An Unconditional Quantile Analysis of the Determinants of Self-Employed Income across Regional Economies: An Initial Assessment

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Supporters claim entrepreneurship is critical to building and sustaining regional economies in both urban and rural areas. Proponents argue that economic development practices that support entrepreneurship are essential because they cultivate innovation which, in turn, creates new jobs, new wealth, and a better quality of life. However, real self-employed per capita income has decreased over the last decade in the three states examined here. This downward trend highlights the need to examine the drivers of entrepreneurial income. The income of self-employed workers 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 regional (especially agglomerative) economic factors that influence self-employed income provides policy makers with another tool to enhance economic development efforts. This study uses data from the American Community Survey for three states (Georgia, North Carolina, and South Carolina) in ordinary and unconditional quantile regressions to investigate relationships between individual entrepreneurial income and (1) individual personal attributes, (2) social/institutional assets available to the entrepreneur, and the (3) regional economic environment. Personal attributes, such as education and gender, and the importance of self-employed income to total family income partially explain self-employment income variation. We test for the positive impact of agglomerative effects through lagged per capita income, metropolitan status, and concentration of financial services. We also test the hypothesis that agglomerative effects are greater for higher levels of self-employed income. Results support a generally positive relationship between the agglomerative variables and self-employed income and the hypothesis that agglomerative type effects are stronger for individuals with higher self-employed income.
Introduction

State and local government officials have traditionally focused on major industry and/or firm recruitment as a driver for jobs and income in regional economies. Some 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, water and sewer services, and the negative environmental cost that often accompany industrial growth (Leistritz and Sell 2001). As an alternative to this approach, some argue that entrepreneur led growth, facilitated through a support system, may provide 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).

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. The appeal of entrepreneurial strategies is based on theories of regional growth where entrepreneurs are viewed as change agents who bear the risk associated with introducing innovations (Jovanovic, 1979; Formaini, 2001). For example, entrepreneurs play a key role in new growth theory as the appliers of innovations (Romer, 1994). Entrepreneurs are viewed as possessing the broad skill set necessary to utilize new technologies to meet new economic opportunities (Lazear, 2004).

Prior U.S. entrepreneurial research at the regional level has focused on the growth in the number of self-employed rather than self-employment income (Gallardo and Scammahorn, 2011, Low and Weiler, 2012, Edmiston 2007; Van Praag and Versloot 2007; Henderson 2002). In particular, these studies examined the relationship between the number of self-employed individuals and various measures of regional economic activity (Fleming and Goetz, 2011,
McGranahan et al. 2010, Glaeser and Kerr 2010, Low 2009, Acs 2007). However, if entrepreneurs earn less than potential salaried employment options, increased entrepreneurship may not be an efficient regional development strategy.

A few studies have examined the relationship between per capita income and level of self-employment at the regional level using aggregate county-level data. Low et al. (2005) examined the factors underlying entrepreneurial income in the context of the regional economy through what they termed entrepreneurial depth, by investigating the relationship between county-level economic structure (concentration of retail, construction, and higher-skilled service firms) and county-level entrepreneurial income. Stephens and Partridge (2013) estimated that county per capita income increased by 0.65% for each 1% increase in proprietors’ income as a share of total county income for counties in the Appalachian Region.

Other studies have examined the factors that influence entrepreneurial income at the national or international level with an emphasis on entrepreneur attributes, opportunities and goals (Kusmin 2010; Gurley-Calvez and Hammond 2010; Colombatto and Melnik, 2007; Aldrich and Cliff, 2003; Shane and Venkataraman, 2000; Gibbs, 1996; Holtz-Eakin, Joulfaian, and Rosen 1994; Evans, 1989; Evans and Leighton (1989); Evans and Jovanovic (1989); Blanchflower and Oswald, 1998; Blanchflower, 2000; Blanchflower, Oswald, and Stutzer, 2001; Walker and Brown, 2004 Benz and Frey, 2008; Block and Koellinger, 2009, Hurst and Pugsley, 2011; Astebro and Thompson, 2011; Moskowitz and Vissing-Jorgenson (2002) and Hamilton 2000). However, in these studies individual characteristics and circumstances that affect self-employed income levels received little attention at the regional level. In contrast to these prior studies, this research focuses on the determinants of the individual self-employed income level within the context of the local economy.
Prior research has generally assumed the relationship between self-employed income and the determinants of self-employment income are consistent across all self-employed income levels. But observation and to some degree theory suggest that the nature of such relationships may change with the income level. Unconditional quantile regression (Firpo, Fortin, and Lemeiux, 2009) provides a promising tool for relaxing the assumption that the relationships are consistent across income levels. Thus, we employ unconditional quantile regression to examine the impacts of various explanatory factors across the self-employed income distribution. To our knowledge, unconditional quantile regression (UQR) has not been used in any study regarding the determinants of self-employed income in any study. One could use traditional conditional quantile regression (CQR) to estimate the impact of the impact that sociodemographic factors have on self-employment income, however, CQR offers a narrower of the effect of each factor on self-employment income because the quantile estimates explicitly depend on the level of the level of the other conditioning variables in the quantile. To overcome this limitation, we use UQR. UQR parameters for a given quantile can be interpreted as traditional OLS parameter estimates in a given quantile independent of the level of the conditioning variables in an CQR.

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 self-employment growth is responsible for income growth. This distinction is important. It is the income of self-employed workers, as opposed to just the number of self-employed, that is of concern to economic development strategies because a major goal of economic policy is to increase incomes not just employment (Porter, 2000). Information concerning the factors that increase self-employment income, combined with an understanding of 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 regional
economic development. This study provides an important initial step in the analysis of the
determinants of individual self-employed income. By using unconditional quantile regression
analysis, this study jointly examines the relationship between individual socio-economic factors,
and regional economic characteristics across the various income levels for self-employed workers.
Such information will be particularly useful to policy makers if the effect of a specific policy tool
varies with the level of self-employed income.

