will seek to engage in as well (Bönte et al., 2007). Through their analysis of time series data, Davidsson and Honig (2003) found individual social capital, defined as familial and community social networks as well as organizational relationships, to be a positive influence on the probability of entrance into nascent entrepreneurship and longer run venture success. Education also plays a role in the decision to enter into entrepreneurship. Individuals with higher levels of explicit human capital, education, and those with higher levels of tacit human capital, experience, are likely to become nascent entrepreneurs (Davidsson&Honig, 2003). Human capital is a particularly influential trait. An individual's stock of human capital is determined in a number of ways. Formal education and experiential learning over time both affect the accumulation of human capital. Ultimately a person's human capital directly impacts their productivity and suitability for particular forms of employment (Bönte et al., 2007).

In addition to a the positive influence of higher educational attainment, studies have also revealed that men, older workers and those who are married are more likely to be self-employed (Fairlee and Meyer, 1996; Blanchflower, 2000). The greater propensity to enter into self-employment among may be at least in part explained by gender divergences in occupational choice. Individuals employed in managerial or supervisory positions are more likely to become self-employed, while clerical and administrative support workers are less likely (Boden, 1996). Boden (1996) further explains that relative to men, women are underrepresented in managerial or supervisory positions and overrepresented in clerical and administrative positions. Fairlee and Meyer (1996) also found that disabled individuals are more likely to be self-employed. In a later study, Fairlee (2004) found that education and age distribution within certain minority groups

exacerbate racial gaps in self-employment while Dawkins (2008), in a study examining the interplay between spatial patterns, race and the black-white self-employment gap, identified race as a significant determinant of entrance into self-employment (Dawkins, 2008).

The probability of entrance into entrepreneurship, and longer run venture success has also been found to be positively influenced by social capital (Davidsson and Honig, 2003). Social capital can be thought of as the "social" component of human capital in the form of strong community ties and business networks (Bowles and Gintis, 2002; Glaeser et al., 2002). Risk tolerance may also play a role in the decision to be self-employed. Compared with wage and salary opportunities, self-employment is accompanied by greater uncertainty with regard to future income (van Praag and Cramer, 2001). Research conducted by Caliendo, Fossen and Kritikos (2009) indicates that the role of risk varies across circumstances. In other words, while in general lower risk aversion is associated with a higher propensity for self-employment, the finding only holds for those who were otherwise engaged in regular employment. Risk tolerance does not appear to play a role in the self-employment decision for individuals exiting a period of unemployment or inactivity.

Capital constraints play a large role in the decision to become an entrepreneur. Entrepreneurs can borrow capital to start up or to expand. However, banks are, in general, reluctant to extend loans to potential entrepreneurs with low levels of wealth for use as collateral (Fonsecaet al., 2007). Accordingly, access to capital has been identified as yet another determinant affecting the self-employment decision (Evans and Jovanovic, 1989; Evans and Leighton, 1989). Branchflower and Oswald (1998) show that an inheritance or monetary gift, particularly earlier in life (prior to the mid-30s) is associated with a greater likelihood of self-employment. Wealth may also indicate an individual's financial management acumen. Housing

wealth is accrued due to a number of different factors including a homeowner's ability to contribute to equity through payments and the homeowner's choice of a dwelling. Thus, increases in housing wealth not only affect an entrepreneur's ability to secure financing for start-up or expansion but may also signal financial management ability. Black, de Meza and Jefferys (1996) found that increases in housing wealth do indeed exhibit a positive relationship with the formation of at least average quality businesses.

In contrast to those factors which are commonly identified as pulling individuals into self-employment, "push" factors tend to be associated with a more negative connotation. For example, some entrants into self-employment transitioned due to challenges in finding employment in the more conventional, wage and salary, labor market (Blanchflower and Oswald, 1998). In a comprehensive investigation of self-employment drivers, Evans and Leighton (1989) find lower-wage workers, the unemployed and those who exhibit employment history volatility are more likely to become self-employed. This may be due to their "lack of acceptance" into the traditional labor force, a factor which may "push" them into self-employment. In an examination of the relationship between unemployment and self-employment, Thurik et al. (2008) find that two distinct relationships between unemployment and self-employment exist. The first, the "refugee" effect, occurs when higher rates of unemployment spur greater levels of self-employment. The second, the "entrepreneurial" effect, occurs when higher rates of self-employment reduce unemployment levels over time. While Thurik et al. (2008) confirm the presence of the so-called "refugee" effect; they also found the "entrepreneurial" effect to be the stronger of the two.

Self-Employment Later in Life

Seniors have been shown to be more likely than younger cohorts to be self-employed and the presence of senior entrepreneurs is increasing (Schintler in Zhang, 2008; Sloan Center Fact Sheet, 2010). Stangler's 2009 synthesis of Kauffman Foundation entrepreneurial activity research reveals that Americans between the ages of 55 and 64 had a higher rate of entrepreneurial activity than those aged 20-34 during each year between1996 to 2007. During that same period, entrepreneurial activity owed to 55 through 64 year olds averaged approximately a third more than was the case for the entrepreneurial activity owed to their youngest counterparts (Stangler, 2009). Using Dunn and Bradstreet data, Wadha, Freeman and Rissing (2009) found that "twice as many American-born entrepreneurs start ventures in their fifties as do those in their early twenties." Looking at entrepreneurship more broadly, Hipple (2004) found that older workers, those aged 51 and older, were more likely to be self-employed than younger workers in 2003. Self-employed workers aged 51 and older, compared with wage and salary peers, are more likely to be "male, white, married, and college educated; and more likely to be healthier, but to have a health condition that limits work" and were more likely to work on a part-time basis and have a family-business (Hipple, 2004). Workers aged 50 and over are significantly more likely than their younger counterparts to be self-employed or small business owners. A survey of recent studies conducted by the Sloan Center on Aging at Boston College noted that some older workers anticipate starting a business or working for themselves part-time or full-time after retirement or a lay-off; however, of those who have started businesses, a relative few report traditional labor market inopportunity as a major driver (Cohen, 2010).

For potential retirees whose primary reasons for remaining in or re-entering the workforce depart from traditional economic drivers, self-employment may present an attractive

alternative to more conventional wage and salary positions. Indeed for many, the move into retirement may be gradual wherein self-employment may be a form of partial retirement – an option with greater flexibility (Quinn, 1980). The transition into full retirement is generally not absolute; many middle-aged and older workers move from a full-time career job through other transitions before finally leaving the labor force. Individuals take many paths as they move from their full-time career position into bridge employment, partial employment/retirement or full retirement (Quinn, 1980; Ruhm, 1990, 1992; Peracchi and Welch, 1994; Gingh and DeNoble, 2003). Such transitions include work hour reduction and movements from full-time to part-time work, as well as transitions from wage and salary employment to self-employment.

In a cross-country [international] empirical individual-level study, Branchflower, Oswald and Stutzer (2001) found that ease of entrance into self-employment increases with age and higher levels of job satisfaction are associated with self-employment. Aging self-employed workers, relative to their wage and salary counterparts, are able to continue in the labor force longer despite poorer health, as they are better able to balance their demands for work and for leisure and are afforded greater flexibility in hours (Quinn, 1980). This may explain why Hipple (2004) found that older workers, those aged 51 and older, were more likely to be self-employed than younger workers in 2003. Self-employed workers aged 51 and older, compared with wage and salary peers, were more likely to be "male, white, married, and college educated; and more likely to be healthier, but to have a health condition that limits work" and were more likely to work on a part-time basis and have a family-business (Hipple, 2004). Hipple's findings bolster Quinn's (1980) argument that aging self-employed workers may be better able to accommodate their changing preferences for work versus leisure based on the conclusion that older self-employed workers, relative to their wage and salary counterparts, are able to continue in the

labor force longer despite poorer health, as they are afforded greater flexibility in hours. Overall, self-employment appears a potentially attractive option for individuals as they age and developing a greater understanding of why this might be the case is important to a society concerned with labor force replacement rates and an adequate revenue base for several large, government-funded social safety net programs.

The following study examines the likelihood of self-employment among older individuals while also identifying the major factors influencing the decision to become self-employed later in life. Special focus is directed toward differences between sub-segments of the identified "older" cohort. In other words, this study looks to identify potential differences between the young old, the middle-aged old and the old old. This study presents the conceptual marriage of endogenous growth theory and entrepreneurship theory as the framework for explaining the increasing occurrence of elder entrepreneurship.

THEORETICAL MODEL

Endogenous growth theory has experienced rapid development and refinement since its introduction by Paul Romer in the mid-1980s. Up until that point, the neoclassical growth model was a dominant presence in economics. Neoclassical growth theory is heavily reliant on the role of capital within the economy. Under the neoclassical model, the growth rate is influenced by the level of capital accumulation and is only policy amenable in the short run because it converges toward a steady state in the long run. Convergence occurs as the model exhibits diminishing returns. In the long run, growth is exogenously determined and is dependent upon the rate of technological progress and the rate of labor force expansion (Solow, 1956). Robert Solow formally presented this model in a 1956 article published in the *Quarterly Journal of Economics* and used it as the framework underlying further research that provided evidence that

eighty percent of growth in output per worker in the U.S. is attributable to technological progress (Solow, 1957). While this finding certainly strengthened neoclassical assertions, two major problems remained. First and foremost, the model lacks an explanation for the source of technological progress. Secondly, it predicts that convergence occurs in the long run, which would lead one to naturally assume that weaker economies should, in the long run, converge with stronger economies. According to much of the cross country growth literature, this does not appear to be the case. An additional issue of concern with the model is an apparent omission of the role of human capital and government policy (Ehrlich, 1990).

In response to and building upon Solow's inclusion of technological progress as a determinant of economic growth, Romer (1986) developed mathematical structures that attributed progress to the deliberate efforts of individuals accumulating knowledge and engaging in research and development. Based upon a comprehensive survey of the literature, Grossman and Helpman (1994) assert that "purposive, profit-seeking investments in knowledge play a critical role in the long-run growth process." Romer's model distinctly departs from the traditional neoclassical view as to the origins of economic growth. Romer's model goes so far as to reject the assumption that growth is solely an exogenously driven process. Rather, he shows that the rate of long run growth is directly determined by the "accumulation of knowledge by forward-looking, profit maximizing agents" (Romer, 1986). The production function therefore includes not only labor and capital but knowledge as well. Knowledge, unlike capital and labor, can be infinitely obtained. It is this unique trait that gives rise to the revolutionary nature of the endogenous growth model. Growth models prior to Romer's model had always exhibited diminishing returns. Romer turned this precept on its head, showing that with the inclusion of knowledge, increasing returns are achievable.

