NEXUS AMONG IMMIGRANTS, SELF-EMPLOYMENT, AND ECONOMIC GROWTH IN NORTH CAROLINA

Saman Janaranjana Herath Bandara, West Virginia State University

ABSTRACT

The study was to scrutinize the connection of immigrants, self-employment, and economic growth in North Carolina. The study used county level data mainly from the American Consumer Survey for the period of 2010- 2017. Pooled OLS regression analysis was conducted using STATA. The results brought some significant insights. The findings highlight the significant and positive impacts of both immigrants and self-employment to the economic growth of the state. The counties with more self- employment opportunities are more attracted by immigrants. Growth in the construction, manufacturing, and service sectors show significant and positive impacts on self-employment opportunities. The lower the average income Counties show higher rates of self-employment. Growth in the service and education sectors, lead to higher household incomes. Thus, the investment priorities in the construction, services, and education sectors can accelerate the economic growth of North Carolina.

INTRODUCTION

Economic growth is the key to development that can be measured by modifying GDP, income, or other increases in the market value of goods and services. Among the main factors affecting economic growth, labor force (human capital), and entrepreneurial activities (entrepreneurship) are important within the context of natural resources and physical capital availability. A diversified labor force with different skill sets could bring significant changes in economic growth (Fernald & Chares, 2014). Immigrants are such a diversified workforce that brings entrepreneurial ideas to make a difference in an economy. Self-employment is an important aspect of the immigrant experience in the labor market. It simply offers immigrants the possibility of upward mobility and integration into society. Interestingly, self-employment appears to be a vital means for immigrants to integrate into the foreign economy.

Studies show how immigrants and self-employment contribute to U.S. economic growth. Immigrant entrepreneurship creates about 25% of new businesses in the U.S., which is common in the states of California and New York (Kerr and Kerr, 2020). Over a million immigrants arrive in the United States every year, mostly from China, India, Mexico, and the Philippines (National Geographic, 2018). Immigrants contribute a high share of patent filings, science and technology graduates, and leadership positions in large venture capital-funded firms ("Patent Pending, 2012). In addition, by creating opportunities for the least skilled indigenous workers, and their productivity ("Patent pending, 2012). It is noted that immigrant labor has proven to be a major component of American agriculture (USDA ERS, 2016a). According to Bureau of labor statistics, nearly 15 million people, or 10 percent of total U.S. employment, were self-employed in 2015. Immigrants are more likely to be self-employed, and this rate is high, as the longer an immigrant remains in the U.S. (Borjas, 1986).

The impact of immigration and self-employment on economic growth varies across states in the United States. Recent studies show that North Carolina's economy is transforming in many ways and moving towards knowledge-intensive business services, requiring more skilled workers, particularly in metropolitan areas. In the meantime, in labor-intensive rural areas like agriculture and construction, there are labor shortages that demand more workers. Studies show that the part of the labor demand is filled by immigrants. The state reports that nearly 8% of the state's population was composed of immigrants in 2018, and the number is increasing. Thus, it is important to understand the relationship between immigrants, small business growth (self-employment) and state economic growth to make effective and efficient strategic decisions. The main objective of this paper is to evaluate immigrants, self-employment and economic growth in North Carolina to provide policy suggestions for improving economic growth in North Carolina. Although some research studies focus on economic growth and small business development across different sectors of North Carolina, the analysis of these factors taken together is limited. Rest of the paper consists of four sections. Section 2 presents the literature review for the United States and particularly for North Carolina. Section 3 presents the data and methodology. Section 45 focuses on empirical findings and the last section, section 5 brings concluding comments.

LITERATURE REVIEW

Economics theory points out that diversified labor force with different skill sets could bring significant changes in an economy. Over the past decades, the skilled, diversified, and innovative workforce has brought massive change to the American economy (Fernald and Chares, 2014). The contribution of immigrants to certain industries is very high and their geographical mobility facilitates labor shortages, reducing barriers that could weaken the economy. Immigrant workers help sustain an aging population by increasing the number of workers relative to retirees and strengthening social security and Medicare trust funds. In addition, children from immigrant families are mobile and promise benefits for their families and the broader American economy (Sherman et al., 2019). Brieger and Gielnik (2021) highlighted the high level of immigrant support for the country's economic growth. According to Peri (2012), states with high concentrations of foreign-born workers are experiencing much faster productivity growth due to certain technological developments. However, the economic gains of immigrants depend upon market structures, services, and business opportunities (Raith, 2000; Eckhardt and Shane, 2010). Immigrants represent 13.7% of the U.S. population, nearly three times more than in 1970 (Pew, 2017). Most immigrants, 77%, are legal, and the rest is unauthorized. In 2017, almost 45% were naturalized United States citizens. Asian immigrants have experienced the fastest growth in the past 10 to 15 years and this trend is expected to continue in the coming years (National Geographic, 2018). It is projected to become the largest immigrant population by 2055, ahead of Hispanics (Pew 2017; Krogstad 2017).

