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**EVALUATING THE DETERMINANTS OF SELF-EMPLOYED INCOME ACROSS REGIONAL ECONOMIES: A CASE-STUDY OF THE U.S. SOUTHEAST**

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# **EVALUATING THE DETERMINANTS OF SELF-EMPLOYED INCOME ACROSS REGIONAL ECONOMIES: A CASE-STUDY OF THE U.S. SOUTHEAST**

## **Abstract**

Supporters claim that entrepreneurship is critical to building and sustaining the regional economies 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, creates new jobs, new wealth, and a better quality of life. However, South Carolina's real self-employed per capita income has decreased over the last decade. This downward trend highlights the need to examine the drivers of entrepreneurial income. The income of self-employed workers, as opposed to the number of self-employed, is critical to economic development because a major goal of economic policy is to increase incomes not just employment. Identifying and quantifying the personal, cultural, and economic factors that influence self-employed income provides policy makers with another tool to enhance economic development policies. This study uses data from the American Community Survey for South Carolina in both an ordinary regression approach and a quantile regression approach to investigate the relationship between individual entrepreneurial income and individual personal attributes, social/institutional assets available to the entrepreneur, and the regional economic environment the entrepreneur operates within. Personal attributes, such as education and sex, and the importance of self-employed income to total family income are significant variables in explaining income variation among self-employed individuals.

## **EVALUATING THE DETERMINANTS OF SELF-EMPLOYED INCOME ACROSS REGIONAL ECONOMIES: A CASE-STUDY OF THE U.S. SOUTHEAST**

### **Introduction**

State and local government entities have historically focused on major industry and/or firm recruitment as a driver for jobs and income in regional economies. Recently, researchers have begun to criticize this approach because it often fails to consider the public cost impacts of providing additional services, such as roads, schools, police protection, and water and sewer services, and/or potential negative environmental costs that often accompany industrial growth (Leistritz and Sell 2001). An increasing share of development experts now argue that development of a support system that increases the likelihood local entrepreneurs will be successful may prove to be a more cost-effective means to engender regional economic growth than the traditional approach of recruiting large industries (Spindler 1994; Shrestha, Goetz, and Rupasingha 2007; Yeneral 2008). The growth in the rising popularity of the entrepreneurial approach may be driven the potential misperception that strong national and regional growth in entrepreneurial-based self-employment accelerates regional per capita income growth.

While entrepreneurial activity is an intuitively promising vehicle for economic development (Edmiston 2007; Henderson 2002), the extent to which self-employment facilitates local economic growth is unclear. To date, much research has focused on the growth in the number of self-employed rather than the self-employment income level (Edmiston 2007; Henderson 2002; Van Praag and Versloot 2007). Individual characteristics and circumstances that affect the self-employed income level have not been fully examined and few studies have addressed the determinants of self-employed income. Prior studies on entrepreneurial employment have focused on individual characteristics such as health insurance, education, race, and the labor market experience as factors in the self-employment decision (Hamilton 2000; Wellington 2001). Other researchers have examined the relationship between the number of self-employed individuals and regional economic activity (Acs 2007; Glasser and Kerr

2010). In contrast to these prior studies, this study focuses on the determinants of the self-employed income level and not the attributes that lead an individual to become self-employed.

While economic development practices that support entrepreneurship are generally believed to cultivate innovation, new jobs, new wealth, and a better quality of life, it is unclear to what extent growth in self-employment is responsible for income growth. The income of self-employed workers, as opposed to the number of self-employed, is crucial to economic development strategies because a major goal of economic policy is to increase incomes not just employment. Knowledge of the factors that increase self-employment income in combination with how increases in self-employment income affect regional economic growth will facilitate the design and implementation of effective economic policies to enhance regional economic development. Identifying and quantifying the personal, cultural, and economic factors that influence self-employed income provides policy makers with another tool to enhance economic development policies. This study constitutes an initial step in the analysis of the determinants in self-employed income. This study contributes to this literature by jointly examining the relationship between individual socio-economic factors and regional economic characteristics have on a self-employed worker's income level.