Literature Review

Despite the role assigned to self-employment as agents of economic growth, and the
growth of self-employment as a share of total employment over the last three decades, neoclassical
economists continue to treat entrepreneurs as a black box when explaining 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 beginning to examine the role of the self-employed entrepreneur in a
theoretical or applied developmental framework. Entrepreneurship has been defined as “the
process of creating or seizing an opportunity and pursuing it regardless of the resources currently
controlled” (Fayolle p. 37, 2007). Thus, business owners can be viewed as entrepreneurs as they
are the business decision makers (as opposed to stockholders who must take investment risks but
do not make day-to-day business decisions) and risk takers (as opposed to hired managers, who
make business decisions but do not take investment risk).
Much of the entrepreneurial business literature is focused on either identifying individual or cultural attributes that are correlated with success, or the teaching of entrepreneurial skills. Entrepreneurial education most successfully occurs in a flexible information environment with a problem solving orientation where instructors provide feedback in a guided discovery process (Gibbs, 1996). Prior work experience, especially in an industry closely related to the entrepreneurial activity, is a key determinant of entrepreneurial success (Colombatto and Melnik, 2007). 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 is influenced by idiosyncratic knowledge and skills acquired via various prior work experiences (Aldrich and Cliff; Shane and Venkataraman, 2000). The literature also suggests that age is correlated with labor market experience which improves entrepreneurial decision making (Holtz-Eakin, Joulfaian, and Rosen 1994). Hence, the entrepreneur’s age is often used as a proxy variable for individual work experience.

Other individual attributes such as education, gender, and ethnicity have been identified as important individual success characteristics that influence self-employed income levels (Kusmin 2010; Gurley-Calvez and Hammond 2010). In prior research, these individual attributes consistently explain differences in the self-employed income level (Kusmin 2010; Gurley-Calvez and Hammond 2010). Additional education enhances an individual’s ability to make profitable business decisions. Prior findings have also found males generally have higher incomes than females and whites tend to have higher incomes than non-whites do, which may be attributable to labor market discrimination (Kusmin 2010). Evans (1989) found ethnic entrepreneurs in
concentrated ethnic markets often succeed because they understand ethnic preferences and their customers often prefer to do business with individuals sharing similar cultural experiences.

Access to financial institutions is an important consideration to successful self-employment. Evans and Jovanovic (1989) found that access to capital is a key determinant in starting a business. In a 50 state-level study, Goetz and Freshwater (2001) examined the role of “external” or regional financial institutions in explaining entrepreneurial activity among states. They found a positive relationship between access to financial capital markets and entrepreneurial activity existed, but beyond a certain income level, enhanced access to capital does not increase self-employment income. They also found that wealthier individuals are more likely to engage in entrepreneurial activities because their wealth provides easier access to additional capital. In addition to access to financial institutions, financial assets owned by the entrepreneur’s family represent additional resources available to the entrepreneur and increase the probability of success (Aldrich and Cliff 2003; Shane and Venkataraman 2000). Glazer and Kohlhouse provide evidence of the strong association between the presence of financial services and urban growth as an agglomerative effect.

As Walzer (2007) and Todorovic (2004) state home ownership can be an indicator of entrepreneur success because the skills needed to maintain a home parallel those of creating and maintaining a business, such as risk taking, being proactive, and having a desire to succeed. Fairlies and Krashinsky (2012) found that housing value appreciation is positively correlated with entrepreneurial growth at the regional level, and Parker and Belghitar (2006) found that nascent entrepreneurs where much more likely to become permanently self-employed if they owned their own home. In contrast to these two studies, Hurst and Lusardi (2004) found no relationship between business start rates and housing stock appreciation at the regional level.
The job lock hypothesis posits that potential loss of employer provided health insurance is a deterrent to entrepreneurial employment. Prior studies have found that individuals lacking health insurance are less likely to be self-employed (Welllington 2001; Holtz-Eakin, Penrod and Rosen 1996). Thus wage and salary earners are less likely to become self-employed if they fear losing employer-based health care coverage (Holtz-Eakin et al. 1996). If this hypothesis holds, individuals with spouses who have health insurance are more likely to be self-employed all else equal. We do not model the relationship between access to health insurance and the decision to become self-employed, but we hypothesize that self-employed individuals with insurance have greater access to resources. Hence, we expect a positive correlation between access to health coverage and the self-employed income level.

In addition to the entrepreneur’s business skills, access to resources, and the economic climate, a number of studies have found the entrepreneur’s life-style goals are a major determinant in the decision to become self-employed. Entrepreneurs are often willing to trade income for non-pecuniary goals, such as the desire for greater independence and the ability to be ones’ own boss (Blanchflower and Oswald, 1998; Blanchflower, 2000; Blanchflower, Oswald, and Stutzer, 2001; Walker and Brown, 2004; Benz and Frey, 2008; Block and Koellinger, 2009; Hurst and Pugsley, 2011), and/or the desire for a greater variety of work activities (Astebro and Thompson, 2011). In a survey of 290 small business owners in Western Australia, Walker and Brown (2004) found non-financial objectives are a primary motive for small business start-ups. They report that personal satisfaction, pride in their work, and a flexible lifestyle were often valued more highly by survey respondents than earning additional income. The magnitude of the work/life-style tradeoff are influenced by factors such as age, education, and the characteristic of the business. Hurst and Pugsley (2011) found non-pecuniary goals, such as flexible hours and being one’s own boss are
critical considerations in the decision to start a business. Moreover, many new business start-ups are focused on providing services to existing markets, as opposed to new markets, and such new entrepreneurs often do not anticipate growing larger or innovating in any major way. These entrepreneurial characteristics are often associated with small business owners that specialize in either service provision (e.g., lawyers and physicians) or retail sales (e.g., small shopkeepers and restaurant owners). By ignoring the goals of many entrepreneurs, the literature has probably overstated the importance of talent, luck, and access to capital in explaining the size distribution of entrepreneurial firms.