Studies show that in recent years, foreign-born workers or immigrants occupy most of the jobs in agriculture (Aquirre International, 2005), and are significant contributors to the economy (USDA ERS, 2016a). The contribution of immigrants is significant, particularly in labor-intensive agriculture such as the produce, fruit, and livestock sectors in recent years (USDA ERS, 2016b). Sherman et al. (2019), show that immigrants with no college education account for more than one-third of the agriculture, fishing, construction, cleaning and maintenance occupations in the country. It is important to note that immigrants have implications not only for the industry but also for the local economies of the country (Hernandez, Gabbard & Carroll, 2016; Fairlie et al. 2016; Krogstad, 2017). Immigrants will be critical to filling future labor shortages across the economy, with 76 million baby boomers retiring and 46 million U.S. -born workers entering the workforce by 2030.

Self-employment based on innovative ideas and creativity continues to be an important source of employment and income in the U.S. According to labor statistics, only 10% of the US labor force were self-employed in 2015. Of these, 9.5 million were unincorporated; the remaining 5.5 million were incorporated (US Burau of Labor Statistics, 2016). Hipple (2010) found that the self-employment sector accounted for

10.9% of total employment in 2009. According to the Pew Research Center (2021), over 150 million workers in the United States comprise approximately 16 million (10.6%) self-employed workers. Self-employment seems to be an essential means for immigrants to integrate into the U.S. economy (Carpenter & Loveridge, 2017; Borjas, 1986). The differences in self- employment or engage in entrepreneurial activities across immigrant groups are persistent and substantial as well (Fairlie & Meyer,1996; Lofstorm, 2002; Fairlie et al. 2010). Differences can be seen between groups such as Asians and Hispanics, including age, education, immigration status, and time spent in the country (Fairlie and Meyer, 1996). Lassmann & Busch (2015) reveal a significant relation between immigrants and entrepreneurial activities, which is related to the country of origin. Oyelere and Belton (2012) show that the income level of the country of origin plays a crucial role in the independent work of immigrants in the United States. According to Kerr & Kerr (2020), immigrant entrepreneurial activity creates about 25% of new businesses in the United States. According to Bates et al. (2018) there are unique challenges faced by immigrants as well minorities in pursuing entrepreneurial alternatives with the specific social, political, historical, and economic contexts that differ from nation to nation. Dutta et al. 2021, found that self-employment is a key source of earnings for immigrants and the primary means of social assimilation. Moreover, the difficulty employers have in assessing the quality of immigrants' higher education has a positive impact on immigrants' self-employment. Small businesses and micro-enterprises are the trend in self-employment, accounting for approximately 18% of employment, creating approximately 900,000 jobs annually in the United States (Carpenter and Loveridge, 2017).

Background of the Study Area

North Carolina is the 28th largest state with approximately 10.5 million people currently, and its population density is relatively high (Agency Census, 2017). It shows a constant increase in population each year with natural growth in health and net immigration. The gender ratio in the state is about 51.4% for women and 48.6% for men in 2017. The median household income is approximately $50,320 USD. Considering the racial makeup, 69% is white, approximately 21.5% is black and the remainder is with Asians and South Americans. According to census data, poverty and unemployment predominate among Black and other racial groups in relation to the white population. The Job creation of the state is mostly concentrated in service-providing industries. Professional and business services create the most jobs, representing 31% of new jobs (Agency Census, 2017). North Carolina is one of the major states that is attracted skilled and unskilled immigrants. According to the American Immigration Council (AIC), almost 8% of the state's total population is foreign-born, and they contribute significantly to the state's labor force. The largest proportion of immigrants is in the agriculture, fisheries and forestry category (44%), and the second largest is in construction and mining (24%). There are 21% engaging in building and grounds cleaning & maintenance, 20% in computer and math sciences and 15% in production related activities (Immigrants in North Carolina, 2017). Based on the same sources, undocumented immigrants accounted for about 5% of the labor force in North Carolina. With regard to immigrant education, more than 25% of adult immigrants had a college diploma or more, while about 33% did not have a high school diploma.