## **Literature Review**

Even though self-employment as a share of total employment has been growing for three decades), neoclassical economists have continued to treat entrepreneurs as a black box in the process of regional growth (Goetz, 2003). Goetz (page 4, 2003) states, "there have been only scant attempts to develop formal theories of entrepreneurship and even fewer efforts to formally study proprietorship formations". Researchers are now just beginning to examine the role of the entrepreneur or the self-employed individual in a theoretical or applied developmental framework. Among the literature that has examined the role of entrepreneurs from either regional or firm perspective, individual attributes such as age, race, ethnic background, and educational attainment have been identified as important individual success characteristics

(Shrestha, Goetz, and Rupasingha 2007). Access to capital, as well as, local economic structure also influence entrepreneurial success (Goetz and Freashwater 2001; Walzer 2007).

Entrepreneurship can be defined as “the process of creating or seizing an opportunity and pursuing it regardless of the resources currently controlled” (Fayolle p. 37). Much of the entrepreneurial business literature is focused on identifying individual or cultural attributes that are correlated with success, or is devoted toward teaching entrepreneurial skills. Learning entrepreneurial skills requires mutual learning through interpersonal debates and discussions using feedback from numerous individuals. Learning must occur in a flexible information environment with a problem solving orientation where instructors provide guided discovery (Gibbs, 1996). Work experience, especially in an industry closely related to the entrepreneurial activity, is a key determinant of entrepreneurial success (Colombatto and Evans, 2009). 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). Opportunity recognition 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 (Aldrich and Cliff; Shane and Venkataraman, 2000).

Other researchers have focused on the roll and importance of entrepreneurial ethnicity and/or access to natural and financial resources as a means to create entrepreneurial market opportunities. For example, Evans (1989) found ethnic entrepreneurs in concentrated ethnic markets often succeed because ethnic entrepreneurs have inside knowledge on the preferences of individuals belonging to these groups and their customers often prefer to do their business with individuals sharing similar cultural experiences.

Aggressive marketing of regional amenities is designed to draw tourism and create opportunities for entrepreneurship development (Walzer, 2007). Walzer, p.67 2007) states, “tourism opportunities differentiated counties with respect to growth during the 1990s” and since

then “there has been increased interest in amenities”. Goetz and Freshwater (2001) focus on “external” or regional factors, to examine potential entrepreneurial access to financial capital and “entrepreneurial capital” on entrepreneurial activity in the 50 states. They found that a U-shaped relationship between access to financial capital and entrepreneurial activity indicating beyond a certain level, enhanced capital access does not result in more entrepreneurs.

Another research area has examined the impact of health insurance on entrepreneurial employment rates. This research is based on the job lock hypothesis, where wage and salary earners are less likely to become self-employed because they fear losing employer-based health care coverage (Holtz-Eakin et al. 1996). If the hypothesis holds, individuals with spouses who have health insurance are more likely to be self-employed all else equal. Even though we do not model the relationship between the access to health insurance and the decision to become self-employed, we hypothesize that self-employed with insurance have greater access to resources, and hence, we expect a positive correlation between access to health coverage and the self-employed income level.

### **Study Area and Data**

South Carolina serves as the study area. Both the level of per capita income and the growth of per capita income in South Carolina have consistently been well below the national average for the last decade. In 2008, South Carolina ranked 47<sup>th</sup> out of 50 states in terms of per capita real GDP and 48<sup>th</sup> in terms of per capita real GDP percentage growth between 2000 to 2008 (Bureau of Economic Analysis, U.S. Department of Commerce). Of specific importance to this analysis is that the growth of the percentage of self-employed income to total earnings<sup>1</sup> has been less than the growth in the percentage share of entrepreneurial employment to total employment. In 1969, the percentage of self-employed income to total earnings was 11.4 percent and in 2008, the percentage had decreased to 11.1 percent, 0.3 percent less than in

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<sup>1</sup> Total earnings are defined as the sum of personal income-wage and salary disbursements and proprietors’ income (Regional Economic Information System 2010).

