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The Determinants of Entrepreneurial Income in South Carolina

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THE DETERMINANTS OF ENTREPRENEURIAL
INCOME IN SOUTH CAROLINA

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the Graduate School of
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Applied Economics and Statistics

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by
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Accepted by:
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Dr. David B. Willis

ABSTRACT

Supporters claim that entrepreneurship is critical to building and sustaining the economy of urban and rural areas across the nation. Proponents argue that economic development practices that enhance and support entrepreneurship are essential because they cultivate innovation which, in turn, provides the area with new jobs, new wealth, and a better quality of life.   However, self-employment income growth in South Carolina in particular and in the United States in general has lagged growth in income from other sources. This fact raises the need to study the determinants of self-employed income. Using the literature as a guide, a conceptual model was developed that consist of independent variables based on personal characteristics, resource availability, and economic structure. The investigation of the determinants of self-employed income in South Carolina is carried out using a regression of the natural logarithmic of self-employed income in 2008 on the variables selected from the Integrated Public Use Microdata Samples (IPUMS) database based on the conceptual model. In general, empirical results are consistent with expected outcomes. Policy implications focus on numerous programs that economic development agencies can implement to increase the availability of resources to entrepreneurs and help meet training needs.

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CHAPTER ONE

INTRODUCTION

State and local government entities have historically focused on major industry recruitment as a driver for jobs and income in regional economies. Researchers have recently begun to criticize this approach because it fails to consider its impact on the cost of publically provided services, such as roads, schools, police protection, fire coverage, and water and sewer services, and the potential negative environmental effects of the industry (Leistritz and Sell 2001). Several experts have argued that developing local entrepreneurs may be a more appropriate form of engendering regional economic growth (Spindler 1994; Yeneral 2008; Shrestha, Goetz, and Rupasingha 2007). This argument has been boosted by strong national and regional growth in self-employment or entrepreneurial-based employment[1]. It is possible, however, that economic development practitioners have oversold the potential contribution of entrepreneurs as a method to facilitate local economic growth. In particular, advocates have not fully examined all assumptions regarding the contribution of self-employment to local incomes. Specifically, much research has focused on the growth in self-employment rather than self-employment income.

This chapter proceeds by first exploring industrial recruitment as a potential driver of development on a community. This is followed by a section

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[1] The relation between entrepreneur and self-employed is discussed in Chapter Two. These terms are used interchangeably here.

focusing on the growth of self-employed individuals in South Carolina and their earnings. This discussion provides the motivation for the study and is followed by an overview of the remainder of this thesis.

Industrial Recruitment as a Development Tool

Industrial recruitment has typically relied on low wages, substantial tax subsidies, other incentives, such as inexpensive or free publicly provided services or worker training programs, and lenient environmental protection efforts to attract large, often manufacturing, businesses. Overtime, this recruiting process created a bidding war between regions (including states) as firms play hosts of the potential sites against each other in an effort to gain the most substantial incentive package (Spindler 1994).

A major explicit goal for leaders of regional economies is job generation. Over time, competition between regions to attract external capital results in driving up the per job cost of industrial relocation incentive packages (Spindler 1994). In 1980, Tennessee recruited a new automotive manufacturing facility (Nissan) with a subsidy package that cost $11,000 per direct job. Toyota was attracted to Kentucky with an estimated subsidy package of $49,900 projected per direct job created in 1985. South Carolina recruited BMW for $65,000 estimated per direct job, with the total incentive package costing $130 million. Most substantially, Alabama provided an incentive package estimated at $300

2

million, or $200,000 per direct job, to recruit a Mercedes manufacturing facility (Spindler 1994).

Researchers have questioned the use of incentive packages in terms of effectiveness and net benefits. Numerous studies have concluded that economic incentives are not the primary factor in business location; hence, such efforts often do not themselves directly offer a substantial effect on regional employment or income growth (Milward and Newman 1989).

While industrial recruitment is viewed as an instantaneous boost to tax revenues without an increase in tax rates by its supporters, researchers have argued that the costs often exceed the benefits to regional economies and taxpayers for such efforts (Spindler 1994). The long-term effect for regional economies is often a net utility loss due to the increase in demand for publicly provided services, the fact that jobs are often filled by workers outside of the area, possible negative environmental impacts, and increases in property taxes (Spindler 1994; Leistritz & Sell 2001).

Adversaries of industrial recruitment argue that communities could receive a greater and presumably more beneficial impact on the local economy by investing the same resources in existing firms and encouraging small business growth (Edmiston 2007). Thus, while industrial recruitment may have a short-term growth impact, a number of studies have concluded that developing local entrepreneurs leads to more jobs in the long run (i.e. Davis and Haltiwanger 1992, Baldwin and Picot 1995, Broersma and Gautier 1997; Picot and Dupuy

1998). Further, advocates also argue that developing local entrepreneurs leads to greater commercialization of innovations and higher rates of productivity growth within the region (Van Praag and Versloot 2007).

Self-Employment Growth in South Carolina

Strong self-employed growth in South Carolina provides evidence for the entrepreneur based job growth argument. As shown in Figure 1.1, self-employed jobs have been a contributor toward the generally strong job growth in the state economy over the last thirty years.
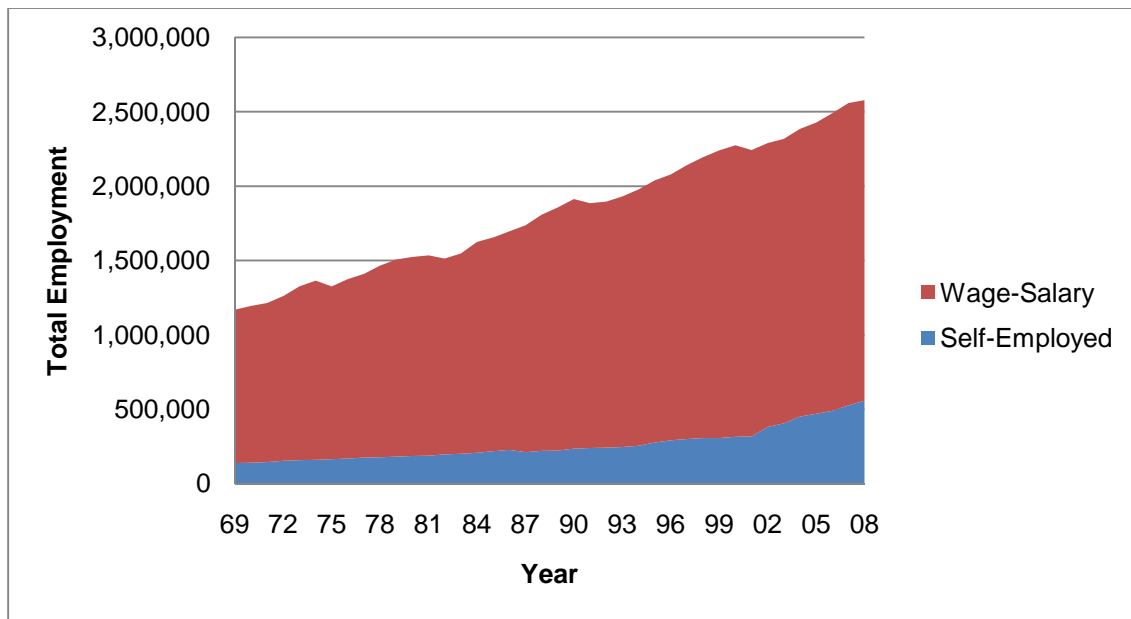
Figure 1.1. Total Employment Growth in South Carolina.
Source: Regional Economic Information System (2010).

As shown in Figure 1.2, the contribution of self-employed jobs to total job growth has increased dramatically. In particular, from 2001 through 2008 total employment in South Carolina increased by 335,621; 71 percent of this growth is attributable to self-employed jobs as opposed to hired wage and salary employees. As a result, the estimated share of self-employment relative to all employment in the state has increased from 11.9 percent in 1969 to 21.7 percent by 2008.

Proponents of entrepreneur based growth argue that entrepreneurship (self-employment) development leads to greater wealth in the community. Yenerall (2008) states that "entrepreneurs create new jobs, increase local income and wealth, and connect the community to the larger global economy" (page 1). Henderson (2002) found that in the United States, three-fourths of the jobs created in the 1990's can be attributed to entrepreneurial firms. These new jobs bring in new sources of wealth and offer new sources of tax revenue to communities (Henderson 2002). Further, Shrestha et al. (2007) found that economic growth is associated with growth in proprietor owned firms. These studies imply that entrepreneurs are capable of becoming the driver of economic growth through income generation.
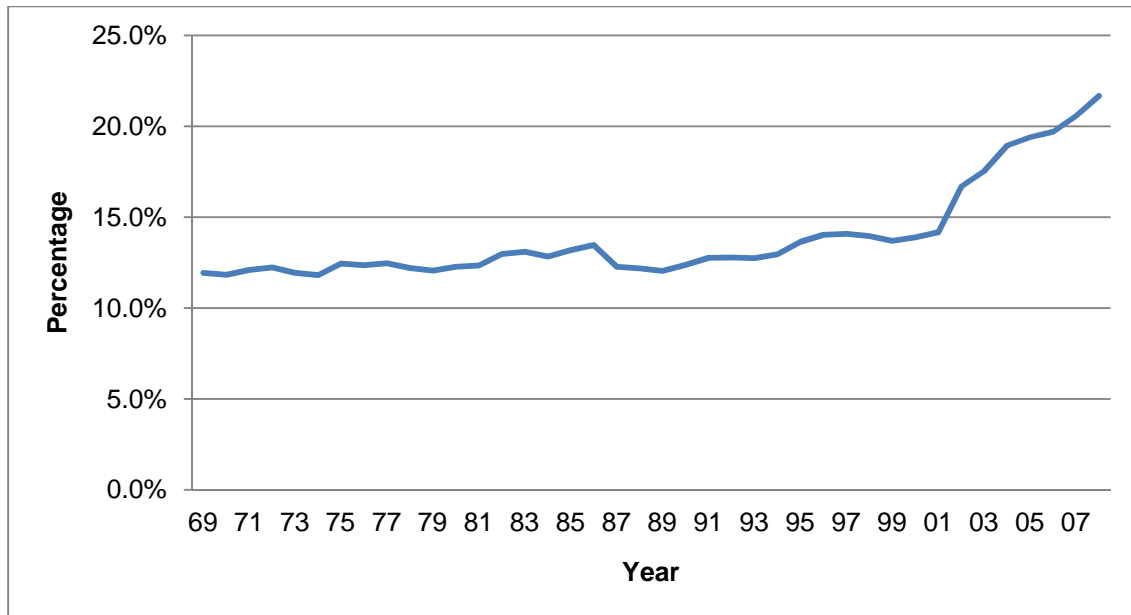
Figure 1.2. Self-Employed as a Percentage of Total Employment in
South Carolina.
Source: Regional Economic Information System (2010).

However, a cursory examination of total earnings in South Carolina casts

doubt on this argument. Specifically, as shown in Figure 1.3, the percentage of

self-employed income to total earnings[2] has lagged growth in the number of

entrepreneur jobs. In 1969, the percentage of self-employed income of the total

earnings was 11.4 percent. The relative contribution decreased to a low of 7.4

percent in 1983, rising to its peak of 12.7 percent in 2000. In 2008, the

percentage of proprietor income of total income was 11.1 percent, 0.3 percent

less than the measure in 1969. Given that 2001 was the beginning of an

increasing trend of the number of self-employed workers (Figure 1.2), it would be

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[2] The sum of personal income-wage and salary disbursements and proprietors' income (Regional
Economic Information System 2010).

6

expected that the percentage of total income from self-employed workers in South Carolina would increase as well. Interestingly, this was not the case and the opposite occurred, meaning that earnings per entrepreneur had a pronounced decline.

This trend in earnings per entrepreneur casts aspersions on the argument that growth in entrepreneurship generates growth in wealth. If that argument does hold true, one would expect entrepreneurship income per capita to at least keep pace with growth in the number of entrepreneurs. It also highlights the need for examining the drivers of entrepreneurial income. Besides shedding light on a perhaps an under studied issue, such research could indicate ways for promoting policies that engender higher net returns to self-employment and hence, meet its proponents' claims.
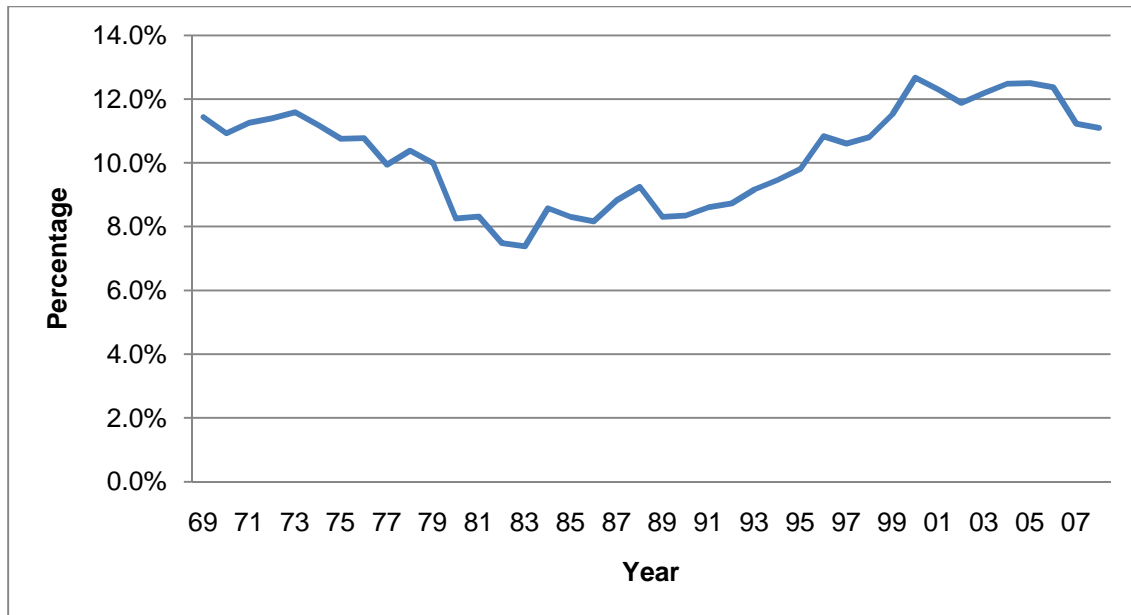
Figure 1.3 Percentage of Self-Employed Income Relative to Total Earned Income in South Carolina.
Source: Regional Economic Information System (2010).

