

DETERMINING COAL'S PLACE IN THE
APPALACHIAN REGIONAL COMMISSION AND ITS
IMPACT ON POVERTY AND MIGRATION IN
APPALACHIAN KENTUCKY

By

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CHAPTER I

INTRODUCTION

1.1 Introduction

In the United States there is a common proverb “don’t bite the hand that feeds you.” This proverb allows for some insight into the culture of the American people and shows the respect that is often given to those who provide for us. In Appalachian Kentucky this proverb is often extended to one’s place of employment. For Appalachian Kentucky this sign of respect and trust empowered the coal industry. The people of the region do recognize that an unchecked extractive industry such as coal can cause social and environmental problems. Yet, they live with the problems because, for most of the region, the coal industry offers the best wages and until recently had been the largest employer. This grin-and-bear it attitude not only comes from a strong sense of pride in one’s work but also the fact that in the past workers who have spoken out against the coal companies have been fired or worse, blacklisted from the entire industry (Eller 1982). By the late 1960s as part of President Johnson’s Great Society, the Appalachian Regional Commission (ARC) was created as a Federal agency, tasked with funding and providing support for the redevelopment of the region (ARC 2010). It was now up to the ARC to sort out the best way to improve the region.

The ARC or any other agency organizing development must address all of the issues that affect that region, no matter how difficult they are to deal with. In the case of Appalachian Kentucky, coal companies claim that their investments brought modernization and the modern American consumer culture to the region (Eller 1982). This claim allowed the companies to cast themselves as saviors. In the last 120 years, statements such as the one above create a discourse for Appalachia, which claims that the region is unable to develop on its own and is in need of help. In re-examining coal and the coal industry's impact on the region, one can begin to understand some of the reasons why poverty is present in the region.

This re-examination of coal's impact is the starting point for a study of the ARC. This analysis offers a chance to bring the ARC back to the treatment of the causes of poverty and not the symptoms of it. The ARC has done some good for the region by constructing new roads and implementing social programs and reforms (Eller 2008). However, all of these advancements are built upon sand. The sand in Appalachian Kentucky is the fantasy of a stable region. In Appalachian Kentucky, the coal industry is still a major employer but is prone to a boom and bust cycle that can and has left whole communities economically depressed (Eller 1982). With this being said, the services and jobs brought in by the ARC may never fill the void left by the coal industry. In order to close the scars of the coal industry, the coal industry's impact on the region must not be buried but closely analyzed in order to rise above boom and bust economic cycles. By including coal and the coal industry in the analysis of poverty in Appalachian Kentucky, the policies or programs created to eliminate poverty will have a greater chance of success. The following section explains the background of the ARC and how the agency was set up to develop the region.

1.2 Background on the Appalachian Regional Commission

In 1963 President Kennedy formed the President's Appalachian Regional Commission (PARC). Within two years the work of the PARC provided Congress with the needed information to pass the Appalachian Regional Development Act (ARDA). With the passing of the ARDA the PARC's job was done and President Johnson officially formed the ARC as a Federal agency under the umbrella of the Great Society (ARC 1968).

In 1965 Congress designed the ARDA to advance the effort to narrow the economic and social gap between Appalachia and the rest of the country, making the need to migrate out of the region for economic opportunity unnecessary (ARC 1966, 1967, 1968). The ARC's primary goals are:

- *To make recommendations, on programs and projects.*
- *To develop on a continuing basis comprehensive and coordinated plans and programs.*
- *To provide expert technical assistance to the States in their implementation of the Appalachian program.*
- *To serve as a focal point of coordination of Federal and State efforts in Appalachia.*
- *To sponsor, and initiate research on problems facing the region (ARC 1966, 7).*

From its foundation the ARC has had lofty goals for the region. However, the ARC did foresee that without a new administrative system in the region, this experiment in “creative federalism” would quickly fail (ARC 1966, 1). In order to foster intergovernmental cooperation and to limit corruption, the ARC's first task was to get all three levels of government (local, state, and federal) thinking on the same plane. Without the ARC's guidance, the funds provided by the ARDA would have been split between local, state, and federal governments and might have been squandered. The founding of the ARC saw the creation of an unprecedented level of intergovernmental cooperation (ARC 1968, 3). In the last 47 years the ARC's ability to foster

communication and cooperation among all levels of government has become a lasting contribution to regional development.