The rate of technological progress is endogenous in Romer's model. Human capital and the creation of new technologies due to innovation are therefore essential to growth. Actors in constant pursuit of productivity gains seek opportunities ripe for exploitation as they are faced with the incentive to invent and innovate in order to gain advantage over competitors. During this process positive externalities are observed as knowledge associated with innovation "spills over" to other interested parties. Arrow (1962) coined this process "learning by doing". Although Arrow is counted amongst top neoclassical theorists, his work in a 1962 *Review of Economics Studies* article acknowledged the neoclassical model's inability to account for the underpinnings of technological change and introduced the idea that such change was likely an endogenous factor, which hinged upon the cumulative body of knowledge gained by experience over time. The work of Romer, Arrow, Lucas, Becker and others outlines the importance of human capital to economic growth.

Entrepreneurship is essentially the mechanism whereby firms and/or individuals make use of knowledge gained through experience to exploit situations which result in advantages over competitors. It is a phenomenon that is endogenous in nature and is a means of employing human capital. Entrepreneurial firms and entrepreneurs are those businesses and individuals who seek out, identify and capitalize upon market opportunities. Schumpeter's seminal 1934 paper *'The Theory of Economic Development'* highlighted the importance of the entrepreneur as the 'personification of innovation' while later works stressed the role of the large corporations as the 'main drivers of innovation' (Hagedoorn, 1996). Opportunities often present themselves in the form of potential innovations geared toward improving a process or a particular product. Improvement leads to efficiency gains and/or improved profit margins for those willing to take [calculated] risks. Given the uncertainty, asymmetries and high transactions costs associated

with knowledge, the importance of entrepreneurship in a knowledge-based economy is logical as it provides the means by which knowledge flows from the source to those looking to commercialize (Audretsch and Thurik, 2001). Indeed, entrepreneurship serves as a crucial link between knowledge and growth, an assertion supported by cross country empirical analysis suggesting that higher levels of entrepreneurial activity lead to higher subsequent growth rates (Audretsch and Thurik, 2001).[2]

Motivated by the notion that economies grow in large part through the activities of entrepreneurs and small business owners, investigation into entrepreneurship has been quite popular in recent decades. More specifically, achieving a better understanding of entrepreneurship has become a priority within both the research and policy communities and as a result many studies have been conducted examining the individual attributes of entrepreneurs, the environments in which entrepreneurship occurs as well as the relationship between individual- and firm-level entrepreneurial activity and economic growth. While these studies have all contributed to the body of knowledge on entrepreneurship, the isolated and segmented nature of the analyses performed has not resulted in the formation of a uniform and cohesive structural framework. A 2003 book entitled, *A General Theory of Entrepreneurship: The Individual-Opportunity Nexus,* combined the findings of past research with additional insights into the dynamism, complex interrelationships and necessary conditions associated with entrepreneurship.

The 'individual-opportunity nexus' as coined by Shane (2003) is the interplay between those individuals with characteristics that predispose them to entrepreneurship and an environment that is inherently supportive of entrepreneurship and also ripe with opportunities for

[2] Sample included only Western European countries from 1990 to 1994 – 1992 was noted as a recessionary year while 1994 was noted an 'exceptional strong recovery' year.

entrepreneurial exploitation. Simply put, an entrepreneurial environment separate and apart from individuals with entrepreneurial spirit and skills will not result in entrepreneurship. Nor will entrepreneurship occur when entrepreneurial individuals are located in an environment which is not conducive to start-ups.

Entrepreneurial opportunities can arise from changes in technology, politics, regulation, demographics and social factors (Shane, 2003). Heterogeneity of thought within the population allows for entrepreneurial activity. Shane (2003) notes that if everyone applied the same price information and optimization rules to each resource allocation decision then they would all arrive at the identical valuation. Given this condition, there would be no motivation to obtain resources and then sell them to others for more than their acquisition cost. Thus, people must not all allot the same value to the same resources at a single point in time if any one person is going to be able to identify an entrepreneurial opportunity (Shane, 2003). Additionally, the decision-making process in the entrepreneurial realm cannot be grounded in the use of mathematical formulas reliant upon the input of current market prices. These prices represent current, not future, market transactions and current, not future, costs of production. For the entrepreneur, current prices and costs are not relevant to something that has yet to be created and introduced.

The entrepreneurial process not only requires the presence of an opportunity but also the intellect and persona of an individual capable of identifying the opportunity with an inherent willingness to exploit it once found. Because entrepreneurs must make decisions outside of the framework applied to goods and services that are currently available, the application of their personal judgment to the perception of an opportunity is paramount. Casson (1982) points out that "The essence of entrepreneurship is being different – being different because one has a different perception of the situation" (as cited in Shane, 2003). Ultimately, Shane (2003)

explains that "entrepreneurial decision-making involves making decisions that require judgment at odds with the judgment of others." Entrepreneurs must devise a framework to consider what the market wants, competitors' reactions and the effect of technological change (Wu, 1989 as cited in Shane, 2003). In this context it is individuals' creativity which allows them to assess the uncertain (Shane, 2003). In early work examining entrepreneurial theory of firm formation, Kihlstrom and Laffont (1979) note that the entrepreneur contributes managerial and organizational skills and is characterized by two activities – the supply of entrepreneurial inputs and the bearing of risks associated with production.

In a macro sense, older individuals have had a significant number of years over which to amass social capital. At the same time, older individuals have a relatively high level of human capital accrued through a significant period of time in the labor force which has afforded them a great deal of experiential learning. Additionally, older individuals, particularly those in the baby boomer cohort, have achieved higher levels of educational attainment than was true of preceding generations. The combination of these favorable individual characteristics with a knowledge economy in which many of the available opportunities do not require intensive physical labor, set the stage for the possibility of increasing levels of entrepreneurship amongst older segments (those over 50 years of age) of the population.

DATA AND EMPIRICAL MODEL

Data

The analysis is conducted using data from the 2006 and 2008 waves of the Health and Retirement Study (HRS) public access files. The HRS sample is comprised of Americans aged 50 years and older and contains detailed information regarding general demographics and familial associations; sources and amounts of income; job characteristics, jobmobility, work

hours, attitudes toward retirement, and early retirement incentive offers; the asset composition and total amounts; entitlements to current and future benefits (Social Security, Medicare, Medicaid, employer pension plans, and employer-sponsored health insurance); the movement of assets, including gifts and bequests; housing arrangements; earnings, savings, and spending of individuals and families as they approach retirement and over the course of their retirement. The present study is limited in its applicability due to the truncation of respondents from age 50 onward. Comparisons cannot be drawn between the labor force transitions of individuals under 50 and those over 50. This limitation is not fatal. There is some use in comparing peers to peers. A comparison between a 30-something and a 60-something when examining a possible transition into self-employment would not be meaningful given their divergent stages in the life cycle. Rather, a comparison of individuals all nearing retirement may be more appropriate.

The public use HRS microdata files only include self-reported data. While more detailed Social Security and Medicare information is collected and linked directly to the respondent information found in the public use files, it is only available under the most stringent of confidentiality arrangements. Access to these restricted files was not obtained for use in this study and as such, the data used may suffer from the influences of recall deficiency and intentional misreport.

Empirical Model

Individuals face a multitude of choices during their lifetime and those at or over the age of 50 encounter an increasing number of decisions regarding labor force participation. As has been true for many entrepreneurship studies, the present study chooses to use self-employment as a proxy for entrepreneurship. Hereinafter, the two terms, entrepreneurship and self-employment are used interchangeably.

Individuals engaged in wage and salary employment, face a choice set which includes continuance of wage and salary employment, self-employment, retirement or possibly some form of non-work status (due to disability, unemployment, etc.). Facing this particular choice set, the individual is assumed to derive some level of utility that is relative to each choice. The utility gained by the selection of a given choice is a function of the alternative's attributes (work schedule flexibility, income security, etc.) and the individual's attributes (human capital, social capital, etc.). Ultimately, the individual will select that choice which maximizes their utility. Under this framework, the choice set is the dependent or discrete random variable. It is random because it is not possible to identify with certainty the choice an individual selected at random will arrive at.

Discrete choice models relate a choice made by an individual to the choice set faced by the individual and the individual's attributes. The econometric model employed in this analysis acknowledges that labor force choices amongst older workers are often more transitory than abrupt. This is done through the use of longitudinal data which allows any given individual within the sample to be tracked over time. Thus, any changes in a respondent's labor force status that occur between sample periods can be observed and included in empirical analysis intent upon determining the probabilities of certain behaviors occurring given certain individual attributes over time.

Following the empirical approach used by Zissimopoulos and Karoly (2003), a multivariate analysis of the factors associated with a potential transition from wage and salary employment to either self-employment, retirement, or not working is conducted. More specifically, the empirical results presented in this essay are generated with a two-period multinomial logit procedure. The dependent variable is categorical; thus, the multinomial logit

model is superior to the ordinary least squares (OLS) method, which cannot yield the best linear unbiased estimator (BLUE) when the dependent variable is not continuous (Park, 2009). Multinomial logistic regression is specified for responses that are *polytomous*, (i.e., the dependent variable assumes more than two choices) (Schafer, 2006). The model has been extended to accommodate either ordinal (inherently ordered categories) or nominal (unordered categories) dependent variables (Schafer, 2006). The dependent variable in this study is nominal as it does not exhibit an inherent ordering.

It is assumed that the tendency for person *i* to transition from a given state, *k*, at time *t* to a given state, *j*, at time *t+2* (approximately two years later) is given by the index function:

$$Y^*_{ij} = \beta_{0j} + \beta_{1j} D_i + \beta_{2j} W_i + \beta_{3j} H_i + \beta_{4j} S_i + \beta_{5j} E_i + u_{ij}$$

Where D = a vector of demographic characteristics, W = a vector of wealth measures, H = a vector of health status measures, S = a vector of measures of social interaction (social capital), E = a vector of human capital (educational attainment), and u_{ij} is the model error term. All determinants of Y^*ij are measured as of time t.