Moskowitz and Vissing-Jorgenson (2002), and Hamilton (2000), found that average income for entrepreneurs is less than for wage and salary workers. Hamilton (2000) estimated the median annual income reduction is 35% for self-employed individuals relative to their salaried counterparts, for entrepreneurs in business for 10 years. This earning differential was consistent across various industries. Hamilton concluded the lower average entrepreneurial income level could be related to the possibility that the decision to become an entrepreneur is often partially influenced by non-pecuniary goals. However, other researchers disagree with Hamilton’s explanation and instead postulate the lower income level may be attributable to overconfidence and excessive optimism by entrepreneurs regarding their future earnings relative to their skill level (Cooper, Woo, and Dunkelberg, 1988; Camerer and Lovallo, 1999; Koellinger, Minniti, and Schade, 2007).

Still other researchers have found evidence that the decision to become an entrepreneur is influenced by the phase of the business cycle. Individuals whose entrepreneurial activity is influenced by the business cycle are commonly classified as either necessity (or forced-in) entrepreneurs, or opportunity (or drawn toward) entrepreneurs. During an economic downturn,
increases in the unemployment rate tend to increase the number of necessity entrepreneurs, and may also increase the number of opportunity entrepreneurs due to reductions in the cost of capital and/or labor (Parker, 2009). Necessity entrepreneurs are motivated to start businesses in response to lost wage and salary income from prior employment. The motivation for necessity entrepreneurs is consistent with the concept that less-skilled individuals opt for self-employment due to limited employment opportunities during periods of high unemployment (Koellinger and Thurik, 2012; Low and Weiler, 2012).

In contrast to necessity entrepreneurs, opportunity entrepreneurs see an opportunity to increase their earnings relative to their current employment situation and thus their entry into a business is not “forced” by circumstances. During economic downturns, opportunity entrepreneurs often focus on the adoption of new production technologies and depressed capital cost to reduce per unit production cost (Bowen and De Clercq, 2008; Hessels et al., 2008).

In any particular year, regions with lagging growth are likely to have more necessity entrepreneurs than their more prosperous regions as individuals living in the less prosperous regions start businesses due to familiarity, asset fixity (Hite, 1997) or social capital considerations (Sabitini, 2008). In their analysis of returns to self-employment, Evans and Leighton (1989) found that entrepreneurs starting a new business, having less formal education and a long period of unemployment prior to starting their new business, were often less skilled than individuals doing the same job for either wages or salary. Given their situations, we would expect lower returns for necessity entrepreneurs and an increased number of such individuals in an economic downturn. Supporting this argument is the work of Low and Weiler (2012) who found that limited employment prospects increased the likelihood of individuals opting to become entrepreneurs within regional commuting zones.
Local economic structure has also been shown to influence entrepreneurial success (Evans and Jovanovic, 1989; Goetz and Freshwater 2001; Walzer 2007; Low and Weiler (2012). In particular, Goetz and Freshwater (2001) and Walzer (2007) found that regional (state) self-employment is positively correlated with access to capital as measured by the number of regional financial institutions. Aggressive marketing of regional amenities designed to draw tourism can also 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”.

Agglomeration economies 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 type agglomerative economies.¹ For example, Glaeser and Kohlhase (2004) found a 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 suggests that the availability of financial resources and services, increases with population density, and thus an entrepreneurs’ chance 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 diverse skill sets, increase the size of the local market, and access

¹ These are 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 as opposed to the core industry (Glaeser et al. 1992). 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 (2000) 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).
to specialized business services (Fujita and Krugman, 2004). Thus entrepreneurs located in metropolitan areas should benefit from agglomeration economies and have a higher income level than entrepreneurs in non-metro areas.

Another issue related to this work is the year of analysis (2008), which was part of the great recession. Shane (2011) and Yua et al. (2014) argue that the level of self-employment declined during the great recession primarily due to a reduction in the rate of new firm formation. Shane in particular shows that firms with employees and incorporated firms had an especially large decline in the rate of net formation from 2007 through 2009 (with 2009 showing by far the largest net decline). With respect to this research, returns to self-employment would obviously be reduced in our period of analysis as opposed to other years. We would also expect the number of necessity entrepreneurs to increase as well. Moreover, given the downturn in the economy and especially banks service as a major cause of the downturn and most important their reticence to lend, the presence of financial services might not be an important determinant of self-employed income levels given our year of analysis (2008). In addition, the year of analysis might reduce the importance of financial services as an agglomerative type variable.

**Study Area and Data**

The three southeastern states of Georgia, North Carolina and South Carolina serve as the study area. The level of per capita income in all three states has consistently been well below the national average for the last decade. In 2016, South Carolina ranked 44th, Georgia 40th, and North Carolina 39th out of 51 states and District of Columbia in terms of per capita income (Bureau of Economic Analysis, U.S. Department of Commerce, 2018). Of specific importance to this analysis is that the annual growth of the three-state percentage of self-employed income to total earnings²

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² Total earnings are defined as the sum of personal income-wage and salary disbursements and proprietors’ income (Regional Economic Information System 2018).
has been less than the growth in the percentage share of entrepreneurial employment to total employment. In 2000, the percentage of self-employed income to total earnings was 9.7 percent. This percentage declined to a low of 9.4% in 2011 and rebounded to 10.3% in 2016, 0.6% more than in 2000. However, this small increase in the share of earnings income derived from entrepreneurial activities is misleading because the share of self-employment relative to total employment in the three states increased from 15.0 percent in 2000 to 22.2 percent in 2016 (a relative increase of 47.4%) (Bureau of Economic Analysis, U.S. Department of Commerce, 2018). Thus, over the last decade and a half, earnings per entrepreneur have significantly decreased in the three states. This earning trend per entrepreneur 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 least kept pace with the percentage increase in the number of entrepreneurs. The downward trend in U.S. per entrepreneurial income (in real terms from $29,766 per entrepreneur in 2001 to $25,394 in 2007 a decline of 23%) further highlights the need to examine the drivers of entrepreneurial income.³

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). Constructed variables are

³ This decline predated the national recession. Still, in 2016, U.S. per entrepreneurial real (2000 dollars) income was only $22,520. The same variable for the three states in our analysis shows the same trend.
created in the database using 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 the three states. The sample was narrowed down using several criteria to obtain the data 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 and labor force status are used to select only individuals active in the labor force. Because this study focuses on the determinants of entrepreneurial income, the variable for the class of worker was used to restrict our analysis to individuals whose primary labor market activity was listed as self-employment and resulted in a 2008 sample size of 8,808 entrepreneurs for the three state regions. 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 may be salaried employees.