1969. The decrease in the share of earnings income derived from entrepreneurial activities occurred even though the share of self-employment relative to total employment in the state increased from 11.9 percent in 1969 to 21.7 percent in 2008 (REIS 2010). Thus, over the last four decades, earnings per entrepreneur have significantly decreased in South Carolina. This earning trend per entrepreneur casts conflicts with the argument that growth in entrepreneurship generates growth in wealth. If that argument is true, one would expect the percentage increase in entrepreneurship income to have at kept pace with the percentage increase in the number of entrepreneurs. The downward trend in per capita entrepreneurial income highlights the need to examine the drivers of entrepreneurial income.

The 2008 American Community Survey (ACS) data reported in the Integrated Public Use Microdata Series (IPUMS) is used in this study. IPUMS is an open access online database that is free to the public and contains census micro data to facilitate social and economic research. The ACS is conducted by the U.S. Census Bureau to provide annual estimates of population and housing characteristics. In the IPUMS database, U.S. Census microdata is converted “into a single harmonized database with uniform documentation, without losing any significant information contained in the existing samples (Page 4, Ruggles, et al. 2008).” Certain variables are created in the database from the original Census data, such as family interrelationship variables, which allow individual family member records to be linked (Ruggles et al., 2008).

This data set was chosen because it provides a large, unbiased sample set for the entire population of South Carolina. The sample was narrowed down using several criteria to obtain the data that was pertinent to the study. Observations on individuals outside the ages of 21 and 65 were discarded to exclude individuals not likely to be active in the labor market. In addition to age, the variables indicating employment status<sup>2</sup> and labor force status<sup>3</sup> are used to select only individuals active in the labor force. Because this study focuses on the determinants of

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<sup>2</sup> The IPUMS EMPSTATD variable

<sup>3</sup> The IPUMS LABFORCE variable

entrepreneurial income, the variable for the class of worker<sup>4</sup> was used to restrict our analysis to individuals whose primary labor market activity was listed as self-employment and resulted in a sample size of 711. This sample design excludes entrepreneurs who have a full-time job but may run a side business or farm on the weekends or as a hobby. Even though our observations are for self-employed workers, the spouses of such workers are not restricted based on workforce status.

### **Conceptual Model**

This research posits a functional relationship exists between the self-employed income level and individual personal attributes, economic and social/institutional assets available to the entrepreneur, and the economic environment the entrepreneur operates within. The dependent variable is self-employment income, the INCBUS00 variable which is self-reported reported in the annual ASC survey. The INCBUS00 variable reports pre-tax income self-employment income derived from sampled businesses or farms (Ruggles et al. 2008). In conceptual terms, we define  $Y_{ijr}$  the earnings of individual  $i$  in sector  $j$  within region  $r$  as:

$$Y_{ijr} = f(A_i, R_i, S_{ijr}),$$

where  $A_i$  accounts for the entrepreneur's personal attributes,  $R_i$  measures the availability of resources to the entrepreneur, and  $S_{ijr}$  is a set of variables that controls for the economic structure, industry makeup, and human and social capital within the individual's region and industry.

**Personal Characteristics:** Personal characteristics embedded in the  $A_i$  term of the conceptual model control for individual productivity factors that are hypothesized to affect the self-employed income level. These variables include demographic characteristics such as an individual's age, sex, race, and education. A review of the literature found that these variables consistently

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<sup>4</sup> The IPUMS CLASSWKRD variable

control for and explain differences in the level of self-employed income (Kusmin 2010; Gurley-Calvez and Hammond 2010).

Education enhances an individual's ability to make intelligent business decisions. Age tends to be associated with labor market experience and is expected to improve entrepreneurial decision making (Holtz-Eakin, Joulfaian, and Rosen 1994). The entrepreneur's age is often used as a proxy variable for individual work experience.

Sex and race demographics are also included as explanatory variable because they often explain income level differences. Males generally have higher incomes than females and whites tend to have higher incomes than non-whites which might be attributable to labor market discrimination (Kusmin 2010). The variable percent of family income coming from entrepreneurial activities indicates commitment as well as possible enhanced access to resources. Some researchers view additional family as human capital resources available to the entrepreneur that should increase entrepreneurial income (Aldrich and Cliff 2003; Shane and Venkataraman 2000). Arguably, owners of incorporated businesses may have enhanced business skills and access to a greater resource base. Finally, business activity in finance and insurance and health care is expected to result in higher self-employed income while activity in retail trade is expected to have the opposite effect.