Dependent Variable

The errors in this model are assumed to follow the standard logistic distribution.The multinomial logit model jointly estimates the parameters for all m outcomes using maximum likelihood estimation, where the parameters for one of the choices (the reference or base category) are normalized to zero.For those who are full-time wage and salary workers during the 2006 wave, transitions to one of four states by the next wave (2008) are estimated. The possible outcomes in t=2 are as follows: continue wage and salary employment (reference category), enter into self-employment, become retired or exit the labor force for some other reason (unemployed,

disabled, etc.) The resulting sample consists of 2,490 observed transitions between two consecutive interview waves, 2006 and 2008. Table 1 presents the choice definitions and corresponding descriptive statistics for the dependent variable.

Table 1: Laborforce Transition Dependent Variable Descriptive Statistics

Index	Value	Frequency	Percent
1 = Wage and Salary	0	1697	68.15
2 = Self-Employment	1	346	13.9
3 = Retirement	2	365	14.66
4 = Not in Laborforce	3	82	3.29

A cross tabular comparison between respondents' laborforce status in *t*+2, 2008, relative to the same respondents' laborforce status in *t*, 2006, revealed that amongst individuals who were retired as of *t*, 89.86 percent were still retired 2 years later in *t*+2. Within the same group of individuals who were retired as of 2006 only 0.83 percent had transitioned to full time wage and salary employment while another 0.38 percent had transitioned to part-time wage and salary employment by 2008. Interestingly, amongst respondents who were retired in 2006, 36.51 percent were self-employed as of 2008 (8.55 percent of all self-employed in 2008). These statistics indicate two things. First, future studies should consider elder transitions from both wage and salary employment and retirement to self-employment. Second, for a certain proportion of the elder self-employed, the decision to enter into self-employment is likely made simultaneous to the decision to retire and those engaged in self-employment during the retirement period may still consider themselves retired. It should also be noted that there is a range associated with the definition of self-employment which may capture even those individuals reporting no more than a few thousand dollars per year owed to self-employment activities.

The coefficients associated with the multinomial logistic regression and the marginal effects were derived. Since the parameter estimates of logit models cannot generally be used to interpret results, the discussion presented in the results section is focused on the marginal effects. Discrete choice model parameter estimates must be transformed to yield marginal effects; inferences are to made from the marginal effects which represent the change in predicted probability of the dependent variable choice set associated with changes in the explanatory variables (Anderson and Newell, 2003; Greene 2003). Marginal effects are nonlinear functions of the parameter estimates and the levels of the explanatory variable and as such, they cannot be readily derived from the parameter estimates (Anderson and Newell, 2003). The marginal effects for the dummy variables are calculated as the difference between two resulting probabilities when the dummy variable equals its two values 0 and 1 (Gillett, 2004).

Explanatory Variables

Demographic. Common demographic measures including race, ethnicity (Hispanic), sex, age and marital status are included in the model used in the present study. Age is of course, the central focus of the study and is therefore, considered to be more than a 'standard' demographic measure. Race and ethnicity

Wealth.Among older workers, transitions into self-employment have been found to be positively associated with wealth (Bruce, Holtz-Eakin, and Quinn, 2000). Thus, self-employment transitions are likely influenced by liquidity constraints for older workers (Zissimopoulos and Karoly, 2003). Measures of wealth are derived from self-reported estimates of total assets (to include the values of primary and secondary residences). Negative wealth values are accounted for in the model used in the present study.

Health Status. Measures of health status are derived from respondents' ranking of their health status. Respondents were asked to rank their health according to five categories; these categories were condensed down to three categories for use in this study's model.

Social Capital.Glaeser and Redlick (2009) provide the following explanation of social capital: it is location-specific while human capital is not. More specifically, skills learned via education are portable but investments in social connections within a given location are not (Glaeser and Redlick, 2009). Therefore, the measures of social capital included in the model used in this study relate to respondents' proximity to relatives and friends as well as the frequency of their interactions with other people, including relatives and friends.

Human Capital. Older workers with relatively high levels of educational attainment continue to build their stock of human capital through on-the-job and other life experiences. This "tacit" knowledge accumulates throughout life peaking in an individual's 50s and remaining relatively steady across groups until the 80s (Wang and Kaufman,1993; Kaufman and Horn, 1996; Ryan et al., 2000). The model used in the present study includes educational attainment levels as measures of human capital.

Variance inflation factors and tolerance values for the explanatory variables were calculated to identify potential multicollinearity. These tests are necessary because regression model coefficient estimates become unstable and standard errors inflate as the degree of multicollinearity increases. For any given variable, a variance inflation factor in excess of 10 or a tolerance value under 0.1 would give cause for concern. The highest observed variance inflation factor for this model was 1.87 while the lowest tolerance observed was 0.53. Thus, it is relatively safe to assume that the model is not adversely impacted by an intolerable level of multicollinearity.

One of the goodness of fit values for multinomial logit model employed in the present analysis is consistent with similar studies. In a study examining the relationship between self-employment and social networks in China, Yueh (2009) is satisfied with multinomial logit model likelihood ratios ranging between 294.41 and 532.16. As presented in Table 2 (below), the likelihood ratio of the laborforce transition model is 207.26, slightly below the level deemed acceptable by Yueh (2009). Diaz-Garcia and Jimenez-Moreno (2010) in a study of the relationship between gender and entrepreneurial intentions find a likelihood ratio of 106.142 and are satisfied with the fit of the model. Unfortunately the other measures reported, in particular the Estrella, the Adjusted Estrella, and the McFadden's LRI measures are somewhat low. Other studies (Yeuh, 2009; Diaz-Garcia and Jimenez-Moreno, 2010) are able to report pseudo R^2 values of at least 0.18. The multinomial logit model in the present study can only report pseudo R^2 values (Estrella, Adjusted Estrella and McFadden LRI) ranging from 0.0448 to 0.0816. The McFadden LRI, for example, is a direct comparison of the full set model and the null set model. These measures are designed for use in a fashion similar to the R^2 of the ordinary least squares regression model. In other words, values approaching one indicate better fit than those closer to zero. The fit of the laborforce transition model is less than desirable based on pseudo R^2 values.

Table 2: Laborforce Transition Multinomial Logit Model Goodness-of-Fit Measures

Goodness-of-Fit Measures		
Measure	Value	Formula
Likelihood Ratio (R)	207.26	2 * (LogL - LogL0)
Upper Bound of R (U)	4628.5	- 2 * LogL0
Aldrich-Nelson	0.0768	R / (R+N)
Cragg-Uhler 1	0.0799	1 - exp(-R/N)
Cragg-Uhler 2	0.0946	(1-exp(-R/N)) / (1-exp(-U/N))
Estrella	0.0816	1 - (1-R/U)^(U/N)
Adjusted Estrella	0.0583	1 - ((LogL-K)/LogL0)^(-2/N*LogL0)
McFadden's LRI	0.0448	R / U
Veall-Zimmermann	0.1182	(R * (U+N)) / (U * (R+N))
McKelvey-Zavoina	0.1115	

RESULTS

With the exception of the age measures included in the empirical model, the variables included in this study served primarily as controls. However, it is important to note that several of these control variables were found to be significant to an individual's continued wage and salary employment or transition into self-employment, retirement, or non-laborforce status. Marital status, sex, and total asset accumulation all influence the laborforce participation decisions of individuals aged 50 years or more. Rees and Shah (1986) explain that married individuals, men in particular, may be more likely to take greater risks because of the support provided by their familial [marital] arrangement. The wealth variable representing those with total assets of more than one million dollars positively related to the likelihood of both retirement and self-employment. This result confirms much of the entrepreneurship literature covering the relationship between entrepreneurship and wealth and liquidity constraints (Branchflower and Oswald, 1998; Zissimopoulos and Karoly, 2007). It is also consistent with the retirement literature estimates of wealth 'required' to retire.The direction and magnitude of influence associated with each of these measures are reported in Table 3 (below).

Table 3: Marginal Effects for Laborforce Transition Multinomial Logit Model

Variable Descriptors		Multinomial Logit Model Choice Set Results			
Variables and Variable Definitions	**Variable Means**	**Wage and Salary**	**Self-Employment**	**Retirement**	**Not in Laborforce**
Marital Status					
Separated or Divorced*	0.1428	***-0.04759***	***0.013079***	***0.024269***	***0.010245***
Widowed***	0.0727	***0.104124***	***-0.02861***	***-0.0531***	***-0.02241***
Never Married	0.0361	-0.01389	0.003818	0.007084	0.00299
Married (Base)	0.7494				
Ethnicity and Race					
Hispanic	0.0980	-0.04826	0.013262	0.02461	0.010389
Black	0.1622	0.003299	-0.00091	-0.00168	-0.00071
Race other than Black or White	0.0691	0.02976	-0.00818	-0.01518	-0.00641
White (Base Category)	0.7687				
Sex					
Male** (Base = Female)	0.4896	***-0.04354***	***0.011966***	***0.022204***	***0.009373***
Educational Attainment					
Less than High School diploma	0.0972	-0.02448	0.006727	0.012483	0.00527
GED	0.0341	0.060534	-0.01663	-0.03087	-0.01303
Some college, but no degree	0.2695	0.02397	-0.00659	-0.01222	-0.00516
College or Grad/Professional degree	0.3289	0.002962	-0.00081	-0.00151	-0.00064
High School Graduate (Base)	0.2703				
Age Cohort					
Aged 60-70 years***	0.3004	***-0.18075***	***0.049671***	***0.092171***	***0.038909***
Over 70 years old***	0.0530	***-0.21356***	***0.058686***	***0.1089***	***0.045971***
Aged 50-59 years (Base)	0.6466				
Health Status					
Excellent or Very Good Health	0.5743	0.029958	-0.00823	-0.01528	-0.00645
Fair or Poor Health	0.1265	-0.03085	0.008477	0.015731	0.006641
Good Health (Base)	0.2992				
Wealth					
Negative Wealth	0.0546	0.015735	-0.00432	-0.00802	-0.00339
Wealth of $0-$50,000*	0.1446	***0.050704***	***-0.01393***	***-0.02586***	***-0.01091***
Wealth of $51,000 - $100,000	0.1020	0.038718	-0.01064	-0.01974	-0.00833
Wealth of $101,000 - $200,000**	0.1606	***0.0597***	***-0.01641***	***-0.03044***	***-0.01285***
Wealth of $501,000 - $1 million	0.1470	-0.0405	0.01113	0.020653	0.008718
Wealth of more than $1 million***	0.1313	***-0.09026***	***0.024802***	***0.046025***	***0.019429***
Wealth of $201,000 - $500,000 (Base)	0.2598				
Social Interaction					
Regularly connect with relatives	0.4755	-0.00396	0.001089	0.00202	0.000853
Regular contact over email	0.6317	0.019272	-0.0053	-0.00983	-0.00415
Proximity to Social Networks					
Live close to friends	0.6048	-0.00234	0.000643	0.001193	0.000504
Live close to relatives	0.2530	-0.01265	0.003476	0.00645	0.002723
Contact Frequency					
Get together at least 1x month	0.2470	0.012793	-0.00352	-0.00652	-0.00275
Get together once per year or less	0.3016	0.020327	-0.00559	-0.01037	-0.00438
Get together at least 1x week (Base)	0.4514				

In consideration of the main question posed in the present study, the results of greatest interest are tied to the relationship between age and labor force participation. The model employed sought to examine the impact of age on transitions from wage and salary employment into one of the following three categories: 1. self-employment; 2. retirement; and 3. labor force exit for reasons other than retirement (i.e. unemployment, disability, etc.) – continued wage and salary employment was also considered. As hypothesized, for persons aged 50 years or more, age has a significant impact on labor force participation decisions. The relationship intensifies for different age groups but the association appears to remain the same.

