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The Effect of Wal-Mart on the Economic Growth of Nebraska Counties

By

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Professor Amalia Yiannaka

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CHAPTER 1

INTRODUCTION

1.1 STATEMENT OF THE PROBLEM

Wal-Mart is the largest corporation in the world operating 3600 stores in the US and 1150 stores in other countries. With its highly automated distribution system, Wal-Mart has dominated the retail industry in the US becoming the largest employer and realizing higher sales than any other retail corporation in recent years. There are claims that the store has created benefits for consumers in the form of low prices, a wide assortment of products under one roof and employment opportunities and that communities have also benefited from Wal-Mart in the form of its involvement in charity and infrastructure.

Despite its market success, Wal-Mart has generated ample controversy regarding its socioeconomic impact on the communities in which it has been established as well as neighboring communities. Complaints are emanating from consumers, suppliers, community leaders and labor unions. In some communities incumbent retailers have joined forces in the fight against Wal-Mart since its opening in a community has been associated with the collapse of downtown business and mom and pop shops which had for many years identified themselves with communities.

Some consumers despite benefiting from low Wal-Mart prices have formed coalitions against shopping in the store. The *always low prices* have been viewed as coming at a hidden cost. Anti-Wal-Mart websites have been set up which Wal-Mart has counteracted by coming up with a website of its own aimed at improving its image in the retail world.

Labor activists blame Wal-Mart for being anti-workers union, for contributing in an increase in unemployment, not providing health insurance for its employees and for the payment of low wages to employees. The retailer has been heavily criticized for the loss of jobs by employees who used to work for incumbents that were forced out of the market as a result of Wal-Mart entry.

In addition, suppliers have complained about being forced to follow the Wal-Mart way of doing business which translates into low input prices that benefit Wal-Mart at the expense of the suppliers. Suppliers who did not yield to Wal-Mart's demands blame their collapse on the retail giant.

Wal-Mart has also been blamed for the ailing US economy through outsourcing and forcing its suppliers to outsource manufacturing production to other countries. In 2003 the store imported 10% of the total US imports from China which was viewed as being too high for a retail corporation. Most of Wal-Mart's suppliers had to outsource to meet the Wal-Mart low price demands.

These different complaints have also attracted the attention of academic researchers who are interested in understanding the impact of Wal-Mart on communities. Research on the impact of Wal-Mart has yielded mixed results. Some studies conclude that Wal-Mart is a good citizen while others conclude that Wal-Mart has a negative impact on communities.

Even though prior studies provide some useful information, their contribution to our understanding of the impact of the giant retailer on local communities is limited. No study to our knowledge has used a formal economic framework that would allow sorting out the effects of other economic variables on the impact of Wal-Mart on the economic growth of communities. Most of the studies attribute all changes in sales, tax revenues, or other measures of economic activity to the presence of Wal-Mart which could potentially bias conclusions in favor of or against the store. Even if one were to sort out the effects, there is no a priori reason to conclude that changes in pre- and post-Wal-Mart retail sales or other measures are beneficial or detrimental for a community, regardless of whether the changes are positive or negative. What matters is the net effect of changes in every economic activity affected by Wal-Mart. This net effect, as I posit in this thesis, is best summarized by the change in the standard of living of the community, as measured by economic growth, after Wal-Mart moves into that community. So far, the impact of Wal-Mart on the economic growth of communities remains an unanswered empirical question.

.1.2 Objectives and Hypotheses

To address the above question, the objective of this research is to contribute to the understanding of the impact of big box retailers on the economic growth of communities. In particular, this study will measure the effect of Wal-Mart on the standard of living of Nebraska communities, where standard of living is measured by median household income. Specifically, an empirical test involving an economic growth model with regressors specific to Nebraska will be conducted. So, a positive (negative) economic impact of Wal-Mart in this case means the store has contributed positively (negatively) to the standard of living of the community. The a priori notion is that because retail corporations (non-basic sector) do not contribute much in bringing new money into a community and they rather have a supporting role on the basic sector (manufacturing sector), which spurs economic growth by bringing in new money to the community, one would expect Wal-Mart's impact on the economic growth of Nebraska counties to be small, if any.

1.3 Organization of the study

The second chapter reviews previous research on Wal-Mart and relevant economic growth literature. Chapter three presents the empirical model and describes the data. Chapter four presents and interprets the empirical results. Summary and implications are discussed in the final chapter.

Chapter 2

Literature Review

2.1 History of Wal-Mart

Wal-Mart Stores, Inc. was founded by Sam Walton with one store in Rogers, Arkansas in July 1962; the same year rival Kmart opened its first store. The giant store was built around three basic beliefs, namely, respect for the individual, service to the customer, and striving for excellence. Respect for the individual requires that everyone's opinion is respected through an open door policy and that managers are servant leaders. Service to the customer requires that the customer is the boss. Striving for excellence entails that associates are committed to customer satisfaction.

Initially, Wal-Mart concentrated on small rural towns while its competitors, such as Kmart, concentrated on larger towns with populations greater than 50,000. The store, which opened its first distribution center in 1970, operates 110 distribution centers world-wide today. Wal-Mart was listed on the New York Stock exchange in 1972.

In April 1983 the first SAM'S CLUB, also owned by Wal-Mart, opened in Midwest City, Oklahoma. The Wal-Mart Satellite Network was completed in 1987 and became the largest private satellite communication system in the U.S. The satellite network enabled the store to build a Retail Link System which is the stronghold for its sophisticated inventory management system.

It was in 1988 when the first super center opened in Washington, Missouri. The super center version of the giant store brought controversy to the retail company's operations evidenced by efforts to block Wal-Mart entry in many U.S. communities. Some communities, like Contra Costa County in California, came up with a store size limit to avoid the spread of super centers.

By 1990 Wal-Mart had become the nation's No. 1 retailer. Wal-Mart rose to stardom owing to its “Always Low Prices” strategy and its close supervision of supplier’s actions through its Retail Link System. As Wal-Mart gained ground in the U.S., it decided to go international. The first international market entered by the store was Mexico in November of 1991. With 664 stores, Mexico has the largest number of stores in any single foreign country. In August 1992 the store entered Puerto Rico where it currently owns 54 stores. Wal-Mart acquired 122 Woolco stores in Canada in August 1994 and it runs 240 stores today. In Canada as in the U.S., Wal-Mart has met varied criticisms on its operations. Anti Wal-Mart movements through websites have been set up. Wal-Mart built three units in Argentina and five units in Brazil in 1995. The store’s units had risen to 145 and 11 by 2004 in Brazil and Argentina, respectively.

In 1996 Wal-Mart entered China through a joint venture agreement. The retail corporation operates 40 stores in China today. A greater percentage of the goods sold in Wal-Mart come from China. Because of its Chinese link, the giant store has been accused of misleading the nation through its made in America labels when in fact it was depending on cheap labor in China.

It was in 1997 that Wal-Mart was voted the number one employer in the United States. Today it employs over 1.2 million associates in the U.S. and over 300,000 in other countries. During the same year Wal-Mart replaced Woolworth on the Dow Jones Industrial Average. Wal-Mart entered Korea through a joint venture agreement in 1998, the same year it acquired 21 Wertkauf units in Germany. Wal-Mart operates 16 stores and 92 stores in Korea and Germany, respectively. The giant store has since struggled in the German market which is highly competitive.

In 1999 Wal-Mart acquired 220 stores owned by the ASDA group public limited company in the United Kingdom and it operates 272 stores there today. During the same year the store was voted the largest private employer in the world with 1.4 million associates. It was ranked 5th by the Fortune magazine in its Global Most Admired All-Stars list. It also recorded the biggest single day sales in history of US$1.25 billion on the day after 2001 Thanksgiving. In 2003 Wal-Mart's sales rose to $256 billion. It also topped Fortune's Global 500 and ranked third among the "Most Admired Companies in America" in 2001. The store entered the Japanese market in 2002.

In 1982, Wal-Mart opened its first store in Nebraska, in Jefferson County. The giant store went on to open 3 stores in 1984, 4 stores in 1985 and 2 stores in 1986. The year 1985 marks the time when Wal-Mart opened most of its stores in a single year in Nebraska.

After this phase, it took Wal-Mart three years to open another store in Nebraska. The giant store opened 2 stores in 1989, 2 stores in 1990, 2 stores in 1991, 1 store in 1993, 1 store in 1998 and 1 store in 2000. Wal-Mart went on to open 2 stores in 2001, 1 store in 2003 and 3 stores in 2004. This brings the number of Wal-Mart stores in Nebraska counties to a total of 25 stores. The map in Appendix 1 shows the counties where Wal-Mart located 21 stores between 1979 and 2002.

2.2 Review of the literature on Wal-Mart

Wal-Mart's success and the controversy it has generated have attracted the attention of academic researchers who want to understand its impact on communities. Wal-Mart has received bad publicity in the media and anti Wal-Mart websites (such as *wal-martsucks.com*) have been set up to convince the public that the giant retailer is not good for communities. Wal-Mart has set up a website (*wa-lmartfacts.com*) to mend its public image.

Stone (1988, 1997) was among the first to study the impact of Wal-Mart. In two studies that compared sales before and after Wal-Mart entered a community in Iowa, he found that sales increased in host towns and decreased in surrounding (within a 20 mile radius) communities.

Stone's results are supported by Artz and McConnon (2001) who conducted a statistical analysis to determine the impact of Wal-Mart on retail sales in host and surrounding communities in Maine. They concluded that the entry of Wal-Mart resulted in a shift in general merchandise trade from the non-host to the host communities.

In a similar study using a Sales Conversion Index (SCI), McGee and Gresham (1995) reported that Wal-Mart's entry into local markets was associated with disruptions in the existing trade patterns. Like Stone (1988, 1997), McGee and Gresham (1995) agree that communities with Wal-Mart benefit from increased retailing activity while neighboring communities suffer in terms of reduced retailing activity.

In a study based on data on all US counties, Goetz and Swaminthan (2004) found that communities which attracted more Wal-Mart stores between 1990 and 1999 registered the highest poverty levels. They argued that poverty rises as displaced workers from existing operations have no option but to work for Wal-Mart at lower wages. Their study is mainly centered on understanding the contribution of Wal-Mart to family poverty rates in the U.S. Their conclusions are based on a recursive econometric model where they first test for Wal-Mart location decisions and then examine the impact of Wal-Mart on changes in poverty rates. They also test for effects of spatial clustering through spatial econometric methods. Goetz and Swaminthan (2004) also highlighted that retail corporations fall in the non-basic sector of the economy which has no large impact on economic growth as compared to the basic sector (manufacturing sector).

Basker (2004) studied the impact of Wal-Mart on county-level retail employment and concluded that Wal-Mart presence had a positive impact on job creation. Basker (2004) used an OLS regression model to capture the impact of Wal-Mart on retail employment in counties. A total of 2382 counties were involved in the country wide analysis. In contrast to prior studies, Basker (2004) did not find any effect of Wal-Mart entry on businesses which it does not compete directly with, that is businesses which do not sell products that Wal-Mart sells, such as gas stations. Basker's study failed to explain the spillover effects to neighboring counties as found by Stone (1988, 1997) and McGee and Gresham (1995).

Stone, Artz and Myles (2002) using sales tax data in Mississippi to measure the impact of Wal-Mart on the sales of existing businesses in local trade areas found that Wal-Mart entry is associated with both positive and negative impacts on incumbents. According to this study, Wal-Mart's entry was viewed as a zero sum game as the gains for Wal-Mart super centers were matched by corresponding losses for existing businesses in both the host and surrounding communities. The study is based on an analysis of sales tax reports in Mississippi. The authors analyzed changes in sales of different good categories and the county as a whole. The authors, however, agree that their findings might not be due to Wal-Mart alone but they still argue that Wal-Mart might have played a dominant role in the changes they uncovered.

Hicks and Wilburn (2001) studied the location impact of Wal-Mart in West Virginia and concluded that Wal-Mart brings employment and wage net benefits to counties where it is located. In their analysis, they control for endogeneity between other economic effects affecting communities and Wal-Mart entry. They noted that rivalry, proximity of another Wal-Mart, and population densities play an important role in Wal-Mart's decision to locate a store in a community.

Franklin (2000) conducted a study on the impact of Wal-Mart on supermarket concentration in U.S. metropolitan areas. The hundred largest metropolitan areas in the U.S. were investigated in this study and logit and linear regression analysis methods were used. Franklin (2000) concluded that Wal-Mart's impact on concentration and grocery retailing performance to date has been minimal.

Ketchum and Hughes (1997) studied the effect of Wal-Mart on employment and wages in Maine and concluded that the relative wage growth in counties with a Wal-Mart was not due to the presence of a Wal-Mart and also that Wal-Mart was not responsible for lack of growth in retail employment. Ketchum and Hughes (1997) controlled for industry specific shocks in order to isolate Wal-Mart effects from effects of other variables on wages or employment.

Mattera and Purinton (2004), who examined the subsidies which Wal-Mart received from communities, argued that retail stores like Wal-Mart do not have economic impact comparable to manufacturing factories to justify the subsidies they receive. The authors find that Wal-Mart has benefited from more than $1 billion in the form of subsidies from state and local governments. They further point out that retail stores do not increase consumer disposable income. All the retail store does is to take revenues away from existing merchants. They also view the controversy surrounding Wal-Mart as enough to make the question of whether Wal-Mart should be subsidized through taxpayer money an important policy question.

Dube and Jacobs (2004) conducted a study in which they analyze Wal-Mart's labor practices by comparing wages paid by Wal-Mart to its employees to the retail industry wage standards. They went on to compare Wal-Mart wages and employment based health coverage to those of unionized grocers. The authors also analyzed annual public assistance to workers of large California retailers before and after Wal-Mart involvement in the state. The authors concluded that Wal-Mart receives indirect subsidies as its employees rely heavily on public assistance such as social welfare, taxpayer funded healthcare because of the low wages Wal-Mart pays its employees. Their study is based on Wal-Mart practices in the state of California.

Fishman (2003) in an article published in the *Fast Company* concluded that Wal-Mart's low prices come at a high cost. The author noted that Wal-Mart destroys its competitors and forces its suppliers to outsource manufacturing production. He also highlighted that Wal-Mart's imports from China were about 10% of the total US imports from the country. Wal-Mart also squeezed out suppliers such as Huffy's (a bicycle manufacturing company) and Lovables (a ladies clothing company) by pulling out when these companies refused to go with its demands. Levi Strauss was struggling with its sales until it decided to follow Wal-Mart demands. As a result, Levi's sales rose by 6% after the cut in prices.