**Resource Availability:** Entrepreneurs having greater access to resources are likely to have a lower rate of business failure and higher profits. With enhanced access to resources, self-employers can acquire more assets based on the greater availability of capital and other resources. As a result, business output and profits may increase. Ideally, the  $R_i$  variables should 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. Unfortunately, this data is not readily available and a set of proxy variables are used to control for resource availability in the analysis.

Entrepreneurs with health insurance are assumed to have greater access to resources and this relationship is one proxy measure used to account for resource availability. A positive relationship between the self-employed income level and the entrepreneur's access to health insurance is hypothesized. Prior studies have found that individuals with health insurance are more likely to be self-employed (Wellington 2001; Holtz-Eakin, Penrod and Rosen 1996). The existence of a home mortgage is used to proxy for access to financial resources as well as the willingness to take a risk. Walzer (2007) and Todorovic (1999) note that 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 the desire to succeed. Thus, the presence of both health insurance and a mortgage are expected to be positively correlated with self-employed income.

#### **Regional Economic Structure:**

Other measures of resource availability are better associated with the regional economic environment than the individual. These regional structural characteristics are labeled  $S_{ij}$  in the conceptual model specification.

Goetz and Freshwater (2001) and Walzer (2007) found that to the level of regional (state) self-employment is positively correlated with access to capital. Because obtaining information concerning capital access at the sub-state level is virtually impossible, the percentage of income earned in the banking and the insurance sector (NAICS 52)<sup>5</sup> relative to total income earned in a PUMA region is used to proxy for access to capital.

Agglomeration economies<sup>6</sup> are believed to play a pivotal role in the growth of regional economies (Shaffer, Deller, and Marcouiller 2004). Population density is a driver of especially Jacobs<sup>7</sup> type agglomerative economies<sup>8</sup>. For example, Glaeser and Kohlhase (2004) found a

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<sup>5</sup> The medical services industry (NAICS 62) is added as a variable due to the typically high incomes found in this sector.

<sup>6</sup> 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).

<sup>7</sup> 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

strong connection between worker productivity and population density. They argue that an increase in population density accelerates the spread of knowledge, attracts skilled workers, increases social capital and improves entrepreneurial opportunities. Hence, regional population density is expected to be positively correlated with self-employed income. Moreover, central place theory suggest that the availability of financial resources and services, increases with population density, and thus an entrepreneurs' chances to obtain outside financial resources should increase with population density (Shaffer, Deller, and Marcouiller 2004). Increases in population density also increase access to skilled employees with a diverse set of skills, increases the size of the local market, and access to specialized business services. Thus entrepreneurs located in metropolitan areas should benefit from agglomeration economies and have a higher income level than entrepreneurs in non-metro areas.

### **Descriptive Statistics**

Descriptive statistics for the categorical variables used in the empirical model are provided in Table 1. Average self-employed income for males (\$61,872) is more than twice the average self-employed income for females. Average self-employed income for individuals with a mortgage (\$54,709) is more than twice the average self-employed income for non-home owners. Being married, having health insurance, having an incorporated business, having more than a high school education, and being white are all associated with higher self-employed income. Average self-employed income in finance and insurance and health care is considerably larger than self-employed income in all other industries.

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coming from the variety and diversity of industries in the region opposed to the core industry (Glaeser et al. 1992).

<sup>8</sup> 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).

Table 1. Categorical Variable Summary Statistics

Variable Name	Description	Mean Self-Employed Income	Percentage of Observations
Mortgage	Mortgage present	\$54,709	88
	Never had a mortgage	\$25,577	12
Sex	Female	\$30,724	35
	Male	\$61,872	65
Health Insurance	Has health coverage	\$56,034	82
	No health coverage	\$29,944	18
Corporate Status	Incorporated	\$70,299	39
	Not incorporated	\$39,268	61
Industry	Finance and insurance (NAICS 52), Health Care (NAICS 62)	\$118,286	4
	Retail Trade	\$33,664	10
	All others	\$50,302	86
Race	White	\$53,102	88
	Not White	\$37,418	12
Education	Greater than high school	\$62,974	56
	High school or less	\$36,542	44

Descriptive statistics for the continuous variables included in the empirical analysis are reported in Table 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 the self-employed is 47.4 with a standard deviation of 10.3. The self-employed percentage of family income is calculated

as the ratio of self-employed income to total family income earned by all family members<sup>9</sup>. 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 set at 100 percent.