The situation of self-employed individuals in South Carolina is similar to the nation (Figure 1.4) in that both have shown strong in self-employment relative to all employment while the share of self-employed income of total income has lagged. However, South Carolina has lagged the nation in self-employment income growth. As a result, the gap between percentage of employment and percentage of income for self-employment in South Carolina is much wider than that found nationally, with self-employed individuals in South Carolina falling further behind their national counterparts in terms of earned income.

This study chooses to focus on self-employed individuals in South Carolina for several reasons. First, because of the lack of growth in self-employed income in the state especially as it relates to national trends. Second,

interest in self-employment may be growing in the state as individuals lose wage

and salary jobs due to the severity of the recent economic downturn. Finally, the

state government has displayed an increased interest in developing

entrepreneurs as an economic development policy. In this regard, state

government has initiated support of an entrepreneurial training program,

(FastTrac, a set of Kaufman Foundation programs) and a venture capital fund

(SC Launch, designed to funnel capital to high growth entrepreneurs).
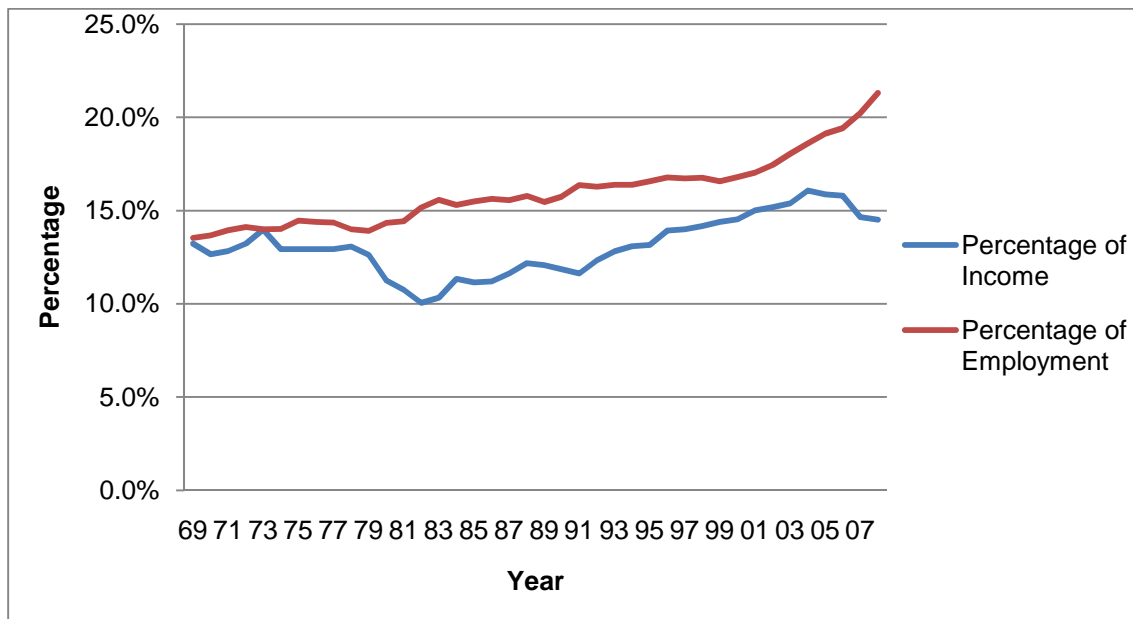

Figure 1.4. Percentage of Self-Employed Income and Employment Relative to
Total Income and Employment in the U.S.
Source: Regional Economic Information System (2010).

Though economic development practices that enhance and support

entrepreneurship are seen as essential to cultivate innovation, new jobs, new

wealth, and a better quality of life, South Carolina and national data may refute

the argument that growth in self-employment is responsible for income growth. While relatively little research has been documented on entrepreneurs, even fewer studies address the determinants of entrepreneur income. This study provides a first step in the analysis of the determinants in entrepreneurial income. The income of entrepreneurs opposed to the number of entrepreneurs is critical to economic development because, arguably, a major goal of policy is increasing incomes not just employment. Further, higher incomes mean greater impacts as the multiplier effect of self-employed individuals will be greater due to an increase in the induced effect, which also increases state and local tax revenues. In addition, locally owned businesses are less likely to relocate outside of South Carolina (Yenerall 2008), meaning the increase in tax revenues is more reliable in the long-run compared to other firms which may be prone to relocate.

The remainder of this document organizes as follows. Chapter Two presents an in depth review of the relevant literature and description of the conceptual model. Chapter Three describes the data and approach used in the analysis. This chapter begins with a discussion of the American Community Survey as part of the Integrated Public Use Microdata Samples (IPUMS) program, the database used for the empirical analysis. Following this, results of the empirical analysis are presented; results center on measures related to personal productivity, resource constraints, and economic structure as possible drivers of entrepreneurial income. Chapter Four provides a research summary, policy implications, and recommendations for future research.

CHAPTER TWO

LITERATURE REVIEW

Importance of Entrepreneurship in Regional Growth

Research and development (R&D) is regarded as essential to the traditional approach of economic growth. R&D, whether it be from research universities, government labs, corporate R&D, or other sources of knowledge creation, have the potential to bring wealth and economic value when outputs are brought to market (Koo and Kim 2009). Although new knowledge creation brings new opportunities, there is a specific skill set needed by an individual to transform knowledge into a financially viable product or service (Acs et al. 2010). These unique individuals, who are "willing to take risks and bring new ideas and knowledge to the marketplace to capitalize on their potential value" (Koo and Kim 2009, page 829), are known as entrepreneurs.

Entrepreneurship may be the missing link in growth theory models. Acs et al. (2010) suggest that theoretical growth models assume that knowledge generated from R&D and innovation is automatically converted into commercial activities and are retained within the region. However, entrepreneurship is critical in the conversion process as it serves as a "conduit for the spillover of knowledge that might not otherwise be commercialized; entrepreneurship is one conceivable mechanism that links knowledge to commercialization and economic growth" (Acs et al. 2010, page 108). Recent empirical evidence has suggested that an

increase in entrepreneurship is associated with increased employment growth (Audristch and Thurik 2001; Thurik 1999; Acs et al. 2010).

This, however, may not be the case. To commercially benefit from R&D, regions must train, attract, and retain entrepreneurs. Entrepreneurial retention and attraction is primarily affected by knowledge creation (Koo and Kim 2009). Human capital, usually measured as educational level, has been found to be an indicator for increased amounts of regional output and income growth (Lucas 1988; Rauch 1993; Glaeser et al. 1995; Simon 1998; Mather 1999). Research universities often produce highly skilled labor which, if retained within the region, can effectively implement R&D breakthroughs (Zucker et al. 1998; Jaffe 1998). The spillover from this knowledge attracts and retains entrepreneurs within the region to capitalize on the innovations.

Social capital which includes culture, network, social interactions, religion, etcetera, is another important aspect in facilitating knowledge flows within a region (Coleman 1988; Putnam 1995; Florida 2002). The presence of a diversity of industries greatly influences the production of R&D through knowledge transfers. Given that cities are most likely to have a diversity of knowledge and industries, this is usually where innovations arise. In addition, retention of the R&D is more likely to occur when generated and shared within a city (Glaeser et al. 1992; Felmand and Audretsch 1999; Acs et al. 2010). Entrepreneurs realize the potential capital gains from technical knowledge and are attracted to higher

populated areas to maximize the economic value of the new knowledge generated.

Despite the growing import of self-employment as a source of all employment, neoclassical economists traditionally treat entrepreneurs as a "black box" in the regional growth process (Goetz 2003). Arguably, "there have been only scant attempts to develop formal theories of entrepreneurship and even fewer efforts to formally study proprietorship formations" (Goetz 2003, page 4). Research has only recently begun to examine the role of the entrepreneur, or the self-employed, in a theoretical or applied framework. Among the literature that has examined the role of entrepreneurs from a regional or firm perspective individual attributes such as age, race, ethnic background, and educational attainment have been identified as important elements of success (Shrestha, Goetz, and Rupasingha 2007).

This chapter begins by discussing the different types of entrepreneurship defined within the literature, followed by the impact of self-employment on regional economies and job creation. Next is a review of the literature regarding the difference in wages, employer benefits, and innovation between small and large firms. The chapter concludes by documenting the determinants of becoming an entrepreneur and a conceptual model developed with support of the literature.

Types of Entrepreneurship

Despite a number of studies conducted on entrepreneurship, the definition and identification of entrepreneurs remains unclear. Experts seem to agree that entrepreneurs are "people who design, produce and generate value through the creation or expansion of economic activity by identifying new products, processes or markets" (Yenerall 2008, page 2). However, classifications of entrepreneurs vary. The Kauffman Center for Entrepreneurial Leadership recognizes two types of entrepreneurs, "lifestyle" versus "high growth" entrepreneurs (Henderson 2002).

Lifestyle entrepreneurs do not seek a high income, but rather a desirable lifestyle based on non-pecuniary benefits such as having your own schedule, or living in a quaint downtown area. While these individuals are often successful and may provide social benefits such as enhancing downtown areas, they are not often large employers (Yenerall 2008; Henderson 2002).

In contrast, high growth entrepreneurs seek resources to fuel growth for their businesses. They may have aspirations to take their business public or to grow the business and then sell at a large profit. Firms started by successful high growth entrepreneurs can create significant local employment and local tax revenue (Yenerall 2008; Henderson 2002).

Survival entrepreneurs and intrepreneurs are two additional entrepreneurial categories. Survival entrepreneurs are created by economic conditions (Yenerall 2008). Many have suffered a recent job loss and have a

"desire to remain in a specific place or in a specific location without consideration for the local market" (Yenerall 2008, page 3). Thus, firms spawned by survival entrepreneurs usually have limited growth possibilities due to their specific circumstances. An intrepreneur is an employee of an existing firm who seeks out new firm opportunities to increase firm revenue and profit (Yenerall 2008). Most notably, intrapreneurs do not own the firm. They may be managers, accountants, or any other employee of the firm who displays entrepreneurial actions for the benefit of the firm.

Entrepreneurship is generally defined in empirical studies at either the macro-level or micro-level. When studying entrepreneurs on the macro-level, the general consensus is to use small business data. At the micro-level, data samples of entrepreneurs are usually generated through defining entrepreneurs as individuals who are self-employed or are the owner-manager of an incorporated business (Van Praag and Versloot 2007). Though these measures are common in literature, all self-employed or owner managers are not necessarily considered to be entrepreneurs. For example, the Schumpeterian entrepreneur requires that the individual is a market entrant or is a young firm. However, not all self-employed or small businesses are market entrants or young firms, but identification of such classifications would be extremely difficult and costly, especially at the macro-level (Van Praag and Versloot 2007). Due to the ambiguity of the use of the term "entrepreneurship" in empirical studies, the

conventional method of using "entrepreneur", "small business", and "self-employed" interchangeably is used in this study.

Two approaches are generally used to gather sample data on entrepreneurs. The first approach relies on surveys of small businesses. Surveys are usually sent out to small business owners in a specific metropolitan area or a rural region in which businesses report taxable, self-employed income along with other data. The second approach uses secondary small business data (usually businesses with less than 500 employees) as their sample. This data is usually collected from a government entity (such as the Small Business Administration) or non-profit group focusing on entrepreneurship (e.g. the Kauffman Foundation).

Effect of Self-Employment on Regional Economies

Economic development organizations, academics, and local governments have begun to focus on entrepreneurship as a driver of regional economic growth (Goetz, Partridge, and Deller 2009). Small business development is viewed as a source of both instantaneous and long-term economic growth. Small business start-ups deliver immediate impacts to jobs and income in an area. In addition, successful small businesses have been found to have a positive net effect on long-term employment (Van Praag and Versloot 2007). Entrepreneurship

promotion through programs provided by local government[3] are seen as a way to increase the number of small business startups and their survival (Stephens 2010; Van Praag and Versloot 2007).

However, the benefits of small business growth for regional economies are controversial. Controversies center on the contribution of small businesses to job growth, job quality, the impact on the rate of innovations in a region, and contributions to the local tax base (Yenerall 2008).

Some argue that smaller, entrepreneur based firms grow faster and create more jobs than larger employers (Van Praag and Versloot 2007) while others dispute such claims. Fritsch and Mueller (2004) state that the employment affects of small businesses may simply be due to the displacement effect; i.e., small businesses take jobs from pre-existing firms thereby negating any positive effect on net employment growth.

 Also questioned are the potential benefits of entrepreneurs in rural areas which are often also economically lagging. Several authors have argued that the positive effects of entrepreneurship are primarily centered in metropolitan areas, which are best suited to benefit from knowledge "spillover" effects (Stephens 2010; Audretsch 2002; Shrestha, Goetz, and Rupasingha 2007). Further, arguments arise suggesting that entrepreneurs in rural areas are often survival entrepreneurs, and, thus, generate minimal income and employment growth (Henderson 2002; Stephens 2010; Acs 2006). However, authors such as Van

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[3] Such as business training programs like FastTrac and Bizdom U, as well as business incubators and Small Business Development Centers.