More specifically, individuals aged 61 to 70 years are 1.81 percent less likely than individuals aged 50 to 60 years to continue in their wage and salary position. At the same time, individuals aged 61 to 70 years are 4.97 percent, 9.22 percent and 3.89 percent more likely than individuals aged 50 to 60 years to become self-employed, retire, or exit the laborforce for other reasons, respectively. Individuals aged 70 or more years are 21.36 percent less likely than individuals aged 50 to 60 years to continue in their wage and salary position. Similar to the behavior of persons aged 61 to 70 years, individuals over 70 years of age are 5.87 percent, 10.89 percent and 4.60 percent more likely than individuals aged 50 to 60 years to become self-employed, retire, or exit the laborforce for other reasons, respectively. It is important to note that although individuals over the age of 60 are more likely to transition into self-employment than are individuals aged 50 to 60 years, the same individuals are also much more likely to retire than become self-employed.

The HRS only samples individuals aged 50 years or more; thus, it is not possible estimate the self-employment propensity of the 50 to 60 year old cohort relative to younger cohorts. What can be established is that the propensity to transition into self-employment does increase

beyond the age range of 50 to 60 years old. However, individuals in the middle-aged old (61 to 70 years) and the old old (70 years or more) cohorts are also less likely to remain in their wage and salary position and more likely to retire than individuals between the ages of 50 and 60 – this is certainly an expected outcome.

CONCLUSIONS AND IMPLICATIONS

With dramatic increases in the number of retirement-eligible Americans and the lack of replacements on a 1-to-1 basis, it will become increasingly important to develop means for tapping the knowledge, wisdom and creativity of older generations. Certain forces: the widespread shift from defined-benefit- to defined-contribution pension plans, increased longevity, financial pressures as a result of macro-economic conditions and targeted policy changes, will likely aid in maintaining older Americans' ties to the labor force. The results of this study indicate that the oldest members of the U.S. population are less likely to continue in their wage and salary positions and more likely to retire than is the case for their younger counterparts who are also 50 years or older. However, the results indicate that individuals aged 61 or more years are also more likely to transition from wage and salary employment to self-employment than individuals between 50 and 60 years old. These results lead to a number of possible implications for the future.

Baby boomers, a significantly large proportion of the population, are currently between the ages of 46 and 64. Within the 2006 wave of the HRS, baby boomers only account for those individuals aged 50 to 60 years old. With the age at which individuals are retiring from their primary career occupation increasing, baby boomers may wait until they reach the average age of retirement before transitioning into self-employment. This may explain why the two older cohorts considered in this study exhibit a greater likelihood of transitioning into self-employment

than the baby boomer reference category. However, if this trend applies to the future, the sheer size of the baby boom cohort combined with a greater propensity to enter into self-employment at older ages, raises the possibility that the prevalence of elder entrepreneurship will continue to increase. Such a trend would not be unexpected given the predications to be made based upon the theoretical framework. As the U.S. continues to further evolve as a knowledge-based, or 'new' economy, older individuals with a combined desire accommodate their changing physical and lifestyle requirements may more readily seek out entrepreneurial opportunities that favor human and social capital over physical capacity. The potential work hour flexibility afford to older entrepreneurs is certain to be an attractive feature or self-employment.

Overall, the laborforce transition model indicates that age does play a role in later life labor force participation choices, with middle old (61 to 70 year olds) and older old (those over 70 years of age) individuals exhibiting a greater tendency toward self-employment than their young old (50 to 60 year olds) counterparts. However, the results also indicate that individuals over age 60 are more likely to retire than they are to transition from wage and salary employment to self-employment. Drawing from these conclusions, economic developers should consider expanding entrepreneurship and small business development programs to include even those individuals ahead of the baby boomer cohort. Higher levels of wealth were also found to be positively associated with elder transition into self-employment. Tax policy makers should take this into consideration when creating and amending tax treatment of the 'nest eggs' of older individuals as significant tax induced reductions of wealth may reduce the capital available to older individuals interested in becoming self-employed.

The results of the present study could be further improved upon through the use of confidential HRS files which contain Social Security and government-collected earnings

information. The present study may have suffered from problems common to analyses that employ self-reported data including inaccurate recall and deliberate misreport. Financial data, like that included in Social Security files, is highly susceptible to misreport because of the sensitive nature of the release of personal financial information. For this reason, use of actual financial status as provided in Social Security and other government earnings files may improve the accuracy of the model employed in the present study.

Finally, an additional concern arising from this study is the use of a multinomial logistic regression. Horowitz and Savin (2001) note that "the danger in using the multinomial logit model is that it can produce misleading inferences when some of the alternatives are close substitutes." This is an issue because one of the major assumptions of a multinomial logit model is that the characteristics of any other alternatives in the choice set have no influence on the odds of the other alternatives; this is known as the *independence from irrelevant alternatives (IIA)* property (Horowitz and Savin, 2001). In the present study, it is possible that the decision to transition from salary and wage employment to self-employment is made simultaneous to the decision to either retire or not retire. To remedy this possibility with certainty a different econometric approach would be required. The multinomial probit model, for example, relaxes the need for strict adherence to IIA but is difficult to estimate and often does not converge when the dependent variable includes more than four alternatives in the choice set.

ADDITIONAL MODEL FIT TABLE

Table 4: Laborforce Transition Multinomial Logit Model Fit Summary

Model Fit Summary	
Number of Endogenous Variables	1
Endogenous Variable	Laborforce Status in 2008
Number of Observations	2490
Log Likelihood	-2211
Maximum Absolute Gradient	0.00411
Number of Iterations	46
Optimization Method	Quasi-Newton
AIC	4481
Schwarz Criterion	4656

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CHAPTER 3. OLDER AGE AND DWELLING CHOICE

This chapter investigates the housing unit choices made by older Americans who choose to relocate. A multinomial logit model is used to examine the relationship between age and the type of housing units that older recent movers select as a residence. The results indicate that age does influence housing unit selection as it relates to the basic physical characteristics of a dwelling.

INTRODUCTION

A multitude of products and services geared toward the tastes and preferences of older Americans have emerged.The proportion of the 50 and over population that has entered into the retirement phase is no longer competing in the labor market and is living off income that is not location dependent (Graves and Knapp, 1988; Conway and Houtenville, 2003). The real estate market has certainly recognized these characteristics unique to older individuals, responding with many a housing development designed and marketed for "senior living" (Schintler in Zhang, 2008). Although residential relocation declines later in life, the impact of older households that do choose to move in absolute terms is likely to increase given the significant upward trend in the proportion of the population that is 50 or older (Heumann, 2010; Woo, 2005). Additionally, elder migration has become increasingly common; the incidence of elder movers has increased at a greater rate than has been observed in the general population (Conway and Houtenville 1998).

REVIEW OF LITERATURE

Residential Location Choice

The literature highlights a number of residence location choice hypotheses. Feridhanusetyawan and Kilkenny (1996) broadly categorize these hypotheses according to the following five determinants of residence location: workplace location; local amenities; life-cycle and other personal characteristics; return to human capital accumulation; and real costs of living.

According to the workplace model, individuals choose one location over another with the expectation of maximizing expected household earnings net of commuting costs. The monocentric theory, which describes urban development as emanating from a central node outward, most closely tracks with this [the workforce] model's predictions of residential location choice because of the moncentric model's inverse relationship between land and commuting costs, or the bid-rent curve (Lerman; DeSalvo; Greenwood and Hunt; Nakosteen and Zimmer as cited in Feridhanusetyawan and Kilkenny, 1996). The human capital model is somewhat similar to the workplace model in that a location is selected for its potential to maximize the expected return on the individual's investment in human capital and job search (Schwartz; Rogerson as cited in Feridhanusetyawan and Kilkenny, 1996). Wages lose explanatory power in the amenity model which asserts that individuals will select a location with greater amenities over locations which could be expected to provide higher incomes (Dickie and Gerking; Knapp and Graves; Roback as cited in Feridhanusetyawan and Kilkenny, 1996). Demographics, in keeping with the personal characteristics model, significantly affect residential location choice. In this model, factors including stage in life-cycle, marital status, number of school-age children and other demographics characteristics all influence the location decisions of individuals and households (Clark and Hunter; Heckman; Plane as cited in Feridhanusetyawan and Kilkenny, 1996). Factors like travel time and housing costs are the most significant determinants according to the costs of living model (Turnbull, Glascock, and Sirmans as cited in Feridhanusetyawan and Kilkenny, 1996).

In reality, the residential location choice decision is influenced simultaneously by some or all of the factors highlighted as determinants in Feridhanusetyawan and Kilkenny's five typologies. Residential location choice is determined through comparison of multiple locations with the goal

maximizing expected utility over amenities, given potential income and expenses associated with a specific place. Expected utility is a function of the characteristics and associated demands of the individual or household faced with the selection of a residential.