Table 2. Continuous Variable Summary Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum
Self-Employed Income	\$51,226	\$72,206	\$4,817	\$412,447
PUMA Per Capita Income	\$24,312	\$4,914	\$17,161	\$38,381
PUMA Population Density (hundreds of people per square mile)	3.54	4.08	0.51	14.38
Age	47.39	10.8	21	65
Self Employed % of Family Income	53.4%	33.9%	0.0%	100.0%
PUMA Workforce Utilization	39.4%	4.2%	30.0%	48.4%
PUMA Income Earned in NAICS 52 as % of Total	6.4%	3.1%	1.2%	10.9%

Other continuous variables reflect the nature of the region (the PUMA unit) in which the self-employed individual operates (Table 2). Mean PUMA per capita income is \$24,312. The high variation in the population density variable (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. PUMA workforce utilization is the percent of jobs in the region per working age adult and ranges from 30% to 48.4% across the PUMA regions. PUMA income earned in business services (NAICS 52) as a percent of all earned income is designed to capture possible agglomerative effects of being close to business service providers. The value ranges from 1.2% to 10.9% with a mean of 3.1% across all PUMA units.

<sup>9</sup> Sum of the IPUMS INCTOT and SPINCTOT variables

## Results

Both ordinary least squares regression and quantile regression is used to test several hypotheses, including the impact that health insurance access, capital resources, and agglomeration economies had on the level of self-employed income in South Carolina.

Variables that describe the regional economic structure were quite mixed in their ability to explain the observed variance in self-employed income. A region's population density was not significantly related to the dependent variable in the regression results (Tables 3, 4). Per capita income was found to have a low level of significance in the OLS regression results (at  $\alpha=0.1$ ; Table 3), but when further examined through quantile regression were not significant at any level. Conversely, the region's workforce utilization, which reflects the proportion of

Table 3. Parameter Estimates for Log of Self-Employed Income: OLS Regression<sup>1</sup>

Variable	Estimate	Std Error	t Ratio	Prob> t
Constant	10.505***	0.2887	36.39	<.001
Race (white=1)	-0.151**	0.0740	-2.04	0.042
Age	-0.008***	0.0023	-3.48	0.001
Age_Sex (male=1)	0.005***	0.0010	4.92	<.001
Education (greater than H.S. =1)	0.188***	0.0523	3.61	<.001
Finance, Insurance and Healthcare Industries (true=1)	0.1035	0.1266	0.82	0.414
Retail Industry (true=1)	0.0041	0.0813	0.05	0.960
Mortgage (mortgage present=1)	0.139*	0.0787	1.77	0.078
Health Insurance (has health insurance=1)	-0.057	0.0682	-0.84	0.401
Self Employed % of Family Income	1.137***	0.0748	15.20	<.001
Per Capita Income 2000	-0.0001*	6.29E-06	-1.81	0.071
Population Density	-9.16E-06	5.96E-05	-0.15	0.878
PUMA Workforce Utilization	-0.0566	0.5702	-0.10	0.921
PUMA Income Earned in NAICS 52 as % of Total	1.824*	0.9857	1.85	0.065
Corporation Status (incorporated=1)	-0.030	0.0504	-0.59	0.552
R-Squared	0.3665			
F Ratio	28.76***			

<sup>1</sup> Average self- employed income level for all 711 observations is \$51,226.