Praag and Versloot (2007) argue that entrepreneurial firms have disproportionally high contribution to the creation of jobs within and across sectors. In addition, the authors state that in the long run, "the net contribution to employment generation will be higher for entrepreneurs" (page 359) as opposed to large firms. This is thought to be because of indirect effects of increased competition driven by entrepreneurial innovation, resulting in economic growth (Van Praag and Versloot 2007; Fristsch 1997). Proponents assert that entrepreneurship provides additional regional benefits such as new sources of tax revenues, attracting additional visitors to local downtowns, reinvesting wealth back into their business, and by purchasing local inputs (Yenerall 2008; Van Praag and Versloot 2007; Henderson 2002).

Small Business and Job Creation

Net job creation is driven by job creation and job destruction. Data describing gross jobs indicate substantially different rates by firm size[4]. From 1990 to 2003, small firms created 29.3 percent of gross jobs while accounting for 23.9 percent of gross job destruction. Large firms created 39.9 percent of gross job creation but were also responsible for 43.5 percent of gross job destruction. Medium size firms also had a greater share of gross job loss (32.6 percent) than gross job creation (30.7 percent) (Edmiston 2007). Hence, net job gains were concentrated in small businesses (79.5 percent of new net jobs) primarily

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[4] Small firms are defined as firms with less than 20 employees; midsize firms have between 20 and 499 employees, while large firms have greater than 500 employees.

because of relatively low rates of job destruction, as compared to medium and large firms. The majority of the small business gross and net new jobs were spawned by business expansions rather than by new business startups (Edmiston 2007).

Analysis of longitudinal data, supplied by the U.S. Census Bureau, in part supports the assertion that small business drives employment growth and economic expansion. From 1990 to 2003, the majority of net new jobs[5] have been produced by firms with less than 20 employees (Edmiston 2007). "During this period, small firms accounted for 79.5 percent of net new jobs, despite providing 18.4 percent of all jobs in 2003. Midsize firms accounted for 13.2 percent of net job growth, while larger firms accounted for 7.3 percent of net job growth" (Edmiston 2007, page 77). Despite their contribution to net job growth, small business's share of total employment in the U.S. decreased from 20.2 percent in 1990 to 18.4 percent in 2003; meanwhile, larger firms have increased their share of employment from 46.3 percent to 49.3 percent (Edmiston 2007). This result is explained by the migration of firms across size classes from year to year, either small firms grow beyond 20 employees or larger firms contracted. Thus, this data suggests that "the effects of migration of small firms into larger size classes and small business failures outweigh the effects of the migration of large firms into smaller size classes and small business startups" (Edmiston 2007, page 78).

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[5] Net jobs is the difference between the total number of jobs created by startups and expansions and the total jobs destructed by closures and contractions.

With researchers insisting that small business and entrepreneurship are the drivers of job growth, it is reasonable to investigate the quality of jobs small businesses and entrepreneurs are creating and their impact on economic development. Job quality can increase the quality of life and the stability of the job market through low turnover rates. Wages and benefits are desirability factors for employees and have multiplier effects within the economy. However, innovation created and retained within the region is the primary characteristic of small businesses and entrepreneurs that create value within the regional economy (Vossen 1998).

Job quality is dependent on pay, benefits, retention, and quality of the workforce environment[6] (Edmiston 2007). As a rule, small firms tend to pay less than larger employers. For example, in 2005 the average hourly wage for firms with less than 100 employees was $15.69, for firms with 500-999 employees it was $19.94 and for firms with greater than 2,500 employees the average hourly wage was $27.05 (Edmiston 2007). In 2004, firms with less than 100 employees paid nearly 25 percent of their workers less than 8 dollars an hour, while the largest firm paid 3 percent of their workforce less than 8 dollars an hour (Edmiston 2007).

Several explanations have been advanced to explain the wage divergence of small and large firms (referred to as the size wage gap). Olsen (2002) argues

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[6] Workforce environment issues pertain to weak autonomy of the workforce, strict rules and regulations, less flexible scheduling, etcetera, that are generally found within larger firms.

that workers are willing to trade higher wages, generally paid by larger firms, for enhanced benefits, increased job stability, or other benefits that small firms are thought to provide. However, analysis of the data show that larger firms generally offer greater job stability and better benefit packages than smaller firms. Other possible benefits of employment by firm size are difficult to quantify (Edmiston 2007).

Several theories have arisen as a way to explain this size based wage gap. Industry mix is one possibility in that larger firms and greater wages are correlated with certain industries. Thus, the wage gap is influenced by industry composition as opposed to firm size. Analysis of U.S. Census Bureau data provides insight into this theory. The data displays that the wage gap is present and consistent throughout the majority of industries (Edmiston 2007).

Another possibility is that the demographic composition of employees may help explain the sized based wage gap. Women and minorities in general earn less than white males. Yet, with the exception of Hispanic workers, data shows that women and minorities are more likely to work for larger firms, thus providing counter evidence for this explanation (Headd 2000; Mitra 2003).

Many other studies have offered more suggestions to explain the size wage gap. Headd (2000) suggests that larger employers make better use of workers. With greater efficiency, large firms cut marginal costs and increase worker productivity, justifying higher wages. Others argue that due to greater upward mobility and increased returns to education in larger firms, workers have

a greater incentive to increase their education and skill sets due to the possibility of an increase in remuneration (Zabojnik & Bernhardt 2001). Assuming economies of scale, larger firms will have lower per unit costs of production and thus can afford to pay higher wages (Pull 2003; Idson 1996). Alternatively, inferior workers may not have the qualifications required to work at larger firms, and consequently, may be driven to smaller firms with lower wages (Evans and Leighton 1989; Mayo and Murray 1991;).

<u>Employer Benefits</u>

While evaluating the composition and level of benefits by firm is difficult, larger firms, as a rule, provide a wider range of employee-based benefits. Benefits provided by small businesses (less than 25 employees) versus those of large businesses (more than 1,000 employees) are not equivalent. Analysis of U.S. Census Bureau data suggests that in 2002 the percentage of workers with their own employer based health insurance policies was 31 percent for small businesses versus 69 percent for large businesses (Mills and Bhandari 2003). Further, 60 percent of uninsured individuals in the U.S. at that time were members of families where the individual providing the main source of income either worked for or owned a small business (Edmiston 2007).

An attempt to assess benefits by employer size is found in The National Compensation Survey conducted by the Bureau of Labor Statistics in 2006 (displayed in Table 2.1 below). Using 100 employees as the division between

small and large firms, a markedly larger percentage of employees in large firms receive benefits as compared to employees of small firms. This result includes retirement benefits as well as medical, dental, and vision care. Large firms are more likely to provide coverage for life insurance and short and long- term disability benefits. Employees of larger firms receive more paid vacation days and more paid holidays on average than those of smaller firms (Edmiston 2007).

Table 2.1. Fringe Benefits Offered by Firm Size.

Fringe Benefit	100+ Employees	1-99 Employees
Retirement benefits (%)		
Any type	78	44
Defined benefit	35	9
Defined contribution	70	41
Health care (%)		
Medical care	84	59
Dental care	64	31
Vision care	40	20
Outpatient prescription drug coverage	80	56
Insurance (%)		
Life insurance	69	36
Short-term disability benefits	53	27
Long-term disability benefits	43	19
Paid vacation days (#)		
After 1 year of service	10.1	7.8
After 5 years of service	15.0	12.3
After 25 years of service	22.3	16.3
Paid holidays (#)	9	8
Nonproduction bonus (% eligible)	49	44

Source: Edmiston (2007), based on Bureau of Labor Statistics

Despite better pay and benefits, smaller firms may be more desirable places to work than larger firms due to enhanced job satisfaction. Edmiston (2007) suggests that the propensity of employees to separate from their

employers is an effective measure of job satisfaction; in addition, the probability of job dismissal should be considered in valuing the quality of jobs. Edmiston (2007) argues that "turnover in general, that is, both employer- and employee-initiated separations, is therefore indicative of lower quality jobs—due to job instability in the former case and (relative) job dissatisfaction in the latter" (page 85).

Studies show a negative relationship between permanent job separations and firm size; that is, larger firms tend to have lower rates of employee separation (Anderson and Meyer 1994; Groothuis 1994). There is also a negative relationship between layoffs and firm size (Winter-Ember 2001; Campbell 1994) and between employee initiated separations and firm size (Brown and Medoff 1989). The latter could be explained by better wages, benefits, retirement plans, job training and advancement possibilities for employees of larger firms. These all, in turn, provide greater incentives for employees to stay with larger firms relative to smaller firms (Edmiston 2007).

This relationship could be partially explained by the failure rates of small businesses; higher failure rates of these organizations may lead to more employer initiated separations (Dunne, Roberts and Samuelson 1989; Idson 1996). Failure rates of firms with less than 5 employees are found to be one and a half times that of the largest firms. From 2002 to 2003, 12.6 percent of workers of the smallest establishment size lost their jobs due to business failures, while

5.1 percent of all workers in large firms became unemployed to do this (Edmiston 2007).

While the labor data suggests that individuals are more satisfied with jobs at larger firms, small firms may still provide a better work environment. Small firms in general have less strict regulations, offer more flexible schedules, and offer greater autonomy (Vossen 1998). In addition, job satisfaction surveys (Clark and Oswald 1996; Frey and Benz 2003) indicate employees at small firms are more satisfied than those at large firms. In conclusion, while the work environment at small firms may be more desirable, individuals are more likely to choose to work for large firms due to the increase in wages, the enhanced provision of retirement and health benefits, and stability of the job.

Despite the theoretical and empirical efforts, analysts have yet to generate an explanation that accounts for the firm size wage gap. Perhaps it is the difficult to quantify aspects of working for larger firms such as working conditions, the bureaucracy, authoritarian regulations, and the impersonal working environment that explains the size wage gap (Brown and Medoff 1989). That is, higher pay is a reward for "putting up with" a rigid work environment. Nevertheless the debate still is not resolved. The lack of success of explaining the size wage gap is summed up fittingly by Brown and Medoff (1989) who concluded: "Our bottom line is that the size-wage differential appears to be both sizable and omnipresent; our analysis leaves us uncomfortably unable to explain it, or at least the part of it that is not explained by observable indicators of labor quality" (page 1056).

Innovation

A common thread that runs through most theories of regional economic development and entrepreneurship is innovation. Joseph Schumpeter, an enthusiast of the capitalism system, believed that innovation is the key feature of capitalism. Schumpeter emphasized the "creative destruction" process of innovation as "the sweeping out of old products, old enterprises, and old organizational forms by new ones" (Edmiston page 87). Entrepreneurs who endure are those who innovate by creating new products, enterprises, or systems of firm organization and management. These new processes or products add value and enhance efficiency in a competitive marketplace (Henderson 2002; Edmiston 2007; Syrneonidis 1996). Even though innovation is thought to be a staple for economic development and a driver of entrepreneurship, it is unclear whether small businesses tend to be more innovative than larger firms.

Large firms hold several advantages over small firms when it comes to innovation due to their market power, financial benefits, and economies of scale. Firms that obtain the majority of their market share, or if the firm is a monopoly, are more likely to take part in R&D because they can reasonably expect to reap the benefits of the innovation. These firms have a better possibility to finance the R&D from internal sources, thus, eliminating the necessity of disclosing theories, projects, and research to outside entities (Vossen 1998). When external funding is needed, larger firms are usually more able to obtain such funds and generally

do so with better terms of financing than smaller firms. Because R&D efforts are

thought to have scale economies, larger firms are able to spread their large fixed

(sunk) costs of innovation over a large volume of output. Larger firms have "a

larger output over which to realize the benefits of process innovations" (Vossen

1998, page 3). Thus, larger firms can fund numerous, diversified portfolio of

R&D projects, and in doing so can minimize the risk of a failure. Further,

economies of scale could be present in R&D; it is possible the larger firms have

access to advanced technology, or researchers with higher productivity and

access to a network of colleagues with specialized knowledge in the field

(Kamien and Schwartz 1982). According to Vossen (1998), "this may be the

case because a large research group permits the division of labor, increases the

chance of serendipitous discoveries being recognized as important, and the effort

to come up with a solution can be reduced if there are other colleagues around

with new insights or a special familiarity with the problem" (page 3).

While scale economies probably drive innovations in large firms, small firm

innovation is primarily based on behavioral strengths. Vossen (1998) states that

as a firm grows, it inevitably becomes increasingly bureaucratic. Large firms

tend to have a "longer chain of command" which can result in a loss of flexibility

and efficiency in coordinating activities (Vossen 1998). In contrast, small firms

have immediate or short chains of command with freer and more efficient

communication; this can allow for an improvisation, the use of specific knowledge

and skills, and efficient and flexible use of new production processes

(Nooteboom 1994). Small firms may have more incentive to innovate due to the threat of rivals competing for market shares (Scherer 1984). Researchers and product developers at small firms often have equity stakes; hence, they have a greater probability of monetary rewards from firm-level innovations (Zenger 1994).

While large and small firms have different advantages in terms of innovation, knowledge itself does not lead to economic gains, it is only when the innovation is brought to the market that the regional economy benefits (Koo and Kim 2009). Entrepreneurs are the individuals who have the unique characteristic of identifying market opportunities for economically meaningful knowledge and are willing to take the risks to capitalize on their value (Acs, Audretsch, and Carlsson 2003). They are regarded as "knowledge brokers" by Hargadon (2003) because of their ability to exploit knowledge not being tapped by current businesses. Thus, entrepreneurial small businesses are more likely to retain to knowledge within the regional economy and are the link from R&D to economic development through increasing efficiency and commercializing innovations which in turn create jobs and income (Koo and Kim 2009; Van Praag and Versloot 2007).