If unprecedented intergovernmental cooperation is the ARC's great achievement then the ARC's inability to balance road and non-road (social programs) funds is one of its greatest drawbacks (Estall 1982). Once it is pointed out that road funds have been more plentiful than non-road funds, the list of goals above takes on a new meaning. This is because the goals for the ARC in 1966 were vague at best. This has left room for interpretation and with limited funds in the 1980s, the development of the road and highway system took precedence over most non-road projects. This was seen as the most practical way to develop the region but it left the cultural and social problems on the table.

In sum, the ARC has provided a foundation for cooperation and that needs to be recognized. However, the fact that the ARC still provides more funding for roads than non-road project needs to be addressed (ARC 2010). By far, the ARC has achieved more in Appalachia than any other organization but there are still holes that need to be filled. The literature review addresses other theories of development that have been applied to Appalachia as well as their developmental impacts. The literature review also covers coal's impact on the region's development. However, first I review my research questions.

1.3 Research Questions

This project works from the premise that the ARC has not kept coal in mind while creating development policies, thereby not solving the problem of poverty and instead just masking it. A second premise is that coal is a major predictor of poverty and that coal-producing counties experience more migration than the surrounding non coal-producing counties. These premises guide the questions below and will help better understand poverty in Appalachian Kentucky.

Question 1: What is coal's place in the ARC's discourse of development and how has it changed over time?

Question 2: Can a measure of coal production provide the needed analytical power to explain the coal industry's impact on Appalachian Kentucky?

Question 3: Could the instability of the coal industry be a leading cause for poverty and migration out of the region between 1980 and 2000?

The culmination of these questions is the ability to better answer why there is still poverty in Appalachian Kentucky. The above questions are meant to provide balance a between qualitative and quantitative methods in order to analyze the relationship between poverty and coal in Appalachian Kentucky. This balance is needed because individually these questions do not provide as full a picture of why there is poverty.

CHAPTER II

LITERATURE REVIEW

2.1 Introduction

When fighting an adversary as insidious as poverty it is easy to lose sight of the reasons why the “war” was started in the first place. In order to bring the “war on poverty” (Bradshaw 2002) back into perspective, one needs to re-examine the Appalachian region. The first part of this review covers how scholars have treated various forms of development from the early twentieth century to the present. By providing a brief review of current arguments and praises for the various forms of development that have been applied in Appalachia, I can then continue with a deeper analysis of the ARC. In this chapter I also examine works that look at poverty and coal from different perspectives. The difference in these works is that they try not to narrowly define the causes of the current poverty in the region but instead take a more historical look at persistent poverty. Next, I examine the available literature on the coal industry and its impact on the region. In doing this I am able to understand how current and past scholars have treated coal’s influence. By combining a look at past development theories in Appalachia and how coal impacts the region, I am able to see if these past development theories are explaining coal’s impact on the region, or if it is overlooked.

2.2 Development and Its Ever-Changing Face in Appalachia

There is no clear agreement among scholars as to which theory of development best explains or applies to Appalachia. Among the many theories applied to Appalachia, two stand out as the most widely used. The first theory is the Culture of Poverty. The Culture of Poverty is a theory that claims that poverty is a trait that is passed down through generations of people who are unable and unwilling to rise above their poverty. This sense of marginalization and helplessness leads to the idea that the current social/political/economic systems do not serve one's needs. This, in turn, ingrains a sense of futility in the population, completing the circle of the Culture of Poverty (Lewis 1998 [1963]). The second theory is Internal Colonization. This theory was designed as a response to the Culture of Poverty. It shows that the people themselves are not to blame but the coal companies, among other businesses, have directly shaped long-term poverty in the region (Eller 1982).