\* Significant at the  $\alpha=.10$  level

\*\* Significant at the  $\alpha=.05$  level

\*\*\*Significant at the  $\alpha=.01$  level

Table 4. Parameter Estimates for Log of Self-Employed Income: Quantile Regression<sup>1</sup>

Variable	0.05	0.25	Median	0.75	0.95
Constant	8.59*** (0.494)	9.43*** (0.268)	10.12*** (0.250)	10.66*** (0.324)	11.55*** (0.871)
Race (white=1)	0.22 (0.147)	-0.11* (0.066)	-0.16** (0.065)	-0.234*** (0.082)	0.14 (0.225)
Age	-0.002 (0.005)	-0.0041* (0.002)	-0.007*** (0.002)	-0.005*** (0.002)	-0.001 (0.006)
Age_Sex (male=1)	0.005 (0.002)	0.005*** (0.001)	0.004*** (0.001)	0.003** (0.001)	0.003 (0.003)
Education (greater than H.S. =1)	0.405*** (0.109)	0.329*** (0.049)	0.232*** (0.045)	0.120*** (0.059)	-0.20 (0.155)
Finance, Insurance and Healthcare Industries (true=1)	0.10 (0.220)	0.12 (0.112)	0.08 (0.109)	-0.04 (0.140)	-0.23 (0.371)
Retail Industry (true=1)	-0.116 (0.154)	-0.063 (0.075)	0.128* (0.071)	0.039 (0.087)	0.004 (0.211)
Mortgage (mortgage present=1)	0.081 (0.116)	0.051 (0.071)	0.060 (0.068)	0.001 (0.089)	0.207 (0.210)
Health Insurance (has health insurance=1)	0.094 (0.109)	-0.033 (0.062)	-0.011 (0.059)	-0.083 (0.078)	-0.162 (0.229)
Self Employed % of Family Income	0.646*** (0.217)	0.683*** (0.088)	1.077*** (0.065)	1.793*** (0.075)	2.287*** (0.138)
Per Capita Income 2000	4.69E-08 (0.0001)	-6.17E-07 (5.4E-06)	-7.29E-06 (5.4E-06)	-3.64E-06 (7.3E-06)	-0.00002 (0.0001)
Population Density	-0.00007 (0.0001)	-4.84E-06 (0.0001)	-0.00004 (0.0001)	0.00009 (0.0001)	-0.00003 (0.0001)
PUMA Workforce Utilization	0.91 (0.999)	1.24** (0.520)	0.63 (0.495)	-0.45 (0.655)	-2.07 (1.804)
PUMA Income Earned in NAICS 52 as % of Total	-0.57 (2.149)	0.40 (0.922)	1.79** (0.857)	1.12 (1.122)	5.32* (3.022)
Corporation Status (incorporated=1)	0.024 (0.094)	-0.016 (0.046)	-0.033 (0.044)	0.018 (0.057)	-0.066 (0.146)
Pseudo R-squared	0.232	0.232	0.2359	0.261	0.360

<sup>1</sup> Self-Employed Income at the .05 percentile is \$15,407, at the .25 percentile is \$26,508, at the .50 percentile (median) is \$44,126, at the .75 percentile is \$71,011, and at the .95 percentile is \$218,678.

Note: Standard error provided in parenthesis.

\* Significant at the  $\alpha=.10$  level

\*\* Significant at the  $\alpha=.05$  level

\*\*\*Significant at the  $\alpha=.01$  level

employed workers relative to the region's total workforce, was not significant in the OLS regression, but was found to be significant at the 0.25 income quantile. The remaining variables designed to reflect the regional economic structure were more useful in explaining entrepreneurial income. The percentage of a region's income earned through NAICS 52 industry activities (finance and insurance), was significant both in the OLS regression, and at the median and .95 income level quantile regressions. Importantly, this variable was found to have a larger and more significant relationship with self-employed income at the highest income level. This outcome was expected and reflects the relative importance of financial services for higher income businesses. Businesses that generate less income tend to be less technical operations and have less need for business services. White collar firms, however, in general generate higher levels of income and have a higher reliance on financial services<sup>10</sup>; this result then reflects the importance of enhanced access to financial resources for high-income self-employed individuals.