Determinants of Entrepreneurship

Many researchers once believed that entrepreneurship could not be taught. They argued entrepreneurship was the result of personality and

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psychological characteristics such as temperament and entrepreneurship talent (Fayolle 2007). Fayolle (2007) claims it is now widely accepted that entrepreneurship can be taught and disputes the prior argument by suggesting that the personalities, characteristics, temperament and talent needed by successful entrepreneurs are present in every profession. Fayolle (2007) backs this argument by suggesting that "nobody will dispute the fact that medicine, law or engineering can be taught, and yet there are doctors, lawyers and engineers who are talented and others who are not" (page 53).

Given the more recent belief that entrepreneurism can be taught, a newer segment of the literature has centered on the teaching of entrepreneurial skills. Though education is thought to be in a classroom setting where shared experiences, culture, and community surrounds can mold successful entrepreneurs. Learning entrepreneurial skills requires mutual learning through interpersonal debates and discussions using feedback from different and numerous people. Training is most successful when it occurs in a flexible information environment with a problem solving orientation where instructors provide guided discovery (Gibb 1996). The education of entrepreneurs should rely heavily on learning through the entrepreneurship mode[7] as compared to the didactical mode[8] (Gibb 1996).

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[7] The entrepreneurship mode is a mode of education that focuses on hands-on participation, participant generated knowledge, learning from mistakes, and focuses on multiple disiciplinaries (Gibbs).
[8] The didactical mode of education comprises of a focus on theory, mistakes are looked down upon, and participants passively receive knowledge (Gibbs).

Opportunity recognition is a widely accepted component for successful entrepreneurs. Scholars agree that "a crucial aspect of entrepreneurship involves the recognition of emerging business opportunities, which are often exploited through the creation of new business ventures" (Aldrich and Cliff 2003, page 573). Opportunity recognition is the entrepreneurship phenomenon that has caused researchers to ask the questions of why, when, and how entrepreneurship opportunities are realized by some individuals and not others (Aldrich and Cliff 2003). The process is influenced by idiosyncratic knowledge (i.e., knowledge and skills in various activities). This idiosyncratic knowledge is developed in each person through their own experiences in life (Shane and Venkataraman, 2000). These experiences could include previous jobs, interactions through social networking, information heard from a spouse's experience at work, the process of raising a child, childhood events, or other interactions and occurrences throughout one's life. These experiences bring about awareness of "underutilized resources, new technology, unstated demand, and political and regulatory shifts" (Aldrich and Cliff 2003, page 576). Through the acquisition of new knowledge, possible entrepreneurial opportunities are created that allow an individual to craft an entrepreneurial edge.

Work experience, especially in an industry closely related to the entrepreneurial activity, is a key determinant of entrepreneurial success (Colombatto and Melnik 2007; Evans 1989). This experience provides the entrepreneur with proper knowledge and skills as well as social capital need to

successfully operate a business within a given industry. In addition, it has been stated by Lazear (2002) that many successful entrepreneurs have knowledge and skills in various sets of business related activities. Any previous work experience, or an array of work experiences, can facilitate the entrepreneur to attain the skills and knowledge needed (Lazear 2001).

Other authors identified ethnic markets and natural resources as means for creating niche market opportunities for entrepreneurs to exploit. Evans (1989) examines how concentrations of ethnic markets can lead to an increase in small business ownership by members of that ethnic group. It is agreed that this entrepreneurship pattern is thought to be due to the inside knowledge ethnic entrepreneurs have regarding the preferences of these groups. Also, it provides the community the opportunity to make transactions with a business with a similar cultural background; this may provide an ethnic small business owner a competitive advantage over an outside source, not owned within the community, in supplying goods and services for the concentrated demographic group in the area. Evans (1989) concludes that these factors contribute to business success.

Likewise, "tourism opportunities differentiated counties with respect to growth during the 1990s" and since then "there has been increased interest in amenities" (Walzer 2007, page 67). These amenities refer to the scenic factor and natural resources in counties that attract tourists and create opportunities for entrepreneurship development (Walzer, 2007). Entrepreneurs located in areas

with premium natural resources may thus have access to unique opportunities that will facilitate their success.

Additional literature has centered on the family or personal resources that potential entrepreneurs can access. Dyer, Gibb, and Handler (1994) found that the family of the entrepreneur provided support through "access to markets, sources of [labor and capital] supply, technology, and even new ideas" (page 73). Even with the support network, some families desire the stable incomes and low risks that come with standard jobs. However, the risks of entrepreneurship can be minimized if their household has multiple sources of income (Dyer, Gibb, and Handler 1994). For instance, when both spouses work, if one spouse makes an investment in a new start up business and they fail, the household may still have a stable and sufficient income through the other spouse. This decreases the perceived risk of entrepreneurship activity and can facilitate families with this structure to become entrepreneurs.

Another area of research has explored the impact of resource constraints, such as health insurance, on entrepreneurial rates. This literature is based on the job lock hypothesis, where wage and salary earners are seen as less likely to become self-employed because they would lose employer-based health care coverage (Holtz-Eakin, Penrod, and Rosen 1996). If the hypothesis holds, individuals with spouses who have health insurance are more likely to be self-employed all else being equal. Holtz-Eakin, Penrod, and Rosen (1996) used both the Panel Study of Income Dynamics (PSID) and the Survey of Program

Participation (SIPP) data on people who moved to self-employment from 1984 to 1987 to examine the job lock hypothesis. These authors report that both datasets indicated that job lock was likely to not exist and hypothesized that because self-employed is such a risky proposition to begin with, individuals who wanted to be entrepreneurs would ignore the additional risk of being uninsured. Alternatively, using data from the 1993 Current Population Survey (CPS) on all self-employed, Wellington (2001) found that universal health care coverage could increase the percent of self-employed males from 2.3 to 4.4 percent and self-employed females from 2.5 to 4.4 percent. Possible explanation of the difference in results for the two studies includes different years of analysis (overtime the cost of not providing own health insurance has risen), consideration of newly self-employed versus all self-employed, differences in modeling approaches, and other differences in data (Wellington 2001).

In addition, in many small rural areas, financial institutions may not have the expertise and resources necessary to judge the entrepreneurship opportunities and ideas. This leads the institutions to "follow more conservative lending strategies, requiring collateral that is difficult for entrepreneurs to provide" (Walzer 2007, page 12). Goetz and Freshwater (2001) focus on "external" or regional factors in examining the influence of access to financial capital and "entrepreneurial capital" on entrepreneurial activity in the 50 states. Their research indicates a U-shaped relationship between access to financial capital and entrepreneurial activity indicating beyond a certain level, enhanced capital

access does not mean more entrepreneurs. For the purposes of this study,

assuming rural areas in South Carolina do not have an excess of capital access,

and often have a shortage, their results imply that a lack of entrepreneurial

capital may limit small business growth in more rural areas.

Conceptual Model

The research presented here explores the determinants of self-

employment income within South Carolina. Conceptually, the recent literature

indicates that certain attributes of business owners and attributes of the regions

in which they conduct business affect self-employed income. Self-employment

will be used to generate the sample in this study due to the focus on the

determinants of individual entrepreneurs.   As previously discussed in the

literature review, self-employment is the conventional approach used to measure

entrepreneurs as individuals in empirical studies (Van Praag and Versloot 2007).

Therefore, our basic conceptual approach is to examine the functional

relationship between self-employed income and possible determinants of it. Let

Y_{ijr} demonstrate the earnings of individual i in sector j within region r

$$Y_{ijr} = f\big(A_i \ + \ R_i \ + \ S_{ijr}\big)$$

where: A_i accounts for relevant personal attributes of the individual, R_i measures

the availability of resources to the business owner, and S_{ijr} is a matrix of

variables accounting for the economic structure, industry makeup, and human

and social capital present within the individual's region and industry. The

variables included in each of these categories of determinants are described below.

Personal Attributes

Personal characteristics measured by A_i are included to account for individual productivity that are thought to account for differences in self-employed income. These variables include demographic characteristics and other measures of background such as an individual's age, sex, race, presence of children, education, work experience, and business age.

Demographic measures found consistently in the literature to impact self-employed income or levels of self-employment include education, age, sex, race, education, and household size (Kusmin 2010; Gurley-Calvez and Hammond 2010). This model assumes these same demographics affect self-employed income as well. Education provides individuals with knowledge to make intelligent business decisions.   An increase in age could be associated with labor market experience adding to the knowledge base available to draw upon to encourage quality business decisions (Holtz-Eakin, Joulfaian, and Rosen 1994). Sex and race are demographics contained within literature that has an effect on an individual's income; males are expected to have higher incomes than females and whites are expected and whites are expected to have the highest income relative to their counterparts at least in part due to labor market discrimination (Kusmin 2010).

The number of children the business has owner is expected to have a positive correlation with self-employed income for several reasons (Hamilton 2000; Aldrich and Cliff 2003; Shane and Venkataraman 2000). An individual could be less likely to participate in a risky, non-rewarding venture if he or she has a family to support (Holts-Eakin, Joulfaian, and Rosen 1994; Dyer and Handler 1994). Those with larger families tend to apply a more risk adverse filter to their business decisions and thus ignore high risk business options. It is worth noting that risk averse behavior would likely rule out risky options with high returns. Further, self-employers with larger households have greater income needs and hence may be "forced" to seek only opportunities which offer higher self-employed income. Finally, additional family members may also increase the variety and quantity of human and social capital resources available to the business (Aldrich and Cliff 2003; Shane and Venkataraman 2000).

Other characteristics of entrepreneurs have also been found relevant to their entrepreneurial income potential. Colombatto and Melnik (2007) and Evans (2009) found that previous work in the same industry leads to higher returns to business owners. Lazaer found that while work experience in the same industry has a larger impact on self-employed income, experience working in any industry leads to a similar increase. Work experience of the entrepreneurs spouse is also expected to have a positive impact on self-employed income by increasing the knowledge and human capital available to the business from labor market

experience (Fayolle 2007; Gibb 1996). Age of the entrepreneur can be a proxy variable for work experience of the individual.

The age of the business would also be expected to be positively correlated with self-employed income. In the first years of business, net income is often very low, or even negative, due to the initial large investments required by the business and often slow initial sales. As the business matures, net income can be expected to grow or the firm will close. Unfortunately, our dataset contained no information concerning this variable (Evans 1989).

Resource Availability

Variables that measure resource availability to business owners, R_i, are seen as decreasing the risk of business failure and providing greater opportunity for growth in self-employed income. With enhanced access to resources, self-employers can acquire more assets based on greater levels of capital and other resources. As a result, business output and profits may increase. Preferably, survey data would provide information on the success of obtaining outside sources of capital and the availability of self funding for new businesses and business expansions for entrepreneurs. This data is not available and proxy variables for resource availability are explored in the following discussion.

One possible resource is the presence of family health insurance obtained through a working spouse. When present, the previously discussed job lock hypothesis is nullified and the individual is allowed to devote more efforts and

resources towards the business venture. For this study, the importance of health

insurance would not be expected to be as pronounced as in previous studies

discussed in the literature review (Welllington 2001; Holtz-Eakin, Penrod and

Rosen 1996) because this study attempts to model the determinants of self-

employed income rather than the decision to become self-employed. However,

self-employed individuals indicating the presence of insurance have greater

access to resources in general, and hence, a positive and significant relationship

between self-employed income and the presence of health insurance is

expected.

The existence of a mortgage can also be a measure of the availability of

financial resources as well as the willingness to take a risk (Walzer 2007;

Todorovic 1999). The characteristic traits used in the process of buying and

maintaining a home are parallel with those of creating and maintaining a

business, such as risk taking, being proactive, and desire for achievement

(Walzer 2007; Todorovic 1999). Hence, the presence of both health insurance

and a mortgage are expected to be positively correlated with self-employed

income.

Regional Structure

Other measures of resource availability are based on the region rather

than the individual.   These measures are grouped with other regional structural

characteristics (S_{ijr}) all of which are expected to have a positive impact on self-employed income.

Previous research (Goetz and Freashwater 2001; Walzer 2007) has indicated that access to capital is a determinant of the level of regional (state) self-employment. Because obtaining information concerning access to such capital at the sub-state level is virtually impossible, the concentration of activity in banking and insurance sector (NAICS 52)[9] for the region can be used as a proxy for access to capital.

Another possible determinant of a business owner's success is access to business services, such as accountants and appropriate lawyers. The existence of business services could also indicate a more dense concentration of self-employment since the self-employed would be a primary market, and those employed in these industries are often themselves self-employed. Such density could imply greater levels of appropriate social capital, which may exist in the form of support programs such as local business training activities and networking opportunities. Because direct measures of business social capital and access to business services are not available, the concentration of activity in professional, technical, and scientific services[10] (NAICS 54) can be used as a

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[9] The medical services industry (NAICS 62) is added as a variable due to the typically high incomes found in this sector.

[10] As to be discussed in Chapter Three, the level of activity in banking and insurance and in professional, scientific, and technical services at the PUMA regions were both insignificant and not used in the empirical model. However, the existence of earned income by a self-employed individual in both sectors does appear in the empirical model.

measure of access to business services and a proxy for access to business related social capital[11].

Agglomeration economies[12] are considered to play a pivotal role in growth of regional economies (Shaffer, Deller, and Marcouiller 2004). Population density is a driver of especially Jacobs[13] type agglomerative economies[14]. For example, Glaeser and Kohlhase (2004) have found that there is a strong connection between productivity of workers and population density. They also argue that an increase in population density leads to the spread of knowledge and the attraction of skilled workers; this leads to better information channels for the entrepreneurs based on enhanced social capital. Hence, population density at the regional level is expected to have a positive correlation with self-employed income. In addition, the basics of central place theory suggest that financial resources and services are more widely available as the population density increases, which would increase the entrepreneurs' chances in obtaining outside financial resources (Shaffer, Deller, and Marcouiller 2004). The increase in

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[11] The addition to the economic structural differences between regions, the diversity of natural and cultural resources across regions could also have an impact on self-employed income. As discussed in the literature, the presence of cultural centers could provide entrepreneurs with a niche market.