In a newspaper article titled, "The great Wal-Mart Wars", Rosen (2003), reported on the resistance that Wal-Mart faced in Contra Costa County (California). In this county the Board of Supervisors voted to ban Wal-Mart super centers which they found not to be consistent with good jobs, good pay and good benefits to the community. Wal-Mart counteracted the decision by running a petition to take the Board's decision on a ballot. Rosen (2003) also noted that Wal-Mart super centers have faced resistance in more than 200 communities. The article concludes that convenience and lower prices come with hidden costs.

In an article titled "Learning to Love Wal-Mart", which appeared in the Economist, Wal-Mart was accused of chewing up virgin land and spreading suburban blight, destruction of mom and pop retailers, changing once vibrant inner cities, destroying the country's manufacturing base through its dealings with China, being antiunion and destroying its own suppliers. The article posits that Wal-Mart is not the originator of out of town shopping or trade imbalances with China but it emerged as one of the best firms to take advantage of opportunities available retail firms. The article revealed that Wal-Mart is doing well in Mexico, Canada and Britain and it is struggling in Japan and Germany. The article noted that Wal-Mart has done a favor to its customers by bringing prices down, its suppliers have benefited through improvement in their own efficiency and quality and its competitors who have been forced to improve the quality of their services in response to Wal-Mart challenge. At the industry level, Wal-Mart has set standards which have inspired and challenged other industries. In terms of employment, the article finds Wal-Mart is beneficial to immigrants, part-timers and older people who might have been jobless.

In a report that reviews Wal-Mart's labor practices in the U.S. and around the world, Miller (2004) concludes that Wal-Mart's success has come as a result of payment of low wages and benefits, violations of basic worker's rights and threats to the standard of living of communities in the country. Wal-Mart was also accused of trading away jobs to countries such as China. The report by Miller argues that these practices pose high costs to tax payers who end up subsidizing Wal-Mart's labor costs which undermines the country's economy. Wal-Mart's low cost demands have been blamed for the closure of U.S. manufacturers which found it difficult to remain operating in the country. Miller, who is a Senior Democrat in the House of Representatives, based his conclusions on prior studies by Stone, Dube and Jacobs (2004), a Harvard Business School case study and newspaper reports.

Wilson (2004) in a commentary on Wal-Mart argues that Wal-Mart took advantage of the Chinese market to force the suppliers from whom it buys products to sell their products at low prices on a take it or leave it basis. Wilson (2004) gives Rubbermaid as an example of Wal-Mart's supplier which had to close its U.S. factories for cheap labor countries to match Wal-Mart's price demands. This commentary highlights the "bad side" of Wal-Mart which includes being anti union and being responsible for the rise in the unemployment rate. The commentary also blames Wal-Mart for the ailing U.S. economy.

Freeman (2003) reported that Wal-Mart destroys communities. The conclusion is based on findings by Stone (1988, 1997), Stone, Artz and Myles (2002) and newspaper and magazine reports. He also accused Wal-Mart for forcing its suppliers to outsource production to foreign countries, paying low wages, destroying communities, and siphoning tax revenue through subsidies offered to Wal-Mart.

2.3 Review of the Literature on Economic growth at the US County Level

Since the focus of this thesis is on the effect of Wal-Mart on economic growth in Nebraska counties, this section reviews the literature which draws on economic growth theory and also focuses at the county level.

Shaffer (2002) studied the linkages between average firm size and economic growth and found that manufacturing and retail firms were important in explaining economic growth while wholesale firms were not. Shaffer used an OLS model in a sample of more than 700 US counties. Data in this study came from the County and City Data Book published by the US Bureau of the Census in 1988 and 1994. In Schaffer's study, growth is measured by the average percentage growth rate of median household income between 1979 and 1989.

Krueger and Lindahl (2000) compared the macroeconomic and microeconomic models' view of how education influences economic growth. They reported that macroeconomic models view the existing stock of human capital as leading to technological progress and sustained growth. These models make the point that secondary and post-secondary educations are more important for growth than primary education. Microeconomic models view the accumulation of human capital over time as important for sustained growth and focus more on private rather than social returns to education.

Rupasingha, Goetz and Freshwater (2002) studied the role of social and institutional factors on economic growth at the county level in the U.S. and concluded that social and institutional factors are important for explaining economic growth. They also found that the reason why economic growth rates are not uniform across communities is that social and institutional dimensions are not uniform across communities. In particular, they find that ethnic diversity is associated with fast rates of economic growth, higher levels of income inequality are associated with lower rates of economic growth and higher levels of social capital have a positive effect on economic growth rates. An OLS model was used in their study and the authors controlled for spatial dependence. They find that the presence of a highway or an interstate, investment in human capital, and proximity to urban areas are important for economic growth of counties.

James, IIvento and Hastings (2002) analyzed the role played by local development strategies on employment in non-metropolitan counties. They concluded that counties that placed greater emphasis on economic development experienced higher employment growth. An OLS regression analysis was used. Employment gain between 1990 and 1999 (the dependent variable) was used as a proxy for economic growth. The effect of local economic activities on employment was determined after controlling for location factors such as highway access, the proportion of the population with a bachelor's degree, and the coefficient of specialization. Data used in this study came from surveys, 1990 Census of Population data, and Housing and BLS data, and considered 46 non-metropolitan counties in Delaware, Maryland, Pennsylvania, Virginia and West Virginia.

Rupasingha, Goetz and Freshwater (2000) studied the effect of social capital on economic growth. They concluded that social capital is an important determinant of economic growth in U.S. counties. They used density of membership organizations, crime rate, charitable giving and voter participation as measures of social capital. Their results are based on (OLS) estimates of an extended version of Barro and Sala-I-Martin's economic growth model. They used data from 3040 U.S. counties and the study period covers 1990 through 1996.

Chapter 3

Theoretical framework, model specification and data analysis

3.1 Theoretical framework and model specification

The theoretical framework used in this thesis to address the effect of Wal-Mart on economic growth in Nebraska counties is based on the Solow growth model. The Solow growth model begins with three main assumptions:

1) A constant returns to scale production function.
2) Each factor of production is subject to diminishing returns.
3) The depreciation rate of capital, δ and the saving rate, s, are constants.

The Solow growth model starts with the production function, **Y = F(K, L),** where **Y** is output, **K** is capital, and **L** is Labor. The simple production function tells us that output depends on the capital stock and the labor force. The assumption of constant returns to scale is made, which entails that, for all $\alpha \geq 0$, **F(**α **K,** α **L)** = α **F(K,L)** where α is a constant. Letting α **=1/L**, yields **Y/L=f(K/L,1).** Note that **1** is constant and can be ignored and if we ignore it we get **Y/L = f(K/L).** This assumption tells us that the size of the economy measured as total labor force does not affect the relationship between per capita output and per capita capital. We can present all the quantities in per capita terms, that is **y = Y/L** and **k = K/L**. The production function can now be written in per capita form as, **y = f(k).** The slope of **f(k)** defined as the marginal product of capital shows how much additional output a worker produces when given an extra unit of capital. As capital increases, the production function becomes flatter assuming that the production function exhibits diminishing marginal product of capital. The model considers demand for goods denoted by**, y = c + i,** where per capita consumption**, c = C/L;** and investment per capita,

I = I/L.

This gives us the per capita version of the national income accounts identity for an economy. This identity assumes that people save a fraction of their income, **s** and consume a fraction of their income, (**1-s**). This means that **c = (1-s)y**, where **s** is the savings rate and **0 < s < 1.**

y = (1-s)y + i gives us **i =sy = sf(k**) since **y =f(k)**

i = sf(k) shows that investment equals saving.

The Solow growth model also considers the depreciation of the stock of capital over time. The model assumes that a constant proportion of existing stock of capital depreciates in each time period at the rate, δ. The capital stock is increased by investment and decreased by depreciation as shown below:

Δ **k = i-** δ **k** = **sf(k) -** δ **k**

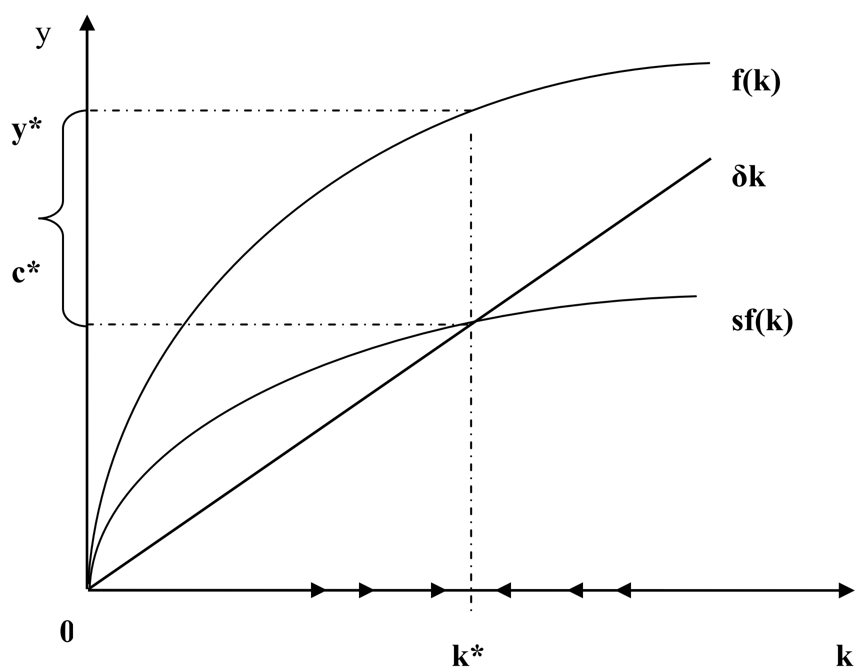
This result postulates that if **sf(k) >** δ **k**, the capital labor ratio **k** will increase and if

sf(k) < δ **k**, the change in the change in the capital stock will be negative and **k** will fall.

To find the Solow equilibrium we need to find the equilibrium levels of **k** and **f(k)** through a comparison of **sf(k)** and δ **k** . Because of the assumption of diminishing returns on factors of production **f(k)** increases at a decreasing rate. This also applies to the savings rate **sf(k)** since it is directly proportional to **f(k)**. Depreciation, δ **k**, is a straight line function of **k**. The stock of capital per worker, **k**, tends towards a stable equilibrium, **k*** because the forces acting on it, **sf(k)** and δ **k** are equal. It follows that **y** also tends towards a stable equilibrium, **y*= f(k*).** These equilibrium conditions give rise to the steady state where all the variables in the model grow at constant rates. An economy at the steady state will stay there and one which is not at the steady approaches it.

The Solow growth model concludes that if the law of diminishing returns applies to all the inputs, if the production function exhibits constant returns to scale and if the depreciation rate and the savings rate are constants, the capital labor ratio settles at the equilibrium value, **k***, and per capita income settles at the equilibrium value, **y***, in the long run. This means that the steady state represents the long run equilibrium of the economy. Growth rates of **k** and **y** in the steady state are zero. A visual representation of the Solow equilibrium is shown in Figure 1.

Figure 1. The Solow growth model



The Solow growth model equilibrium suggests that economies converge to the steady state k*. Convergence is defined as a situation where economies with relatively low per capita outputs grow faster than economies with relatively high per capita outputs. If we take a closer look at, Figure 1, the difference between the **sf(k)** curve and the δ **k** curve is greater the further below the steady state the economy is. Also, the lower is **k,** the greater is the slope of the production function and the marginal product of capital. This shows that, all things held constant, low income economies should grow faster than high income economies. Although some economists suggested that the Solow growth model predicts the convergence of per capita income in the world, this has been based on faulty reasoning. In fact, the Solow growth model, holding everything else constant, predicts convergence only if economies have the same steady states. This has been termed conditional convergence, which is convergence conditional on economies having the same steady states.

The addition of population growth to the Solow model leads to an increase in total output and not in per capita output. Augmenting technological progress in the Solow model results in an upward shifts of the production function. Under the assumptions that labor- augmenting technological progress equals **p** and that labor force grows at a rate, **n**, in the steady state, the Solow growth model predicts that total output grows at the rate (**p** + **n**) and output per worker grows at the rate **p**. This will lead to permanent per capita growth in the steady state. Technological progress is exogenous in the Solow model.

After the adding of population growth and technological progress, economies can only converge to the same steady state of per capita output if they have the same production functions, the same savings rates, the same population growth rates, and the same rates of technological progress.

The exogeneity of technological progress in Solow's model was heavily criticized and gave rise to endogenous growth theories. Technological progress involves the creation of new ideas. Solow's model works well for perfectly competitive environments and increasing returns due to technological progress conflicts with perfect competition. A wave of endogenous growth theories beginning with Arrow (1962) to Barro and Sal-i-Martin (1997) attempted to explain the effect of technological progress on economic growth. These endogenous growth theories which encompass the creation of new ideas and production methods were found to be important for explaining long run growth. Endogenous growth theories found that long run growth rate depends on governmental actions such as taxation, other economic factors, human capital and diffusion of technology.

Human capital is not susceptible to diminishing returns as it does not necessarily diminish as economies grow. According to Barro (1997), the diffusion of innovations stems from imitations by follower economies in sharing technological advances. Diffusion models predict some form of convergence that is similar to the one in the neoclassical model. The diffusion of innovations model combines the long run growth of endogenous growth theories and the convergence of the neoclassical growth model. The neoclassical growth model can be easily extended to include government policies, human capital, and diffusion of innovations to allow it to predict long run economic growth in empirical analysis.

Barro (1997) applied the convergence property from the neoclassical growth theory. Barro (1997) highlighted that the convergence property, which states that the lower the starting level of real per capita gross domestic product the higher is the predicted growth rate, has been used frequently as an empirical hypothesis in recent years. The speed of convergence is determined by the diminishing returns to capital. In the case where economies are similar except for their starting capital, absolute convergence would result. In the case where economies differ in several aspects, convergence will only occur in the conditional sense, as noted by Barro and Sala-i-Martin (1995). Growth rate will be high if the starting per capita income is low in relation to its long run or steady state position. Convergence in the neoclassical model is conditional because the steady state levels of capital and output per worker depend on the propensity to save, the position of the production function, the growth rate of population and the same rates of technological progress. These characteristics may vary across countries.

Extensions of the neoclassical model, which include findings from endogenous growth theories, suggested additional sources of cross-country variations, which include government policies linked to levels of consumption spending, protection of property rights and distortions of domestic and international markets. In the case of regional analyses such as county level analyses, these additional variables will be sources of cross-county variations.