In general, access to individual resources, such as a health insurance, sufficient credit worthiness to have a mortgage, and the business stability and commitment offered through firm incorporation demonstrated little ability to explain regression results. None of these variables were significant in any of the quantile regressions (Table 4), and in the OLS regression, the mortgage variable was found to be only weakly significant (Table 3). As this outcome is somewhat counter-intuitive, we hypothesize that other variables in the model such as self-employed income as a percent of family income, and access to capital at the regional level, may have captured the self-employed income benefits normally thought to be drawn from these resources. The impact of entrepreneur access to individual resources on their self-employed income earnings remains an area in need of further exploration.

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<sup>10</sup> Conversely, regions with high-income self-employed are likely demand additional financial and insurance services; providers of these services are likely to be drawn to regions with these entrepreneurs.

Characteristics of the individual entrepreneur and their family proved to be the most significant determinants of entrepreneurial income. This was especially true in the case of the standard OLS regression, and in the 0.25, median, and 0.75 (middle income) self-employed income quantile regressions. The Age variable displays the negative relationship with self-employed income in the middle of the self-employed income distribution, but not a determining factor of self-employed income at the lower and higher income levels. Interacting the impact of age and gender, was found to also be highly significant in the overall regression and within the middle income quantile regression results. The age variable captures the overall age trends, the age and sex interaction variable captures the relationship of age of men and self-employed income. In jointly considering these results, the positive coefficient on this term clarifies that men's self-employed income has a positive association as they age, while for females there is a negative relationship between age and self-employed income. Younger 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. For older women, this result can be explained by both discriminatory and voluntary acts within the labor market.

Other results ran counter to expectations. For example, while the race variable is significant at the .25, median, and .75 income levels, counter to our hypothesis and the raw data, it was found to have a negative relationship between being white and self-employed income (Table 4). It is possible, however, that other variables such as education, could be accounting for the disparity between white and non-white self-employed individuals.

As measured by the presence of an education greater than high school or high school and less, the education variable is significant at all levels within the quantile regression except at the highest level of .95 (Table 4). The strength of the relationship between education greater than high school and self-employed income decreases as the income level increases; thus, at lower levels of self-employed income, an increase in has a greater impact on self-employed

income. It cannot be determined from this model if the impact of education on the higher levels of income is captured by college or professional degrees. Perhaps this explains the decreasing impact of a high school education on self-employed income.

Self-employed income as a percent of family income was significant in all quantile regressions and the magnitude of the parameter value successively at each higher quantile (Table 4). For example, the beta value for the .95 quantile at 2.29 is more than three times larger than the beta value for this variable in the .05 quantile regression. At lower income levels, wages and salaries make up a relatively large share of household income. As self-employed income increases, the need for households to bring in income in the form of wages and salaries as secondary income sources is reduced in importance. Not surprisingly then, the share of self-employed income of total household income increases in significance with higher level quantile regressions.

### **Summary and Conclusions**

Supporters claim that entrepreneurship is critical to building and sustaining the regional economies 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, creates new jobs, new wealth, and a better quality of life. However, in South Carolina real self-employed per capita income has decreased over the last decade. The income of self-employed workers, as opposed to the number of self-employed, is critical to economic development because a major goal of economic policy is to increase incomes not just employment. Identifying and quantifying the personal, cultural, and economic factors that influence self-employed income provides policy makers with another tool to enhance economic development policies. This study uses data from the American Community Survey for South Carolina in both an ordinary regression approach and a quantile regression approach to investigate the relationship between individual entrepreneurial income and individual personal

attributes, social/institutional assets available to the entrepreneur, and the regional economic environment the entrepreneur operates within.

Variables that reflect regional economic structure showed mixed results in terms of explaining self-employed income. Entrepreneur resource access variables had relatively little explanatory power. We hypothesize that perhaps other variables in the model explained access to resources, such as self-employed income as a percent of total family income and access to capital at the regional level. Additional survey based data needs to be collected to more fully quantify the importance of entrepreneur access to resources in explaining entrepreneur income.