[12] Clustering of firms that enhance linkages to share ideas, methods, and processes; ultimately generates social capital and directly impacts growth (Shaffer, Deller, and Marcouiller 2004).

[13] The interactions derived from the "the cramming of individuals, occupations, and industries into close quarters" (Glaeser et al. 1992) that generates ideas and innovations; the critical knowledge transfers coming from the variety and diversity of industries in the region opposed to the core industry (Glaeser et al. 1992).

[14] Additional agglomeration economy theories include the Marshall-Arrow-Romer theory which suggests a core industry, similar to a local monopoly, drives knowledge spillovers within firms which, in turn, drives growth of the core industry and region (Glaeser et al. 1992). Porter proposes that growth is driven by a core industry, however, local competition drives firms to innovate; if firms do not maintain innovation parallel with other firms in the region, the firm will fail (Glaeser et al. 1992).

population density would lead to the entrepreneur's access to a skilled and diverse workforce, a larger market, and enhanced and specialized business services. Locating in a metropolitan (i.e., generally densely populated) region should also capture the impact of agglomeration economies on self-employed income (with the expectation that self-employed income in the metropolitan areas are enhanced).

Natural resources may also be expected to provide niche markets. An appropriate measure for this may be the amount of mountains, water, and coastline within the region. A natural amenity index is also provided by the USDA Economic Research Service was considered as a viable variable in our efforts. However, given the relative lack of variability in such a measure across South Carolina, it was not included as a model variable[15].

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[15] Though all the variables discussed in the conceptual could not be used due to data restraints, the variables used and their expected relationship with self-employed income can be found in Table 3.3.

CHAPTER THREE

RESULTS

Our objective is to identify and quantify the determinants of
entrepreneurial income in South Carolina. In Chapter Two, the literature is
reviewed to identify various types of entrepreneurs and a conceptual model of
individual entrepreneurial income is presented. In this Chapter, the conceptual
model is empirically estimated to provide an empirical explanation of what drives
entrepreneurial income. Ordinary least squares regression analysis is used to
estimate the model. The discussion proceeds by first introducing the data used
in the analysis including the construction and justification for the explanatory
variables. The empirical results are then discussed.

Data and Measurements

Data for this study are based on the 2008 American Community Survey
(ACS) reported in the Integrated Public Use Microdata Series (IPUMS). IPUMS
is an open access online database that has compiled census micro data to
facilitate social and economic research (Ruggles et al. 2008). The ACS is
conducted by the U.S. Census Bureau to provide annual estimates of population
and housing characteristics. The Census currently releases ACS data for areas
with a population of at least 65,000 (Ruggles et al. 2008). In the IPUMS
database, U.S. Census micro data is converted "into a single harmonized

database with uniform documentation, without losing any significant information contained in the existing samples" (Ruggles, McCaa, and Sobek 2005, page 4). Annual ACS data is available from 2001 through 2008 based on a 1 percent population sample; a more detailed ACS data set is compiled every ten years based on a 5 percent population sample. Each sample extracted from the IPUMS database contains personal and household data and codes that identify individual and household members that can be interlinked (Ruggles et al. 2008).

This data set was chosen because it is a large, unbiased sample of the entire population of South Carolina. There is no cost to obtaining the sample; further, the analysis is not limited by business size or geographical region within a state. Other databases that were considered for use of this study include the Survey of Income and Program Participation (SIPP), the Current Population Survey (CPS, and the Panel Study of Income Dynamics (PSID), the Kaufmann Firm Survey, and U.S. Census Bureau Business Statistics; however, these databases were found to be too limited to satisfy the purpose of this study.

For example, the SIPP has sampling limitations that prohibits an adequate sample size for South Carolina (SIPP year). While the CPS provides detailed information on the individual, it only reports data at the national level (www.census.gov/cps/). The PSID is similar to IPUMS in that it is a longitudinal sample providing detailed individual characteristics; however, since the sample size is 9,000 families, regardless of self-employment status, it does not provide a sufficient number of observations on South Carolina entrepreneurs (Panel Study

of Income Dynamics 2010). The Kauffman Firm Survey provides researcher access to data they claim to be "the largest longitudinal survey of new businesses in the world" (Kauffman.org). However, this survey is limited to the first four years of a business's operations while this study requires the self-employment income of firms of all ages (Kauffman.org). The U.S. Census Bureau offers small business data that allows for the aggregation of firms based on employer size. This data has been used to track small business growth and entrepreneurial growth but lacks the detailed individual information required for this study (U.S. Census Bureau, Small Business Statistics).

Individuals reporting self-employed income were used to identify the initial data set. However, after reviewing our initial data set, it was determined that a number of individual records should be deleted. First, observations for individuals younger than 21 or older than 65 years of age were eliminated because the research focus was on individuals fully active in the labor market. From the remaining observations, variables indicating employment status[16] and labor force status[17] were used to identify and select individuals active in the labor force. The remaining observations were examined across category of workers. The variable for the class of worker[18] reports seven employed classifications (Ruggles et al. 2008):

- Self-employed

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[16] The IPUMS EMPSTATD variable.
[17] The IPUMS LABFORCE variable.
[18] The IPUMS CLASSWKRD variable.

- Employer

- Working on own account

- Self-employed, not incorporated

- Self-employed, incorporated

- Works for wages or salary

- Government employee.

Since this study focuses on the determinants of entrepreneurial income only the

individuals classified as self-employed (not incorporated and incorporated) as

their main labor market activity were selected for inclusion in this analysis. That

is, individuals who have a full-time salary job and operate a part-time business

were eliminated from the sample. Even though our observations are for self-

employed workers, the spouses of such workers are not restricted based on

workforce status. Our sample selection process provided 711 observations.

The dependent variable in the study is self-employment income which is

measured with a series of indicators and measures provided in the ACS. The

INCBUS00 variable reports the pre-tax income from self-employment of a

business or farm (Ruggles et al. 2008); this variable is the sole measure for self-

employed income for non-incorporated firms. However, an individual who reports

self employment but is involved with an incorporated firm will earn wages as well

as returns from a business due to the tax structure for corporations. Therefore,

for individuals reporting that their business is incorporated, self-employed income

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is measured as the sum of income from wages[19] and income from the business. Further, $15,000 is added to the self-employed income for each individual because self-employed individuals hide the true amount of their income to avoid additional taxes.[20]

The distribution of self-employed income as measured in this study is provided in figure 3.1.

Figure 3.1. Self-Employed Income Distribution.

As displayed, the self-employed income is not normally distributed. If a non-normal distribution is used in an OLS regression, parameter estimates are unbiased but t-statistic results could be misleading (Woolridge 2009). As this income appears to be log-normally distributed, applying a natural logarithmic transformation to self-employed income results in data that is approximately

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[19] The IPUMS INCWAGE variable.
[20] There are 5 outlier observations IPUMS provided that were removed from the sample because of their extraordinary large incomes.

normally distributed and is presented in Figure 3.2. The expectation is that this

transformation results in a normally distributed error term.
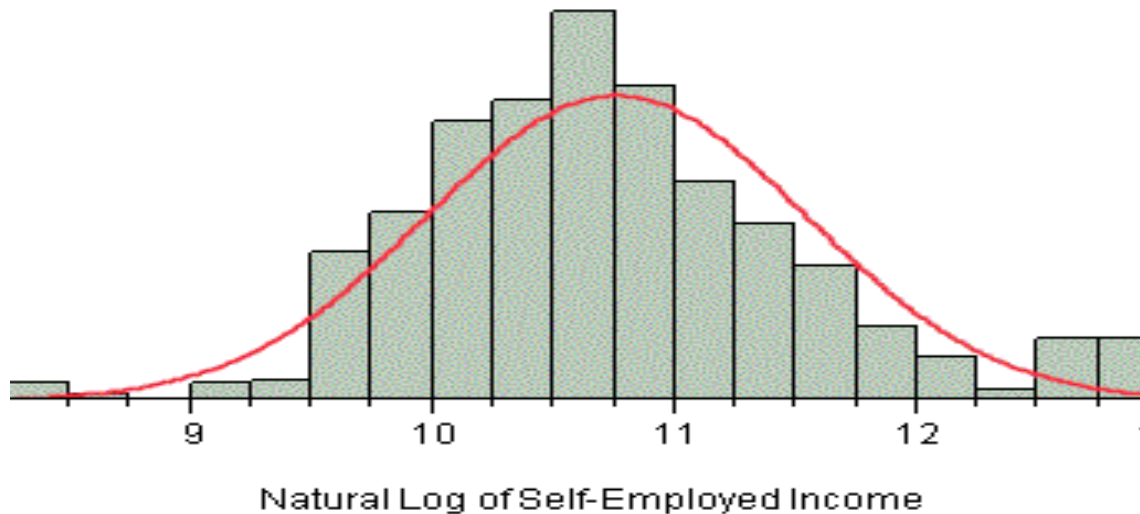
Figure 3.2. Natural Logarithmic of Self-Employed Income Distribution.

Independent Variables

The specified model predicts that self-employment income is a function of

personal, household, and economic attributes. The personal characteristics

measured are sex[21], age[22], race [23]and education[24]. Variables intended to

account for household characteristics and resource availability include health

insurance[25], mortgage status[26], self-employed percentage of family income[27],

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[21] The IPUMS SEX variable.
[22] The IPUMS AGE variable.
[23] The IPUMS RACE variable.
[24] The IPUMS EDUC variable.
[25] The IPUMS HCOVANY variable.
[26] The IPUMS MORTGAGE variable.
[27] Percentage of family income from entrepreneurial activity.

marriage status[28], the industry to which the self-employer's business belongs[29], and the incorporation standing of the company[30]. Included regional economic structural variables are metropolitan status[31], population density, PUMA income change from 2005 to 2008, and PUMA 2000 income.

Based on our theoretical model, health insurance provided through a spouse is hypothesized to be a determinant of self-employed income. However, the data does not provide a means to identify if health insurance is provided by the self-employed individual or through the employer of the spouse (using IPUMS variable SPHCOVANY (Ruggles et al. 2008)). Hence, we evaluate the effect of health insurance regardless of its source.

The mortgage status variable was constructed from IPUMS survey data. The survey allowed individuals to respond in one of five ways: no mortgage present, home owned free and clear, mortgaged or similar debt, contract to purchase, and mortgage present (Ruggles et al. 2008). In this analysis, these responses have been aggregated to a mortgage present or not present binary variable.

The class of worker variable was previously discussed and used to construct an indicator variable for self- employment income. However, the class of worker variable also allows the construction of another explanatory indicator

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[28] The IPUMS MARST variable.
[29] The IPUMS INDNAICS variable.
[30] The IPUMS CLSSWKR variable.
[31] The IPUMS METRO variable.

variable to identify if the self-employer's business is incorporated or non-incorporated (Ruggles et al. 2008).

The industrial category for the business owned by self-employed individuals is constructed using the North American Industrial Classification System (NAICS). While NAICS provides hundreds of industrial classifications in a hierarchical system (Executive Office of the President), the data this study uses is aggregated at the NAICS two digit level because of sample size limitations. Observations are divided into one of four industry groups: finance and insurance (NAICS 52), professional, scientific, and technical services (NAICS 54), health care and social assistance (NAICS 62), and all other two digit NAICS industries (Ruggles et al. 2008).

The measure of metropolitan status provides information on the location of the individual relative to the city center (i.e. within central city, in outer city, central city status unknown, or metropolitan status unknown (Ruggles et al. 2008)). This information was used to designate if an individual lives in a metropolitan area using the IPUMS METRO[32] and METAREA variables. Some records are labeled "not identifiable" in IPUMS to ensure confidentiality of the survey respondents (Ruggles et al. 2008); however, the METAREA variable indicates whether the individual would have been classified within a specific metropolitan area (i.e. Columbia, Myrtle Beach, Charleston, etc.) in the 2000 census (Ruggles et al. 2008). Thus, merging the two variables permits the "not

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[32] METRO uses the ACS survey to indicate whether the observation is within a metropolitan area.

identified" records to be identified as within a metropolitan or not within a metropolitan area.

The marriage status variable provides additional detail beyond the simple married/single response, such as separated, divorced, and spouse absent (Ruggles et al. 2008). However, in this analysis only the information regarding if the individual is married is used.

IPUMS reports educational status disaggregated across twelve levels ranging from "no schooling" and "nursery school", to the specific number of years of high school and college attained (Ruggles et al. 2008). Observations for this variable have been aggregated into two categories, "greater than high school" and "high school or less". This breakdown was chosen to divide the population in fairly even amounts. If aggregations were used with higher levels of income, i.e. bachelor's degree or doctorates, sample sizes for these groups would not be large enough for statistical analysis.

Descriptive Statistics

Descriptive statistics for the categorical variables used in the empirical model are provided in Table 3.1. Average reported self-employed income for males ($61,872) is more than twice the average reported self-employed income for females. Average reported self-employed income for individuals with a mortgage ($54,709) is more than twice the average reported self-employed income for non-home owners. Being married, having health insurance, and

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having an incorporated business are all associated with higher self-employed income. Average self-employed income in the three industries of interest (finance and insurance, scientific and technical services, and health care) are considerably larger than self-employed income in all other industries. In addition, average self-employed income in metropolitan areas is $22,062 less than that in non-metropolitan areas.

Descriptive statistics for the continuous variables included in the empirical analysis are reported in Table 3.2. The self-employed percentage of family income is calculated by taking the percentage of self-employed income of total family income earned by all family members[33]. Self-employed income can be greater than the total family income (if the spouse had an income loss). In these instances, the percentage family income is respectively set to 100 percent.

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[33] Sum of the IPUMS INCTOT and SPINCTOT variables

Table 3.1. Categorical Variable Summary Statistics.

