The Determinants of Self-Employed Income in a Regional Economy

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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.

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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. Some researchers have criticized 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). Recently, development experts have argued that developing and supporting local entrepreneurs may be a more cost-effective means to engender regional economic growth (Spindler 1994; Shrestha, Goetz, and Rupasingha 2007; Yeneral 2008). The entrepreneurial approach has been boosted by the potential misperception that strong national and regional growth in self-employment or entrepreneurial-based employment has accelerated income growth.

While entrepreneurial activity does offer 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 which 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 207; Glasser and Kerr

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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 remains 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 critical to economic development 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 the first 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

Despite the growing share of self-employment (as a percent of all employment), neoclassical economists have traditionally treated entrepreneurs as a black box in the process of regional growth (Goetz, 2003). Arguably, "there have been only scant attempts to develop formal theories of entrepreneurship and even fewer efforts to formally study proprietorship formations" (Page 4, Goetz, 2003). Researchers have just recently begun 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 a 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 the individual or cultural attributes that are correlated with success, or devoted toward the teaching of 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).

Others have focused on the existence of ethnic markets, and natural and financial resources as a means for creating niche market opportunities that potential entrepreneurs can exploit. For example, Evans (1989) notes that entrepreneurs in concentrated ethnic markets often succeed because ethnic entrepreneurs have inside knowledge on the preferences of individuals belonging to these groups and provide incentives to customers to trade with their business due to cultural similarities. Likewise, "tourism opportunities differentiated counties with respect to growth during the 1990s" and since then "there has been increased interest in amenities" (Walzer p.67). The marketing of these regional amenities is designed to draw tourism (Walzer, 2007) and create the opportunities for entrepreneurship development. 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.

Another area of research has examined the impact of health insurance on entrepreneurial employment rates. This literature 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 are not modeling 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 47th out of 50 states in terms of per capita real GDP and 48th 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 percentage of self-employed income to total earnings[1] has lagged growth in the number of entrepreneur jobs. 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 1969. This decrease share of earnings income share from entrepreneurial

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[1] Total earnings are defined as the sum of personal income-wage and salary disbursements and proprietors' income (Regional Economic Information System 2010).

activities occurred despite the fact that 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 trend in earnings per entrepreneur casts aspersions on 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 least 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 not between the ages of 21

and 65 were discarded to avoid individuals that were not active in the labor market. In addition

to age, the variables indicating employment status[2] and labor force status[3] are used to select

only individuals active in the labor force. Since this study focuses on the determinants of

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[2] The IPUMS EMPSTATD variable
[3] The IPUMS LABFORCE variable

entrepreneurial income, the variable for the class of worker[4] was then used to limit our analysis to individuals who defined their primary labor market activity as self-employment resulting in a sample size of 711. This excludes individuals 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

Conceptually, 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 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 mathematical terms, we define Y_{ijr} the earnings of individual i in sector j within region r as

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

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

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[4] The IPUMS CLASSWKRD variable

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 generally explain differences in income levels. 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). Percent of family income coming from entrepreneurial activities indicates commitment as well as possible enhanced access to resources. In this regard, 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 greater levels 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 proxy variables for resource availability are utilized in the analysis.

Entrepreneurs with health insurance are assumed to have greater access to resources in general, and hence, a positive relationship between the self-employed income level and the presence of health insurance is hypothesized. Prior studies have found that individuals with

health insurance are more likely to be self-employed (Welllington 2001; Holtz-Eakin, Penrod and Rosen 1996).   The existence of a mortgage can also be used as a 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 ae labeled S_{irj} in the conceptual model specification.

Previous research (Goetz and Freashwater 2001; Walzer 2007) found that access to capital is positively related to the level of regional (state) self-employment. Because obtaining information concerning capital access at the sub-state level is virtually impossible, the concentration of economic activity in banking and the insurance sector (NAICS 52)[5] in a PUMA region is used to proxy for access to capital.

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

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

[6] 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).

[7] 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).

[8] 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).

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 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, 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.

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[9]. Self-

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[9] Sum of the IPUMS INCTOT and SPINCTOT variables

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.

Results

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 found not to have a significant relationship with the dependent variable in any of the regression results (Tables 3, 4). Per capita income were found to have a low level of significance in the OLS regression results (at α=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[1]

Variable	Estimate	Std Error	t Ratio	Prob>|t|
Constant	10.505***	0.2887	36.39	<.001
Per Capita Income	-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
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
Corporation Status (incorporated=1)	-0.030	0.0504	-0.59	0.552
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
Self Employed % of Family Income	1.137***	0.0748	15.20	<.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
R-Squared	0.3665			
F Ratio	28.76***			

[1] Average self- employed income level for all 711 observations is $51,226.
* Significant at the α=.10 level
** Significant at the α=.05 level
***Significant at the α=.01 level

Table 4. Parameter Estimates for Log of Self-Employed Income: Quantile Regression[1]

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

[1] 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 α=.10 level

** Significant at the α=.05 level

***Significant at the α=.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[10]; 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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[10] 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 was 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 relationship between education greater than high school and self-employed income decreases as the income 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 found to be significant and to increase strongly across all of the quantile regressions (Table 4). For example, the beta value for the .95 quantile at 2.29 was well over 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, 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.