The work by Barro (1997) described below provides a link between the theoretical neoclassical growth theory approach to empirical approaches that aim at measuring economic growth. The theoretical growth theories suggest which variables are important in explaining economic growth. Barro (1997) provides an empirical model that combines the variables suggested by the neoclassical growth theory and the endogenous growth theories. The conditional convergence finding is applied in the same spirit in empirical growth models as in the Solow growth model. The only difference is that convergence in empirical growth analysis is conditional on a set of control and environmental variables which are specific to each individual economy.

In the light of the extension of the neoclassical model, Barro (1997) provides an extended version of the form:

D_y = h(y,y*) where: **D_y** is the growth rate of per capita output.

y is the current level of per capita output.

y* is the steady state level of per capita output.

Dy is inversely related to **y** and positively related to **y*.** The value of **y*** will depend on an array of control and environmental variables. The control and environmental variables include country specific variables, or region specific variables in regional economic growth analysis. The effects of the control and environmental variables on the growth rate correspond to their influences on the steady state level growth rate of per capita output. Given the beginning period per capita output, **y**, an increase in the steady state level, **y***, raises the per capita growth rate over the period under consideration. For example, if the government improves the climate for business activity, such as reduction in corruption, growth rate increases for sometime. An increase in the target, **y***, translates into a transitional increase in the economy's growth rate. When output, **y**, rises, the law of diminishing returns restores the growth rate, **Dy**, to a value determined by the rate of technological progress. The transitions tend to persist over a long time. A higher starting level of per capita output, **y**, implies a lower per capita growth rate for given values of the control and environmental variables, and hence **y***. This effect corresponds to conditional convergence. In this case a low level of **y*** explains why an economy would have a low observed value of **y** in some chosen initial period. Poor economies will not grow rapidly if they also tend to have low steady state positions, **y***. To capture convergence we need to condition on the determinants of the steady sate, **y***. Convergence in this case is conditional convergence. Absolute convergence will only occur if **y*** were identical across economies. The same model can be adopted to analyze economic growth at a regional level.

The analysis of the neoclassical model and its extensions was designed to shed light on the origin of the model which I am using to analyze the impact of Wal-Mart on the growth of Nebraska communities. The OLS estimation procedure was used to conduct this analysis. To examine the robustness of the results of interest, I estimate several versions of the OLS empirical growth model were used. The empirical models are specified in the same manner as Shaffer (2002) as:

$$\textbf{Growth}_i = \textbf{Constant} + \gamma\,\textbf{(Conditioning set)}_i + \beta\ \textbf{Wal-Mart}_i + \textbf{Error}_i$$

Where the subscript **i** indicates the **i**th county in Nebraska, β and γ are parameters to be estimated, **Growth** is the growth rate in median household income per year between 1979 and 2002, **Conditioning set** is a vector of exogenous control variables specific to each county in Nebraska, **Wal-Mart** is a vector of Wal-Mart specific variables and error is a random disturbance. Growth, Wal-Mart variables and the conditioning set are described below.

Growth is the **growth rate of median household income between 1979 and 2002 per year** in Nebraska counties. Median household income represents the middle point of the income distribution, that is, there are an equal number of households with incomes lower than the median and an equal number of households with incomes higher than the median. The use of the growth rate in median household income over time as the dependent variable serves as a proxy for economic growth. I use this variable in this study in the same manner that Shaffer (2002) applied it in his cross-county analysis. Median household income will provide the same measure as the per capita income if income is normally distributed and it provides a better measure in cases where the income distribution is highly skewed.

The conditioning set is a vector of exogenous control variables specific to each county in Nebraska. This set consists of initial personal per capita income, education, interstate, population density in 1980, population, unemployment rate, total local government expenditure, highway expenditure and the rural dummy variable.

Initial per capita personal income in 1980 is the per capita personal income at the beginning of the study period. Personal income reflects pre-tax income received by or on behalf of individuals from all sources such as wages and salaries, proprietor's income, investment income, government transfer payments and employer payments for employee insurance. This is designed to capture conditional convergence noted by Barro and Sala-i-Martin (1995). Rupasingha, Goetz and Freshwater (2000, 2002), James, IIvento and Hastings(2002), Shaffer (2002), Rajan and Zingales (1998), Levine et al.(2000), Cetorelli and Gambera (2001) and Nzaku (2004) use initial per capita income to capture conditional convergence. The initial personal per capita income is similar to the initial level of GDP noted by Barro (1997) in his cross-country analysis. A negative sign is expected for the coefficient on the initial personal per capita income.

Initial education as of 1980 is a measure of the stock of human capital available in a county. It is measured by the percentage of the population 25 years or older who have attained at least four years of college education. According to Barro (2001) a higher initial stock of human capital signifies a higher ratio of human to physical capital giving rise to higher growth. Krueger and Lindahl (2000) highlighted that initial stock of human capital is important for economic growth. They also noted that secondary and post-secondary levels of education affect economic growth more than do primary levels of education. Barro (1997, 2001), Shafer (2004), Rajan and Zingales (1998), Levine et al. (2000), and Cetorelli and Gambera (2001), Rupasingha, and Goetz and Freshwater (2000, 2002) use initial percentage of the population 25 years or older with at least four years of college education as a measure of the accumulated level of human capital. A positive sign on the education variable coefficient is expected.

The **interstate** is a dummy variable measuring the nearness of a Nebraska county to interstate-80. In this case if any point of a county is within 25 miles of interstate-80 then the county is considered close to the interstate. This refers to counties that are located in the range of at most 25 miles on either side of the interstate 80. The Geographic Information System software was used to identify these counties. Nearness to the interstate is a measure of accessibility of an area or the isolation of an area. The proximity and access to an interstate is important since businesses are expected to locate in areas with better access to markets. This variable is also a measure of basic physical infrastructure of a county. Appendix 2 shows a map of counties which are within 25 miles of interstate-80 in the state of Nebraska. The interstate variable is analogous to the highway dummy variable used in Rupasingha, Goetz and Freshwater (2000, 2002), and James, IIvento and Hastings (2002). The sign of the coefficient on this variable can be either positive or negative.

Population density is defined as the number of persons per square mile. Population density of a county as of 1980 is used to control for agglomeration effects, Shaffer (2002). Agglomeration occurs when a firm's production costs are lowered due to the presence of other industries or cost savings that result from the spatial concentration of production at a given location. Agglomeration effects have been found to be important in location models in helping areas grow through spillover effects. The sign of the coefficient on this variable is expected to be positive.

Population refers to a county's population as of 1980. This provides a measure of market size as in Cetorelli and Gambera (2001), Nzaku (2004) and Shaffer (2002). This variable is assumed to have an influence on a firm's decision to locate in the area which is important for economic growth. A positive sign is expected for the coefficient on the population variable.

Unemployment rate is defined as the number of persons unemployed expressed as a percentage of the total labor force in a community. The unemployment rate is a measure of the economic health of a geographical area. High unemployment rates are bad for the economic development of a community. Nzaku (2004) used unemployment rate in this manner in a county level analysis in Alabama. The 1986 unemployment rate is used as a proxy for the initial unemployment rate; the 1986 unemployment rate is the closest data to the initial period available. The sign on this variable is expected to be negative.

The **total local government expenditure** variable is defined as the total general expenditure by the local county government for 1981-1982 in thousands of dollars. The 1981-1982 data is used as a proxy for 1979 expenditure as it is the closest data to the initial period, 1979. This variable is designed to capture government size. This variable is similar to the variable used by Nzaku (2004), Shaffer (2002), Barro (1991) and Levine et al. (2000). Government expenditure stimulates economic growth when spent on infrastructure which brings investment. The sign on this variable can either be positive or negative depending on how the government spends its money.

Highway expenditure is defined as the percentage of local government expenditure spent on road construction and maintenance for 1981-1982. This variable is designed to capture county infrastructure development. Highway also serves as a proxy for public investment as noted by Rupasingha, Goetz and Freshwater (2000, 2002). Roads are important in linking the activities that help the development process such as health care, amenities and employment. Government expenditure on roads has a direct impact on productivity. This variable is used in a manner similar to Nzaku (2004). The sign on this variable is expected to be positive.

The vector of Wal-Mart specific variables includes the Wal-Mart dummy variable (**Waldum1**), for counties with at least one Wal-Mart store, (**Waldum2**) for counties with two Wal-Mart stores, **(WalAdjacent)** for counties adjacent to counties with a Wal-Mart, and a measure of the number of years Wal-Mart has been operating in a community (**Walyear**). These variables are designed to capture the impact of Wal-Mart on the economic growth of Nebraska communities.

The dummy variable **Waldum1** is used to capture the average initial entry effect of adding a Wal-Mart store in a Nebraska county. This variable measures any impact on economic growth that arises when a Wal-Mart comes into a community. There are 19 counties in Nebraska which had a Wal-Mart between 1979 and 2002.

The dummy variable **Waldum2** is used to account for Nebraska counties with more than one Wal-Mart stores by 2002. Of the 19 counties with a Wal-Mart, only two out of 93 counties had a second Wal-Mart store, Douglas and Sarpy county, which opened in 2001. This dummy variable will measure the marginal effect of an additional Wal-Mart store when another Wal-Mart store is present.

WalAdjacent is a dummy variable for counties which are adjacent to counties that have a Wal-Mart. Stone, Artz and Myles (2002), Artz and McConnon (2001), Stone (1988, 1997), and McGee and Gresham (1995) found that Wal-Mart affects host counties as well as counties surrounding the host county. It is important to test this through considering counties adjacent to host counties. Host counties refer to counties which have a Wal-Mart. I consider adjacent counties to be close enough to the host county that if Wal-Mart affects neighboring counties the effect can be captured in this way. There were 49 counties in Nebraska which were adjacent to counties with a Wal-Mart between 1979 and 2002.

A fourth Wal-Mart specific variable **Walyear** which measures the number of years Wal-Mart has been operating in a community is used to test whether the number of years a Wal-Mart store has been operating in a community affects its economic growth. The year 1985 is used as the base year as most of the Wal-Mart stores in Nebraska opened during this time. Note that, regressing the growth rate in median household income on **Walyear** with 2002 as the base year may lead to an unreliable estimate as most data points are around 1985. The data points around 1985 may bias the results as there will not be a nice spread in the data points. Using 1985 as the base year will help control this as the **Walyear** variable will get zeros for Wal-Mart which entered during this year. The Walyear variable captures the effects of Wal-Mart on the economic well being of communities through its activities over time.

Table 1 below presents the descriptive statistics for the variables used in this analysis and histograms showing the distribution of the data are given in Appendix 3.

Table 1 Descriptive statistics.

	Mean	StdDev	Minimum	Maximum
Growth (dollars)	17.29	154.73	-130.43	341.68
Income 1980(2002 dollars)	17573	4768.9	9526.7	41999
Education 1980(%)	11.043	3.0951	6.4	23.9
Population density(persons per square mile)	34.042	129.48	0.69034	1192.3
Population (number of persons)	16880	45789	513	397 038
Gvtexp (2002 dollars)	35.25	106.12	1.1184	938.92
Highexp (%)	14.661	4.9754	5.3	30.2
Unemployment rate (%)	5.1452	2.0023	1.8	16.7
Interstate-80	-	-	Counties not close to interstate-80	Counties close to interstate-80
Waldum1	-	-	Counties without a Wal-Mart store	Counties with a Wal-Mart store
Waldum2	-	-	Counties with at most 1 Wal-Mart store	Counties with more than 1 Wal-Mart store
WalAdjacent	-	-	Counties not adjacent to a county with a Wal-Mart	Counties adjacent to a county with a Wal-Mart
Walyear	-0.66667	2.5209	-15	3

The average growth rate was -$45.72, $49.62, $33.27 and $17.29 in counties with a Wal-Mart, counties adjacent to a county with a Wal-Mart, counties with no Wal-Mart and the whole state, respectively, between 1979 and 2002.

3.2 Data analysis

The data set used in this analysis consists of 93 Nebraska counties. The sources of the data used in this analysis are the *County and City Data Book* published by the US Bureau of Census, 1988, 1994, and 2000 and the Bureau of Economic Analysis. The descriptive statistics on the variables of interest show that the data on most of the regressors are highly skewed. Information on Wal-Mart opening dates was obtained from Wal-Mart. Histograms showing the distribution of the data are given in Appendix 3.

Banner County had the highest **personal per capita income in 1980** of $41998 which was about four times greater than the initial personal per capita income of the county with the lowest value, Greeley, with $11091.

Data on the **education** variable is also unevenly distributed. Lancaster county had the highest percentage of people 25 years and older who have attained at least 4 years of college education, 23.9%, followed by Sarpy county with 21.4% and Douglas county with 20.2% in 1980. A total of 86 counties were below 15%. Pawnee County had 7.4% which is almost three times less than 23.9% for Lancaster County.

Douglas county, Sarpy county and Lancaster county have the highest **population densities**. Douglas County had the highest population density in 1980 of 1192 people per square mile, followed by Sarpy county and Lancaster county with 361 and 230 people per square mile, respectively. The rest of the counties had less than 200 people per square mile in 1980. Arthur County had the lowest population density of 0.72 people per square mile.

The distribution of **population** data is similar to the distribution of population density data. Douglas County had the highest population of 397038 persons in 1980 followed by Lancaster County with 192884 persons. Arthur County had the lowest population in 1980. The rest of the counties had populations below one hundred thousand. The population data is highly skewed.

Douglas County had the highest **government expenditure** of about 939 million dollars followed by Lancaster County with 423 million dollars and McPherson had the lowest government expenditure of 1.1 million dollars between 1981 and 1982. A total of 91 counties spent 200 million dollars and less in terms of government expenditure.

Data on **highway expenditure** is skewed. Gosper county spent 30.2% followed by Sioux county with 24.7% between 1981 and 1982. Douglas County is among the lowest with 5.4% and Lancaster County had 8.1%. The rest of the counties spent between 5% and 25%. Blaine County spent the least with 5.3% of the total local government expenditure.

The **unemployment rate** data is positively skewed. Loup County had the highest unemployment rate of 16.7% followed by Thurston with 10.2%. The majority of the counties had unemployment rates of less than 5%. The county with the lowest unemployment rate was Sioux county with 1.8% which is about nine times less than that of Loup County.

Skewness measures the degree to which data values are evenly or unevenly distributed on either side of the mean. If the median is smaller than the mean, the data is said to be skewed to the right and if the median is greater than the mean, the data set is said to be skewed to the left. Data skewed to the right is said to be positively skewed and has more extreme measurements in the right tail of the distribution than in the left tail while data skewed to the left is negatively skewed and has more extreme measurements in the left tail of the distribution than in the right tail. Skewness poses a problem in data analysis and needs to be rectified to allow for a good fit of the data. The best fit is not attained when data is highly skewed. Also data presented in ratio form may easily lead to skewness. This is true for the education, unemployment rate, and highway expenditure data. To address the above problem a log transformation can be used. A log transformation which entails taking the logarithm of each observation in the data set tends to help squeeze together larger values and to stretch the smaller values. If the largest value in the data set is more than three times larger than the smallest value, a log transformation is recommended. This is true for the data on most of the variables used in this analysis. If the data used violates one or more of the linear regression assumptions, the results of the analysis may be misleading. Chatterjee and Price (1991) highlighted that a logarithimic transformation helps to achieve linearity where problems with outliers exist.