Residential Relocation of Older Individuals

The need for further research pertaining to the residential decisions of mobile older individuals has been highlighted (Farnsworth, 2001; Engelhardt, 2009; Morrow-Jones and Kim, 2009). Much of the residential location choice literature focuses more generally on migration patterns across cohorts and not specifically on the housing unit choices of older individuals. Older Americans value housing for the shelter, a sense of comfort and security it provides. Housing is a source of wealth for the approximately 80 percent of Americans aged 50 years or more who are homeowners (Souare and Lloyd, 2008). Neighborhood safety and the physical attributes of housing can be critical to a person's ability to age in place and remain independent (Souare and Lloyd, 2008). As households age, their dwellings may no longer meet the occupants' needs and they will move to meet their changing demands if such a is not too costly (Strassman, 2001). Beyond its association with an occupant's physical needs, housing is also tied to the financial characteristics and expectations the dweller.

The life-cycle investment hypothesis posits that as an investor ages, housing demand will stabilize or decrease and as the demand for financial assets increases (Bakshi and Chen, 1994). Empirical evidence has shown that housing consumption does change in older age; however, it does not indicate that it decreases. Rather it appears that the lifetime profile of housing consumption increases monotonically and is somewhat flat in old age (Yang, 2009). More specifically, research has shown the market-valued housing service increases through age 55 after which point it slightly decrease and then flattens out until the end of the life cycle

(Fernandez-Villaverde and Krueger, 2006). In fact, homeowners tend to hold significant amounts of wealth even into old age.

Older households faced with fixed incomes prefer a constant level of housing stock because significant stock changes are accompanied by transaction costs. Relative to younger households, older households are less likely to seek new housing because they only have a relatively short window in which to live in a new home (Yang, 2009). Despite the existence of these constraints, individuals aged of 50 years or more, as represented by the original cohort in the HRS over the 1992-2004 period, exhibit an average two-year moving rate of approximately 7 percent; however, 30 percent of homeowners moved at least once over the complete study period (Calvo, Haverstick and Zhivan, 2009). While moving rates have been shown to decrease with age (Yang, 2009), the absolute impact of older households' moves can still be substantial given that relatively low rates are applied across a relatively large cohort. The impact would likely be particularly large in locations with substantial proportions of older households and significant in-migration of older individuals.

Much of the research concerned with the residential relocation decisions of older individuals can be categorized into several streams including: Tiebout sorting motivations; amenity-driven relocation; health or financial shock initiated moves; and the potential policy implications for those areas in which older migrants concentrate. Conway and Houtenville (2003) and Woo (2005) expand upon the literature by distinguishing between sub-segments within the older age population. Conway and Houtenville (2003) found that the younger portion of the elderly cohort are more likely to "shop around" in search of attractive destinations while older elderly persons are more likely to be ''driven out'' of their locations. Woo (2005) examines the migration decisions specific to the youngest old, those who are close to but not yet retired. These workers,

Woo (2005) argues, still factor the wage offer of potential areas for relocation as they may relocate within the intent of working some portion of time before retiring in the location to which they most recently migrated. Whether or not older individuals relocate and what type of housing they move to when relocating has the potential to impact physical landscapes and land use planning policies.

Dwelling Choice in Later Life

Younger old households (aged 52-62 years) considering retirement and making their post-retirement housing choices, are most sensitive to housing wealth gains (Lehnert, 2004). After age 62, households tend to live in less valuable dwellings (Lehnert, 2004). According to Lehnert (2004) it is often thought that younger couples are more likely to increase their housing stock while older couples are more likely to downsize. Older households, when faced with unexpected changes such as sudden medical expenses or the death of a spouse, were more likely to downsize, albeit in a gradual manner (Sheiner and Weil, 1992). The relationship between housing size and age is difficult to test given younger households' greater propensity to relocate. To account for this, Lehnert (2004) conditioned the size of dwelling upon relocation finding that while older households are likely to remain owner-occupiers they are also more likely to downsize than are younger households. Research conducted by Gourinchas and Parker (2002) has suggested that younger households face greater liquidity constraints and use housing as a financial buffer while older households tend to view housing choices on the basis of their tastes and preferences

Increases in the household numbers are likely to occur primarily within the older, post-childrearing age cohorts (Richie, 2001). Households and household needs differ across age groups; in particular, needs and choices differ greatly between household with and households

without children (Richie, 2001). Richie (2001) notes the need for further examination of the many facets of relocation and dwelling selection amongst those in the later portion of earning as well as those who entered retirement. Young families should no longer be the central focus of developers and planners. There are a great number of households with heads between the ages of 45 and 64 that generally do not have children at home and tend to have higher incomes (Richie, 2001). Furthermore, individuals are increasing remaining vital into their 70s and their housing preferences should not be excluded from consideration (Richie, 2001). Housing types need to adjust to reflect the many varied demands for dwellings present in the current U.S. marketplace.

The present study proposes an incremental step toward a richer understanding of elder dwelling selection behaviors. To some degree it is not possible to completely detach the influence of location on the choice of a specific type of housing unit. As demonstrated in the literature, housing is a bundle of goods and services that is influenced both by the physical attributes of a dwelling and the attributes (i.e. crime, employment opportunities, municipal services, etc.) of the surrounding community. While identification of the determinants that underlie residential location choice is important, this analysis is primarily concerned with the specific community and land-use planning implications of older individuals' dwelling selection upon relocation. As such, the empirical model employed narrowly focuses upon the factors underlying the selection of specific typologies of housing units. The results of this analysis may also contribute to the housing adjustment literature.

DATA AND EMPIRICAL MODEL

Data

The 2007 American Housing Survey (AHS) National sample is a product of the U.S. Census Bureau and is collected for the U.S. Department of Housing and Urban Development (HUD).Survey data included information on apartments; single-family homes; manufactured/mobile homes; vacant housing units; age, sex, and race of householders; income; housing and neighborhood quality; housing costs; equipment and fuels; and size of the housing units. Information on mortgages, rent control, rent subsidies, previous unit of recent movers and reasons for moving are also provided through the AHS. The 2007 national survey is a sample of about 52,850 interviews conducted every other year. The recent mover and household microdata files were merged for the present study.

Empirical Model

When relocating, individuals face a multitude of dwelling choices. Many residential relocation choice studies employ the multinomial logistic regression technique to quantify the relationship between a dwelling choice set, and individual and locational characteristics. This study follows the same approach, estimating a single multinomial logistic regression focused upon the dwelling selection of older recent movers.

Discrete choice models relate a choice made by an individual to the choice set faced by the individual and the individual's attributes. The dependent variable is categorical; thus, the multinomial logit model is superior to the ordinary least squares (OLS) method, which cannot yield the best linear unbiased estimator (BLUE) when the dependent variable is not continuous (Park, 2009). Multinomial logistic regression is specified for responses that are *polytomous*, (i.e., the dependent variable assumes more than two choices) (Schafer, 2006). The model has been extended to accommodate either ordinal (inherently ordered categories) or nominal

(unordered categories) dependent variables (Schafer, 2006). The dependent variable in this study is nominal as it does not exhibit an inherent ordering.

The errors in this model are assumed to follow the standard logistic distribution. The sample consists of 8,655 observations from the 2007 American Housing Survey National sample. In addition to the coefficients associated with the multinomial logistic regression, the marginal effects were derived. Since the parameter estimates of logistic regression models cannot generally be used to interpret results, the discussion presented in the results section is focused on the marginal effects. Discrete choice model parameter estimates must be transformed to yield marginal effects; inferences are to made from the marginal effects which represent the change in predicted probability of the dependent variable choice set associated with changes in the explanatory variables (Anderson and Newell, 2003; Greene 2003).

Marginal effects are nonlinear functions of the parameter estimates and the levels of the explanatory variable and as such, they cannot be readily derived from the parameter estimates (Anderson and Newell, 2003). The marginal effects for the dummy variables are calculated as the difference between two resulting probabilities when the dummy variable equals its two values 0 and 1 (Gillett, 2004).

Dependent Variable

The dependent variable is segmented by dwelling type (i.e., single vs. multi-family) and dwelling size, defined as overall finished square footage. The dwelling choice set for recent movers could be categorized a number of different ways including the number of bedrooms, the number of full bathrooms, and the number of floors, to name a few. Dwelling type and finished square footage of the unit were selected as the measures used to create the index values that

comprise the dependent variable because of their close relation to the common considerations of planners and developers. The choice set for each of the logistic regression models is as follows:

1. Single family unit with 3,000 or more finished square feet; or
2. Single family unit with 2,000 to 2,999 finished square feet; or
3. Single family unit with 1,000 to 1,999 finished square feet; or
4. Single family unit with less than 1,000 finished square feet; or
5. Multi-family unit with 1,000 or more finished square feet; or
6. Multi-family unit with less than 1,000 finished square feet.

Table 5 (below) presents the dependent variable summary statistics.

Table 5: Dwelling Choice Multinomial Logit Model, Dependent Variable

Dwelling Choice Set		Summary Statistics	
Dwelling Type	**Finished Square Footage**	**Frequency**	**Percent**
Single Family	Greater than or equal to 3,000	578	6.68
	2,000 - 2,999	1055	12.19
	1,000 - 1,999	2251	26.01
	Less than 1,000	794	9.17
Multi-Family	Greater than or equal to 1,000	1214	14.03
	Less than 1,000	2763	31.92

Explanatory Variables

Facing this particular choice set, the head of household is assumed to derive some level of utility that is relative to each choice. The utility gained by the selection of a given choice is a function of the alternative's attributes (dwelling types and total finished square footage), the individual householder's attributes (age, presence of children in the unit, educational attainment, income, reasons for moving including desired a larger or better quality unit, family or financial motivations or involuntary move, etc.) and locational characteristics (center city, rural, Census region, etc.). Ultimately, the householder will select that choice which maximizes their utility.

Under this framework, the choice set is the dependent or discrete random variable. It is random because it is not possible to identify with certainty the choice an individual selected at random will arrive at.

Goodness of fit measures for the dwelling choice multinomiallogit model are detailed in Table 6 (below).