By analyzing these two theories one can start to see different patterns of development and how that development shaped the region. Also one can learn of the mistakes and achievements of each of these theories. In the future as new theories are proposed and tested, development experts must keep in mind the mistakes of past regional planners so as to not repeat them.

2.2.1 Culture of Poverty

Oscar Lewis is credited with the formulation of the Culture of Poverty theory. Lewis (1998 [1963]) saw the Culture of Poverty as a subculture of modern middle class culture and this subculture was closed off from all other cultural systems. According to Lewis, if one was to eliminate physical poverty, the culture of poverty would persist because it is a way of life.

No matter how much Lewis tries to say that poverty exists in every country, he still states that some people will never be in the Culture of Poverty because their "original" culture is too strong. Lewis stresses that a Jewish community in poverty would not develop a Culture of

Poverty because their tradition of literacy and their religion gave them a sense of identification. However, a Mexican or African community would develop a Culture of Poverty because they lacked a tradition of literacy and a unifying religion (1998 [1963], 7-8). This statement is biased because it stereotypes groups of people to be better than other groups of people. Lewis uses traits such as isolation, uncontrolled pride, loyalty to family, and feuding as the leading cause of the Culture of Poverty. Scholars, such as Jack Weller and Herbert Gans, looking for ways to explain poverty in Appalachia prior to the 1980s, were quick to use the Culture of Poverty because the traits above, according to these scholars, were abundant in Appalachia (Walls and Billings 2002).

How a theory that is openly biased, and to some extent racist, can be widely accepted in academia is unclear. On the one hand, Culture of Poverty provided a simplistic answer to the question of why there is poverty, but blind acceptance of a theory is not acceptable. Over time the Culture of Poverty became widely criticized for those biases and its shallow analysis of why poverty exists. The Culture of Poverty's analysis was shallow because it only looked at the aftermath of poverty and concluded that the people were to blame for the situation they lived in. This was only half of the story because time had washed away the other causes of poverty. A cycle of poverty could have existed but the cause might have been the loss of a major employer, overuse of natural resources, population decline, or a loss of economic diversity. To say that poverty was caused by isolation, uncontrolled pride, loyalty to family, and feuding, was to ignore other important economic, political, and institutional factors.

For the past 30 years geographers and historians who specialize in Appalachia have been trying to say that Lewis' Culture of Poverty has a middle-class bias and does not go beyond isolation, uncontrolled pride, loyalty to family, and feuding to explain poverty in Appalachia. This middle-class bias treats people who are from lower classes as victims of their own creation, trapped in a cycle that they cannot escape. A middle-class way of life was privileged and seen as a norm shared by society (Jackson 1989a). By applying the Culture of Poverty to Appalachia, one

assumes that Appalachians comprise a homogeneous lower class of people who have no chance of ever breaking the cycle of poverty and therefore have given up hope of economic improvement. In this way, culture is seen to have its own driving force. This superorganic form of culture is the problem. By allowing culture to have in a sense “agency,” one can easily overlook other reasons for poverty (Duncan 1980). This overt cultural determinism and class bias helped to discredit the Culture of Poverty (Duncan 1980, Jackson 1989a).

Duncan (1980) shows that viewing culture as superorganic is just a form of cultural determinism. Such culturalism was seen by many to be the answer to the problems of environmental determinism (Semple 1901), but Jackson (1989b) and Duncan (1980), state that culturalism is still a form of determinism, just not environmental determinism. What is clear in Appalachia is that neither culture nor the environment alone explains why there is persistent poverty in the region. The one thing the Culture of Poverty leaves out is the institutions. People themselves may not cause their own poverty; they may have help from institutions in charge of their well-being or development.