Due to the foregoing reasons and the potential nonlinear relationship between these regressors and the measure of growth, logarithms of the population, population density, local government expenditure, highway expenditure, initial personal income, and education and unemployment rate are used as in Shaffer (2002). In addition, regression analysis requires the assumption of linearity and the log transformation comes handy in ensuring that this requirement is met. Appendix 4 shows histograms of the transformed data.

Chapter 4

Empirical Results and Interpretation

4.1 Empirical results

Results in Table 2 are based an OLS estimation procedure for 5 models. The first model includes the conditioning set and all the Wal-Mart variables. In model 2 the **WalAdjacent** and **Walyear** variables which are statistically not significant in model 1 are dropped and the estimation is conducted with the rest of the variables. In model 3 the **Waldum2 and Walyear** variables which are statistically not significant in model 1 are dropped and the estimation is conducted with the rest of the variables. In model 4, Waldum2 and WalAdjacent variables which are not statistically significant in model 1 are dropped and the estimation is conducted with the rest of the variables. Finally, in model 5 **Waldum2, WalAdjacent** and **Walyear** variables are dropped**.** The variable **Waldum1**, which captures the initial entry effect of a Wal-Mart is highly statistically significant, robust and negatively related to the average growth rate in median household income. **Waldum2**, **WalAdjacent** and **Walyear** are insignificant in all the model specifications in which they are included. It is important to note that the full conditioning information set is considered in all the model specifications.

The mathematical versions of the five OLS models are as follows.

Model 1

$\mathbf{Growth_i = Constant + \gamma (Conditioning\ set)_i + \beta\ Wal\text{-}Mart_i + Error_i}$, where Wal-Mart variables include Waldum1, Waldum2, WalAdjacent, and Walyear.

Model 2

Growth_i = Constant + γ (Conditioning set)$_i$ + β Wal-Mart$_i$ + Error$_i$, where Wal-Mart variables include Waldum1 and Waldum2

Model 3

Growth_i = Constant + γ (Conditioning set)$_i$ + β Wal-Mart$_i$ + Error$_i$, where Wal-Mart variables include Waldum1 and WalAdjacent.

Model 4

Growth_i = Constant + γ (Conditioning set)$_i$ + β Wal-Mart$_i$ + Error$_i$, where Wal-Mart variables include Waldum1 and Walyear.

Model 5

Growth_i = Constant + γ (Conditioning set)$_i$ + β Wal-Mart$_i$ + Error$_i$, Where the only Wal-Mart variable considered is Waldum1.

Ramsey's RESET test failed to indicate specification error in any of the four regressions. I tested for heteroskedasticity and the test did not show evidence of heteroskedasticity. Appendix 5 shows how I arrived at the heteroskedasticity and specification error decisions noted above. Table 2 shows the results for the four model specifications.

Table 2 OLS estimation results

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	1628.7 (2.0307)**	1755.7 (2.2160)**	1728.9 (2.1655)**	1889.4 (2.3640)**	1884.4 (2.3733)**
ln(Initial personal per capita income)	-121.32 (-1.772)*	-134.73 (-2.0014)**	-126.88 (-1.8625)*	-139.02 (-2.0306)**	-140.13 (-2.0682)**
ln(Education)	-135.97 (-1.725)*	-117.14 (-1.5171)	-116.89 (-1.5036)	-95.979 (-1.2466)	-95.542 (-1.2489)
ln(Population density)	101.07 (3.321)***	90.649 (3.1162)***	112.30 (3.8915)***	103.77 (3.6143)***	102.97 (3.6564)***
ln(Population)	-22.984 (-0.2954)	-27.100 (-0.36194)	-30.686 (-0.40958)	-44.954 (-0.57725)	-41.576 (-0.55539)
ln (Gvtexp)	-26.718 (-0.3641)	-19.762 (-0.27904)	-22.728 (-0.31848)	-7.0373 (-0.09583)	-9.8837 (-0.13904)
ln (Highexp)	45.619 (0.8871)	30.657 (0.62552)	31.001 (0.6272)	18.673 (0.37277)	16.767 (0.34546)
ln(Unemployment rate)	-99.336 (-2.313)**	-91.374 (-2.173)**	-108.28 (-2.5528)***	-98.448 (-2.3174)**	-99.069 (-2.3545)**
Interstate-80	50.228 (1.577)	42.248 (1.3837)	51.390 (1.6307)	40.463 (1.2921)	41.277 (1.3416)
Waldum1	-169.07 (-2.8421)***	-126.40 (-2.6665)***	-174.06 (-3.0883)***	-135.80 (-2.6525)***	-132.72 (-2.7883)***
Waldum2	162.79 (1.4219)	173.14 (1.5235)			
WalAdjacent	-46.655 (-1.2315)		-51.104 (-1.3533)		
Walyear	-1.6643 (-0.25224)			-1.1334 (-0.17008)	
R^2	0.3990	0.3872	0.3836	0.3700	0.3698

Note for Table 2. The growth variable is the average growth rate in median household income, 1979 – 2002. The numbers in parenthesis are the t – statistics of the coefficients above them. P values are indicated as ***0.01, **0.05 and *0.10. All the variables on the right hand side are entered as logarithms except for interstate-80, and the four Wal-Mart variables.

4.2 Interpretation of Results

Appendix 6 shows the justification for the interpretation of coefficients on variables expressed in logarithms.

As expected the growth rate in median household income is negatively related to the **initial personal per capita income**. This coefficient indicates that if personal per capita income increased by 1%, the growth rate in median household income would on average be reduced by 7.02% 7.79%, 7.34% , 8.04% and 8.10%, ceteris paribus, in models 1, 2, 3, 4 and 5, respectively. This implies that higher initial per capita personal income leads to low growth rate in later years. The initial per capita personal income is statistically significant in all the five models showing evidence of conditional convergence.

Contrary to theory, the **education** variable has a negative but insignificant effect on growth rate. The estimated coefficient indicates that increasing the percentage of population aged 25 and over who have attained at least 4 years of college education by 1%, would on average reduce the growth rate in median household income by 7.86%, 6.78%, 6.76%,5.55% and 5.53% per year, ceteris paribus, in models 1, 2, 3, 4 and 5, respectively. Given that this variable is not statistically significant, in models 2, 3, 4 and 5, it shows that human capital had no effect on economic growth in Nebraska counties during the period of study.

As expected **population density** is positively related to the average growth rate in median household income. The estimated coefficients indicate that increasing the initial population density by 1%, on average, is expected to increase the growth rate in median household income by about 5.85%, 5.24%, 6.5%, 6% and 5.96% per year, ceteris paribus, in models 1, 2, 3, 4,and 5, respectively. This suggests that the growth of Nebraska counties also benefits from spillover effects which help foster economic growth.

Contrary to the hypothesized result, the coefficient on **population** is negative and statistically insignificant. The coefficient on the population variable indicates that increasing initial population by 1%, on average, would lead to a decrease in the growth rate in median household income by 1.33%, 1.57%, 1.77%, 2.6% and 2.40% per year, ceteris paribus, in models 1, 2, 3, 4 and 5, respectively. Since this coefficient is not statistically significant in all model specifications, we conclude that population was not important in explaining the economic growth of Nebraska counties between 1979 and 2002.

The negative sign on the coefficient of the **total local government expenditure** variable indicates that local governments are not devoting their expenditure on economic growth enhancing sectors of the economy. The estimated coefficient indicates that increasing the initial period total local government expenditure by 1%, on average, leads to a decrease in the growth rate in median household income by 1.55%, 1.14%, 1.31%, 0.41% and 0.57% per year, ceteris paribus, in models 1, 2, 3, 4 and 5, respectively. This tells us that increasing government expenditure may not necessarily enhance economic growth. Devoting expenditure on infrastructure such as education, highway expenditure and public services is more likely to attract investment and labor related population growth which would increase the median household income. However, since the coefficient of total local government expenditure is not significant in all the model specifications in which it is included, we conclude that it does not help in explaining the economic growth of Nebraska counties between 1979 and 2002.

As expected local government expenditure on **highways** is positively related to growth rate in median household income. The estimated coefficient indicates that increasing initial highway expenditure by 1%, on average, would lead to an increase in the growth rate in median household income by 2.64%, 1.77%, 1.79%, 1.08% and 0.97% per year, ceteris paribus, in models 1, 2, 3, 4 and 5, respectively. This suggests that counties which spend a higher percentage on infrastructure development experienced higher growth as compared to ones which spend less on infrastructure development. However, since the coefficient on this variable is not statistically significant we conclude that it does not explain the economic growth of Nebraska counties between 1979 and 2002.

The coefficient on the **unemployment rate** variable has a negative and statistically significant effect as expected. The estimated coefficient indicates increasing the unemployment rate by 1%, on average, would lead to a decrease in the growth rate of median household income by 5.75%, 5.28%, 6.26%, 5.69%, and 5.73%, ceteris paribus, in models 1, 2, 3, 4 and 5, respectively. A higher unemployment rate implies a slower growth rate in median household income. High unemployment rates are bad for the growth of counties as it leads to a lower quality of life. Counties with higher unemployment rates experienced lower median household income growth as compared to those having lower unemployment rates. As found in other studies, lack of income due to unemployment may lead to a low median household income.

The coefficient on the **interstate** dummy variable is positive and insignificant. The estimated coefficient on this variable indicates that the average growth rate in median household income is, on average, \$50.23, \$42.25, \$51.39, \$40.46, and \$41.28 per year, higher for counties close to the interstate than for counties far from the interstate, ceteris paribus, in models 1, 2, 3, 4 and 5, respectively. The coefficient on this variable remains positive and insignificant in all model specifications in which it is included. Since the coefficient is not statistically significant we can conclude that being close to the interstate does not explain economic growth for Nebraska counties between 1979 and 2002.

The coefficient on **Waldum1** is negative, statistically significant, and robust in all the model specifications. The estimated coefficient on this variable indicates that, on average, the average growth rate in median household income of counties with a Wal-Mart is $169.07, $126.40, $174.06, $135.80 and $132.72 per year below counties without a Wal-Mart in models 1, 2, 3, 4 and 5, respectively.

The coefficient on **Waldum2** is positive and statistically insignificant in models 1 and 2 in which it is included. The estimated coefficient indicates that the marginal effect of adding a Wal-Mart in 2001 on the average growth rate of median household income is $162.79 and $173.14 per year, ceteris paribus, in models 1 and 2, respectively. Since the coefficient on this variable is insignificant in models 1 and 2, I conclude that this variable did not explain economic growth in Nebraska counties during the period of study.

The coefficient on **WalAdjacent** is negative and statistically insignificant in models 1 and 3 in which it is included. The coefficient indicates that, on average, the growth rate of median household income for counties which are adjacent to counties with a Wal-Mart is $46.66 and $51.10 per year below counties not adjacent to Wal-Mart counties, in models 1 and 3, respectively. Since the coefficient on this variable is insignificant in both models, I conclude that having a Wal-Mart in one county did not affect the economic growth of neighboring counties during the period of study.

The coefficient on **Walyear** is negative and statistically insignificant in models 1 and 4 where it is included. The coefficient on this variable indicates that having a first Wal-Mart in a county for one additional year, on average, leads to a decrease in the growth rate in median household income by $1.66 and $1.13 per year , ceteris paribus, in models 1 and 4, respectively. Since the coefficient on **Walyear** is insignificant in models 1 and 4 we conclude that the number of years Wal-Mart has been in a county was not important in explaining the economic growth of Nebraska counties during the period of study.

Chapter 5

Summary and Conclusions

The primary objective of this study was to examine the effect of Wal-Mart on the economic growth of Nebraska counties while controlling for other factors which have been found in growth literature to be important in explaining economic growth. This study provides insights on the role played by the control variables in the economic growth in Nebraska counties. The control variables include; education, population, population density, and proximity to the interstate, government expenditure, highway expenditure, unemployment rate and initial per capita personal income. It is also important to note that this study shows evidence of conditional convergence which is a common finding in present day empirical work on economic growth. The fact that the initial personal per capita income is highly statistically significant and robust to different model specifications shows evidence of conditional convergence in Nebraska counties.

The most important finding in this study is the empirical evidence on the effect of Wal-Mart on the economic growth of Nebraska counties. Specifically the results provide evidence that the initial entry of a Wal-Mart in a Nebraska county may have been harmful for the county's economic growth for the period 1979 to 2002. This evidence is based on the estimation of four different Wal-Mart variables in a sample of 93 Nebraska counties. The first model includes the conditioning set and all the Wal-Mart variables. In the five model specifications considered, **Waldum2**, **WalAdjacent**, and **Walyear** are insignificant in all the model specifications in which they are included. These results show that the number of years Wal-Mart has been in a county and the opening of a Wal-Mart in 2001 do not have an effect on the economic growth of Nebraska counties. The results also show that having a Wal-Mart in one county does not affect the economic growth of neighboring counties.

Given the high statistical significance and robustness of the **Waldum1** to all the model specifications, I conclude that counties where a Wal-Mart is located experience lower economic growth than counties without a Wal-Mart.