Table 6: Dwelling Choice Multinomial Logit Model Goodness-of-Fit Measures

Goodness-of-Fit Measures		
Measure	**Value**	**Formula**
Likelihood Ratio (R)	3646.8	2 * (LogL - LogL0)
Upper Bound of R (U)	28505	- 2 * LogL0
Aldrich-Nelson	0.2964	R / (R+N)
Cragg-Uhler 1	0.3438	1 - exp(-R/N)
Cragg-Uhler 2	0.3571	(1-exp(-R/N)) / (1-exp(-U/N))
Estrella	0.3629	1 - (1-R/U)^(U/N)
Adjusted Estrella	0.3563	1 - ((LogL-K)/LogL0)^(-2/N*LogL0)
McFadden's LRI	0.1279	R / U
Veall-Zimmermann	0.3865	(R * (U+N)) / (U * (R+N))
McKelvey-Zavoina	0.3749	

RESULTS

Variables of statistical significance in the dwelling choice model includesex, marital status, income, location (i.e. Center City, etc.), regional location (Midwest, etc.), reasons for relocation (i.e. Family or Financial Reasons, etc.), changes in housing cost, educational attainment, race and ethnicity (Hispanic). Age, the focus of the present study, is also statistically significant for each of the three cohorts included. Table 7 (below) displays the variable names and definitions, variable means and marginal effects for the dwelling choice multinomial logit model.

Table 7: Dwelling Choice Multinomial Logit Model Descriptions and Marginal Effects

Descriptors		Single Family (Attached and Detached)				Multi-Family	
Variable Names/Definitions	**Mean**	**>= 3,000**	**2,000-2,999**	**1,000-1,999**	**<1,000**	**>= 1,000**	**<1,000**
Children in house***	0.40	0.0470	0.0501	0.0503	0.0023	-0.0124	-0.1374
50-59 years old***	0.12	0.0255	0.0272	0.0273	0.0012	-0.0067	-0.0745
60-69 years old***	0.06	0.0368	0.0393	0.0394	0.0018	-0.0097	-0.1076
70 years old and over**	0.05	-0.0158	-0.0168	-0.0169	-0.0008	0.0041	0.0461
Under 50 years old	0.78						
Higher housing cost***	0.57	0.0120	0.0128	0.0129	0.0006	-0.0032	-0.0352
Lower housing cost***	0.23	-0.0095	-0.0101	-0.0101	-0.0005	0.0025	0.0276
Same housing cost (Base)	0.20						
MidWest U.S.***	0.22	0.0249	0.0265	0.0266	0.0012	-0.0065	-0.0726
Southern U.S.***	0.39	0.0301	0.0321	0.0322	0.0015	-0.0079	-0.0878
Western U.S.***	0.24	0.0149	0.0158	0.0159	0.0007	-0.0039	-0.0434
NorthEast U.S. (Base)	0.15						
Center City***	0.34	-0.0160	-0.0170	-0.0171	-0.0008	0.0042	0.0466
MSA rural ***	0.08	0.0438	0.0467	0.0468	0.0021	-0.0115	-0.1280
Outside MSA urban***	0.18	0.0387	0.0413	0.0414	0.0019	-0.0102	-0.1131
Outside MSA rural***	0.10	0.0592	0.0631	0.0633	0.0029	-0.0155	-0.1729
MSA urban (Base)	0.30						
Widowed***	0.05	-0.0322	-0.0343	-0.0344	-0.0016	0.0084	0.0940
Divorced or Separated***	0.21	-0.0301	-0.0321	-0.0322	-0.0015	0.0079	0.0880
Never Married***	0.32	-0.0466	-0.0497	-0.0498	-0.0023	0.0122	0.1361
Married (Base)	0.42						
No HS Diploma**	0.12	-0.0094	-0.0100	-0.0100	-0.0005	0.0025	0.0273
Some College/Associates***	0.33	0.0090	0.0096	0.0096	0.0004	-0.0024	-0.0263
Bachelors Degree***	0.20	0.0181	0.0193	0.0193	0.0009	-0.0047	-0.0528
Graduate/Professional***	0.09	0.0160	0.0170	0.0171	0.0008	-0.0042	-0.0467
High School Graduate (Base)	0.26						
Black***	0.14	-0.0173	-0.0185	-0.0186	-0.0008	0.0046	0.0507
Race (not Black or White)***	0.07	-0.0339	-0.0362	-0.0363	-0.0017	0.0089	0.0991
White (Base)	0.79						
Hispanic***	0.16	-0.0247	-0.0263	-0.0264	-0.0012	0.0065	0.0722
Male***	0.50	0.0071	0.0076	0.0076	0.0003	-0.0019	-0.0207
ReloFamily/Financial Prob**	0.22	-0.0072	-0.0077	-0.0077	-0.0004	0.0019	0.0210
Relo Bigger/Better Home***	0.25	0.0108	0.0115	0.0115	0.0005	-0.0028	-0.0315
Involuntary Move *	0.02	-0.0145	-0.0155	-0.0156	-0.0007	0.0038	0.0425
Inc $0 - $50,000***	0.57	-0.0350	-0.0374	-0.0375	-0.0017	0.0092	0.1024
Inc $75,001-$100,000***	0.11	0.0311	0.0332	0.0333	0.0015	-0.0082	-0.0909
Inc $100,001 - $150,000***	0.08	0.0517	0.0552	0.0553	0.0025	-0.0136	-0.1512
Inc $150,001-$200,000***	0.03	0.0859	0.0916	0.0918	0.0042	-0.0226	-0.2509
Inc $200,001-$350,000***	0.02	0.0941	0.1004	0.1007	0.0046	-0.0247	-0.2750
Inc $350,001-$500,000***	0.01	0.0969	0.1034	0.1037	0.0047	-0.0255	-0.2833
Inc $500,001-$1 million***	0.00	0.1049	0.1119	0.1122	0.0051	-0.0276	-0.3066
Inc $50,001-$75,000 (Base)	0.18						

*, **, and *** denote significant at the 10%, 5% and 1% levels, respectively.

In keeping with Richie's (2001) conclusions drawn from previous research, older individuals (at least those between 50 and 69 years old) are more likely to select into larger

single family housing units than their younger counterparts. Table 8 (below) provides an age cohort-based comparison of the marginal effects derived from the dwelling choice multinomial logit model.

Table 8: Dwelling Choice Multinomial Logit Model Marginal Effects Comparison by Age

Age of Householder (Base Category under 50)	Dwelling Choice Set					
	Single Family 3,000 Sq. Ft. or more	Single Family 2,000-2,999 Sq. Ft.	Single Family 1,000-1,999 Sq. Ft.	Single Family less than 1,000 Sq. Ft.	Multi Family 1,000 Sq. Ft. or more	Multi Family less than 1,000 Sq. Ft.
50 to 59 years old	2.55%	2.72%	2.73%	0.12%	-0.67%	-7.45%
60 to 69 years old	3.68%	3.93%	3.94%	0.18%	-0.97%	-10.76%
70 years and over	-1.58%	-1.68%	-1.69%	-0.08%	0.41%	4.61%

Relative to households headed by adults under the age of 50, households headed by individuals in the younger 'old' cohorts (50 to 59 and 60 to 69) are most likely to choose single family homes between 1,000 square feet and just under 3,000 square feet. At the same time, both older cohorts are less likely than adult 50 and under cohort to move to multi-family units of less than 1,000 square feet. To the contrary, households headed by individuals aged 70 years or more are most likely to select multi-family units, and in particular, units of less than 1,000 square feet.

The housing stock preferences of older households have been of great interest in recent years. A recent paper entitled *The New Urbanity: The Rise of the New America*asserted that with population aging and the rise in the number of single-person households, there will be changes in the both housing and neighborhood preferences (Nelson, 2009). Nelson (2009) further asserts that these preferences changes will lend to more dense development accompanied by increased

occurrences of both infill development and redevelopment. Transitaccessibility, proximity to retail and entertainment, mixed use landscapes as well as areas marked by a mix of incomes, ages, and ethnicities, will drive residential location choice decisions (Nelson, 2009). The results of the present study do not entirely confirm Nelson's (2009) claims. Even after controlling for the presence of children, regional location (i.e. West, South, etc.), approximated density (Center City, metropolitan area urban landscape, etc.), race and ethnicity (Hispanic only), the results of the dwelling choice model indicate a heterogeneity amongst households headed by individuals 50 years old and older. Nelson (2009), on the other hand, applies the descriptive results of housing preference surveys to proportions of the population by age and concludes that society, and in particular, the older segments of the population will drastically shift away from their preference for single family, low density housing options. The implication of this shift is a marked move toward a more urban American lifestyle. The flaw in Nelson's analysis relates to the implicit assumption that the housing preferences of older households are homogenous. It may be the case and indeed the results of the dwelling choice model indicate that some older households will express a preference for smaller, higher density dwellings. The caution comes in presupposing that all older households will behave virtually identically to one another – the results of the present study suggest otherwise.

CONCLUSION AND IMPLICATIONS

A great deal of the housing literature has focused on the behaviors of older individuals. Researchers have examined housing demand, housing adjustment and life cycle theories, consumptive patterns, tenure choice, intergenerational transfers of housing wealth, household composition and location decisions. Despite the breadth of studies that have focused upon the housing behaviors associated with older cohorts, the specific housing unit characteristics tied to

the housing unit choices of non-institutionalized older movers have not been explored in great detail. Tasked with the development of plans and ordinances that guide the built environment, planners are concerned with the specific characteristics desired by elder movers because they must anticipate how those demands will impact demand-driven residential development. According to Heumann (2010) "The baby boomers [in particular] contain the most diverse, healthy, and active elderly population in American history, and planners need to understand and build on this."

Richie (2001) and Heumann (2010) would likely agree that planners should continue their efforts with the expectation of being driven primarily by younger households with children. Analysis of dwelling selection amongst recent mover households headed by an individual aged 50 or more years indicates that age does influence housing unit selection as it relates to the basic physical characteristics of a dwelling. Recent mover households headed by individuals between the ages of 50 and 69 were found to be most likely to move to single family dwellings ranging size from 1,000 to just under 3,000 square feet. Conversely, recent mover households headed by individuals aged 70 years or more, were found to be more likely to select multi-family dwellings and in particular, smaller multi-family units (under 1,000 square feet). In other words, households headed by the oldest individuals are most likely to relocate to the smallest, highest density units even after controlling for the presence of increased housing costs, 'shock' motives for relocation, income and the presence of children. These results suggest that households headed by individuals aged 50 years or more are not homogenous in their preferences for housing.