Self-employment is high among young men at all levels of schooling, and it seems to be on the rise in North Carolina (US Burau of Labor Statistics, 2016). Immigrants create jobs for the local population, and every three to five H-2A agricultural workers in North Carolina create jobs for a U.S.-born worker (Clemens, 2013). According to North Carolina Business Statistics, there were 821,189 small businesses in 2007 and an estimated 551,040 self-employed workers. It shows that the number of employees increases each year, and in 2013 it was 1.6 million increased by 2.5% in 2015 (North Carolina Small Business Profile, 2016). This increase is mostly seen in firms with less than 100 employees. Women small business owners were large in North Carolina and 32.8% of self-employed individuals were women in 2007. In addition, it shows strong participation by minority groups in self-employment (US SBA, 2009). In 2015, the state had about 55,867 immigrant business owners, including 14.9 per cent in the Raleigh metropolitan area and 11.8 per

cent in the Charlotte metropolitan area (North Carolina immigrants, 2017). Immigrants contribute billions of dollars in taxes (over $5 billion), and as consumers more than $14 billion to the state economy.

DATA AND METHODOLOGY

To estimate the relationship between immigrants, self-employment and economic growth, county-level data were used for the 2010 to 2017 period for all North Carolina counties. The main source of data is the US Community Survey (ACS). The American Survey is a demographic survey program conducted by the U.S. Census of Bureau. County level, population shares, sectoral employment shares, and education were main data collected from ACS. In addition, additional county data were collected from the United States Bureau of Economic Analysis, the United States Bureau of Labor Statistics, and the United States Department of Agriculture. The variables considered for the analysis with their definitions and the theoretical signs expected from the associated parameters are shown in Table 1.

Table 1**:** Definitions of Variables Used for Analyses

Variable	Description and Unit	Expected Effect
IMMI	Immigrant population share	N/A
SEMP	self-employed population share	N/A
MINC	Average HH income in dollars	NA
WHIT	White population share of the total	+
BLAC	Black population share of the total	+
ASIA	Asian population share of the total	+
HISP	Hispanic population share of the total	+
AGRI	Total share working in agricultural sector	+
CONS	Total share working in construction sector	+
MANU	Total share working in manufacturing sector	+
SERV	Total share working in service sector	Undetermined
EDUC	Total share with bachelor's degree	Undetermined

This table shows the variables considered for the research study with their definitions and expected signs. The first 3 variables are the dependent variables of the regression analysis. Source: Author's construction from the literature review

Table 2 presents descriptive statistics of the selected variables for the analysis. The table shows that the average share of the immigration population (IMMIGRA) is 11.77%, while the share of the self-employed population is 2.81% in 2017. The mean household income (MINC) is 44551.67 for the state. The highest proportion of people is white, 72.29%, and the second is black, 20.38%. Asian and Hispanic people, mainly report that immigrants have averages of 1.15% and 7.09%. The share of the population in the agricultural sector (AGRI) is 1.155, whereas construction (CONS), manufacturing (MANU) and services (SERV) account for 3.23%, 5.96% and 36.18%. The average proportion of having a college diploma (EDUC) is 14.73% in the state.

Table 2: Descriptive Statistics of Variables for 2017

Variable	Mean	Std. Dev.	Min	Max
IMMI	11.77	16.99	2.39	18.36
SEMP	2.81	0.92	1.23	6.01
MINC	44551.67	8913.93	31287	73577
WHIT	72.29	17.54	28.98	98.13
BLAC	20.38	16.27	0.162	62.01
ASIA	1.15	1.34	0.001	7.68
HISP	7.09	4.01	0.71	21.73
AGRI	1.15	1.11	0.12	7.59
CONS	3.23	0.95	1.19	5.97
MANU	5.96	2.57	1.34	1.44
SERV	36.18	43.63	27.97	34.22
EDUC	14.73	6.32	5.19	35.52

This table shows the average, standard deviation, minimum and maximum values of the variables considered for the analysis for 2017.