2.2.2 Internal Colonization

In the 1980s a challenge to the Culture of Poverty’s dominance as a way of thinking about Appalachia began to emerge. One of the leaders of this challenge is Ronald Eller. Eller’s (1982) work is rooted in the theory of Internal Colonization. However, Eller was not the first to state a need for change, just the person to start the Internal Colonization movement. From the beginning, Eller emphasized that Appalachians were isolated and had kin-based networks, just like the rest of rural America at the turn of the twentieth century. In contrast to the Culture of Poverty theory, the theory of Internal Colonization shows that it was not the people or their social structure that led to poverty, but instead the industrialization and modernization brought by outside companies (1982). Eller writes that as the coal companies advanced deeper into the

mountains they left the land scarred and barren, covered by a black residue of coking ovens, coal tipples, and slag piles (1982,199). Since Appalachia offered few established communities, the coal companies became “feudal lords of closed company towns in which mountaineers exchanged their traditional independence for an existence characterized by dependency, powerlessness, and a lack of autonomy” (Eller 1982, 199). Quotes such as this, show that Appalachia was being restructured as an internal colony, at least in the view of some.

One problem with the Internal Colonization theory is that its main goal is to show that external companies and pressures are the cause of many the region’s problems and that the people are victims of exploitation (Billings and Blee 2000). This is a problem because it only sees the outside companies as detrimental and does not see the good they brought. Also, the Internal Colonization theory does not show any internal problems that could have led to poverty (Billings and Blee 2000). Since the Internal Colonization theory was the first theory of Appalachian development after the Culture of Poverty theory, the “us” vs. “them” mentality is understandable. This type of knee-jerk reaction is not unprecedented in the U.S. As previously discussed, a similar reaction can be seen in geography when environmental determinism passed from favor and the Berkley School’s cultural geography took its place (Jackson 1989b).

These criticisms aside, Eller (1982) allowed the greater American public to see a dimension of Appalachian poverty that had been hidden for years. With the theory of Internal Colonization Eller (1982) was able to jump-start research in Appalachia. Eller’s (1982) book is significant because it marks the starting point for Appalachian development research.

As time passed scholars began to analyze and expand on Eller’s (1982) work. Paul Salstorm (1994) is one such scholar. At the heart of Salstorm’s (1994) argument is the Internal Colonization theory, but he takes it in a different direction than Eller (1982). Salstorm (1994) explains that since the mid-nineteenth century Appalachia has been increasingly vulnerable to

capitalist development. However, the new industries are not the sole cause of the region's underdevelopment (Salstorm 1994, viii). Salstorm demonstrates that the trade and barter system and subsistence farming in Appalachia were strengthened by the extra wages that could be earned in the factory or the coal mine (viii). In time, both employer and employee became dependent on each other (Salstorm 1994). Salstorm provides this example from an early firebrick manufacturer in Eastern Kentucky:

I cannot forget the loyal, able, and efficient workers I found in the district. They were not only willing to render good service but they proved to be the best friends I ever had... They were ready to come at any hour of the night or day and spurned the offer of pay. We will never forget the safety we felt among these mountaineers. (1994, 43)

This dependency formed because of the trade and barter system in place in Appalachia. The trade and barter system grew out of practices that put voluntary reciprocity above contractual reciprocity (Salstorm 1994, 42). This voluntary reciprocity endeared the mountain worker to his or her employer and as long as the employer met their worker's needs, the system worked fine (Salstorm 1994). Over time, as the employers took greater advantage of their loyal workers by not paying a fair wage or not providing other services, the workers rioted because their employers there not doing what the workers felt their labor morally obligated the company to provide (Salstorm 1994). This last statement allows one to see that unmet or different economic and social expectations can drive a region apart and affect development.

Salstorm provides a new dimension to Eller's internal colony. This new dimension allows a reader to see that the problem in Appalachia is not black and white or "us" vs. "them" but much more complex. Therefore, one must keep in mind that Appalachia's problems may have been shaped in varying degrees by both locals and the outside companies.