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 self-employment income derived

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4 The IPUMS EMPSTATD variable
5 The IPUMS LABFORCE variable
6 The IPUMS CLASSWKRD variable
from sampled businesses or farms (Ruggles et al. 2008). Conceptually, we define \( Y_{ijr} \) as the entrepreneurial earnings of individual \( i \) in sector \( j \) in region \( r \) as:

\[
Y_{ijr} = f\left(P_i, R_i, S_{ij}, A_{ir}\right).
\]

\( P_i \) is a vector of the entrepreneur’s personal and family attributes, \( R_i \) measures the resources available to the entrepreneur, \( S_{ij} \) is a set of variables accounting for business type owned by the entrepreneur and \( A_{ir} \) is a set of variables useful for examining agglomerative type effects for the region in which the entrepreneur operates.

**Personal and Family Characteristics:** Personal characteristics embedded in the \( P_i \) term of the conceptual model control for individual and family productivity factors that are hypothesized to affect the self-employed income level. These variables include demographic characteristics such as an individual’s age, gender, race, and education. As discussed in the literature review, these variables control for and explain differences in the level of self-employed income (Kusmin 2010; Gurley-Calvez and Hammond 2010). We expect that age and education will have a positive relationship with self-employed income, while being non-white and female will have a negative effect on self-employed income (Table 1). In terms of our unconditional quantile analysis, we hypothesize that the impact of being non-white and female is negative at income levels, but the marginal effect decreases at higher income quantiles (as hypothesized in Table 1). It is our contention that while discrimination remains, its affects should be less daunting for higher income self-employed income earners in both categories. On the other hand, one would expect the relationship between education and self-employed income to perhaps be stronger for higher self-employed income earners. Self-employed income as a percentage of total family income indicates a stronger commitment to entrepreneurial activities and hence is expected to have a positive relationship with self-employed income levels while retirement income as a percentage of family
income is expected to have a negative relationship with self-employed income. We have no a priori expectation with respect to the parameter estimates for age, self-employed income, and retirement income in terms of the quantile analysis except that perhaps the hypothesized relationships remain consistent over quantiles.

**Resource Availability**: Entrepreneurs having greater access to resources or assets 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. Capital is especially important for starts-ups, as owner-investments is the major form of capital for start-up businesses followed by personal debt (Renski and Wallace, 2013). 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 and with a mortgage are assumed to have greater access to resources and this relationship is one proxy measure used to account for resource availability. Thus, the presence of both health insurance and a mortgage are expected to be positively correlated with self-employed income. Arguably, owners of incorporated businesses may have enhanced business skills and access to a greater resource base. Further, Shane (2003) shows that incorporated businesses start-ups do better than sole proprietorships in most respects. In terms of the quantile analysis for the asset based variables (mortgage, health insurance, incorporation), one might expect a slightly stronger positive relationship for lower levels of self-employed income in that such assets maybe more beneficial for individuals with constrained (as
opposed to voluntary) lower levels of self-employed income. Based on the literature (Parker), such individuals would be expected to be necessity entrepreneurs.

**Business Type:** Business activity in the more lucrative finance and insurance and health care sector is expected to result in higher self-employed income while activity in retail trade tends to be smaller (Hurst and Pugsley) is expected to have the opposite effect. According, our expectation is that activity in the former will have a positive effect on self-employed income while in the latter the effect will be negative. Our expectations regarding farming is negative in that most farm operations (half of all U.S. crop farms have less than 45 acres in production, (MacDonald, Korb, and Hoppe, 2013) are small, especially in our three-state region, where our analysis of Census of Agriculture data (US Department of Agriculture, 2014) indicates that 53.7% of all farms have under $5,000 in annual sales. Hence, we would expect that farming would yield smaller levels of 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 $A_{ir}$ 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) relative to total income earned in a PUMA region is used to proxy for access to capital. Based on Glaeser and Kohlhase, we feel that such access is also a type of agglomerative economy.

As discussed in our literature review, agglomeration economies are believed to play a pivotal role in the growth of regional economies (Krugman and Fujita; Shaffer, Deller, and
Marcouiller; Glaeser and Kohlhase; Low and Weiler). Hence, regional population density is expected to be positively correlated with self-employed income. Thus entrepreneurs located in metropolitan areas should benefit from agglomeration economies and have a higher income level than entrepreneurs in non-metro areas. Based on the economic geography literature where increasing returns play a prominent role (Fujita and Krugman), we expect that this direct effect will be stronger for higher-income self-employed income (Table 1). Further, higher levels of income imply fewer necessity entrepreneurs (Parker) and one would expect to have fewer individuals forced into entrepreneurism in higher income and agglomerative effect areas.

Our expectations regarding the relationship between level of financial services in the local economy and self-employed income is less clear. We anticipate a positive relationship between the two variable but do not hypothesize a parameter change in the relationship over income quantiles for two reasons. On the one hand, greater levels of financial services could mean enhanced access for individuals with lower levels of self-employed income. Such access could enhance their ability to move up the self-employed income latter, thus access to financial services might have a greater positive impact at lower quantile income levels. On the other hand, financial services have been typically associated with urbanization (Glaeser and Kohlhase) serving higher income businesses. Given the year of analysis, we maintain no a priori expectation regarding changes in the expected positive relationship between the level of financial services and self-employed income at alternative quantiles (Table 1).