Variables that reflect regional economic structure showed mixed results in terms of explaining self-employed income. The individual resource access variables also showed 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 determining importance of entrepreneur access to resources in explaining entrepreneur income.

The individual 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 overall regression analysis and in 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 range 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 excect 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 across 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.

References

Acs, Zoltan. 2007. "How is Entrepreneurship Good for Economic Growth?." Paper Presented at the 25th Economic Conference of the Progress Foundation, 2007, October 31. Great Barrington, MA.

Aldrich, Howard E., and Jennifer E. Cliff. (2003). "The pervasive effects of family on entrepreneurship: Toward a family embeddednes perspective." *Journal of Business Venturing* 18.5: 573-98.

Colombatto, Enrico, and Arie Melnik. (2007). "Early work experience and the transition into entrepreneurship." *The Journal of Entrepreneurship Finance and Business Ventures.* 12: 9-25.

Fayolle, Alain. Entrepreneurship and new value creation: the dynamic of the entrepreneurship process. New York: Cambridge UP, 2007.

Gibbs, A. A. (1996), "Entrepreneurship and small business management: can we afford to neglect them in the twenty-first century business school?" *British Journal of Management.* 7.4: 309-24.

Glaeser, Edward L. and William R. Kerr. 2010. "The Secret to Job Growth: Think Small." Harvard Business Review.July–August.

Glaeser, Edward L. and Janet Kohlhase. (2004). "Cities, Regions and the Decline of Transport Costs." *Papers in Regional Science.* 83.1:197-228.

Goetz, S.J. 2003. "Proprietor Employment-Dependent Counties." Rural Development Paper RDP-17. The Northeast Regional Center for Rural Development.

Goetz, Stephan J., and D. Freshwater. (2001). "State-level determinants of entrepreneurship and a preliminary measure of entrepreneurial climate." *Economic Development Quarterly.* 5.1: 58-70.

Gurley-Calvez, Tami, and George W. Hammond. (2010). "Determinants of local self-employment growth by gender, age, and selected industry: 2000-2006." Paper presented to the 49th Southern Regional Science Association meeting. March 26.

Evans, M.D.R. (1989). "Immigrant entrepreneurship: effects of ethnic market size and isolated labor pool." *American Sociological Review.* 54.6: 950-63.

Hamilton, Barton H. (2000). "Does entrepreneurship pay? An empirical analysis of the returns to self-employment." *Journal of Political Economy.* 108.3:604-31.

Holtz-Eakin, Douglas, David Joulfaian and Harvey S. Rosen. (1994). "Entrepreneurial decisions and liquidity constraints." *RAND Journal of Economics.* 25: 334-47.

Holtz-Eakin, Douglas, John R. Penrod, and Harvey S. Rosen. "Health Insurance and the Supply of Entrepreneurs." *Journal of Public Economics* 62 (1996): 209-35.

Kusmin, Lorin David. (2010). "Returns to education by metro status, gender, and race/ethnicity: Evidence from the American Community Survey 2006-2008." Paper presented to the 49th Southern Regional Science Association meeting. March 26.

Regional Economic Information System, Bureau of Economic Analysis, US Department of Commerce. March 2010.

Ruggles S., M. Sobek, T. A. Catherine, A. Fitch, R. Goeken, P. K. Hall, M. King, and C. Ronnander. 2008. Integrated Public Use Microdata Series: Version 4.0 [Machine-readable database]. Minneapolis, MN: Minnesota Population Center [producer and distributor].

Shaffer, Ron, Steven C. Deller, and David W. Marcouiller. (2004). *CommunityEconomics: Linking Theory and Practice.* Ames, IA: Blackwell.

Shrestha, Sundar S., Stephan J. Goetz, and Anil Rupasingha. (2007). "Proprietorship Formations and U.S. Job Growth." *The Review of Regional Studies.* 37.2: 146-68.

Shane, S., and S. Venkataraman, 2000. "The promise of entrepreneurship as a field of Research." Acad. Manage. Rev. 25 (1), 217-226

Walzer, Norman, ed. (2007) Entrepreneurship and local economic development. Lanham: Lexington Books.

Wellington, A.J. (2001). "Health insurance coverage and entrepreneurship." *Contemporary Economic Policy.* 19.4: 465-78.