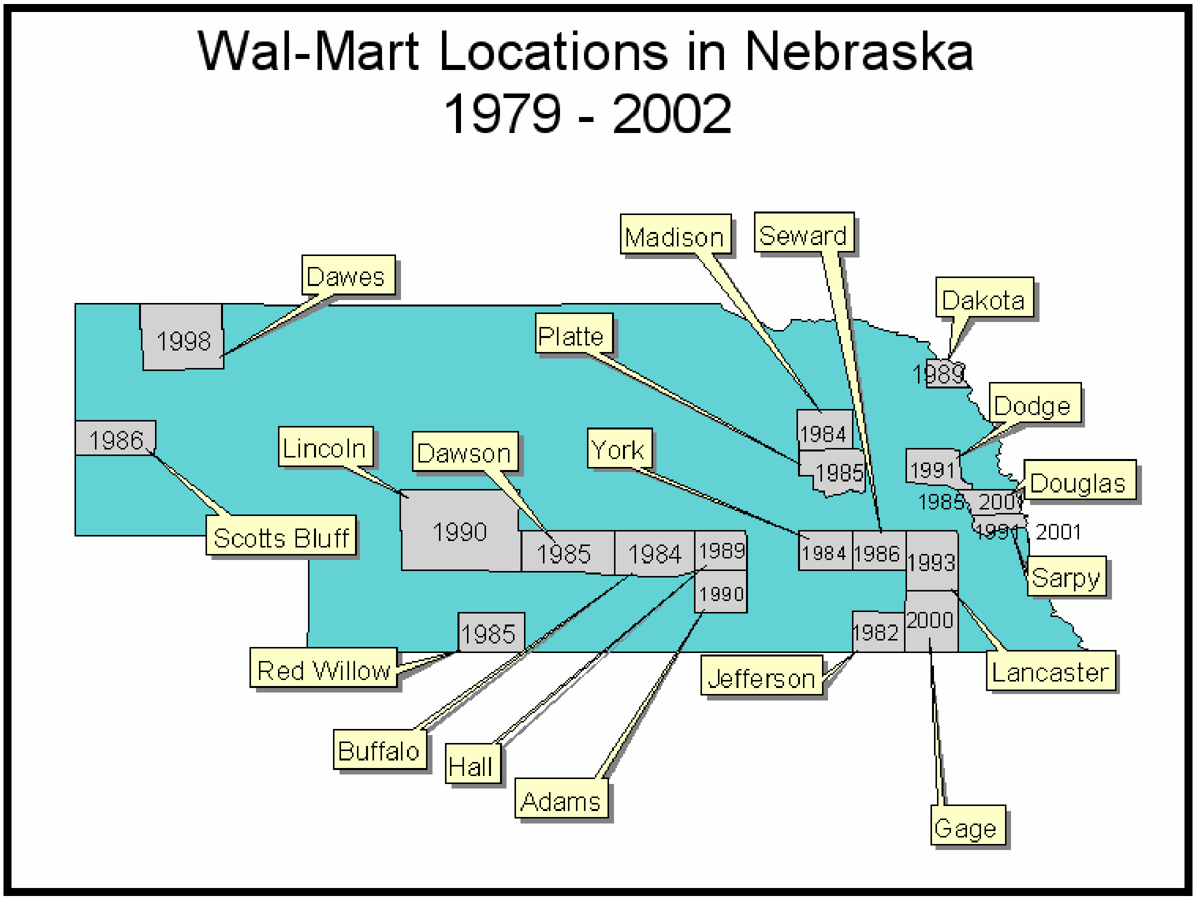
Possible explanations for this result may be that when Wal-Mart comes to town it may affect other retail stores which may have to tailor their strategies and operations to cope with Wal-Mart competitive threat. Wal-Mart through the displacement of workers from their present jobs to low Wal-Mart wages may also be a possible explanation for the negative effect of Wal-Mart on Nebraska counties. This may be attributed to the low wages Wal-Mart pays its associates.

Policy planners should be concerned about answers on why counties with a Wal-Mart experience lower economic growth. This study shows that having a Wal-Mart might not improve the economic well being of a community.

Although this study does provide an exploratory view on the effect of Wal-Mart on Nebraska counties, it does not capture the impact of Wal-Mart on communities before the store is officially opened. The other limitation of this study is that it does not take into account Wal-Mart entry and location decisions. The result found in this study does not explain what causes counties with a Wal-Mart to experience lower economic growth per year than counties without a Wal-Mart.

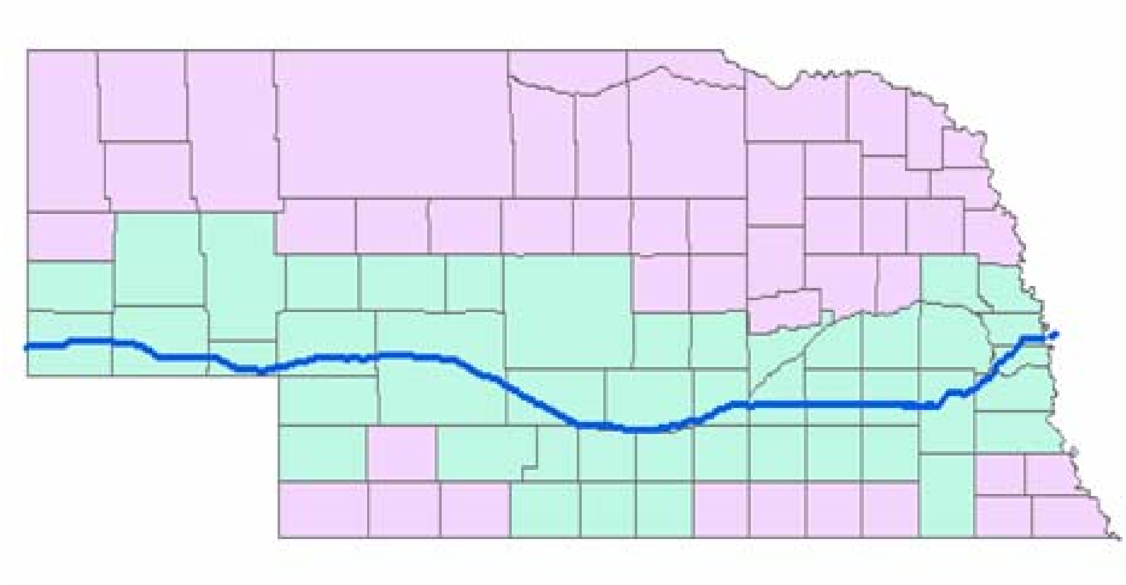
The above limitations leave room for future research. Future research could focus on; how Wal-Mart affects the growth of communities before it officially opens its store in a community, Wal-Mart entry and location decisions and why counties with a Wal-Mart experience lower economic growth than counties without a Wal-Mart.

APPENDIX 1. Wal-Mart Stores between 1979 and 2002.

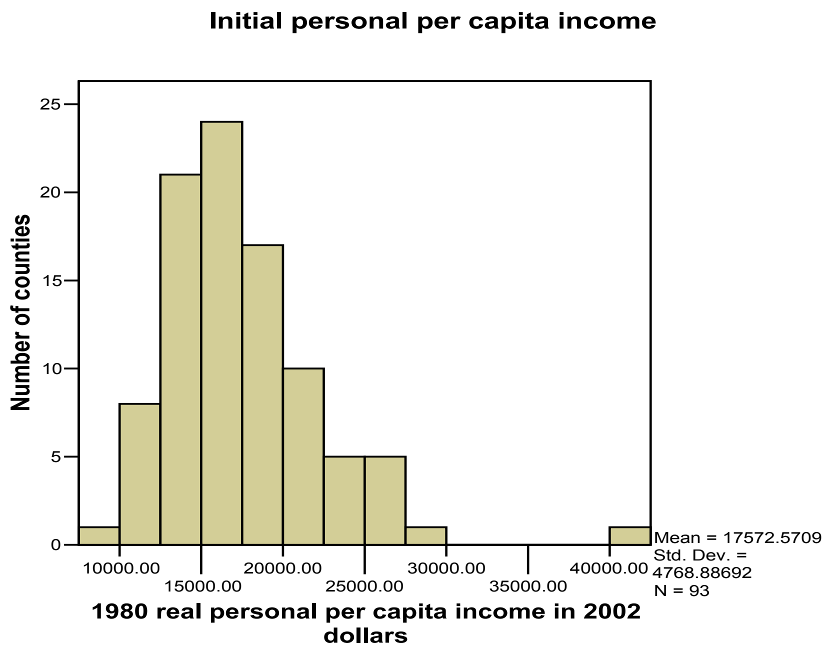


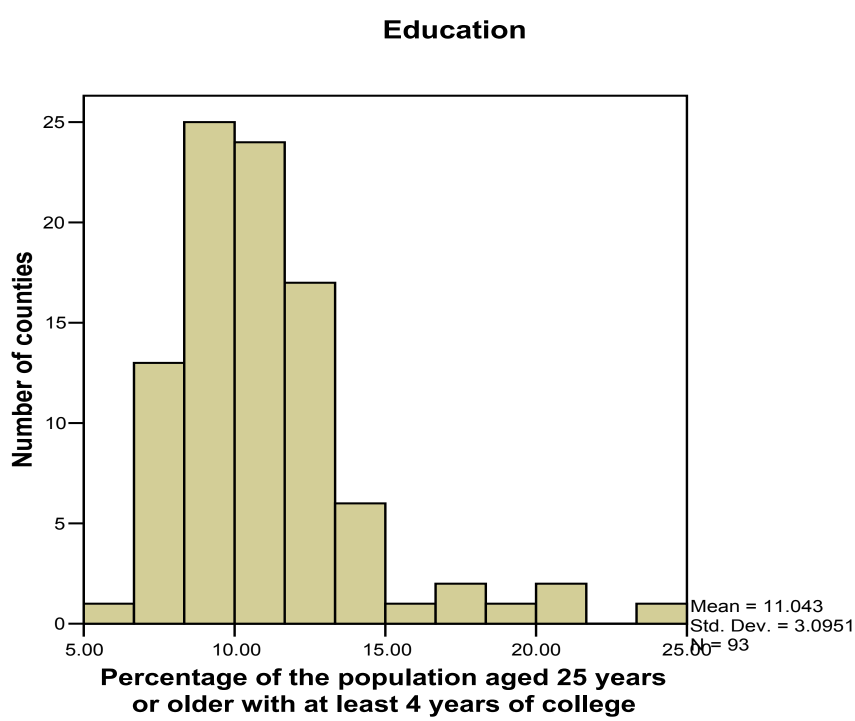
APPENDIX 2. Map showing the Nebraska Counties within 25 miles of interstate-80.

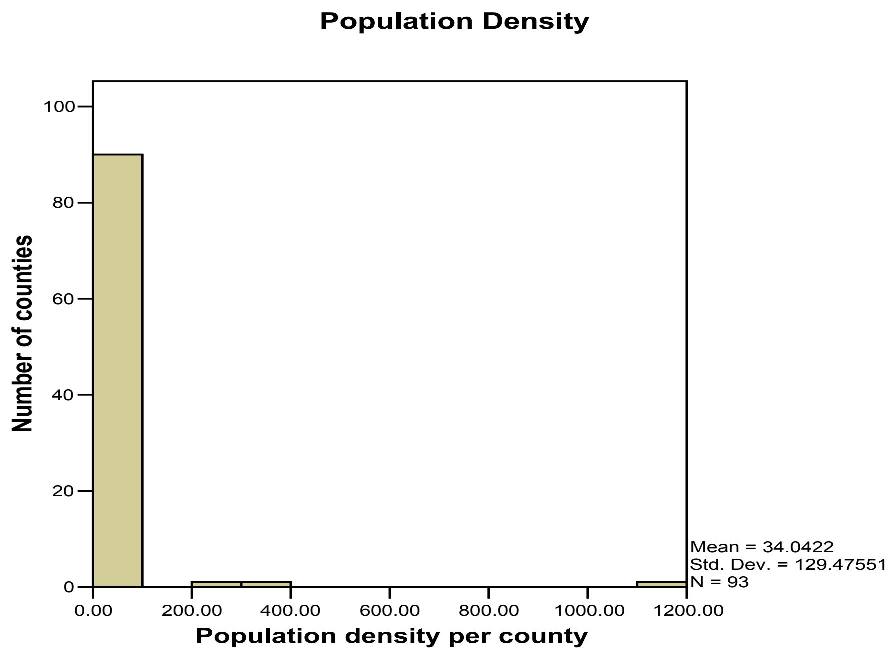
Counties shaded green on the Nebraska map shown below are within 25 miles of interstate-80. Interstate-80 is shown in is the blue line shown below.



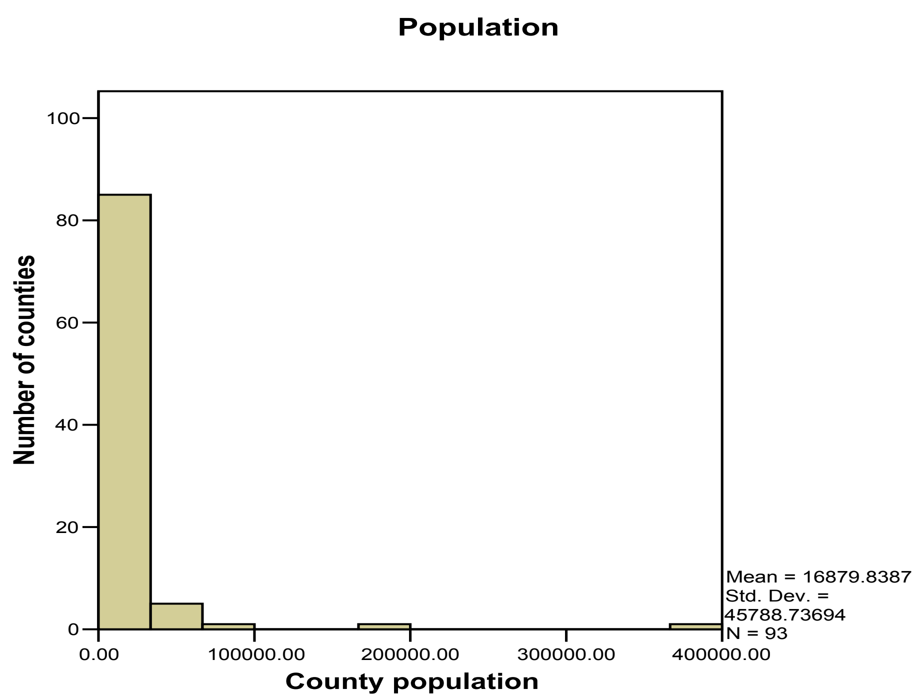
APPENDIX 3. Histograms showing data distributions before log transformation.