Another regional structure variable is the level of workforce utilization in the PUMA, i.e., the percentage of the labor force activity employed. As reported in table 1, we have no hypothesis concerning the relationship between the tightness of the labor market and the level of self-employed income for two reasons. On the one hand, as the workforce utilization rate increases, one
might expect the number of necessity entrepreneurs to decline as they have increased access to salaried work opportunities. Given the well-established relationship between increases in necessity entrepreneurs and decreases in the average earnings of self-employed individuals (Parker, 2009, Koellinger and Thurik, 2012; Low and Weiler, 2012), one might expect the relationship between workforce utilization and entrepreneurial income to be positive as low income entrepreneurs accept higher paying salaried opportunities. On the other hand, given that high-income entrepreneurs often hire workers, an increase in workforce utilization could result in the need to pay wages to compete for increasingly scarce workers. In this case, one could expect a negative relationship between workforce utilization and self-employed income, especially for high income entrepreneurs individuals with higher levels of self-employed income who are more likely to operate businesses that have hired workers.

Descriptive Statistics

Descriptive statistics for the categorical variables used in the empirical model are provided in Table 2. Average self-employed male income ($61,872) is more than twice the average self-employed female income. 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, 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.

Descriptive statistics for the continuous variables included in the empirical analysis are reported in Table 3. 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. Self-employed income can be greater than the total family income (if the spouse had an income loss). In these few instances, the percentage share of self-employed income to total household income is set at 100 percent.

Other continuous variables reflect the nature of the region (the PUMA unit) in which the self-employed individual operates (Table 3). 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 hundred people per square mile) reflects the heterogeneity of the environment in which entrepreneurs operate. PUMA income earned in financial 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 financial services share ranges from 1.2% to 10.9% with a mean of 3.1% across all PUMA units.

Results
Both ordinary least squares regression and unconditional quantile regression results are now presented. Among the hypotheses we test are the effects of personal and family attributes (age, gender, race, education, self-employed as a percent of family income, and retirement income as a percent of family income). We, also test the role of available assets (mortgage, health insurance, incorporation), type of business (retail, financial, or farm), and agglomerative effects of the regional economy (earned income from financial services as a percent of earned income for the PUMS unit, per capita income in 2005 for the PUMA unit, and whether the PUMA unit was in a metropolitan area).

---

7 Sum of the IPUMS INCTOT and SPINCTOT variables
In terms of the OLS results and consistent with the literature, personal and family attributes have the expected sign in terms of impacts on self-employed income. Being older, male, white, and better educated all led to greater levels of self-employed income as shown in Table 4. For the former three variables, quantile results are consistent with the OLS results (i.e., the coefficient for each quantile has the expected positive sign and all results are statistically significant) (Table 5). The quantile results for age reveal a more varied picture, however. For example, age had no effect at quantiles below 50% and only a small positive effect at higher quantiles. Hence, the results do not support our premise that the impact of age is consistently positive throughout the income distribution. We did hypothesize that the advantages of being male and white would be positive throughout the income distribution but have a monotonically smaller impact at higher income levels. For both the gender and race variables, our hypothesis hold through the 50% quantile but then show an unexpected increase at higher quantiles. As subsequently discuss, these results along with others speak to the advantage that traditional demographic groups may still have at higher income levels.

Quantile regression results support our contention that education has an increasingly positive effect on self-employed income at higher income levels (Table 5). The marginal effect of education monotonically increases across the five-reported quantile groups at a fairly constant rate (i.e., the coefficient in each quantile divided by the next lowest quantile ranges from 43.9% (the 75% quantile divided by the 50% quantile) to 33.5% (the 90% quantile divided by the 75% quantile). These results speak to the increasingly strong interaction between education level and income at higher income quantiles.

In the OLS analysis results for both self-employed income as a percentage of total family income (positive) and retirement income as a percentage of total family income (negative) had the
hypothesized sign (Table 4). These results indicate that households specializing in self-employed activities have greater entrepreneurial income. Moreover, households that rely on retirement income for at least 50% of their household income tend to treat self-employment activities as sideline or secondary activities.

In terms of quantile results, the marginal positive impact of at least 50 percent of the household income derived from self-employment has a u-shaped pattern. At low quantiles, less than or equal to 50%, the marginal effect monotonically decreases with increases in the quantile level before showing a consistent increase at higher quantile levels (Table 5). Conversely, as hypothesized, self-employment earnings were significantly less at all quantiles for households that derived at least 50% of their household income from retirement sources. The effect of being a retirement household had a consistently strong negative impact on all income quantiles but the marginal effect decreased as at higher self-employment quantiles. Thus, at higher self-employment income levels, being a “retirement household” has a smaller impact on self-employment earnings than at lower income levels.

Variables that serve as proxies for resource availability (mortgage, health insurance, and corporation) had the expected positive sign in the OLS results (Table 4). However, in the quantile analysis, for three variable the empirical results in general did not support our hypothesis that access to resources would become less important as the self-employed income level increased (Table 5). Following a pattern somewhat similar to gender and race, the effects of incorporation did decline through the 75% quantile (as expected) before increasing at higher quantiles. The marginal effect pattern over quantiles for having a mortgage is more varied, but showed an increasing trend starting at the 75% quantile (although the largest positive impact was at the 25% quantile). Having health insurance showed an almost monotonically increasingly positive effect
throughout the five quantiles (the 50% quantile was slightly lower than the 25% quantile) completely contrary to expectations. As discussed later, these results along with others speak to the advantage of resource availability at the higher income levels.

In terms of business structure, the OLS regression results were consistent with our maintained hypothesis. Retail was associated with a decrease in self-employed income while FIRE was associated with an increase in self-employed income (Table 4). Counter to our expectations, farming is associated with an increase in self-employed income. In contrast to the OLS results, working in the retail sector only had a significantly negative impact on self-employment income at quantiles in excess of 50% (Table 5). Moreover, working in the FIRE sector of the economy only had a significantly positive impact on entrepreneur income ranging from the 25% to 75% (Table 5). The impact on self-employed income of farming operation is significantly positive at all quantiles less than or equal to the 50% quantile, and the marginal effect monotonically decreases with increases in the income quantile.