Variable Name	Description	Mean Self-Employed Income	Number of Observations	Percentage of Observations
Mortgage				
	Mortgage present	$54,709	626	88
	Never had a mortgage	$25,577	85	12
Sex				
	Female	$30,724	243	35
	Male	$61,872	468	65
Marriage Status				
	Married	$56,477	573	80
	Single	$29,425	138	20
Health Insurance				
	Has health coverage	$56,034	580	81
	No health coverage	$29,944	131	19
Class of Worker				
	Incorporated	$70,299	274	38
	Not incorporated	$39,268	437	62
Industry				
	Finance and insurance (NAICS 52)	$118,286	20	2
	Scientific & technical services (NAICS 54)	$79,837	59	8
	Health care (NAICS 62)	$115,166	39	5
	All others	$41,913	593	83
Metropolitan Status				
	Metro	$60,858	538	76
	Not metro	$82,920	173	24
Education				
	Greater than high school	$62,974	395	56
	High school or less	$36,542	316	44

Population density is measured as persons per square mile using the sum of the PERWT variable[34] divided by total PUMA land area[35]. PUMA 2000 income is calculated as the sum of total income of the individual PUMAs for the year 2000. PUMA income change is the ratio of total PUMA income in 2008 to 2005. Accordingly, if the PUMA Income Change variable is greater than one, it indicates growth in total income from 2005 to 2008, less than one indicates a decline in income from 2005 to 2008.

Table 3.2. Continuous Variable Summary Statistics.

Variable	Mean	Standard Deviation	Minimum	Maximum
Self-Employed Income	51,226	72,206	4,817	412,447
Age	47.39	10.80	21	65
Self-Employed % of Family Income	53.41%	33.85%	0.00%	100%
Population Density (hundreds of people per square mile)	3.54	4.08	0.51	14.38
PUMA '00 Income ($Billions)	160.90	54.01	94.11	360.08
PUMA Income Change ('05-'08)	1.01	0.09	0.81	1.23

As shown in Table 3.2, self-employed income is highly variable, ranging from a low of $4,817 to a high of $412,447 with a standard deviation of $72,206. The average age of self-employers is 47.39, and the minimum and maximum values are 21 and 65. The high variation in the population density variable

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[34] The IPUMS PERWT variable identifies how many persons in the U.S. population are represented by the given observation (Ruggles et al.). Thus, if you add all the PERWT counts for the S.C. sample, it would equal the total population for S.C.
[35] The IPUMS LANDAREA variable (must be converted to square miles).

(mean of 3.54 hundred people per square mile and a standard deviation of 4.08 people per hundred square mile) reflects the heterogeneity of the environment in which entrepreneurs operate. The PUMA income change variable reveals that the greatest income growth of a PUMA within the state between 2005 and 2008 was 23 percent and the smallest PUMA income change was a decrease of 19 percent.

Empirical Results

Ordinary least squares regression (OLS), with the log of self-employed income as the dependent variable, was used to test several hypotheses concerning the determinants of self-employed income in South Carolina in 2008. The expected relationships between independent variables and entrepreneurial income were hypothesized using economic logic and the literature as discussed in the conceptual model provided in Chapter Two.

Initial model testing included first-ordered demographic variables such as age, sex, race, and education. These variables were expected to have a significant impact on self-employed income, however, they proved to be insignificance. The interaction variables, age*sex and race*education, were then generated based on literature findings and proved to have significant explanatory power. As discussed in the conceptual model, the concentration of the Finance and Insurance (NAICS 52) and Scientific and Technical Services (NAICS 54) sectors were tested to proxy for access to capital and social and human capital

within a region. The concentration was generated as a ratio of both relative income and employment for the PUMA. None of the tested concentration levels for these variables were significant. However, self-employment indicator variables for both sectors and for health care were significant and were included in the model. In general, the estimated signs of variables included in the final model were as expected, although relationships were statistically insignificant in several cases. Results for the analysis are presented in Table 3.3.

The F-statistic (58.8) measures the overall significance of the regression (Table 3.3) and is highly significant. The associated p-value is less than .0001 and indicates that, when considered together, the independent variables in the regression explain some of the variation in the natural logarithmic of self-employed income (Woolridge 2009). The coefficient of determination, R^2, is the ratio of the explained regression sum of squares to the total sum of squares, or the fraction of the variation in the dependent variable that is explained by the series of independent variables (Woolridge 2009). The amount of variance explained is measured by the R^2 value of .541 or 54.1 percent. An R^2 value of .541 is typical for similar studies based on a cross-sectional analysis.

Table 3.3. Parameter Estimates from Log(Self-Employed Income) Regression.

Variable	Estimate	Std Error	t Ratio	Prob>|t|	Expected Sign
Constant	9.986	0.251	39.72	<.0001	
Population Density	0.00125	0.005	0.24	0.8068	+
PUMA Income Change ('05-'08)	0.0317	0.215	0.15	0.883	+
PUMA '00 Income ($Billions)	0.0002	0	0.65	0.5182	+
Self-Employed % of Family Income	0.0139	0.0007	20.12	<.0001**	+
Age*Sex (Male=1)	0.0026	0.001	3.00	0.0028*	+
Health Insurance (Has Health Coverage=1)	0.1103	0.029	3.76	0.0002**	+
Marriage Status (Married=1)	0.241	0.028	8.57	<.0001**	+
Metropolitan Status (1=Metro)	0.0746	0.026	2.88	0.0041*	+
Mortgage (Mortgage Present=1)	0.131	0.034	3.87	0.0001**	+
Class of Worker (Incorporated=1)	0.0806	0.022	3.64	0.0003**	+
Race*Education (White & Greater than H.S.=1)	0.1194	0.043	2.75	0.0061*	+
Sector: Finance & Insurance (Yes=1)	0.2502	0.062	4.04	<.0001**	+
Sector: Scientific & Technical Services (Yes=1)	0.1067	0.038	2.83	0.0048*	+
Sector: Health Care (Yes=1)	.2414	.046	5.24	<.0001**	+
R^2	0.541				
F Ratio	58.8			<.0001**	
Moran's I (Z-value)	1.07			0.2847	
Condition Number	3.15				

*Significant at the α=.01 level
**Significant at the α=.001 level

Spatial correlation causes a bias in variance estimates and thus provides false or inefficient F and T test statistics. Spatial autocorrelation may exist because of the economic spillover of regional centers influencing the income level for nearby entrepreneurs (Anselin 2003). Furthermore, interaction among near-by entrepreneurs can also lead to spatial autocorrelation. The Moran's I is used to test for spatial autocorrelation (Isard et al. 1998). The Moran's I statistic used in this study applied a matrix of spatial weights of absolute distances from the center of PUMAs multiplied by the error terms as denoted to the PUMA units to test for any spatial based correlation. The calculated Moran's I for our regression is 1.07 based on the z-distribution and is statistically insignificant with a p-value of .28 (Table 3.3). Thus, the OLS assumption of uncorrelated error terms is not violated.

Often in regression models, independent variables will provide redundant information in relation to the dependent variables; consequently, these independent variables can be correlated. The correlation of independent variables is referred to as multicollinearity and when it becomes considerable, statistical problems arise. Severe multicollinearity can lead to errors in the estimated coefficients, skew t-tests for the contribution of the variable, and affect the sign of the parameter estimates (Mendenhall et al. 2009). One test for multicollinearity among the independent variables is to use the condition number of the data matrix. The condition number is the condition index with the largest value; that is, the square root of the quotient of the largest eigen value and the

smallest eigen value. If this ratio is greater than 30, multicollinearity among the independent variables is likely to exist (Judge et al. year). In this analysis, the condition number is 3.15, indicating that multicollinearity is not a significant issue in the estimated model[36] (Table 3.3).

Parameter estimates indicate the nature of the relationship between self-employed income and the independent variables. The natural log of self-employed regression is interpreted as a measure of semi-elasticity. That is, if $\log(y) = \beta_0 + \beta_1 x_1$, then a marginal change in x, one would be $\Delta \log(y) = \beta_1 \Delta x_1$. Simple algebraic methods lead us to a percentage change in the predicted y when $\Delta x_1 = 1$ or:

$$\%\Delta y = 100[\exp(\beta_1) - 1] \qquad\qquad Equation\ 1.$$

Equation 1 is used to calculate the percent and actual change in self-employed income and is reported in Table 3.4. For statistically significant independent variables, change in self-employed income is evaluated about the mean for self employed income and the mean of each of the respective continuous independent variables and the marginal effect for categorical variables.

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[36] Simple correlations of the variables are available in the Appendix.

Table 3.4. Self-Employed Income Effects.

Variable	% Change	Income Change
Race*Education (White & Greater than H.S.=1)	12.68%	$6,494
Age*Sex (Male=1)	0.27%	$136
Mortgage (Mortgage Present=1)	13.99%	$7,168
Marriage Status (Married=1)	27.25%	$13,959
Class of Worker (Incorporated=1)	8.40%	$4,301
Self-Employed % of Family Income	1.41%	$722
Health Insurance (Has Health Coverage=1)	11.66%	$5,974
Metropolitan Status (Metro=1)	7.75%	$3,969
Finance and Insurance (Yes=1)	28.43%	$14,565
Health Care (Yes=1)	27.30%	$13,983
Scientific & Technical Services (Yes=1)	11.27%	$5,771

Demographic Parameters

Included model variables that control for the personal characteristics of the self-employed individuals consist of a continuous variable for age and three indicator variables for sex, education, and race. The dichotomous sex variable is coded as one for male and zero for female. Education is coded as one for more than a high school education and zero otherwise. Race is coded as one if white and zero if non-white. In initial model estimation, age, sex, education and race were not statistically significant variables, but certain interactions between these variables were significant.

Sex, race, and education are demographic characteristics contained within literature that have an effect on an individual's income. This being males, whites and higher educated persons typically have a greater income than their counterparts (Kusmin 2010). Further, empirical evidence based on annual

earnings (of all workers, not self-employed earnings alone) have found that returns to education are higher for African Americans (Kusmin 2010). The assumption has been made that these findings hold for self-employed individuals as well. Conversely, the results suggest that in South Carolina white, educated self-employed individuals receive a 12.68 percent greater income ($6,494 in actual income) than all others (Table 3.4). Non-white self-employed persons with an education greater than high school were tested but no significant results were found.

The age*sex interaction variable is consistent with the literature. Male income increases at an increasing rate with age, whereas female income generally increases at a steady rate with age (Kusmin 2010). This result can be explained by both discriminatory[37] and voluntary acts within the labor market. Further, women may opt for self-employment because of other household duties, especially if they have younger children. In such cases, women may be willing to have lower self-employed incomes as a tradeoff for more flexible work schedules. The positive estimate (.0026, Table 3.3) suggests that for each additional year of age, males receive 0.27 percent more income than females. This equates to $136 for the first year increase of age from the mean for males (Table 3.4).

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[37] Studies have found that even after controlling for a variety of characteristics women earn less than men (Kusmin 2010).

<u>Resource Availability</u>

Resource constraint proxy variables include marriage status (married equal to one with an expected positive sign due to enhanced access to resources), mortgage (owned house or have a mortgage equal to one with an expected positive sign due to enhanced access to resources), class of worker (incorporated equal to one with an expected positive sign due to enhanced access to resources), and health insurance (has insurance equal to one with an expected positive sign due to enhanced access to resources).

Holding a mortgage is a measure of financial resource availability and willingness to take a risk; both the financial resources and risk taking personality required to hold a mortgage are required to run a business requires (Walzer 2007). The mortgage variable displays the expected sign and is significant. Model results imply that individuals who either currently or previously have had a mortgage earn 13.99 percent more self-employment income or an additional $7,168 per year on average (Table 3.4).

The marriage variable is significant and positive, as expected. Individuals who are married have a 27.25 percent ($13,959) higher self-employment income on average (Table 3.4). Married self-employed individuals have access to more resources (financial and otherwise) to invest in the business and increase business output (Aldrich and Cliff 2003).

Incorporated self-employment income is 8.40 percent greater than for self-employed individuals whose businesses are not incorporated. More directly

stated, incorporated self-employers have an income $4,301 larger than non-incorporated (Table 3.4). This is expected as Acs, Desai, and Klapper found that larger businesses are more likely to become incorporated due to the "benefits of greater access to formal financing and labor contracts, as well as for tax and other purposes not related to business activities" (page 273). In addition, larger businesses, which are more likely to be incorporated, are much more likely to be well established; also, economies of scale may play a role in the larger income effect.

Self-employed percentage of family income from entrepreneurial income is a proxy for the motive of the self-employed worker. It is hypothesized that if the percentage of the family income derived from self-employment is low, there is not a need for the individual to produce a higher income because of the availability of other sources of income. As the percentage of self-employed family income increases, it indicates that the self-employed worker is responsible for a larger portion of income to support his or her family; as a result, the self-employed worker has an increased motive to maximize income. Results suggest that a one percent increase at the mean of percent family income from entrepreneurial activity results in a self-employed income increase of 1.41 percent or $722 (Table 3.4).

The health insurance variable is significant and shows a strong positive relationship between self-employment income and access to health insurance. This relationship is as expected. Health insurance is affordable for the majority

of Americans[38] because the employer pays a portion of the premium, and group

rates are offered to employers to lower the overall cost of coverage (Wellington

2001). Without the discounted group rate available through employers, self-

employed workers are forced to pay a higher price for health insurance, thus,

consuming financial capital that could be critical to the success of a business.

The presence of health insurance, whether from the spouse's employer or a

private source, minimizes risk for self-employers and allows them to invest more

resources in their business. Self-employed individuals who have health

insurance have 11.66 percent higher income then individuals without health

insurance (Table 3.4). This percentage increase in income corresponds with a

$5,974 larger self-employed income for those who have health insurance

coverage.