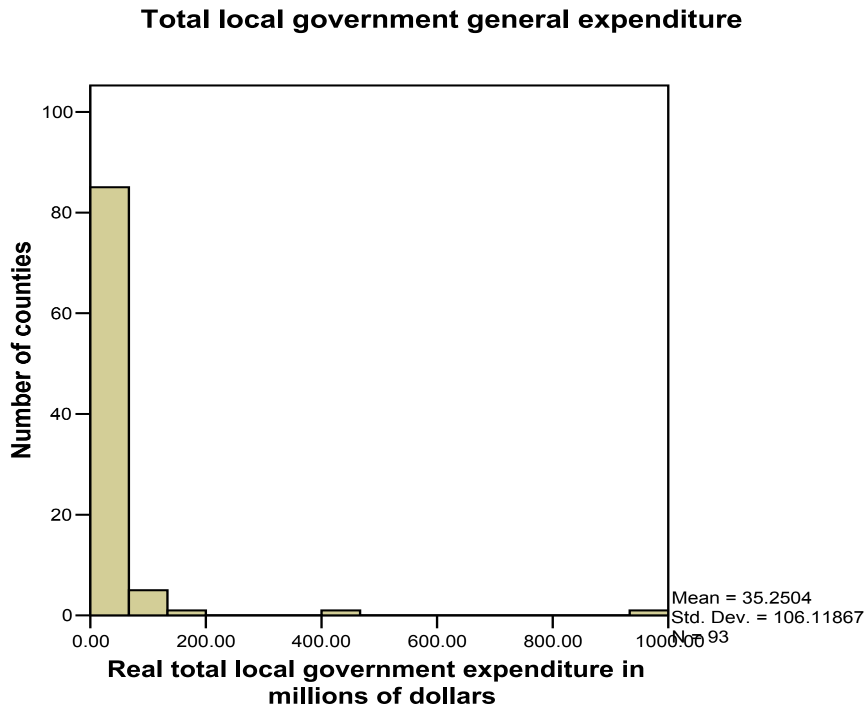


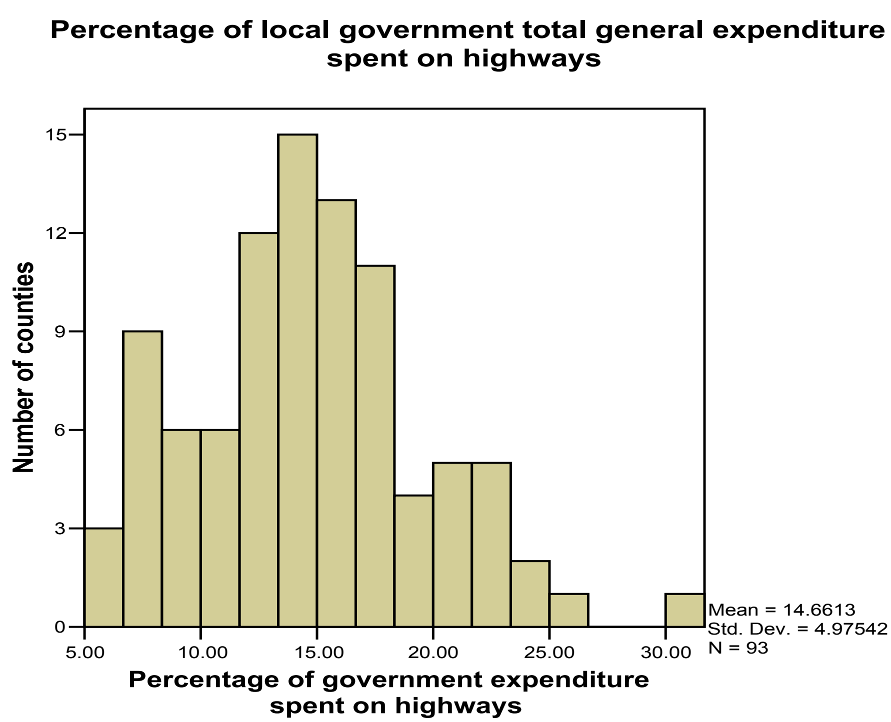


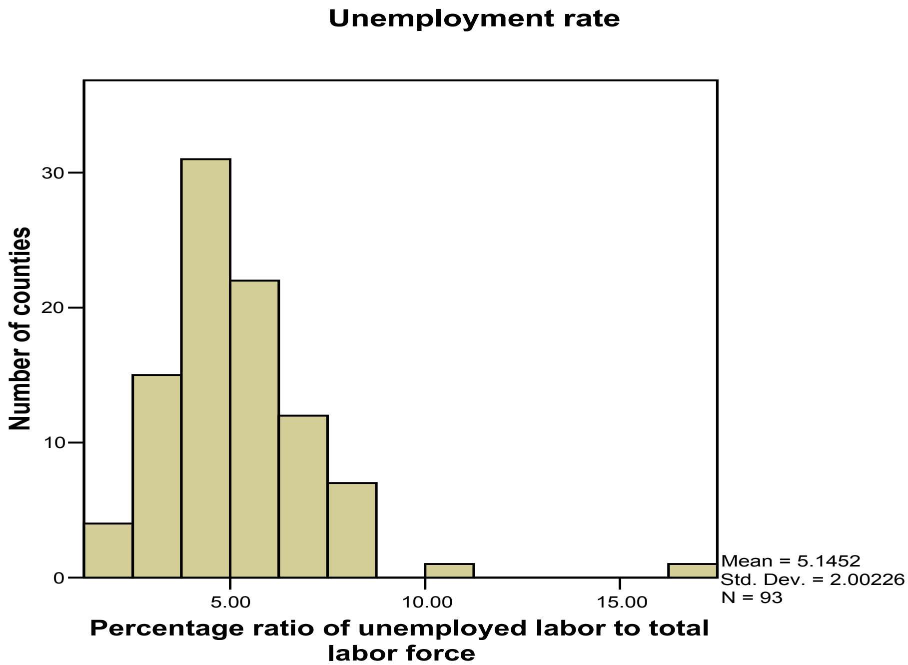
Population Density
100
80
60
40
20
0
Number of counties
0.00
200.00
400.00
600.00
800.00
1000.00
1200.00
Population density per county
Mean = 34.0422
Std. Dev. = 129.47551
N = 93



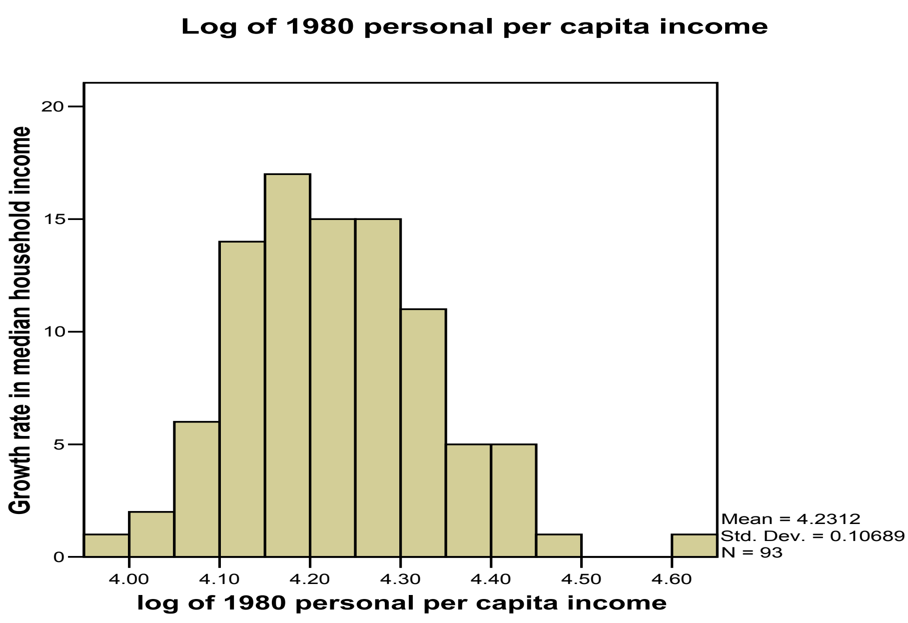
Population
100
80
60
40
20
0
Number of counties
0.00
100000.00
200000.00
300000.00
400000.00
County population
Mean = 16879.8387
Std. Dev. =
45788.73694
N = 93


Total local government general expenditure
Number of counties
100
80
60
40
20
0
0.00
200.00
400.00
600.00
800.00
1000.00
Real total local government expenditure in millions of dollars
Mean = 35.2504
Std. Dev. = 106.11867
N = 93

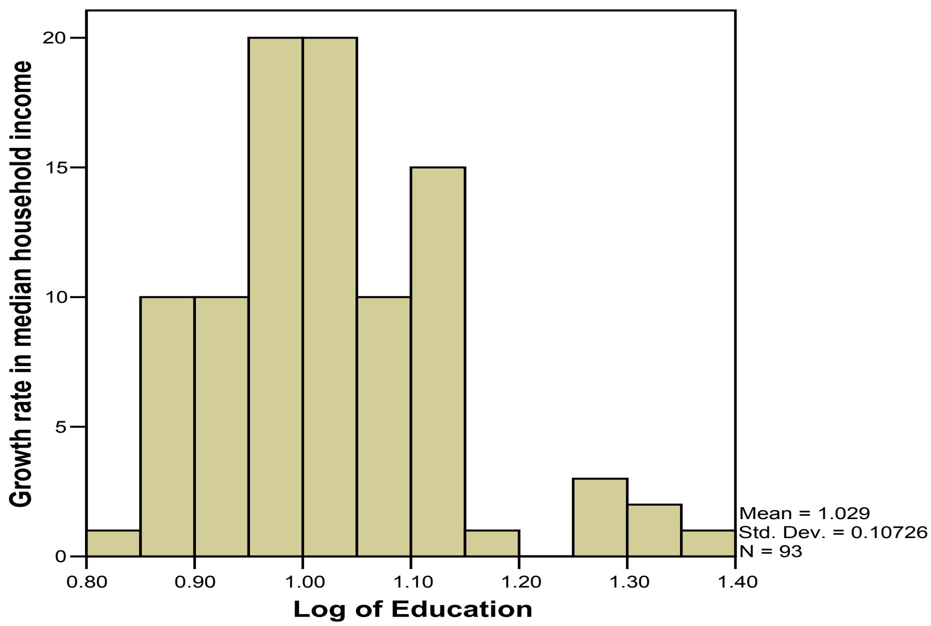

Percentage of local government total general expenditure spent on highways
Number of counties
15
12
9
6
3
0
5.00
10.00
15.00
20.00
25.00
30.00
Percentage of government expenditure spent on highways
Mean = 14.6613
Std. Dev. = 4.97542
N = 93



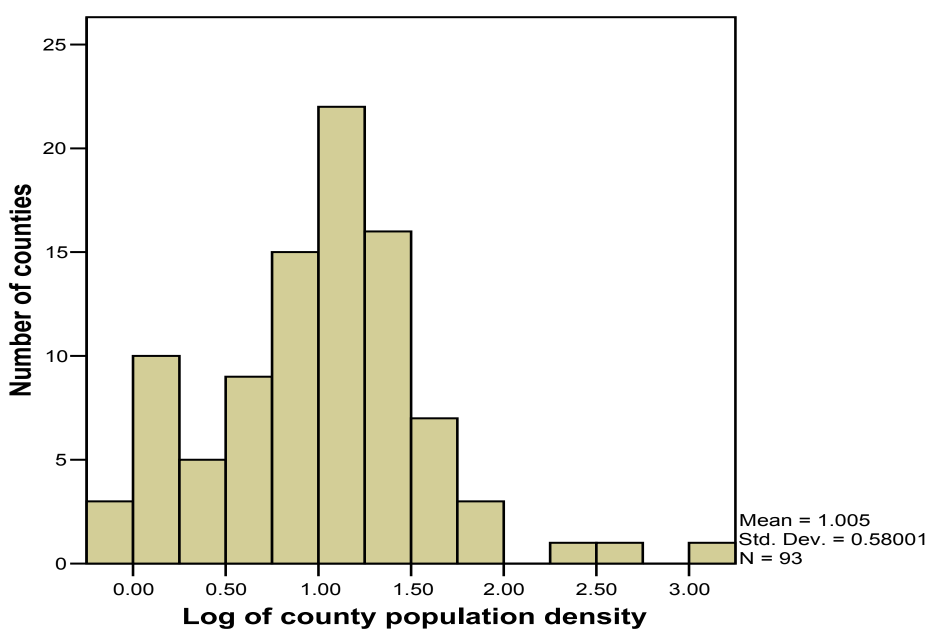
APPENDIX 4. Histograms showing the data distributions after Log transformation.