The results for the parameter estimates that describe the regional economic structure (per capita income, metropolitan status, relative size of the financial sector, and workforce utilization rate) are somewhat mixed in their ability to explain the observed variance in self-employed income. The OLS result for the level of financial services in the PUMA had no impact on self-employed income (Table 4). However, the quantile analysis tells a different story. A statistically significant positive relationship exists between the level of the financial services sector and the self-employment level at all quantiles less than or equal to 0.50. However, the marginal effect monotonically decreases with the quantile level. This suggests that greater access to a robust financial services sector benefits low-income entrepreneur’s more than high-income entrepreneurs (Table 5).
In the OLS analysis, as reported in Table 4, the workforce utilization rate parameter is negative and strongly statistically significant (P < 0.01). This implies tighter labor markets reduce self-employment income. However, the quantile analysis refines this result. In the quantile analysis, this result is strongest and most significant when at self-employment quantiles are at or above the 0.50 level. This may result from entrepreneurs with high levels of self-employment income, have more employees, and higher per unit higher labor costs in tight markets.

This analysis provides some support for agglomerative type impacts on self-employed income. Moreover, as shown in the quantile analysis, these impacts are most significant at higher self-employed income quantiles. In the OLS regression, PUMA per capita income is statistically significant and positively related to self-employment income, and metropolitan status is statistically significant and positively related to self-employed income (Table 4). The quantile results refine the OLS results and support our contention that agglomerative type effects increase for individuals with higher-levels of self-employed income (Table 5).

Overall, the differences in quantile estimates for the marginal effects of personal characteristics (male, white, education, and retirement income), access to resources (mortgage and health insurance), and the nature of the regional economy (workforce utilization, metropolitan status, 2005 per capita income) generally varied the most at the highest quantiles relative to their values at lower quantiles. Focusing on personal characteristics, the advantages of being older, male, white, and better educated are markedly enhanced while retirement is less of a detriment than for lower income levels. For example, the magnitude of the coefficient for the 90% quantile versus the 75% quantile is 2.8 times greater for age (.0114 versus .00411) while the advantage of being white is 2.2 greater between the same quantiles (0.213 for the 90 quantile versus .0976 for the 75% quantile) and the advantage of being male is 58.9% greater (0.351 for the 90% quantile
versus 0.221 for the 75% quantile). For education, the impact is slightly less pronounced at 33.5% greater (0.467 for the .90 quantile versus 0.346 for the .75 quantile). While the result for education and age are not surprising (with the exception of the magnitude regarding age), the results for being male and white are contrary to our expectations; we expected the barriers to terms of being female and black to still be present but of a smaller not larger magnitude at the highest income level.

Likewise, access to resources is also more of an advantage for the highest income quantile although to a lesser extent than personal characteristics. For example, having a mortgage had a 40.6% greater impact at the .90 quantile versus .75 quantile (0.391 versus 0.278). Having health insurance showed an almost monotonically increasingly positive effect throughout the five quantiles (the 50% quantile was slightly lower than the 25% quantile) contrary to expectations.

Several of the regional variables also tend to have a profound impact on the highest impact quantile although similar results are seen between the 50% quantile and the 75% quantile. For example, the 2005 level of PUMA per capita income has the strongest impact in the 90% quantile (at .0256 and 80.3% greater than the impact for the 75% quantile) but the relative difference between the 75% and 50% quantile was markedly greater at over 3.2 times larger (.0142 versus .00443). Likewise, being a metro region results in an impact in the 90% quantile that was 2.3 times the impact at the 75% quantile (0.151 versus 0.0653) but the difference between the 75% quantile and 50% quantile result was still pronounced (with the 75% coefficient being 40.4% greater in size). Collectively these results imply that regional characteristics affect self-employed income levels and higher income quantiles tend to benefit at a disproportional rate in more developed regional economies.
Summary and Conclusions

Supporters claim that entrepreneurship is critical to building and sustaining urban and rural regional economies. Proponents argue that economic development practices that enhance and support entrepreneurship are essential because they cultivate innovation that, in turn, creates new jobs, new wealth, and a better quality of life. However, the PUMA level data for the three states considered in this analysis, 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 Georgia, North Carolina, and South Carolina in both an ordinary regression approach and an unconditional 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.

Our OLS results generally met our a priori expectations. Being older, male, white, better educated, and having access to resources (mortgage, health insurance and incorporation) all led to higher income levels and entrepreneurs living in households that have more than 50% of their income from retirement income were negatively associated with self-employed income. As expected, entrepreneurs working in the retail sector had lower self-employed income, and entrepreneurs working in the FIRE sector had higher self-employment income. Moreover, at the regional level, PUMA per capita income and residing in a metropolitan area both increased the
self-employment income level. As discussed in the results section, the unconditional quantile analysis showed that the marginal effects of these variables varied with the quantile level.

The unconditional quantile analysis provides insight into the factors that determine entrepreneurial income, and how the marginal effect of these factors vary over self-employed income quantiles. The quantile results meet our expectations with respect to education but not gender or race. We had hypothesized that the negative marginal effect of being a woman or non-white would decrease with the quantile level. The most profound and upon reflection not startling outcome is the advantage that key personal attributes, access to resources, and to a lesser extent a more developed economy provide to the highest income levels. Further analysis is needed to provide a stronger understanding of these relationships. For example, additional survey based data needs to be collected to more fully quantify the importance of entrepreneur access to resources in explaining entrepreneur income. In addition, an analysis that examines the determinants of self-employed income in a longitudinal manner could shed more light on the topic. In this regard, the move to alternative work arrangements such as Uber (Katz and Krueger, 2017) could have profound implications for examining the determinants of self-employed income.