Regional Economic Structure

The variables designed to capture regional economic structure affects are

the PUMA income and population measures, metropolitan status (with an

expected positive sign due to agglomeration economies), and industry (industries

seen as having a positive influence on self-employed income, with entrepreneurs

belonging to that group having a dummy variable of one, hence a positive

expected sign).

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[38] 90% of all people under the age of 65 with private insurance were insured through their employer (Wellilngton 2001).

The expected relationship is positive between self-employed income and income change in the PUMA unit from 2005 to 2008, 2000 PUMA income, and population. The analysis reflected the appropriate relationship between all three variables and self-employed income, however, none of the variables are statistically significant (Table3-3). As demonstrated by Glaeser and Kohlhase (2004), earned income and population density have a strong and positive relationship. One could expect at first examination for the positive relationship to also hold between self employed income and population density. However, nominal per capita income grew at a faster rate in nonmetropolitan areas as opposed to metropolitan areas in 2008.

Metropolitan areas in South Carolina have been particularly affected by the recession in 2008 (Bureau of Economic Analysis, 2010). All metropolitan areas in the state had nominal per capita income growth less than the U.S. metropolitan average. The Myrtle Beach Metropolitan Area had negative growth in nominal per capita income as did the Charlotte Metropolitan Area that covers part of the state. Given that financial services are concentrated in urban centers (Glaeser and Kohlhase 2004) and much of the collapse of construction activity was in urban areas, it is perhaps not surprising that population density has an insignificant relationship with self-employed income, even though the metropolitan status variable has a positive and significant coefficient (Table 3.3).

The metropolitan indicator variable is designed to capture the effects on self-employed income of agglomeration economies and other effects similar to

the expected results of population density since metropolitan is essentially an

indication variable for population density[39]. These effects include access to

financial and social capital. The estimate for metropolitan status indicates that

self-employed individuals living in a metropolitan area have a self-employed

income 7.75 percent. This is $3,969 higher than that of those self-employed

individuals not living in a metropolitan region (Table 3.4).

Perhaps the reason for the disparity between the metropolitan status

measure and the population density measure is the PUMA assignments of the

ACS. As can be found in the PUMA maps (maps can be accessed at

http://usa.ipums.org/usa/volii/2000pumas.shtml (Ruggles et al. 2008)), the PUMA

regions that encompass Greenville, Spartanburg, Columbia, and Charleston,the

four largest and most dense cities in the state, there are separate PUMAs for the

inner most city areas and the rest of the county. For example, the Greenville

PUMA 00201 is essentially just the city of Greenville, while the rest of the county

is classified as PUMA 00202. The urban economic fallout may be negatively

affecting the self employed income most in the PUMAs with highest population

density because of the concentration of the financial sector. Meanwhile, the

surrounding less dense areas are still considered metropolitan but have not been

affected with the same severity of the financial crisis.

A positive change in income indicates general economic growth. The

2000 level of income is an indication of stage of development. A negative and

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[39] Significant correlation between Metropolitan Status and Population Density was tested, but no
significance was found.

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statistically significant relationship for PUMA 2000 income would indicate income converge similar to the Barro hypothesis (Barro and Sala-i-Martin 1992) implying convergence of self-employed income relative to general level of economic development. Regressed against self employed income, the estimated coefficients are positive but insignificant (Table 3.3). A positive significant relationship would imply divergence. In any event, model results imply that these relationships are not significant within our data set (Table 3.3), implying neither convergence nor divergence. These results could also be affected by the recent recession.

The three industry indicator variables measured are finance and insurance (NAICS 52), professional, scientific, and technical services (NAICS 54), and health care (NAICS 62). These concentrations of these variables were tested in the initial model as a proxy for industrial structure within each region, though they were found to be insignificant. However, it was found that the use of these variables, in addition to the health care sector, as an indicator for the self-employed individual's industry is significant. Individuals that are self-employed in these industries are expected to have higher incomes in relation to those in any industry other than the three indicated sectors. Further, it is also expected that higher education is required to become self-employed in these sectors, e.g. accountants (NAICS 52), lawyers (NAICS 54), and doctors (NAICS 62), with, consequently, higher incomes.

Each of these industry variables are significant and, as expected, have a positive relationship with self-employed income (Table 3.3). The results suggest that the finance and insurance industry has the greatest relationship with income. Self-employed individuals in this industry have 28.43 percent or $14,565 more income than self-employed individuals not in one of the three indicated industries (Table 3.4). Similarly, the effect of the health care industry versus that of individuals not in one of the three designated industries is 27.30 percent ($13,983) more self-employment income. Based on the results of the model, scientific and technical services on average have 11.27 percent and $5,771 more income for self-employed individuals than individuals in all the other industries[40] (Table 3.4).

In addition, the error term within the model, ε_{ijr}, captures the unobserved, immeasurable aspects of the entrepreneur. Idiosyncratic knowledge, sector specific abilities, human capital, as well as additional affects on the entrepreneurial experience would be extremely difficult to observe and quantify. Therefore, the error term captures these measures.

In summary, the majority of the variables proved to be significant and supported the theory used to determine the expected sign. The variables with the greatest relationship with an increase in self-employed income were marriage

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[40] Though this study does not attempt to model the choice of becoming an entrepreneur, it should be noted that the decision could be effected by the substantially larger income self-employed individuals have relative to wage and salary workers for the three sectors accounted for in the model. The average income for a wage and salary employee in any of these three industries ranges from $34,142 to $37,767 while for self-employed workers the range is from $79,837 to $118,286.

status and the finance and insurance industry indicator. Interestingly, these variables were both a measure for access to resources. Hence, model results imply that resource accessibility is one of the most critical determinants of self-employed income. These findings support previous research (Goetz and Freshwater 2001; Walzer 2007) findings that access to capital and resources is critical for the development of self-employed individuals.

The regional economic structural variables were not significant, but may have been skewed by the recent recession. The typical personal demographics (race, sex, education, age) did not test to be significant; however, some interaction variables were found to capture the labor market discrepancies between differences in demographics as suggested in the literature. The age and sex interaction variable supported Kusmin's (2010) findings directly, whereas the race and education interaction variable contradicted his findings.

CHAPTER FOUR

SUMMARY AND CONCLUSIONS

Economists have argued (Acs et al. 2010; Koo and Kim 2009) that entrepreneurship is the missing link in explaining why regions grow and prosper. They claim that entrepreneurship is critical for converting R&D into commercial activities, developing innovations, and building wealth within a region. Many researchers also argue that industrial recruitment, as opposed to developing local entrepreneurs, is an ineffective approach for long term job and income growth (Barkley 2003; Spindler 1994). Instead, some authors argue that for a more constructive strategy, communities should create "an environment that facilitates the creation, growth, and success of entrepreneurs" (Barkley 2003, page 109) to build employment opportunities and increase regional wealth. While a increasing the number of entrepreneurs is desirable, the most critical factor of increasing regional wealth through entrepreneurship is to enhance entrepreneurial income. Although the boost of entrepreneurial income increases the induced effect of the multiplier of their income, a focus should be on building entrepreneurial income because are less likely to relocate outside of South Carolina in the future as compared to other firms.

Proponents of entrepreneurship have used the recent increase in self-employed workers as an argument for the importance of entrepreneurship to a regional economy. As discussed in Chapter One, the self-employment share of

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employment in South Carolina has nearly doubled since 1969 (11.9 percent to 21.7 percent). However, while the total number of self-employed workers has increased, share of net returns to entrepreneurs have decreased in relative terms. Even though the nation as a whole has displayed similar trends, overall the severity of the issue is worse in South Carolina. This result is counter to the argument of building wealth through entrepreneurship. Because at first glance entrepreneurship does not live up to this expectation and because the topic has not been extensively examined, a better understanding of the drivers of entrepreneurial income is required.

This study purports to analyze the determinants of entrepreneurial income in South Carolina. Using a review of the literature as a guide, personal productivity characteristics, resource constraints, and regional economic characteristics are examined to asses which are critical to an entrepreneur's success in generating income. Though the findings of the study have been determined using South Carolina data, the analysis can be insightful to the national level as well because of the similar issue of decreasing income per entrepreneur. These findings would be more transferable to states in the southeastern U.S. with the similar socioeconomic background, such as education, race, poverty, and similar industrial make-up.

The IPUMS database, based on data provided by the ACS, allows public access to a large array of personal and household measures. This database is used in the examination of the possible determinants of entrepreneurial income.

The regression based findings are consistent with the conceptual model outlined in Chapter Two. In this chapter, results are summarized, policy implications are drawn, and areas of future research are explored.

<u>Summary and Findings</u>

Supporters claim that entrepreneurship is critical to sustaining and building the economy of urban and rural communities across the nation. Economic development practices that enhance and support entrepreneurs are seen as essential because they cultivate innovation which, in turn, provides the area with new jobs, new wealth, and a better quality of life. It has only been of late, however, that researchers and practitioners have begun to examine entrepreneurship as a potential driver of regional economic growth.

The literature indicates personal characteristics, such as education, age, race, and sex, to have an impact on income (Kusmin 2010). In addition, resources available to the entrepreneur are seen as a potential contributor to entrepreneurial success. Support of a family can provide access to markets, sources of capital and labor, innovative ideas, and access to health care (Dyer and Handler 1994). Further, agglomeration economies, which has a greater influence as population and business density increase, leads to an increase in skilled workers and enhanced information channels (Glaeser and Kohlhase 2004). This is thought to have a positive indirect effect on self-employed income as it does with overall per capita income.

Several personal productivity measures that were expected to have an impact on self-employed income in the regression did have explanatory power as interaction variables. Specifically, interaction variables of age and sex as well as race and education were statistically significant. With the minority group having less self-employed income in both cases (females and non-white individuals), results imply that on average these minorities do not have either the resources or training, or both, required to become highly successful entrepreneurs. However, with 44 percent of the self-employed individuals in our sample indicating they have an education of a high school degree or less, many of these entrepreneurs could be survival entrepreneurs (their primary motive is not too maximize income). Therefore, the result of the race*education interaction variable could be skewed by individuals being "forced" into self-employment.

Most notably, the resource constraint variables (marriage status, mortgage, class of worker, and health insurance) as a group proved to have the greatest impact on self-employed income in South Carolina. The finance and insurance indicator (NAICS 52) variable proved to be the most influential individual determinant of self-employed income (Table 3.4). Being married had the third greatest impact on self-employed income and having a mortgage provided the fourth greatest impact. The presence of health insurance also has a fairly substantial impact on self-employed income. Though these variables do not directly measure the access of resources for the self-employed individual, they do indirectly imply that resource availability is likely to be a critical factor in

determining entrepreneurial income. Logically, a greater resource base provides

the means for greater investment and an enhanced ability to minimize risk, both

of which can lead to greater business returns.

The regional economic structure variables (population density, PUMA

income change, and PUMA '00 income) did not prove to be significant in the

model run for this analysis. However, there may have been measurement issues

regarding the PUMA geographic regions; metropolitan status may have captured

the expected effects of agglomeration and population density. Metropolitan

status being significant implies that self-employed workers within metropolitan

areas benefit from the generation and social networks of critical knowledge and

innovation associated with agglomeration economies.

<u>Policy Implications</u>

Policy makers have begun to turn to entrepreneurs as the cornerstone of

regional economies. Questions still arise, however, concerning the most

effective methods to foster entrepreneurial income growth, especially income

growth. The analysis presented here provides a basis for suggesting policies and

programs that could foster the contribution of entrepreneurs to income and job

growth.

The statistical analysis indirectly implies that the availability of resources,

particularly capital resources, is the most critical factor for income growth of self-

employed workers in South Carolina. Because knowledge and experience could

be deemed as important for at least some groups, training may be an additional

policy tool. Consequently, programs and policies that address resource

constraint issues and training needs for targeted groups are likely to be the most

influential in building a successful entrepreneurial based economy.

Capital Access

Capital access efforts can take several forms. Venture capital is an

attempt to provide financing to start-up businesses and established firms for

expansion. The primary advantage of venture capital as opposed to typical loans

provided by the bank or micro-financing entities is that venture capitalists provide

financing in exchange for equity in the company. This allows potential start-up or

pre-existing businesses to access capital without taking on financial debt.

However, traditional venture capital methods target only high growth, high

technological firms because of the investors' motive to maximize their personal

return (Yenerall 2008). Access to venture capital funds usually require business

plans, preferred stocks, rights of first refusal, and representation on the board of

directors (Barkley 2003). While venture capital has been found to be key in the

development of high growth entrepreneurs (Dean and Meyer 1996), the analysis

from this study suggests that the lack of resource availability to the majority of

self-employed persons in South Carolina may be the driving factor for lower net

returns to self-employment. Such individuals generally would not qualify for

venture capital type funding. Therefore, non-traditional venture capital funds may be an alternative for entrepreneurs through state and local agencies.

Many states attempted to publicly support venture capital funds to target the development of specific industries or to address the needs of certain regions (i.e. rural or distressed areas). While there are examples of publicly funded venture capital programs that are successful[41] (Kansas Venture Capital Inc.), state funded programs are on the decline (Barkley 2003), primarily because of the difficulty in avoiding political interference in directing funding and inability to retain successful fund managers. As a result, many state supported efforts have sustained extensive investment losses (Heard and Sibert 2000).