The Internal Colonization for Appalachia was not theorized until after the founding of the ARC. However, the founders and proponents of the ARC did not completely accept the Culture

of Poverty theory as the theory that would be used to develop the region. One such proponent was John Friedmann (1966). The spirit of Friedmann's six-stage development plan seems to have been to integrate Appalachia with the surrounding regions and the national economy. For example, some of his stages included sub-region specific economic development plans and a call for the active support of the local population. This support would continue the changes, once the initial funding and national/state support ended. Overall, Friedmann questioned the determinist nature of the Culture of Poverty and argued that a balanced plan for economic development based on integration is desirable (1966).

2.3 Developmental Impacts

After looking at both the Culture of Poverty and Internal Colonization it becomes clear that Appalachia is in need of a middle ground that provides a balance between the individual and the company. The Culture of Poverty theory is no longer accepted as a developmental theory, by the ARC, the people of the region, and Appalachian scholars, in Appalachia. However, language about Appalachian development that is reminiscent of the Culture of Poverty can still be found. In Appalachia today, theories on development tend to take into account internal colonization and governmental atrophy. This means that the Internal Colonization theory has been able to stay relevant by expanding over the years to include not only private development but also all forms of development that keep Appalachia a "sacrifice zone" (Purdy 2002, 214).

Purdy uses the premise of the Internal Colonization theory and adds a new layer of analysis. Purdy holds that the coal industry no longer makes up the majority of the Appalachian economy, yet it still has political impunity (2002, 214). Purdy's twist on the Internal Colonization theory is the addition of laws and policies that are meant to manage the extraction of natural resources in the United States but instead contribute to the exploitation of the region (2002).

The law that has the most impact on Appalachia is the Surface Mining Control and Reclamation Act (SMCRA). SMCRA was implemented in 1977 by the Carter Administration. SMCRA was intended to manage the expansion of strip-mining that was sweeping the United States by placing environmental regulation on the mines. SMCRA also required the coal companies to return the mine sites to their “approximate original contour.” However, a coal company is exempted from this rule if it made the land available for commercial or recreational uses (Purdy 2002, 209-210).

Purdy explains that between 1977 and 1980 President Carter’s Office of Surface Mining (OSM) was staffed with officials who made sure federal law was strictly enforced through a combination of field inspections and annual reviews of state programs (2002). Under President Carter, OSM inspectors shut down mines that violated SMCRA and irresponsible operators were fined. During this time, inspectors were met with periodic violence and a few inspectors were taken hostage by angry miners. In 1980 when the Reagan Administration took over, Reagan’s Interior Secretary James Watt appointed OSM administrators who had fought SMCRA in the courts (Purdy 2002, 211). This meant that over time OSM was no longer able to enforce SMCRA because it was staffed with officials who put profit above environmental enforcement. This trend continued into the 2000s.

The lax enforcement of SMCRA, according to Purdy, has led to people selling their homes and moving because of the strip-mining process (blasting, digging, and the amount of particulates in the air) (2002, 208-209). Purdy also shows that the wages and profits made on the extraction of coal in Appalachia came with a steep environmental cost. This environmental cost has made the region an accepted sacrifice, which enforces the image of Appalachia as an internal colony.

Purdy makes this observation:

Citizens will have to insist that market prices and profit margins should not alone determine the shape of the country's landscapes and communities. We will have to decide whether to maintain our comfort at the price of more sacrifice zones, with their dead towns and leveled mountains (2002, 214).

This shows that Purdy not only wants the people of Appalachia to stand and say “the buck stops here,” but he also calls for the whole nation to rethink how we view regions with abundant natural resources. This call to not accept colonization and marginalization is a needed sentiment in order to muster national support of the renewed enforcement of SMCRA. With renewed enforcement SMCRA can start the cleanup of the region and help break the region’s dependency on corrupt enforcement laws and irresponsible employers.