Further, it is unclear how the period of analysis (2008) influences the relationships examined in our work. This topic would be an area of fruitful research. In particular, we feel that the result with respect to financial services would be more consistent with our expectation based on agglomeration theory if the analysis was conducted for a non-recession year.
References


Table 1. Hypothesized Relationship between Log of Self-Employed Income and Independent Variables for OLS and Unconditional Quantile Regressions

<table>
<thead>
<tr>
<th>Variable</th>
<th>OLS Sign</th>
<th>Quantile Sign&lt;sup&gt;1&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>+</td>
<td>+ and increasing</td>
</tr>
<tr>
<td>Gender (Male=1)</td>
<td>+</td>
<td>+ and decreasing</td>
</tr>
<tr>
<td>Race (White =1, else 0)</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Education (greater than H.S. =1)</td>
<td>+</td>
<td>+ and increasing</td>
</tr>
<tr>
<td>Mortgage (Yes=1)</td>
<td>+</td>
<td>+ and decreasing</td>
</tr>
<tr>
<td>Health Insurance (Yes =1)</td>
<td>+</td>
<td>+ and decreasing</td>
</tr>
<tr>
<td>Corporation (Yes =1)</td>
<td>+</td>
<td>+ and decreasing</td>
</tr>
<tr>
<td>Self Employed % of Family Income</td>
<td>+</td>
<td>+ and increasing</td>
</tr>
<tr>
<td>Retire % of Family Income</td>
<td>-</td>
<td>- and decreasing</td>
</tr>
<tr>
<td>Retail (Yes=1)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>FIRE Industry (Yes=1)</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Farm (Yes=1)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PUMA NAICS 52 % of Total</td>
<td>+</td>
<td>+ and increasing</td>
</tr>
<tr>
<td>Per Capita Income 2005</td>
<td>+</td>
<td>+ and increasing</td>
</tr>
<tr>
<td>Metro PUMA (Yes=1)</td>
<td>+</td>
<td>+ and increasing</td>
</tr>
<tr>
<td>PUMA Workforce Utilization</td>
<td>?</td>
<td>?</td>
</tr>
</tbody>
</table>

<sup>1</sup>Increasing and decreasing refer to the change in the appropriate parameter value as the quantile increases.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Mean Self-Employed Income</th>
<th>Percentage of Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race</td>
<td>Black</td>
<td>$40,393</td>
<td>10.7%</td>
</tr>
<tr>
<td></td>
<td>Non-Black</td>
<td>$60,122</td>
<td>89.3%</td>
</tr>
<tr>
<td>Gender</td>
<td>Female</td>
<td>$35,394</td>
<td>66.6%</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>$69,343</td>
<td>33.4%</td>
</tr>
<tr>
<td>Education</td>
<td>Greater than high school</td>
<td>$71,218</td>
<td>59.4%</td>
</tr>
<tr>
<td></td>
<td>High school or less</td>
<td>$38,696</td>
<td>40.6%</td>
</tr>
<tr>
<td>FIRE</td>
<td>Employed in FIRE</td>
<td>$74,050</td>
<td>9.8%</td>
</tr>
<tr>
<td>Self Employed Share</td>
<td>Self-employed share of family income &gt; 0.5</td>
<td>N.A.</td>
<td>54.6%</td>
</tr>
<tr>
<td>Retire Income Share</td>
<td>Retirement Income share of family income &gt; 0.5</td>
<td>N.A.</td>
<td>0.6%</td>
</tr>
<tr>
<td>Retail Industry</td>
<td>Employed in Retail</td>
<td>$46,395</td>
<td>8.0%</td>
</tr>
<tr>
<td>Farm</td>
<td>Employed in Farming</td>
<td>$64,337</td>
<td>2.2%</td>
</tr>
<tr>
<td>Other</td>
<td>Employed in Other Ind.</td>
<td>$57,033</td>
<td>80.0%</td>
</tr>
<tr>
<td>Mortgage</td>
<td>Has Mortgage</td>
<td>$61,379</td>
<td>87.2%</td>
</tr>
<tr>
<td></td>
<td>No Mortgage</td>
<td>$35,178</td>
<td>12.8%</td>
</tr>
<tr>
<td>Health Insurance</td>
<td>Has Health Insurance</td>
<td>$66,034</td>
<td>75.8%</td>
</tr>
<tr>
<td></td>
<td>No Health Insurance</td>
<td>$33,114</td>
<td>24.2%</td>
</tr>
<tr>
<td>Corporation</td>
<td>Incorporated</td>
<td>$79,674</td>
<td>44.4%</td>
</tr>
<tr>
<td></td>
<td>Not Incorporated</td>
<td>$40,717</td>
<td>55.6%</td>
</tr>
<tr>
<td>Metro PUMA</td>
<td>Resides in Metro Area</td>
<td>$62,162</td>
<td>72.7%</td>
</tr>
<tr>
<td></td>
<td>Resides in Non-Metro</td>
<td>$46,951</td>
<td>27.3%</td>
</tr>
</tbody>
</table>

n = 8,808
Table 3. Summary Statistics for Continuous Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>St. Dev.</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Employed Income (Dep. Var.)</td>
<td>$58,015</td>
<td>$79,755</td>
<td>$50</td>
<td>$673,000</td>
</tr>
<tr>
<td>Age</td>
<td>46.96</td>
<td>9.84</td>
<td>$25.00</td>
<td>$64.00</td>
</tr>
<tr>
<td>PUMA Per Capita Income 2005</td>
<td>23,120</td>
<td>6,847</td>
<td>13,243</td>
<td>59,919</td>
</tr>
<tr>
<td>PUMA NAICS(^1) 52 % of Total</td>
<td>6.98%</td>
<td>3.82%</td>
<td>2.45%</td>
<td>21.51%</td>
</tr>
<tr>
<td>PUMA Workforce Utilization</td>
<td>73.04%</td>
<td>5.32%</td>
<td>55.20%</td>
<td>82.57%</td>
</tr>
</tbody>
</table>

Note: N=148 for PUMA (SC = 27, NC = 58, GA = 63)

\(^1\) Financial Services
Table 4. Parameter Estimates and Standard Errors for Log of Self-Employed Income: OLS Regression