Formulation of Empirical Model

Multiple double log pooled OLS (POLS) regressions and lag the likely endogenous variables of interest by one time-period (seven-year period) were used as the analytical method. Borjas (1986) found that immigrants are more likely to become self-employed in the five to ten years following their immigration. The argument underpins the seven-year lag; and longer the lag catches the full extent of the impact. The theoretical background of the analytical method is as follows:

$$\ln lnY_{it} = \ln(X_{i,t-1}) + \gamma \ln(W_{it}) + \epsilon_{it} \qquad\qquad (1)$$

Three simultaneous equations used for the analysis. The three simultaneous dependent variables are the natural logs of self-employment population share, immigrant population share, and median household income at time t ($ln(y_{it})$). Each of the regression uses the natural log of the single time period (seven-year period) lag of the other two variables which are not used as the dependent variable $ln(X_{i,\,t-1})$ and a vector of the natural logs of the other concurrent variables $ln(W_{it})$. These variables include racial shares of population, population in manufacturing, service, construction, agriculture, and education.

Empirical Model

Starting from the theoretical model of equation 1, the estimated econometric models for each dependent variable can be written as:

$$
\begin{aligned}
\text{LIMMI} = {} & \beta_0 + \beta_1 \text{ LAGLSEMP} + \beta_2 \text{ LAGLMINC} + \beta_3 \text{ LWHIT} + \beta_4 \text{LBLAC} + \beta_5 \text{ LASIA} + \\
& \beta_6 \text{ LHISP} + \beta_7 \text{ LAGRI} + \beta_8 \text{ LCONS} + \beta_9 \text{ LMANU} + \beta_{10} \text{ LSERV} + \beta_{11} \text{ LEDUC} + \epsilon_{it} \quad (2)
\end{aligned}
$$

$$
\begin{aligned}
\text{LSEMP} = {} & \beta_0 + \beta_1 \text{ LAGLIMMI} + \beta_2 \text{ LAGLMINC} + \beta_3 \text{ LWHIT} + \beta_4 \text{LBLAC} + \beta_5 \text{ LASIA} + \\
& \beta_6 \text{ LHISP} + \beta_7 \text{ LAGRI} + \beta_8 \text{ LCONS} + \beta_9 \text{ LMANU} + \beta_{10} \text{ LSERV} + \beta_{11} \text{ LEDUC} + \epsilon_{it} \quad (3)
\end{aligned}
$$

$$
\begin{aligned}
\text{LMINC} = {} & \beta_0 + \beta_1 \text{ LAGLSEMP} + \beta_2 \text{ LAGLMMI} + \beta_3 \text{ LWHIT} + \beta_4 \text{LBLAC} + \beta_5 \text{ LASIA} + \\
& \beta_6 \text{ LHISP} + \beta_7 \text{ LAGRI} + \beta_8 \text{ LCONS} + \beta_9 \text{ LMANU} + \beta_{10} \text{ LSERV} + \beta_{11} \text{ LEDUC} + \epsilon_{it} \quad (4)
\end{aligned}
$$

Where, LIMMI is the logarithm of Immigrant population share, LSEMP is the logarithm of self-employment population share, and LMINC is the logarithm of average household income at county level. LWHIT, LBLAC, LASIA, LHISP present logarithm values of population share of each racial group of White, Black, Asian, and Hispanic for 2017. These shares were generated in the form of percentages of the county's total population for the year and would show the relationship between them and the dependent variables separately. LAGRI presents the logarithm of total employees working share in the sector in each county for the year. In the same manner, LMANU presents logarithm of the total working in manufacturing sector, LCONS presents the log value of total working in construction sector, and LSERV presents the log value of total working in service sector. These sectoral representations would help to understand the impact of each sectoral change on dependent variables. LEDUC presents the log value of percentage of population 25 years or more with at least a college degree. β_0 is the constant term. β_i are elasticity of productivity with respect to the corresponding input parameters; ε_t is the error term.

RESULTS

The empirical results for the regression results are presented in Table 3. The first column of the table shows the exogenous variables from each equation. Columns 2, 3 and 4 provide the log results for the immigrant population (LIMMI), the self-employed population (LSEMP) and household income (LMINC).