Planners should not continue in their efforts with the expectation that housing market demands are primarily driven by younger households with children (Richie, 2001 and Heumann,

2010). Contrary to Nelson's (2009) blanket recommendations with regard to elder household housing preferences, planners and developers will need to simultaneously account for the single family dwelling preference amongst households with heads aged 50 to 69 years and the dwelling preference for relatively small, multi-family units amongst households headed by individuals aged 70 years or more. For example, those households headed by individuals 70 years of age or more may begin to face mobility challenges and require greater access to public transit as well as greater proximity to healthcare facilities and retail establishments.

ADDITIONAL MODEL FIT TABLE

Table 9: Dwelling Choice Multinomial Logit Model Fit Summary

Model Fit Summary	
Number of Endogenous Variables	1
Endogenous Variable	Dwelling choice
Number of Observations	8655
Missing Values	-12429
Log Likelihood	0.17449
Maximum Absolute Gradient	55
Number of Iterations	Quasi-Newton
Optimization Method	24936
AIC	25211
Schwarz Criterion	6414

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CHAPTER 4. AGING AND RURAL PROSPERITY

This chapter investigates the impact of population aging on the economic performance of rural areas in the United States. A probit model with a dichotomous dependent variable is used to examine the relationship between aging and rural prosperity at the county level. The results indicate that aging impacts whether or not a rural county is prosperous. The relationship is not consistent across older age cohorts.

INTRODUCTION

Rural population aging is a common area of research in economic, sociological and public policy circles. As with much of the policy-oriented research focused on aging, studies with a rural focus tend to examine access to public services, health care provision, housing conditions, and poverty (Rogers, 1999). Growth and prosperity studies often include age as nothing more than a standard demographic variable amongst other commonly included demographic factors including race, education and sex. The age profile of an area and its impact on economic vitality is not a theme that has been well-examined thus far. In recent decades, research examining rural out-migration and the associated economic implications has also become increasingly prevalent. Very little attention has been paid to the impact of rural out-migration corollaries, namely the acceleration of rural population aging.

REVIEW OF LITERATURE

Rural counties like many metropolitan areas in the U.S. face increases in life expectancy combined with decreases in fertility rates. However, population aging in rural America is further exacerbated by the out migration of young people and in some cases, the in migration of older retirement-age people. Rural communities have experienced significant population losses in recent decades. For nearly four decades, it has generally been the case that smaller, resource-

dependent communities reliant on basic industries including farming, logging, and mining have been hard-pressed to prevent both population and business decline (Bolender, 2010). At the same time, birth rates in rural areas are outpaced by death rates (Jones, Kandel and Parker, 2007). Carr and Kefalas (2009) note more than 700 rural counties across the United States (U.S.) experienced population losses of 10 percent or more. Furthermore, in one of every two rural U.S. counties, there are more deaths than births. According to Carr and Kefalas (2009) this "hollowing-out" process while feeding off current recessionary conditions, existed even before the onset of the country's current economic predicament. As a result, typecasts and characterizations including the "Rural Brain Drain" and "Hollowing out the Middle" have emerged. Should rural brain drain and hollowing out of the middle lead to the demise of a significant proportion of this country's rural areas, the impacts will likely be felt at the national level. As stated by Hewings, Feser and Poole (2009):

> *"States and regions are now more tightly bound to each other; changes in production levels in one state now have an immediate impact on related components of the production chain in other states... a phenomenon that is likely to be present throughout the country – namely the degree to which spillovers from one expansion or contraction in one state penetrate the rest of the state economies."*

Following high school graduates from a small, rural town in Iowa, Carr and Kefalas (2009) examine the reasons people either stay in or leave rural areas. Using a qualitative approach, they find that many of the highest achieving students out migrate with the encouragement of family and educators to the eventual detriment of their communities. More specifically, Carr and Kefalas (2009) assert:

"The youth exodus is a zero-sum phenomenon: it benefits the destination cities and hurts regions that migrants flee. For every thriving metropolis now, there are dozens of agroindustrial brain-drain areas where economic growth has stalled."

Rural out-migration creates a situation in which life can become more challenging for those left behind (Moutry, 2009). In general, the labor force in rural areas is older and often either less mobile (Renkow, 1996) or less willing to relocate (Fisher, 2005). Thus, rural areas are more prone to negative labor market shocks than are urban areas with a relatively young labor force (Renkow, 1996). Additionally, the effects of population aging in rural areas are likely to diverge from those experienced in more urbanized areas as a result of differing dominant industries. Although life expectancy has increased similarly in rural and urban areas, the work-to-retirement ratio (as coined by Pollock, 2006) is subject to differing occupational constraints between the two areas. In general, rural economies rely more heavily upon physically demanding basic industries than do their more urbanized counterparts. Dominant rural industries include farming, mining and forestry. Urban areas, on the other hand, in general exhibit greater concentrations of non-basic industries including finance, technology, business and management services, and bioscience. In urban areas older workers are often engaged in knowledge-based occupations that demand high levels of intellectual capability and decision-making skills. Common rural occupations also require high levels of decision-making skills but heavily value physical abilities. As labor market participants age in each setting they must weigh continued engagement in the labor force and the associated earnings against the number of years they expect to spend in retirement and their financial requirements during that period. For individuals employed in more physically demanding occupations, age-related decreases in physical ability influence the likelihood of continued labor force participation; likely resulting in a higher rate of

partial or full exits from the labor force relative to urban employees of similar age and ability (Shattuck, 2010).

The withdrawal of older individuals from the labor force affects the level of economic activity in a given location in two ways. First consumption levels vary with age (Yoon and Hewings, 2006); retirees reduce outlays by shedding work-related expenditures and opting to substitute their labor and time for goods and services previously purchased off the market (Hurd and Rohwedder, 2003). Second, in areas where the number of retirees exceeds the number of labor force eligible replacements, firms experience labor shortages and must alter their business models accordingly (Hewings, Feser and Poole, 2009). Rural areas, with a higher proportion of older individuals due to both retiree in-migration and younger cohort out-migration (Jones, Kandel and Parker, 2007) are conceivably less prosperous than more urbanized areas. Artz (2003) and Carr and Kefalas (2009) suggest that the significant out-migration of younger people, an exacerbating driver of population aging, has placed many rural areas in economic peril. This study seeks to examine such conclusions with a targeted analysis exploring the relationship between rural population aging and rural economic vitality.

This study follows Isserman, Feser and Warren (2007; 2009), opting to focus on measures of prosperity rather than metrics of growth. Population, employment and per capita income are commonly indicators in growth studies. Isserman, Feser and Warren (2007; 2009) assert that prosperity definitions without bias in favor of growth or against are more useful in identifying the relative condition of rural areas. Departure from growth-based indicators is also useful from State and local level policy perspective wherein informing public decision-making requires the identification of measures that are ultimately amenable to intervention. For example, earnings growth is indeed a favorable condition regardless of location however; such

growth in both urban and rural areas has been found to be most influenced by macroeconomic forces (Renkow, 1996) which are far out of the reach of State and local policymakers. Furthermore, the outcome-based approach presented by Isserman et al. (2007; 2009) is predicated upon the reality that the condition of a community could be rated as favorable on the basis of its growth while at the same time suffering from high unemployment rates, high poverty rates, housing inadequacies, and high dropout rates.

Prosperity is defined relative to the nation; prosperous counties exhibit lower rates of poverty, unemployment, high school dropouts, and housing quality problems than the national average. To be categorized as prosperous, a county must exceed the national average for all four criteria (Isserman, Feser and Warren, 2007; 2009), Isserman, Feser and Warren find that age (i.e. higher proportion of older people) is positively related to rural prosperity but classification as a retirement location is negatively related. This may be due not to the age composition of retirement destinations rather the labor force motivations, or lack thereof, of the older individuals that self-select into retirement counties. It may also be due to a relative lack of social capital amassed by recent in-migrants to retirement locales as compared to individuals of similar age that have 'aged-in-place' in a rural location.

DATA AND EMPIRICAL MODEL

Data and Definitions

The present study adopts Isserman, Feser and Warren's (2007; 2009) prosperity index as the dependent variable. The index has been modified in this study to include a banking deposit depth index and exclude the housing problem rate. The substitution was made on the basis that banking deposit are an indication of excess wealth available within a community. When applied to savings deposits this wealth presents the ability for small businesses or entrepreneurs to

borrow from the local lenders that hold the deposits. For this reason, banking deposit volumes are expected to be a reasonable measure of the economic health and potential of a rural community. The poverty and unemployment rates included in the model are taken directly from *USA Counties*, a data publication of the U.S. Census Bureau which includes Census and other government-source data at the county level across reported as annual cross-sections. The dropout rate is calculated according to the U.S. Census Bureau definition of the dropout rate. Specifically, it is derived as follows:

$$\frac{\text{Number of teenagers, 16 to 19, not in school and not high school graduates}}{\text{Population aged 16 to 19 (Absolute)}} * 100$$

Banking deposits per capita is calculated as follows:

$$\frac{\text{Total Nominal Dollar Value of Banking Deposits (Absolute)}}{\text{Total Population (Absolute)}} * 100$$

An area can exhibit high unemployment and poverty rates, poor financial status on a per capita basis, and high secondary dropout rates and yet, be growing according standard measures of economic growth; growth does not guarantee the prosperity or quality of life (Isserman, Feser and Warren, 2007; 2009). These four measures are calculated by county and compared against the national average for each; those with values in excess of the national average are awarded a score of 1. The scores are then aggregated and a prosperity index created. For counties with a value of 4 (i.e. scores are higher than the national average for all four measures), the dependent variable, *PROSPERITY* = 1. Those counties with values of less than 4 are coded in the dependent variable as *PROSPERITY* = 0. Table 11 (below) details the summary statistics associated with the dependent variable, *PROSPERITY*.

Table 10: Rural Prosperity Binary Probit Model Results

Definition	Value	Frequency	Percent
Not prosperous	0	835	84.77
Prosperous	1	150	15.23

The present study deviates from the use of age as a standard demographic variable. Studies investigating rural economic performance often include the proportion of the population aged 65 years or more as a control variable indicative of an upper bound to the labor force. Age and in particular, the classification of 'older individuals" is viewed more broadly in this essay; therefore, the lower bound of the older population is defined as 50 years of age. Older age is examined in a segmented fashion, acknowledging that significant differences may exist between subsets of older individuals. Accordingly, four categories - young old (50 to 59 years of age), middle-aged old (60 to 69 years of age), old old (70 to 79 years of age) and oldest old (80 or more years of age) are included in the analysis. These older age cohorts are accounted for in respect to the population as whole (i.e. birth to 49 years of age) as they are proportions of each age category relative to the total U.S. population.