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimate</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>8.655***</td>
<td>0.184</td>
</tr>
<tr>
<td>Age</td>
<td>0.00218***</td>
<td>0.00107</td>
</tr>
<tr>
<td>Gender (Male=1)</td>
<td>0.372***</td>
<td>0.0229</td>
</tr>
<tr>
<td>Race (Black =1, else 0)</td>
<td>-0.146***</td>
<td>0.0333</td>
</tr>
<tr>
<td>Education (greater than H.S. =1)</td>
<td>0.257***</td>
<td>0.0217</td>
</tr>
<tr>
<td>Self Employed &gt; 50% Family Income (Yes=1)</td>
<td>1.099***</td>
<td>0.0277</td>
</tr>
<tr>
<td>Retire &gt; 50% Family Income (Yes=1)</td>
<td>-0.862***</td>
<td>0.172</td>
</tr>
<tr>
<td>Mortgage (Yes=1)</td>
<td>0.340***</td>
<td>0.0322</td>
</tr>
<tr>
<td>Health Insurance (Yes =1)</td>
<td>0.383***</td>
<td>0.025</td>
</tr>
<tr>
<td>Corporation (Yes =1)</td>
<td>0.485***</td>
<td>0.0204</td>
</tr>
<tr>
<td>Retail (Yes=1)</td>
<td>-0.106***</td>
<td>0.0375</td>
</tr>
<tr>
<td>FIRE Industry (Yes=1)</td>
<td>0.123***</td>
<td>0.034</td>
</tr>
<tr>
<td>Farm (Yes=1)</td>
<td>0.180**</td>
<td>0.089</td>
</tr>
<tr>
<td>PUMA NAICS 52(^1) % of Total</td>
<td>0.325</td>
<td>0.228</td>
</tr>
<tr>
<td>Per Capita Income 2005</td>
<td>0.0118***</td>
<td>0.00213</td>
</tr>
<tr>
<td>Metro PUMA (Yes=1)</td>
<td>0.0948***</td>
<td>0.0277</td>
</tr>
<tr>
<td>PUMA Workforce Utilization</td>
<td>-0.906***</td>
<td>0.282</td>
</tr>
</tbody>
</table>

\(^1\)Financial Services

P <.01*** P <.05**

R-Square = 0.42

N = 8,808
Table 5. Select Quantile Estimates and Standard Errors (0.10, 0.25, 0.50, 0.75, and 0.90)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>.10 Quantile</th>
<th>.25 Quantile</th>
<th>.50 Quantile</th>
<th>.75 Quantile</th>
<th>.90 Quantile</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Estimate</td>
<td>Estimate</td>
<td>Estimate</td>
<td>Estimate</td>
<td>Estimate</td>
</tr>
<tr>
<td>Constant</td>
<td>7.284***</td>
<td>8.162***</td>
<td>8.810***</td>
<td>9.296***</td>
<td>9.341***</td>
</tr>
<tr>
<td>Age</td>
<td>-0.00237</td>
<td>-0.00499**</td>
<td>0.000754</td>
<td>0.00411***</td>
<td>0.0114***</td>
</tr>
<tr>
<td>Gender (Male = 1)</td>
<td>0.554***</td>
<td>0.486***</td>
<td>0.299***</td>
<td>0.221***</td>
<td>0.351***</td>
</tr>
<tr>
<td>Race (Black = 1)</td>
<td>-0.145</td>
<td>-0.122**</td>
<td>-0.0576*</td>
<td>-0.0976***</td>
<td>-0.213***</td>
</tr>
<tr>
<td>Education (greater than H.S. =1)</td>
<td>0.120*</td>
<td>0.173***</td>
<td>0.249***</td>
<td>0.346***</td>
<td>0.462***</td>
</tr>
<tr>
<td>Self Employed &gt; 50% Family Inc. (Yes=1)</td>
<td>1.489***</td>
<td>1.266***</td>
<td>0.916***</td>
<td>0.943***</td>
<td>1.069***</td>
</tr>
<tr>
<td>Retire &gt; 50% Family Income (Yes=1)</td>
<td>-2.474***</td>
<td>-1.408***</td>
<td>-0.525***</td>
<td>-0.277**</td>
<td>-0.355***</td>
</tr>
<tr>
<td>Mortgage (Yes=1)</td>
<td>0.359***</td>
<td>0.399***</td>
<td>0.243***</td>
<td>0.278***</td>
<td>0.391***</td>
</tr>
<tr>
<td>Health Insurance (Yes=1)</td>
<td>0.287***</td>
<td>0.412***</td>
<td>0.383***</td>
<td>0.431***</td>
<td>0.449***</td>
</tr>
<tr>
<td>Corporation</td>
<td>0.675***</td>
<td>0.565***</td>
<td>0.420***</td>
<td>0.400***</td>
<td>0.451***</td>
</tr>
<tr>
<td>Retail (Yes=1)</td>
<td>-0.111</td>
<td>-0.0168</td>
<td>0.00029</td>
<td>-0.109**</td>
<td>-0.279***</td>
</tr>
<tr>
<td>FIRE Industry (Yes=1)</td>
<td>0.138</td>
<td>0.110**</td>
<td>0.116***</td>
<td>0.114***</td>
<td>0.0345</td>
</tr>
<tr>
<td>Farm (Yes = 1)</td>
<td>0.358**</td>
<td>0.318**</td>
<td>0.168*</td>
<td>0.0458</td>
<td>0.141</td>
</tr>
<tr>
<td>PUMA NAICS 52(^1) % of Total</td>
<td>1.072*</td>
<td>0.747*</td>
<td>0.445*</td>
<td>-0.331</td>
<td>-0.187</td>
</tr>
<tr>
<td>Per Capita Income 2005</td>
<td>0.00325</td>
<td>0.00503</td>
<td>0.00443**</td>
<td>0.0142***</td>
<td>0.0256***</td>
</tr>
<tr>
<td>Metro PUMA (Yes=1)</td>
<td>0.0839</td>
<td>0.118**</td>
<td>0.0465*</td>
<td>0.0653*</td>
<td>0.151**</td>
</tr>
<tr>
<td>PUMA Workforce Utilization</td>
<td>-0.998</td>
<td>-0.862*</td>
<td>-0.521**</td>
<td>-0.682**</td>
<td>-1.058*</td>
</tr>
</tbody>
</table>

\(^{1}\)Finance and Insurance. Respective quantile R-Square values = .140, .241, .316, .267, .1744  N=8,808  P <.01***  P <.05**  P <.10*