Table 3: POLS Regression Results For 2017

	LIMMI	LSEMP	LMINC
LAGLIMMI	--------	-0.0122	-0.0152
		(0 .086)	(0.051)
LAGLSEMP	0.3916 **	--------	-0.0602
	(0. 061)		(0.049)
LAGLMINC	0.1216	-0.4135 **	--------
	(0.164)	(0.185)	
LWHIT	-0.3921 **	0.5671 **	0.4633**
	(0.134)	(0.153)	(0.077)
LBLAC	0.0336	0.0146	0.0530**
	(0.028)	(0 .031)	(0.017)
LASIA	0.0587 **	-0.0126	0.0160**
	(0.014)	(0.016)	(0.009)
LHISP	0.8576 **	0.0441	0.0172
	(0.042)	(0.089)	(0.0526)
LAGRI	-0.0141	0.0910	-0.0119
	(0.039)	(0.042)	(0.0259)
LCONS	0.3988**	0.2747**	-0.0256
	(0.062)	(0.097)	(0.0572)
LMANU	0.1912**	-0.0554 **	-0.078**
	(0.038)	(0.047)	(0.026)
LSERV	0.2012**	0.6711**	0.2096**
	(0.0981)	(0.128)	(0.0889)
LEDUC	0.0012**	0.0001	0.0001**
	(0.0006)	(0.0006)	(0.0004)
Cons	-0.2818	0.5248	7.9553
	(1.4823)	(1.6493)	(0.4604)
N	100	100	100
F	605.74	217.44	13.8
R^2	0.88	0.84	0.62

*This table shows Pooled OLS regression analysis at county level for 2017.Column 1 shows the dependent variables used for the analysis. Column 2 shows regression results for log of immigration population share, column shows regression results for log of self-employed population share, and column 4 shows results for log of average household income. All variables used for each of the three regressions were tested for correlation; multicollinearity and variance; heteroscedasticity using the variance inflation factor (LIVELY) and the Breusch-Pagan Cook-Weisberg test to minimize errors. The VIF resulted no multicollinearity while the Breusch-Pagan Cook-Weisberg test demonstrated homoscedasticity. ** indicate significance at 5% level. Standard errors in parentheses. The term 'LAG' emphasizes which explanatory variables are lagged by one time-period (7-year period).*

Results for Immigration Population (LIMMI) are in column 2. The significant and positive relationship between LIMMI and the LAGLSEMP population indicates that a 1% increase in self-employment over the lagged period increases immigration by 0.39%. This implies that counties that have shown more possibilities for self-employment are more attracted to immigrants. Other findings indicate that the white population is negatively related to immigration, when the share of the white population increases by 1%t, the share of the immigration population decreases by 0.39%. This means that counties with a larger percentage of the white population are less attractive to immigrants. This may be related to the rural counties of North Carolina, with a higher white population where small-scale possibilities are less compared to metropolitan areas. The shares of the Black (LBLAC), Hispanic (LHISP) and Asian population (LASIA) demonstrate a significant and positive relationship with the share of the immigrant population. For instance, when the share of the Hispanic population (LHISP) increases by 1%, the share of the immigrant population (LIMMI) increases by 0.85%. Therefore, the higher these population shares, the higher the rate of immigrants. This could be linked to more employment opportunities, more connection, more experience, or easier settlement. Construction (LCONS), manufacturing (LMANU) and services (LSERV) have an important and positive relationship with the immigrant population, indicating that immigrants are working in all these areas. When the total proportion of persons employed in the construction sector (LCONS) increases by 1%, the proportion of the immigrant population (LIMMI) increases by 0.39%. Similarly, the total share of people working in the manufacturing sector (LMANU) increases by 1% of the share of the immigrant population (LIMMI) by 0.19%. When the total share of people working in services (LSERV) increases by 1%, the share of the immigrant population (LIMMI) increases by 0.20%. Theses can be associated with rapid development of cities and market areas in Raleigh, Charlotte, and Greensboro where

higher rates of immigrants are getting job opportunities. However, the highest rate reports from the construction sector, could be more of the Hispanic population involved in the sector. Education (LEDUC), percentage of graduates in the county shows a positive relationship with the proportion of immigrants. It is known that immigrants commit themselves to different industries with higher education (Artz, 2003).