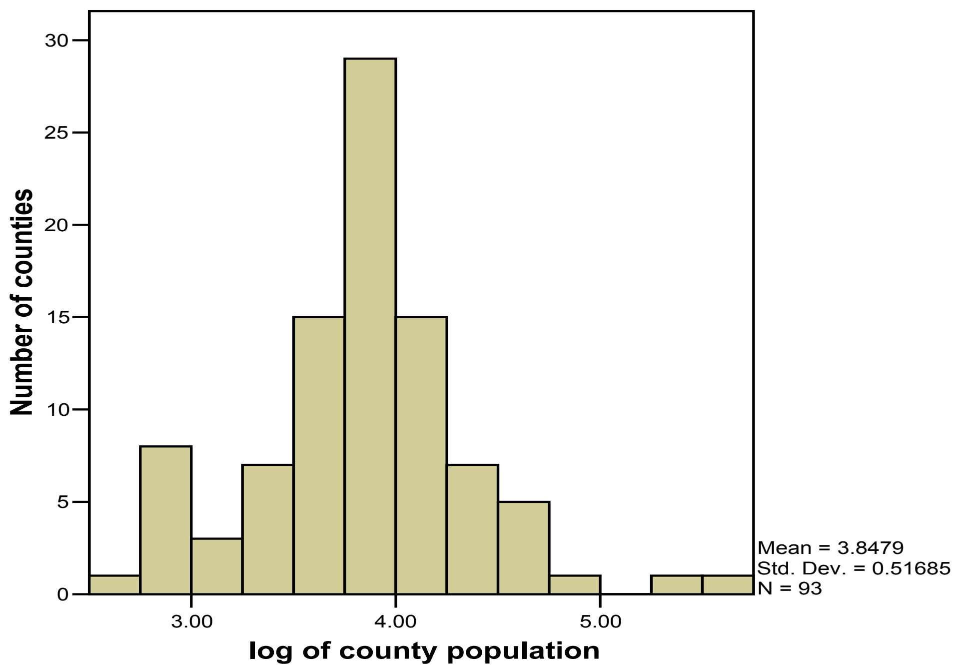
Log of Education



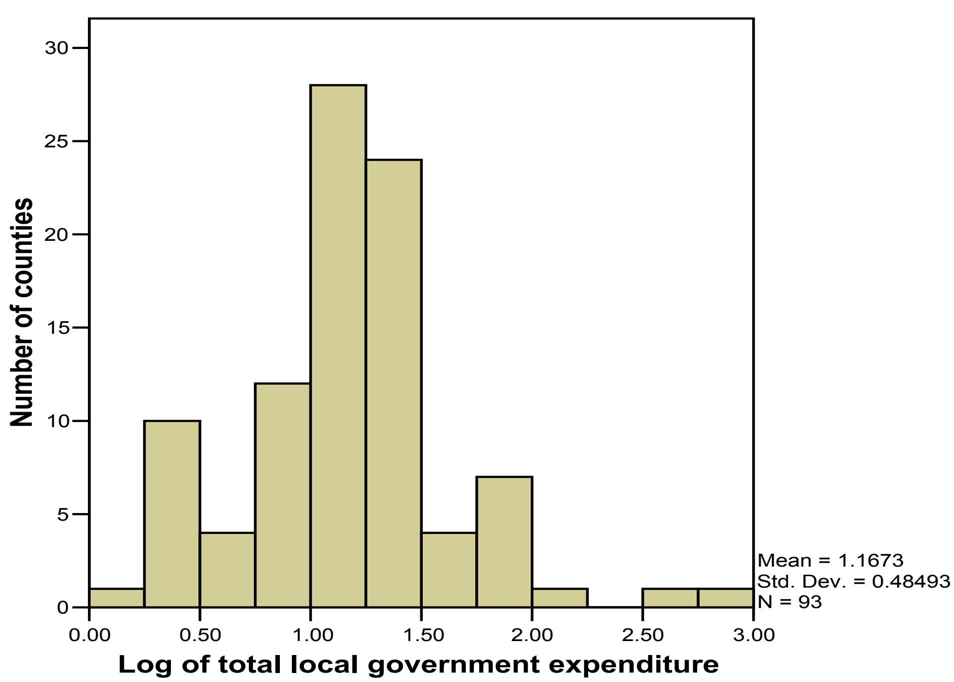
Log of population density

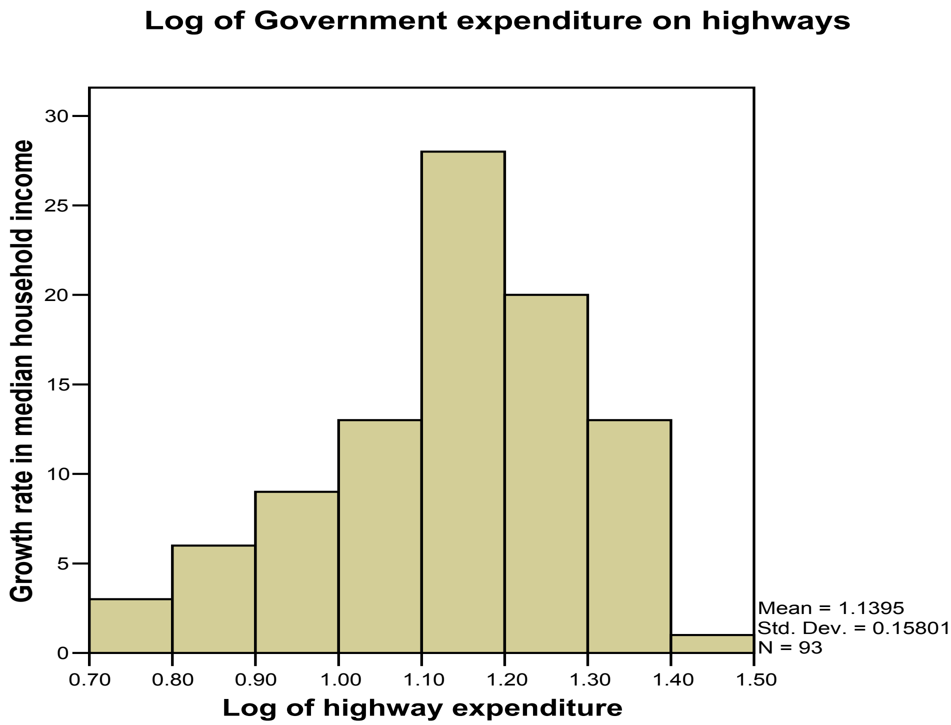


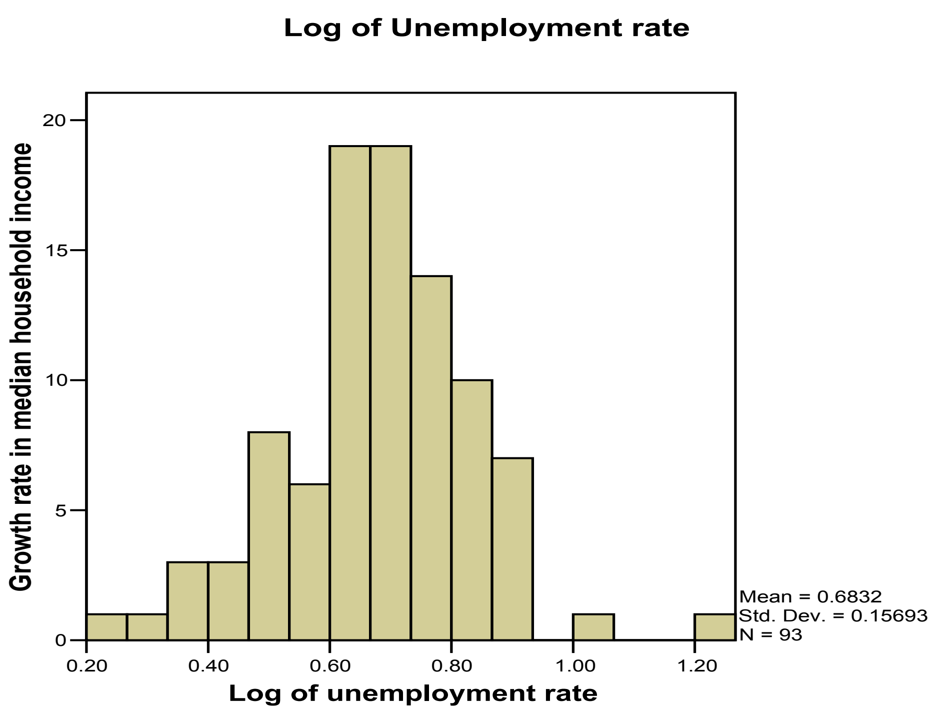
Log of population



Log of total local government expenditure




Log of Government expenditure on highways
Growth rate in median household income
30
25
20
15
10
5
0
0.70
0.80
0.90
1.00
1.10
1.20
1.30
1.40
1.50
Log of highway expenditure
Mean = 1.1395
Std. Dev. = 0.15801
N = 93


Log of Unemployment rate
Growth rate in median household income
20
15
10
5
0
0.20
0.40
0.60
0.80
1.00
1.20
Log of unemployment rate
Mean = 0.6832
Std. Dev. = 0.15693
N = 93

APPENDIX 5. Ramsey tests and heteroskedasticity tests for the 5 model specifications.

Model 1

Ramsey test

```
RAMSEY RESET SPECIFICATION TESTS USING POWERS OF YHAT
   RESET(2)=  0.39964     - F WITH DF1=   1 AND DF2=  79 P-VALUE= 0.529
   RESET(3)=  0.27977     - F WITH DF1=   2 AND DF2=  78 P-VALUE= 0.757
   RESET(4)=  0.58213     - F WITH DF1=   3 AND DF2=  77 P-VALUE= 0.629
```

Ho: no specification error

Ha: specification error exists

With the high P-values, we fail to reject the null hypothesis that there is no specification error and conclude that there is no evidence of specification error.

Heteroskedasticity test

```
CHI-SQUARE     D.F.   P-VALUE
                           TEST STATISTIC
 E**2 ON YHAT:                        0.029     1    0.86580
 E**2 ON YHAT**2:                     2.614     1    0.10590
 E**2 ON LOG(YHAT**2):                0.701     1    0.40228
 E**2 ON LAG(E**2) ARCH TEST:         0.082     1    0.77455
 LOG(E**2) ON X (HARVEY) TEST:        9.166    12    0.68871
 ABS(E) ON X (GLEJSER) TEST:         16.332    12    0.17649
 E**2 ON X                 TEST:
           KOENKER(R2):              18.324    12    0.10619
           B-P-G (SSR) :             15.887    12    0.19645
```

Ho: no hetereskedasticity

Ha: heteroskedasticity exists

The P-values in the tests show that there is no evidence of heteroskedasticity. I conclude that there is no evidence of heteroskedasticity.

Model 2

Ramsey test

```
RAMSEY RESET SPECIFICATION TESTS USING POWERS OF YHAT
   RESET(2) = 0.71624     - F WITH DF1=   1 AND DF2= 81 P-VALUE= 0.400
   RESET(3) = 0.78289     - F WITH DF1=   2 AND DF2=  80 P-VALUE= 0.461
   RESET(4)  =    1.2840      -  F  WITH  DF1=    3  AND  DF2=   79  P-VALUE=
0.286
```

Ho: no specification error

Ha: specification error exists

With the high P-values, we fail to reject the null hypothesis that there is no specification error and conclude that there is no evidence of specification error.

Heteroskedasticity test

```
HETEROSKEDASTICITY TESTS
                            CHI-SQUARE     D.F.   P-VALUE
                          TEST STATISTIC
 E**2 ON YHAT:                     0.092     1    0.76141
 E**2 ON YHAT**2:                  1.761     1    0.18451
 E**2 ON LOG(YHAT**2):             0.061     1    0.80531
 E**2 ON LAG(E**2) ARCH TEST:      0.001     1    0.97952
 LOG(E**2) ON X (HARVEY) TEST:     6.575    10    0.76490
 ABS(E) ON X (GLEJSER) TEST:      14.095    10    0.16871
 E**2 ON X                TEST:
           KOENKER(R2):           17.420    10    0.06557
           B-P-G (SSR) :          14.213    10    0.16351
```

Ho: no hetereskedasticity

Ha: heteroskedasticity exists

The P-values in the majority of the tests show that there is no evidence of heteroskedasticity except the Koenker(R2) test. Since the majority of the heteroskedasticity tests show no evidence of heteroskedasticity we conclude that there is no evidence of heteroskedasticity.

Model 3

Ramsey test

```
RAMSEY RESET SPECIFICATION TESTS USING POWERS OF YHAT
   RESET(2)=  0.47734E-01 - F WITH DF1=   1 AND DF2=  81 P-VALUE= 0.828
   RESET(3)=  0.82287     - F WITH DF1=   2 AND DF2=  80 P-VALUE= 0.443
   RESET(4)=  0.58406     - F WITH DF1=   3 AND DF2=  79 P-VALUE= 0.627

RAMSEY RESET SPECIFICATION TESTS USING POWERS OF YHAT
   RESET(2)=  0.36785     - F WITH DF1=   1 AND DF2=  81 P-VALUE= 0.546
   RESET(3)=   2.2670     - F WITH DF1=   2 AND DF2=  80 P-VALUE= 0.110
   RESET(4)=   1.7859     - F WITH DF1=   3 AND DF2=  79 P-VALUE= 0.157
```

Ho: no specification error
Ha: specification error exists
With the high P-values, we fail to reject the null hypothesis that there is no specification error and conclude that there is no evidence of specification error.

Heteroskedasticity test

```
CHI-SQUARE     D.F.   P-VALUE
                           TEST STATISTIC
 E**2 ON YHAT:                     0.044     1    0.83322
 E**2 ON YHAT**2:                  0.659     1    0.41683
 E**2 ON LOG(YHAT**2):             0.248     1    0.61830
 E**2 ON LAG(E**2) ARCH TEST:      0.149     1    0.69938
 LOG(E**2) ON X (HARVEY) TEST:    10.709    10    0.38062
 ABS(E) ON X (GLEJSER) TEST:      13.465    10    0.19882
 E**2 ON X                 TEST:
           KOENKER(R2):           16.700    10    0.08127
           B-P-G (SSR) :          13.990    10    0.17345
```

Ho: no hetereskedasticity
Ha: heteroskedasticity exists

The P-values in the majority of the tests show that there is no evidence of heteroskedasticity except the Koenker(R2) test. Since the majority of the heteroskedasticity tests show no evidence of heteroskedasticity we conclude that there is no evidence of heteroskedasticity.

Model 4

Ramsey test

```
RAMSEY RESET SPECIFICATION TESTS USING POWERS OF YHAT
   RESET(2)=  0.36785     - F WITH DF1=   1 AND DF2=  81 P-VALUE= 0.546
   RESET(3)=   2.2670     - F WITH DF1=   2 AND DF2=  80 P-VALUE= 0.110
   RESET(4)=   1.7859     - F WITH DF1=   3 AND DF2=  79 P-VALUE= 0.157
```

Ho: no specification error
Ha: specification error exists
With the high P-values, we fail to reject the null hypothesis that there is no specification error and conclude that there is no evidence of specification error.

Heteroskedasticity test

```
HETEROSKEDASTICITY TESTS
                             CHI-SQUARE     D.F.   P-VALUE
                           TEST STATISTIC
 E**2 ON YHAT:                      0.146     1    0.70284
 E**2 ON YHAT**2:                   0.225     1    0.63548
 E**2 ON LOG(YHAT**2):              0.036     1    0.85016
 E**2 ON LAG(E**2) ARCH TEST:       0.006     1    0.93981
 LOG(E**2) ON X (HARVEY) TEST:      6.580    10    0.76442
 ABS(E) ON X (GLEJSER) TEST:       12.992    10    0.22413
 E**2 ON X                 TEST:
           KOENKER(R2):            16.546    10    0.08504
```

```
          B-P-G (SSR) :           13.045    10    0.22115
 E**2 ON X X**2    (WHITE) TEST:
          KOENKER(R2):            19.190    20    0.50953
          B-P-G (SSR) :           15.130    20    0.76892
```

Ho: no hetereskedasticity
Ha: heteroskedasticity exists

The P-values in the majority of the tests show that there is no evidence of heteroskedasticity except the Koenker(R2) test. Since the majority of the heteroskedasticity tests show no evidence of heteroskedasticity we conclude that there is no evidence of heteroskedasticity.

Model 5

Ramsey test

```
RAMSEY RESET SPECIFICATION TESTS USING POWERS OF YHAT
   RESET(2)=  0.28880     - F WITH DF1=   1 AND DF2=  82 P-VALUE= 0.592
   RESET(3)=   2.3939     - F WITH DF1=   2 AND DF2=  81 P-VALUE= 0.098
   RESET(4)=   1.8995     - F WITH DF1=   3 AND DF2=  80 P-VALUE= 0.136
```

Ho: no specification error
Ha: specification error exists
With the high P-values in the first test and the third test, we fail to reject the null hypothesis that there is no specification error and conclude that there is no evidence of specification error.