Angel investors are another source of equity capital for entrepreneurs very similar to venture capitalists. Angel investors are a group of wealthy individuals who are generally experienced entrepreneurs. Angel investors often provide second tier or mezzanine funding in lower amounts relative to venture capital to entrepreneurs (Yenerall 2008). Although they have fewer requirements than typical venture capitalists, like venture capital lenders angel investors still require a business plan, ownership of preferred stock, and usually have an influence in business decisions (Barkley 2003). Because of their business experiences, angel investors also provide entrepreneurs with specialized business knowledge

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[41] South Carolina's publicly funded venture capital program (SC Launch) is dedicated to facilitating applied research, product development and commercialization to build South Carolina's knowledge economy. SC Launch focuses on providing entrepreneurs with financial equity to build high technology start up businesses. Since the program has been in operation, $104,000,000 in follow-on capital has been secured by SC Launch portfolio companies, the average salary of the jobs created is $77,000, and 178 entities have received funding from SC Launch (www.SCLaunch.org).

and industrial expertise (Yenerall 2008). But Angel investors also require high returns on their investment, meaning they are not a good fit for most self-employed businesses in South Carolina.

Tax credit incentives are another means to stimulate investments for local entrepreneurs. Since tax credits shift the decision of investment to the private sector, the motive is primarily maximizing the returns of the investment (Barkley 2003). The tax credit incentives can also be created by the government to focus on a state economic strategy. For example, Delaware created a tax credit of 15 percent for investments in an approved business and Missouri provides credits for investments in a qualified business located within a distressed area of 60 percent and 40 percent in areas that are not distressed (Barkley 2003). Tax credits generally provide a percentage of the total of the investment. Since the tax credits do not require a specific size of investment, i.e. $2.5 million dollars for traditional venture capital, it provides an incentive for entrepreneurs to invest despite the amount resources available. The tax credit program has proved to be effective because "the availability of tax credits increases the return to equity investments, and thus it makes investments in state businesses more attractive" (Barkley 2003, page 113).

While tax credits do not discriminate based on the size of investment, the primary beneficiaries are the wealthy and the tax burden is shifted to lower income individuals. In addition, the net impacts of the tax credits are difficult to

determine in terms of tax forgone and the increase in demand of public services due to economic development (Barkley 2003).

Community development corporations (CDC) and community development financial institutions (CDFI) provide funding to small businesses within a specific area to not only generate a return to their investment, but to generate job creation and economic development. Both are privately managed but the capital sources between the two programs differ. The capital for community development corporations is generally provided by federal or state agencies and local organizations that would benefit from economic development of a certain area, i.e. banks. Community development financial institutions are usually privately funded but still focus on economic development of an area (Barkley 2003). The best CDFIs and CDCs provide expert advice and training, as well as capital, to small businesses.

Community development corporations and financial institutes have the ability and desire to address the funding needs of more typical small businesses often through collateral-backed micro-financing programs, which generally provide loan funds of up to $50,000. A main advantage of micro-financing agencies is that non-traditional sources of collateral are allowed, such as a television or computer (Yenerall 2008). These programs may be beneficial to small businesses and potential start ups that require less capital and do not have the high growth potential.

The Progress Fund is the epitome of a CDFI that provides micro-financing and technical assistance to start-up and established entrepreneurs in western Pennsylvania, eastern Ohio, and West Virginia. Their loans range from $20,000 to $400,000 and can be used to purchase property, equipment, inventory, or for working capital. With no additional charge, The Progress Fund provides financial analysis, marketing assistance, and referrals for business assistance (The Progress Fund 2008). This community development financial institution targets businesses that build the rural economy with an emphasis on tourism-based businesses and businesses located in the downtown area of smaller communities. "The Progress Fund has made 330 loans totaling more than $33 million, and created or retained more than 2,183 jobs since 1997" (Progress Fund). They attribute their success to providing loans to small businesses that often have trouble finding capital sources and providing business coaching to entrepreneurs that generally need assistance (The Progress Fund 2008).

<u>Business Training Programs</u>

As displayed by the success of The Progress Fund, not only do entrepreneurs need capital resources, but also are in need of training and technical assistance. Programs that seek to address training needs include business incubators, Small Business Development Centers, and small business training programs such as FastTrac.

Business incubators are community based facilities that provide resources to start-up businesses and are among the most common means of supporting entrepreneurs (Yenerall 2008). These programs provide rental space, shared office services, technology support, and financing assistance to start-up businesses (Henderson 2002). Most important a well run business incubator has a manager who provides the appropriate mix of advice and support for the new firms. A well run operations also provides training resources and ready access to business services often for free or at a discounted rate. With possible exception of so-called anchor tenants, the main goal of incubator management is to house start-up businesses long enough for them to become financially independent, usually within a one to three year period.

A number of experts praise the development of business incubators as a way to support local entrepreneurs. Yenerall (2008) states that "each new job created with the assistance of a publicly supported incubator saves about $1,000 as compared to other strategies" (page 6). In 2002, 90 percent of the business graduates of incubators associated with the National Business Incubator Association (NBIA) were still in business and 84 percent of those stayed in their local communities (Henderson 2002). However, critics can reply that membership in NBIA is a form of selection bias; in particular, many business incubators in rural and inner city areas struggle to attract business clients and are either forced to close or continue to seek large levels of permanent public support (Barkley 2003).

Small Business Development Centers (SBDC) are a cooperative effort from the federal, state, and local governments to address the needs entrepreneurs in the private sector. SBDCs are created by the Small Business Administration to "provide management assistance to current and prospective small business owners" (Office of Small Business Development Centers-Entrepreneurial Development 2010). SBDCs offer a large array of services which include business planning, finance, accounting, marketing, and business management (Office of Small Business Development Centers-Entrepreneurial Development 2010).

There is also an array of training programs that local policy makers can support the provision of to encourage entrepreneurial income growth including FastTrac, the Entrepreneurial Training Program offered through SBDCs (Office of Small Business Development Centers-Entrepreneurial Development 2010), and the Entrepreneurial League System (Collaborative Stratagies, LLC 2010). Perhaps the most popular and successful entrepreneurial education program in South Carolina is FastTrac. The FastTrac program consists of partner organizations in 49 states. FastTrac offers an array of programs focusing on start-up businesses, high technology business, and business expansion. The programs are designed to teach entrepreneurs the skills needed to manage and grow a successful business through hands on business programs and workshops (FastTracSC). FastTrac has displayed a great deal of success since the establishment of the program in South Carolina in 2003. Since that time, there

have been more than 1,000 graduates, and on average, each FastTrac graduate creates 4 new jobs (Hughes, Barkley, and Eades 2010).

While there are advantages and disadvantages to each program that can be used to nurture entrepreneurs, a range of services may be critical to developing wealth in a region through entrepreneurship. Different types of entrepreneurs require different financial and technical assistance during the stages of business development (Barkley 2003). Community development organizations are critical to small businesses that help build the income base in rural communities but have trouble finding start-up capital. However, high technological ventures still need the larger amount of capital from traditional venture capital programs and angel investors. The analysis in this study suggests that entrepreneurs with access to resources are more likely to have higher incomes than others. Therefore, policy makers should focus on making financial resources readily accessible to all prospective entrepreneurs.

In addition, there are several groups of self-employed workers that are more successful than others. The race*education and sex*age indicator variables implied that the minorities are not receiving training and resources required to maximize income. Further, the metropolitan status variable could indicate that rural entrepreneurs may not have the amount of access to financial services and business training/education relative to urban entrepreneurs. Though the analysis indirectly accounts for resource availability and entrepreneurial training, they do, along with other sources in the literature,

suggest that policy makers should concentrate on providing training such as FastTrac and SBDCs as well as providing an array of financial resources, i.e. angel investors and community development financial institutions, to uneducated individuals, non-whites, and females in rural areas.

Perhaps the most successful program noted is the Progress Fund. The results in this model suggest that resource availability and training are the two critical factors for entrepreneurial success. The success of the Progress Fund can be attributed to the assortment of assistance they provide to a wide range of entrepreneurs. They provide financial funding as low as $20,000 and up to $400,000 along with extensive training assistance (The Progress Fund 2008). Policy makers should note the benefits of being accessible to entrepreneurs of different sizes and different needs, and should offer an array of programs within their region to foster economic growth through entrepreneurship.

Limitations and Further Research

While the benefits of using the IPUMS database are many for this type of study, there are also several limitations. As with any self-employed income study, one of the main issues is the self reporting of income. IPUMS leadership attempts to address this issue by requesting the net pre-income tax returns from a business after accounting for business expenses (Ruggles et al.). However, self-employed workers may still be reluctant to share their true returns from the business in order to forgo additional taxes. Though this issue would be present

in the majority of approaches used to measure self-employed income, the reporting error could skew the analysis and result in inaccurate measures.

In addition to the self reporting of income, labor market discrepancies can have an effect on income regardless of the measures acquired for the entrepreneur. Previous studies (Hamilton 2000; Goetz and Rupasingha 2009) have omitted agricultural based businesses from their entrepreneurial studies because, arguably, agricultural subsidies can distort farm income data. In addition, women are reported (Hamilton 2000; Kusmin 2010) to be discriminated against within the labor market. While some entrepreneurial studies avoid these issues by omitting these groups from their study (Hamilton 2000), these discrepancies should be accounted for to provide an insight to policy implications relating to entrepreneurs. Further research could provide more in depth analysis concerning such labor market issues relating to women and other groups. Such analyses could require a separate regression to study the determinants of entrepreneurial income on sex, industry of the entrepreneur, and the type of entrepreneur.

The OLS regression model used in our study assumes that the entrepreneurs' motive is to maximize income. However, the literature suggests there are several different motives for entrepreneurs. These motives include having a stable medium to low income job to replace their prior job, take a pay cut to live in a desired area, or the non-pecuniary aspects of self-employment such as leisure time and setting your own schedule. Unfortunately, the IPUMS

database cannot be used to identify the motive of the entrepreneur. Future research would address these issues and develop a measurement for indicating the intention of the entrepreneur.

One of the variables found in the literature to effect entrepreneurial income is health insurance provided through a spouse. The IPUMS database allows for spousal linkages, but due to survey or reporting errors, it is unclear whether the self- employed worker or the spouse is the main holder of health insurance. Further research would attempt to breakthrough this data issue, or find a more elaborate data source, to provide the desired information. Whether or not the health insurance comes from the spouse's employer is critical in the job lock hypothesis in relation to entrepreneurial ventures and should be a main focus of future studies.

To address the issues of the motive of the entrepreneur, a double hurdle model would need to be implemented or a case study approach would need to be used. The double hurdle model would first address the decision making process to becoming an entrepreneur. This would shed light on why individuals become entrepreneurs and shed light on the job lock hypothesis and other risk mitigation strategies. A case study approach could use surveys and interviews to determine the motives of the entrepreneur; however, it would not allow for a macro-level assessment because the survey methods used on this level do not provide the level of detail required for this type of analysis. To assess risk mitigation, time series data would be required. This would allow the researcher

to determine acquisition of health insurance, mortgage, and other possible variables in order and in accordance with the start of the business and link the variables to the phase of the business.

The analysis completed in this study was compiled based on South Carolina data. While the findings can be assumed to elsewhere in the nation, this study should be used as a stepping stone for research on the national level. Data at the national level would also provide more variability in measures and allow insights into markets that could not be measured in South Carolina. These include the effect on self-employment income due to the presence of natural resources, ethnic concentrations and markets, and industrial diversification and concentrations.

As indicated in the above policy section, enhanced capital access, business incubators, business training, and other resources are expected to benefit entrepreneurs. The use of these programs by entrepreneurs during start-up and growth phases would be intriguing to study in relationship to short and long term entrepreneurial income. The influence of these programs on entrepreneurial income in relation to the cost of provision of the programs should be a focus of future policy studies.

Closing

Economic developers, regional economists, and state and local policy makers have began to push entrepreneurship as a method for growing the

income base in communities. However, while the number of self-employed

workers have rapidly increased in the last decade, the income of self-employed

workers has not kept pace. Despite the recent push for entrepreneurship, very

few studies document the determinants of income, and none for South Carolina.

The model results from this study suggest that by focusing on supplying

resources and funding opportunities to certain segments of the population, policy

makers can begin to increase the income per self-employed worker in their

region. The analysis provided here is a critical first step in resolving the

determinants of entrepreneurial income.

APPENDIX

Correlation of Coefficients	Intercept	Population Density	PUMA Income Change ('05-'08)	PUMA '00 Income	Metropolitan Status	Mortgage	Age*Sex	Marriage Status	Health Insurance	Class of Worker	Percent Family Income	Sector: Finance and Insurance	Sector: Scientific and Technical Services	Sector: Health Care	Race*Education
Intercept	1.00														
Population Density	-0.17	1.00													
PUMA Income Change ('05-'08)	-0.88	0.09	1.00												
PUMA '00 Income	-0.21	0.08	-0.01	1.00											
Metropolitan Status	0.03	-0.11	0.01	0.09	1.00										
Mortgage	-0.14	0.06	0.02	0.02	-0.08	1.00									
Age*Sex	-0.06	-0.01	0.01	0.04	0.02	0.10	1.00								
Marriage Status	-0.03	0.06	-0.06	-0.01	-0.07	-0.11	0.11	1.00							
Health Insurance	0.06	-0.01	0.01	0.04	0.01	0.23	0.00	0.17	1.00						
Class of Worker	0.09	-0.05	-0.02	-0.02	-0.17	-0.08	0.01	-0.08	0.14	1.00					
Percent Family Income	-0.18	0.07	-0.01	-0.05	-0.27	0.11	0.28	0.27	-0.15	-0.15	1.00				
Sector: Finance and Insurance	-0.25	-0.06	0.01	-0.07	-0.07	0.01	-0.03	0.02	-0.03	0.01	0.04	1.00			
Sector: Scientific and Technical Services	-0.21	-0.02	0.05	-0.04	-0.02	0.02	-0.04	-0.01	-0.07	0.04	0.05	0.09	1.00		
Sector: Health Care	-0.19	0.03	-0.01	0.01	-0.21	0.07	0.10	0.00	0.02	0.04	0.07	0.07	0.10	1.00	
Race*Education	0.05	0.17	0.00	-0.02	0.01	0.05	0.03	0.03	-0.14	0.07	0.00	-0.13	-0.19	-0.13	1.00

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