The entrepreneur personal attribute variables were generally the most significant variables in explaining self-employed income. For example, entrepreneur age had a significant negative relationship with self-employed income in the regression analysis and several of the quantile regressions. This displays the negative relationship of self-employed income and age within the middle of the self-employed income distribution, but shows that it is not a determining factor of self-employed income at lower and higher income levels. The age and sex interaction variable is also highly significant in the overall regression and within the middle quantile regressions. The age variable captures the overall trends for men and women while the age and sex interaction variable captures the relationship of age of men and self-employed income. The positive coefficient of the interaction term clarifies that the men's self-employed income actually has a positive association as they age, while it is the females' relationship between age and self-employed income that decreases. Education had a strong and positive impact on self-employed income except at the 0.95 quantile level; this impact was most pronounced for lower levels of income. Self-employed income as a percent of family income was significant in all quantile regressions (at lower income levels, wages and salaries make up a relatively large share of household income). As self-employed income increases, the need for households to bring in income in the form of wages and salaries as secondary income sources decreases in

importance. Not surprisingly then, the share of self-employed income of total household income increases in significance at the higher quantile regression levels.

Overall, the model in this study provides some insight into the determining factors behind entrepreneurial income. However, further analysis is needed to provide a stronger understanding of this important area.

Table 4. Parameter Estimates for Log of Self-Employed Income: Quantile Regression<sup>1</sup>

Variable	0.05	0.25	Median	0.75	0.95
Constant	8.59*** (0.494)	9.43*** (0.268)	10.12*** (0.250)	10.66*** (0.324)	11.55*** (0.871)
Race (white=1)	0.22 (0.147)	-0.11* (0.066)	-0.16** (0.065)	-0.234*** (0.082)	0.14 (0.225)
Age	-0.002 (0.005)	-0.0041* (0.002)	-0.007*** (0.002)	-0.005*** (0.002)	-0.001 (0.006)
Age_Sex (male=1)	0.005 (0.002)	0.005*** (0.001)	0.004*** (0.001)	0.003** (0.001)	0.003 (0.003)
Education (greater than H.S. =1)	0.405*** (0.109)	0.329*** (0.049)	0.232*** (0.045)	0.120*** (0.059)	-0.20 (0.155)
Finance, Insurance and Healthcare Industries (true=1)	0.10 (0.220)	0.12 (0.112)	0.08 (0.109)	-0.04 (0.140)	-0.23 (0.371)
Retail Industry (true=1)	-0.116 (0.154)	-0.063 (0.075)	0.128* (0.071)	0.039 (0.087)	0.004 (0.211)
Mortgage (mortgage present=1)	0.081 (0.116)	0.051 (0.071)	0.060 (0.068)	0.001 (0.089)	0.207 (0.210)
Health Insurance (has health insurance=1)	0.094 (0.109)	-0.033 (0.062)	-0.011 (0.059)	-0.083 (0.078)	-0.162 (0.229)
Self Employed % of Family Income	0.646*** (0.217)	0.683*** (0.088)	1.077*** (0.065)	1.793*** (0.075)	2.287*** (0.138)
Per Capita Income 2000	4.69E-08 (0.0001)	-6.17E-07 (5.4E-06)	-7.29E-06 (5.4E-06)	-3.64E-06 (7.3E-06)	-0.00002 (0.0001)
Population Density	-0.00007 (0.0001)	-4.84E-06 (0.0001)	-0.00004 (0.0001)	0.00009 (0.0001)	-0.00003 (0.0001)
PUMA Workforce Utilization	0.91 (0.999)	1.24** (0.520)	0.63 (0.495)	-0.45 (0.655)	-2.07 (1.804)
PUMA Income Earned in NAICS 52 as % of Total	-0.57 (2.149)	0.40 (0.922)	1.79** (0.857)	1.12 (1.122)	5.32* (3.022)
Corporation Status (incorporated=1)	0.024 (0.094)	-0.016 (0.046)	-0.033 (0.044)	0.018 (0.057)	-0.066 (0.146)
Pseudo R-squared	0.232	0.232	0.2359	0.261	0.360

<sup>1</sup> Self-Employed Income at the .05 percentile is \$15,407, at the .25 percentile is \$26,508, at the .50 percentile (median) is \$44,126, at the .75 percentile is \$71,011, and at the .95 percentile is \$218,678.

Note: Standard error provided in parenthesis.

\* Significant at the  $\alpha=.10$  level

\*\* Significant at the  $\alpha=.05$  level

\*\*\*Significant at the  $\alpha=.01$  level

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