Heteroskedasticity test

```
HETEROSKEDASTICITY TESTS

                             CHI-SQUARE     D.F.   P-VALUE
                           TEST STATISTIC
 E**2 ON YHAT:                      0.139     1    0.70947
 E**2 ON YHAT**2:                   0.176     1    0.67474
 E**2 ON LOG(YHAT**2):              0.108     1    0.74263
 E**2 ON LAG(E**2) ARCH TEST:       0.011     1    0.91787
```

```
LOG(E**2) ON X (HARVEY) TEST:       6.182     9    0.72158
ABS(E) ON X (GLEJSER) TEST:        12.471     9    0.18801
E**2 ON X                TEST:
          KOENKER(R2):             15.998     9    0.06692
          B-P-G (SSR) :            12.517     9    0.18572

E**2 ON X X**2    (WHITE) TEST:
          KOENKER(R2):             19.687    18    0.35071
          B-P-G (SSR) :            15.403    18    0.63413
```

Ho: no hetereskedasticity
Ha: heteroskedasticity exists

The P-values in the majority of the tests show that there is no evidence of heteroskedasticity except the Koenker(R2) test. Since the majority of the heteroskedasticity tests show no evidence of heteroskedasticity we conclude that there is no evidence of heteroskedasticity.

APPENDIX 6. Coefficients on explanatory variables expressed in logarithms.

Coefficients on variables expressed in logs can be expressed as elasticities in the following manner:

Suppose we had a dependent variable y, and one log transformed explanatory variable, x, we can express the regression line as:

$y = \beta_1 + \beta_2 \ln x$, where, β_1 is the intercept and β_2 is the coefficient on the log transformed variable x.

Taking a total differential of the regression line gives:

$dy = \beta_2 d \ln x$

Dividing the right hand side and the left hand side by y makes the left hand side $d\ln y$ as follows:

$$\frac{dy}{y} = \frac{\beta_2}{y} d\ln x$$

$d\ln y = \frac{\beta_2}{y} d\ln x$ Note that $\frac{dy}{y} = d\ln y$

$\frac{d\ln y}{d\ln x} = \frac{\beta_2}{y}$ This result is the elasticity of β_2 which shows the responsiveness of y to a change in x.

In the same manner I divided the coefficients on variables expressed in logs by the mean of the dependent variable, average growth rate in median household income between 1979 and 2002. The mean of the dependent variable as given in Table1 is 17.29.

I can now be able to interpret the elasticities in terms of percentage changes in the same manner in which I interpreted the results.

APPENDIX 7. Data set

County	Growth	Walyear	Interstate	Waldum1	Waldum2	Education	Population
Adams	-12.2147	-5	1	1	0	15	30656
Antelope	206.3747	0	0	0	0	7.6	8675
Arthur	-179.708	0	1	0	0	8.3	513
Banner	94.60352	0	1	0	0	10.1	918
Blaine	-112.821	0	0	0	0	10.9	867
Boone	238.8793	0	0	0	0	9.2	7391
Box Butte	-205.916	0	0	0	0	12.6	13696
Boyd	92.96342	0	0	0	0	8.6	3331
Brown	111.2044	0	0	0	0	9.5	4377
Buffalo	26.66166	1	1	1	0	19.1	34797
Burt	124.3106	0	0	0	0	9.5	8813
Butler	130.6408	0	1	0	0	9	9330
Cass	318.4132	0	1	0	0	10.3	20297
Cedar	324.5819	0	0	0	0	7.8	11375
Chase	157.2596	0	1	0	0	12.9	4758
Cherry	-138.833	0	0	0	0	13.2	6758
Cheyenne	-20.9654	0	1	0	0	12.9	10057
Clay	59.7277	0	1	0	0	10.6	8106
Colfax	178.2775	0	0	0	0	7.6	9890
Cuming	-39.6118	0	0	0	0	7.9	11664
Custer	42.79612	0	1	0	0	9.8	13877
Dakota	-151.604	-4	0	1	0	9.1	16573
Dawes	-118.149	-13	0	1	0	18.1	9609
Dawson	-226.892	0	1	1	0	12.4	22304
Deuel	-65.3967	0	1	0	0	13.1	2462
Dixon	239.7376	0	0	0	0	9.4	7137
Dodge	-68.1187	-6	1	1	0	10.9	35847
Douglas	138.9741	0	1	1	1	20.2	397038
Dundy	-40.9552	0	0	0	0	10.1	2861
Fillmore	88.18441	0	1	0	0	9.9	7920
Franklin	70.80259	0	1	0	0	9.7	4377
Frontier	-7.69802	0	1	0	0	12.7	3647

Furnas	125.9851	0	1	0	0	11.1	6486
Gage	36.21739	-15	1	1	0	10	24456
Garden	-206.647	0	1	0	0	10.4	2802
Garfield	61.21567	0	0	0	0	10	2363
Gosper	164.266	0	1	0	0	8.6	2140
Grant	1.38074	0	0	0	0	11	877
Greeley	268.9363	0	0	0	0	8.7	3462
Hall	-155.686	-4	1	1	0	12.9	47690
Hamilton	159.4243	0	1	0	0	13.3	9301
Harlan	69.36816	0	1	0	0	10.8	4292
Hayes	-121.052	0	0	0	0	7.8	1356
Hitchcock	-144.896	0	0	0	0	9.1	4079
Holt	119.8921	0	0	0	0	8.7	13552
Hooker	167.2263	0	0	0	0	11.8	990
Howard	29.60474	0	1	0	0	9.9	6773
Jefferson	65.7599	3	0	1	0	8.7	9817
Johnson	231.7644	0	0	0	0	8.9	5285
Kearney	40.30097	0	1	0	0	13.7	7053
Keith	-256.627	0	1	0	0	11.4	9364
Keya Paha	-1.48085	0	0	0	0	8.1	1301
Kimball	-299.656	0	1	0	0	10.1	4882
Knox	34.6258	0	0	0	0	7.8	11457
Lancaster	-15.3526	-8	1	1	0	23.9	192884
Lincoln	-320.431	-5	1	1	0	12.1	36455
Logan	341.6777	0	1	0	0	10.5	983
Loup	-177.451	0	0	0	0	11.4	859
McPherson	-195.113	0	1	0	0	11.1	593
Madison	-64.4052	1	0	1	0	11.9	31382
Merrick	-96.8343	0	1	0	0	9.6	8945
Morrill	165.6739	0	1	0	0	8.7	6085
Nance	149.1849	0	0	0	0	8.1	4740
Nemaha	68.48502	0	0	0	0	14.1	8367
Nuckolls	-139.413	0	0	0	0	9.3	6726
Otoe	146.9775	0	1	0	0	7.6	15183
Pawnee	168.2464	0	0	0	0	7.4	3937
Perkins	-32.9842	0	1	0	0	13.9	3637

Phelps	32.93065	0	1	0	0	13.6	9769
Pierce	106.1503	0	0	0	0	7.9	8481
Platte	-77.7792	0	0	1	0	13.3	28852
Polk	135.911	0	1	0	0	9.4	6320
Red Willow	-201.263	0	0	1	0	12.3	12615
Richardson	49.33963	0	0	0	0	10.9	11315
Rock	-208.086	0	0	0	0	10.7	2383
Saline	15.87769	0	1	0	0	10.6	13131
Sarpy	294.5319	-6	1	1	1	21.4	86015
Saunders	193.2308	0	1	0	0	9.1	18716
Scotts Bluff	-163.22	-1	0	1	0	12.5	38344
Seward	193.6135	-1	1	1	0	12.3	15789
Sheridan	-165.423	0	0	0	0	12	7544
Sherman	118.2747	0	1	0	0	6.4	4226
Sioux	-282.423	0	0	0	0	10.9	1845
Stanton	-104.422	0	0	0	0	9.6	6549
Thayer	-46.0746	0	0	0	0	9.2	7582
Thomas	-157.529	0	0	0	0	11	973
Thurston	-119.39	0	0	0	0	7.7	7186
Valley	54.58857	0	0	0	0	10.2	5633
Washington	241.2504	0	1	0	0	13.8	15508
Wayne	-49.5337	0	0	0	0	18.2	9858
Webster	79.40992	0	0	0	0	9.2	4858
Wheeler	58.5995	0	0	0	0	10.8	1060
York	-49.296	1	1	1	0	13.6	14798

county	Population density	Government expenditure	Initial personal per capita income	Unemployment rate	Waldum3	Highway expenditure
Adams	54.35461	75.68008	21546.31	4.9	0	7.9
Antelope	10.09895	15.09874	12353.65	4.6	1	19.1
Arthur	0.721519	1.864041	19125.35	3.5	0	12.2
Banner	1.228916	2.609658	41998.92	3.2	1	24.7
Blaine	1.214286	2.609658	13979.99	4.6	0	8.7
Boone	10.75837	14.72593	11869.02	5.4	1	16.4
Box Butte	12.71681	25.91018	28765.52	4.9	1	5.3
Boyd	6.261278	5.778528	15228.68	3.9	0	17.2
Brown	3.605437	11.74346	18158.27	6.2	0	13.9
Buffalo	36.82222	58.90371	17344.01	4.6	0	16.8
Burt	18.13374	16.21716	17149.72	8.1	1	23.2
Butler	15.97603	17.14918	15198.11	4.9	1	18.4
Cass	36.43986	29.26545	19987.64	6.3	1	15.6
Cedar	15.37162	14.91233	12259.78	5.4	0	8.9
Chase	5.322148	14.16672	17861.39	4.6	0	12.6
Cherry	1.133702	15.65795	19843.56	4.5	0	21.4
Cheyenne	8.408863	21.80928	22290.71	4.4	0	13.6
Clay	14.12195	19.01322	14984.18	4.5	1	12.9
Colfax	24.12195	16.21716	16267.79	5.3	1	15.1
Cuming	20.28522	19.57244	17468.44	4.6	1	20.9
Custer	5.397511	29.45185	15409.87	4.9	1	22.3
Dakota	64.23643	21.62288	19725.68	6.6	0	7.8
Dawes	6.878311	12.48908	19422.24	3.3	0	10.3
Dawson	22.71283	53.12518	17926.88	7.5	0	14.1
Deuel	5.633867	6.524145	26405.69	5.5	0	13.2
Dixon	15.05696	17.14918	13733.31	4.8	1	14.8
Dodge	67.12921	80.8994	20721.13	6.9	0	8.8
Douglas	1192.306	938.9177	24312.18	5.5	0	5.4
Dundy	3.109783	10.06582	16479.54	2.4	0	10.6
Fillmore	13.75	18.0812	16499.19	4.9	1	15.2
Franklin	7.598958	9.693016	14560.67	4	1	22.5

Frontier	3.73668	9.87942	13480.08	4	1	17.4
Furnas	8.995839	15.47154	15883.58	4.3	1	11
Gage	28.5035	37.28083	17789.35	4.6	0	13.8
Garden	1.667857	8.015378	26231.04	3.8	0	9.8
Garfield	4.145614	4.100891	15185.02	7.9	0	12.2
Gosper	4.642082	3.541679	12969.26	5.6	1	30.2
Grant	1.131613	2.609658	19387.31	3.4	0	9.1
Greeley	6.073684	7.64257	11091.87	6.6	0	12
Hall	88.80819	91.33803	20109.89	5.8	0	11.4
Hamilton	17.12891	19.94524	13993.09	5	1	14.4
Harlan	7.733333	9.320207	13427.69	4.4	0	17.5
Hayes	1.901823	2.796062	13506.28	3.8	1	23
Hitchcock	5.753173	9.320207	16739.32	5.9	1	15.4
Holt	5.632585	21.43648	13779.16	5.3	0	22.9
Hooker	1.373093	3.355275	16289.62	2	0	7.2
Howard	12.00887	19.01322	13183.2	6.3	1	16.4
Jefferson	17.07304	19.57244	17632.17	4.9	0	17.4
Johnson	14.01857	12.67548	14185.2	7.9	1	12.6
Kearney	13.5896	15.65795	15660.91	2.8	1	15
Keith	9.012512	22.74131	22594.15	6.7	1	8.3
Keya Paha	1.691808	2.423254	9526.654	5.1	0	21
Kimball	5.128151	14.53952	26130.63	5.5	0	7.3
Knox	10.36833	20.13165	12266.33	6.4	0	16.5
Lancaster	229.8975	423.1374	21996.01	3.1	0	8.1
Lincoln	14.43762	78.10334	20284.53	6.9	0	8.3
Logan	1.721541	2.050446	20566.13	2.2	1	12.1
Loup	1.496516	2.423254	13600.15	16.7	0	12.4
McPherson	0.690338	1.118425	15383.67	5.4	1	13.2
Madison	54.57739	65.61426	19003.1	5.5	0	7.9
Merrick	18.71339	18.0812	14220.13	5.9	1	13.9
Morrill	4.330961	12.48908	25338.19	7.2	1	13.6
Nance	10.79727	8.760995	13532.48	5.9	1	17.4
Nemaha	20.45721	15.47154	17012.19	4.7	0	12.4
Nuckolls	11.67708	11.37065	14676.37	4.1	1	25
Otoe	24.6878	32.99353	17160.64	5.4	1	13.4
Pawnee	9.092379	10.43863	13381.85	6.5	1	17.2

Perkins	4.109605	13.04829	25958.17	2.5	1	11
Phelps	18.09074	22.18209	18239.05	3.1	1	18.1
Pierce	14.74957	13.4211	13846.83	5.5	1	15.2
Platte	43.12706	40.2633	18725.86	6.6	0	14.9
Polk	14.46224	14.91233	22550.49	4	1	16.7
Red Willow	17.56964	23.48692	20179.74	4.4	0	11.1
Richardson	20.46112	18.26761	17422.6	6.2	0	15.8
Rock	2.375872	5.778528	14451.52	4.5	0	15.8
Saline	22.83652	27.0286	19162.46	3.1	1	9.3
Sarpy	361.4076	160.3076	18985.64	2.6	0	5.3
Saunders	24.85525	29.63826	16392.22	5.4	1	17.1
Scotts Bluff	52.88828	68.78313	23803.54	8.1	0	7.9
Seward	27.45913	25.16456	15732.95	3.1	0	16.7
Sheridan	3.075418	20.13165	19334.92	4.1	1	11.8
Sherman	7.492908	7.64257	11124.62	7.8	1	19.3
Sioux	0.891304	2.609658	24687.66	1.8	1	24.7
Stanton	15.1949	7.828974	14036.75	3.7	1	20.9
Thayer	13.18609	16.58997	15401.13	4.5	1	14.8
Thomas	1.364656	2.23685	21203.57	8.4	0	14.7
Thurston	18.37852	13.6075	11772.97	10.2	1	13.4
Valley	9.934744	15.47154	15776.61	7.3	0	19.9
Washington	40.17617	22.74131	20179.74	4.9	1	14.1
Wayne	22.25282	13.98031	15141.36	3.3	1	20.7
Webster	8.448696	11.18425	14663.28	5.1	1	14.7
Wheeler	1.843478	3.355275	11989.09	2.6	0	16.5
York	25.69097	26.8422	17411.69	3.5	0	16.6

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