Control variables originate from three sources: *USA Counties*, Kansas City Federal Reserve Bank *Regional Indicators* and U.S. Department of Agriculture (USDA) *Rural Typology Codes*. Variables taken from *USA Counties* include the proportion of population that is White, the proportion of the population that is Black, the proportion of the population that is American Indian or Alaskan, the proportion of the population aged 25 years or more that is a high school graduate or equivalent and the proportion of the population that is Hispanic or Latino. Kansas City Federal Reserve Bank *Regional Indicators* incorporated in the model include a human amenity index (i.e. recreational amenities, restaurants, etc.), an infrastructure indicator index (i.e.

expenditures on roads, presence of airports, etc.) and a creative workforce index (i.e. percentage of the total laborforce engaged in 'creative' occupations, NAICS-code based on the work of Richard Florida). For further explanation of the *Regional Indicators* see Federal Reserve Bank of Kansas City (2006). Finally, USDA *Rural Typology Codes* are used to subset the sample to *include only those counties that are designated as non-metropolitan and not adjacent to a* metropolitan area, 985 counties met these conditions. Therefore, the rural county sample consists of 985 counties designated as nonmetropolitan and not adjacent to a metropolitan area. USDA *Rural Typology Codes* dummy variables representing the county classifications of manufacturing-base and agriculture-base are also included as controls. For further explanation of *Rural Typology Codes* see United States Department of Agriculture (2004).

Empirical Model

The dependent variable in the present study is binary and categorical; thus, the binary probit model is superior to the ordinary least squares (OLS) method, which cannot yield the best linear unbiased estimator (BLUE) when the dependent variable is not continuous (Park, 2009). The binary regression model is one in which the dependent variable, in the present study *PROSPERITY,* is a binary random variable with a value of 0 or a value of 1 (Horowitz and Savin, 2001). A binary probit model assumes an underlying cumulative normal distribution function and is estimated according to the maximum likelihood technique (Horowitz and Savin, 2001).

In addition to the coefficients associated with the probit model, the marginal effects were derived. Since the parameter estimates of probit models cannot generally be used to interpret results, the discussion presented in the results section is focused on the marginal effects. Discrete choice model parameter estimates must be transformed to yield marginal effects; inferences are to made from the marginal effects which represent the change in predicted

probability of the dependent variable choice set associated with changes in the explanatory variables (Anderson and Newell, 2003; Greene 2003). Marginal effects are nonlinear functions of the parameter estimates and the levels of the explanatory variable and as such, they cannot be readily derived from the parameter estimates (Anderson and Newell, 2003). The marginal effects for the dummy variables are calculated as the difference between two resulting probabilities when the dummy variable equals its two values 0 and 1 (Gillett, 2004). The model was specified with and without a control variable for the proportion of the population aged 25 years or more with a high school diploma. The split runs were conducted due to concerns over possible endogeneity given that one of the measures accounted for in the prosperity index is the high school dropout rate. The differences between the two models were minimal. Goodness of fit measures for the rural prosperity binary probit model are detailed in Table 12 and Table 13.

RESULTS

As hypothesized, the population aging (accounted for as the proportion of the population in each of the older cohorts) has a significant effect on whether or not a rural area is prosperous. The effect is not significant for all older age cohorts – the proportion of the population aged 70 to 79 years is not a significant factor influencing rural prosperity. The three significant age cohorts present a curious result. The greater the percentage of the population that is aged 50 to 59 years or aged 60 to 69 the less likely a rural county is to be prosperous. Specifically, higher proportion of persons aged 50 to 59 years reduce the likelihood of prosperity by 3.97; for the 60 to 69 cohort the influence is somewhat less at 2.07 percent. The greater the proportion of the population that is aged 80 or older, the greater (3.09 percent) the likelihood that a rural area will be prosperous. This may be attributable to the amount of social capital and the savings rates of the oldest old although, the oldest old are generally drawing wealth down. Additionally, the model included

measures controlling for whether or not a county is a retirement locale. This is important because social capital is tied to place and is known to influence entrepreneurship rates which could in turn, influence prosperity. In retirement locales that have experiences significant in-migration of older individuals it would be expect that social capital per capita would be lower as a substantial portion of the residents in these counties simply have not been present enough to amass a great deal of social capital. However, this is not likely to be the reason as a control was included. Table 12 (below) provides the variable names, variable definitions, variable means and marginal effects associated with the rural prosperity binary probit model.

Table 11: Rural Prosperity Binary Probit Model Descriptions and Marginal Effects

Variable Definitions	Mean	Marginal Effect
Manufacturing County (Predominance of Manufacturing)	0.18	0.0040
Amenity Index (Restaurants, outdoor venues, etc.)	28.22	-0.0030
CreativeWorker Proportion (As defined by R. Florida)***	14.95	***0.0156***
Infrastructure Index (Air, Road, Rail) *	5.62	***0.0056***
Percent of age 25 and over population with HS diploma	23.33	-0.0012
Retirement Locale (Retirement Destination County)	0.11	-0.0188
Proportion of the population aged 50 to 59 years***	11.78	***-0.0397***
Proportion of the population aged 60 to 69 years*	9.18	***-0.0207***
Proportion of the population aged 70 to 79 years	7.46	0.0173
Proportion of the population aged 80 years or more***	4.76	***0.0309***
Proportion of the population ages 18-49 years old (Base)	66.83	
Proportion of the population that is Hispanic*	5.89	***0.0040***
Proportion of the population that is White***	86.54	***0.0208***
Proportion of the population that is Black**	5.80	***0.0117***
Proportion of the population that is AmIndian	0.53	0.0161
Proportion of the population that is another race (Base)	7.12	
Farm County (Predominance of Farming/Agriculture)	0.29	0.0234

*, **, and *** denote significant at the 10%, 5% and 1% levels, respectively.

Although the negative relationship between higher proportions of older individuals and rural prosperity was somewhat expected, it does appear to be attributable to the reasons hypothesized. Controls for a high prevalence of physically demanding occupations

(manufacturing and farming) were included in the model. It was originally hypothesized that rural areas may fall short of prosperous because of the mismatch between an aging laborforce and physically demanding occupations; however, this does not appear to be the case.

Control variables of significance include: the creative workforce percentage index value; the infrastructure indicator index value; the proportion of the population that is reportedly Hispanic; and the proportion of the population that is reportedly black.

CONCLUSION AND IMPLICATIONS

The present study sought to examine two issues often neglect in the literature – rural prosperity and rural population aging, specifically differences between older age cohorts. The results of the present study indicate that the greater the proportion of older individuals in a rural area, the lower the likelihood that the given area will be prosperous. This finding bolsters the qualitative work of Carr and Kefalas (2009) and the quantitative, but descriptive work of Artz (2003) both of which concluded that population aging negatively impacts rural areas. Rural economic vitality is indeed negatively influenced by higher proportions of individuals aged 50 years or more. However, this relationship holds for only two of the older age cohorts. Higher proportions of the oldest old are actually positively associated with rural prosperity. This is a curious result indeed. Further research examining the influence of rural age structure and rural prosperity is in order.

On a positive note, recent research has also considered the impact of middle-age migration to rural communities. Henderson and Akers (2009) find that those areas in which the proportion of the middle aged cohorts has increased exhibit favorable economic growth. The authors confirm that the proportion of the population which is of retirement age (65+) exhibits a negative relationship to economic growth (measured as growth in income). Unfortunately, while

repopulation owed to middle-aged individuals may act to counter the outflow of younger cohorts, it is not a long-term solution. Ultimately the survival of many rural communities will rest in their ability to either retain or attract young, educated individuals or as an alternative, find ways to tap into the young, educated cohort from a distance.

Finally, the results of the population aging and rural prosperity analysis indicate that aging impacts whether or not a rural county is prosperous. As expected, population aging (accounted for as the proportion of the population in each of four older cohorts) has a significant effect on whether or not a rural area is prosperous. However, the relationship is not consistent across older age cohorts. The effect was not found to be significant for relative to the proportion of the population aged 70 to 79 years. At the same time, the three significant older age cohorts present a curious overall result. The greater the percentage of the population that is 50 to 59 years of old or 60 to 69 years old, the less likely a rural county is to be prosperous. Contrary to this finding, the greater the proportion of the population that is 80 years of age or older, the greater the likelihood that a rural area will be prosperous. This may be attributable the savings rates of the oldest old although; the oldest old are generally drawing wealth down. Furthermore, while the negative relationship between higher proportions of older individuals and rural prosperity was somewhat expected, it does not appear to be attributable to the reasons hypothesized. Controls for the predominance of physically demanding occupations (manufacturing and farming) in a given county were included in the model. It was originally hypothesized that rural areas may fall short of prosperity because of a mismatch between an aging labor force and the prevalence of physically demanding occupations. However, results of the model indicate that this is likely not the case.

GOODNESS OF FIT MEASURE TABLES

Table 12: Rural Prosperity Binary Probit Model Fit Summary

Model Fit Summary	
Number of Endogenous Variables	1
Endogenous Variable	prosperity
Number of Observations	985
Missing Values	2
Log Likelihood	-288.0645
Maximum Absolute Gradient	0.0002716
Number of Iterations	141
Optimization Method	Quasi-Newton
AIC	608.129
Schwarz Criterion	686.41127

Table 13: Rural Prosperity Binary Probit Model Goodness-of-Fit

Binary Probit Goodness-of-Fit Measures		
Measure	**Value**	**Formula**
Likelihood Ratio R	264.37	2 * (LogL - LogL0)
Upper Bound of R (U)	840.5	- 2 * LogL0
Aldrich-Nelson	0.2116	R / (R+N)
Cragg-Uhler 1	0.2354	1 - exp(-R/N)
Cragg-Uhler 2	0.4101	(1-exp(-R/N)) / (1-exp(-U/N))
Estrella	0.2755	1 - (1-R/U)^(U/N)
Adjusted Estrella	0.2413	1 - ((LogL-K)/LogL0)^(-2/N*LogL0)
McFadden's LRI	0.3145	R / U
Veall-Zimmermann	0.4596	(R * (U+N)) / (U * (R+N))
McKelvey-Zavoina	0.7696	

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