The results for the self-employed population (LSEMP), in column 3, show that LSEMP is significantly and negatively related to the lag in average household income (LAGLMNC). A 1% increase in LAGLMINC, decreases LSEMP by 0.41%. This means that the higher household income in previous years, decreases the self-employment potential of the county population. Individuals tend to be self-employed with low income and unemployment (Pew research, 2015). The results show that when the proportion of the white population is higher (LWHIT), the self-employed potential (LSEMP) is higher. As the LWHIT rises by 1%, the LSEMP rises by 0.56%. This could be mostly due to small business development in rural counties where the presence of the white population is much higher. Small Business Administration (SBA) financial and consulting services support small businesses among locals in rural North Carolina counties. Given the employment sectors, service (LSERV) and construction (LCONS) sectors indicate significant and positive relationship with self-employment. When the total share of people working in services (LSERV) increases by 1%, the share of self-employment population (LSEMP) increases by 0.67%. The service sector appears to play a significant role in creating self-employment opportunities in the state. Similarly, When the total proportion of persons employed in the construction sector (LCONS) increases by 1 the share of self-employment population (LSEMP) increases by 0.20%. Results are supported by previous findings as well (Hipple, 2010; Toussaint-Comeau, 2005; Goetz and Rupasingha, 2013; Carpenter and Loveridge, 2017). However, manufacturing sector indicates significant and negative relationship with self-employment. Previous studies indicate that manufacturing sector is one of the three lowest contributors on self-employment growth in USA (Pew research, 2015). The manufacturing sector in North Carolina includes chemicals, food process, pharmaceutical and electronic products mainly.

Results for average household income (LMINC) are in column 4. It shows that LMINC is positively and significantly related to the white proportion of the population (LWHIT). When white population share increases by 1%, average household income increases by 0.46%. Furthermore, the Asian (LASIA) and Black (LBLAC) population shares show a positive relationship with average household income (LMINC). This reflects in particular the impact of the immigrant population on the average income level of the counties. The findings indicate that the service sector (LSRV) also has a strong impact on average income (LMINC). 1% increases in service sector population (LSERV), increases average household income (LMINC) by 0.21%. This could be linked to Asian immigrants, who are heavily involved in the service industry in metropolitan areas. The manufacturing sector (LMANU) shows a significant and negative relation with household income. This may be due to low wages in the manufacturing sector (pew research, 2015) relative to other major industrial sectors in the state. Education (LEDUC), percentage of graduates in the county shows a positive and meaningful relation with average family income (LMINC). Higher education is known to have higher earnings.

CONCLUDING COMMENTS

The study was to evaluate the connection between immigrants, self-employment, and economic growth for North Carolina using county level data from American Consumer Survey for the period of 2010- 2017. Pooled OLS regression analysis was followed with three Results indicate that service sector (LSERV) impacts highly on medium income (LMINC) as well. 1% increases in service sector population (LSERV), increases average household income (LMINC) by 0.21%. This could be related to Asian immigrants, significantly engaged in the service sector in metropolitan areas. Interestingly, manufacturing sector (LMANU) indicates significant and negative relationship with household income, and this could be due to low wages engaged in manufacturing sector (pew research, 2015) compared to the other leading industrial sectors of the state. Education (LEDUC), percentage of graduates in the county shows a positive and

significant relationship with average household income (LMINC). It is known that higher education leads to higher incomes. regressions for the immigrant share, self-employment share, and average household income growth. The statistical package of STATA was continued for the analysis. The results highlight the significant and positive impact of immigrants and self-employment on the economic growth of the state. Further, the counties with more self- employment opportunities are more attracted by immigrants. Growth in the construction, manufacturing, and service sectors has significant and positive impacts on self-employment opportunities. The lower the average income counties show higher rates of self-employment. Growth in the service and education sectors, lead to higher household incomes. Thus, the investment priorities in the construction, services, and education, especially to rural North Carolina would enhance economic growth in North Carolina. These investments could be well conceived adequate plans to create entrepreneurial opportunities with diverse immigrants with their talents and abilities. North Carolina has eighty-five rural counties out of hundred that need more investments where economic growth has still fallen behind. Although the agricultural sector works well in rural North Carolina and attracts many immigrant workers, the study found no significant results. The sector includes establishments whose primary activity is growing crops, raising animals, and harvesting fish and other animals. Therefore, an in-depth, stand-alone analysis would be required to examine the impact of agriculture in that context as a future study. The findings of the study for North Carolina may be generalized to some similar states such as Virginia, South Carolina and sometimes Georgia with caution.

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BIOGRAPHY

Dr. Saman Janaranjana Herath Bandara is an Associate Professor of Economics, at West Virginia State University, West Virginia. He holds a PhD in Natural Resource Economics and an MBA in Finance. He can be contacted at: College of Business and Social Sciences, West Virginia State University, Institute, WV 25112.