In contrast with Purdy’s anti-strip-mining stance, Bradshaw (2002, 1985), claims that strip-mining benefits the region. In both works Bradshaw states that the ARC is providing the needed development to the region and that the economic situation in Appalachia has improved since 1965. The ARC has helped Appalachia recover from high poverty and low living conditions, but Bradshaw’s works only show the positive side of the ARC. By only showing the positives (increased housing, increased income, new water treatment plants, and so on) one cannot make a full assessment of the ARC. True balance comes when one can see the negative sides as well. Seeing the negative allows the public to evaluate the ARC, to see what programs and projects are working and which ones need to be reworked. Bradshaw states that by allowing the coal industry to grow, the ARC is increasing the economic power of the region. However, in 2001 a report sponsored by the ARC shows that increased coal industry does not directly lead to increased economic power or jobs, because of increased mechanization and strip mining, both reducing the number of miners needed to maintain the same level of production (Roemaker 2001).

Bradshaw claims that as the ARC developed Appalachia's infrastructure, the coal industry, used this new set of roads to expand its surface mining operation in order to compete with the western coalfields (2002; 1985). This may be true, but Bradshaw only shows this as a positive and does not allow for any of the local problems that this expansion may cause. Strip-mining expansion increases the likelihood of residents having to live with increased blasting, digging, and particulates in the air. Also, if the strip-mines expand close enough to a community, the residents may be forced to move because of the unsafe living conditions these problems cause. Bradshaw also states that "more strip-mining not only made it easier to return mined land to other uses because the mined land is now flat, but also meant that miners were earning better wages as skilled operators of machinery" (1985, 397).

Yes, miners do earn a higher wage for operating machinery but underground mines are just as mechanized. Long gone are the days of picks and shovels. Plus, being underground makes the jobs more hazardous, therefore wages can be higher. Bradshaw claims that reclaimed mines are a source of flat land for economic development but what he does not state is what has been built on the land. Hospitals, industrial complexes, prisons, and airports have all been built on reclaimed mine sites but this only covers a few of the mines sites in Appalachia. For the most part, reclaimed mines are zoned for "wildlife and forest management," yet little grows on these reclaimed mines and what can grow is nothing like the dense hardwood forest teeming with life that once thrived before the strip-mining process (Purdy 2002).

Overall, Bradshaw's works allow a reader to once again view Appalachia as an internal colony or as Purdy puts it a "sacrifice zone" (2002, 214). Bradshaw never mentions internal colony or sacrifice zone, but the trouble that he goes through to state that increased coal production was a major source of prosperity for Appalachia in actuality only serves to strengthen the toxic and unstable relationship between the coal industry and Appalachia. In the end, Bradshaw's discussion of increased strip-mining decreases the effectiveness of his analysis of the

existence of the ARC itself and helps to highlight the fact that the region is still struggling with integration and cooperation.

By 2003, the integration and cooperation that Friedmann (1966) called for had yet to be achieved. Glasmeier and Farrigan (2003) demonstrate that Appalachia is still significantly influenced by natural resource extraction. They point out that poor communities in a resource rich area tend to be engulfed by noxious economic activities that pollute the land, decrease home values, and threaten residents' health (132). Their analysis of the region is in line with the Internal Colonization theory but at times their comments seem to play on stereotypes of the region, invoking the Culture of Poverty. They write:

Driving along narrow valley bottoms, which parallel constantly shifting dendritic streambeds ... It appears as if a great flood upstream scoured a landfill site and then scattered humanity's waste in every direction... All along the highway are heaps of human residue, plastic bottles, old tires, household appliances, broken toys, and abandoned cars. Sometimes the piles seem almost deliberately stacked to look their best, given the circumstances (Glasmeier and Farrigan 2003, 135).

These generalizations may be derived from facts but one needs to avoid implying that all valleys in Central Appalachia are the same. This is because such generalizations can affix an image to a place that may reinforce stereotypes of the region.

Also, as Glasmeier and Farrigan describe the development of Appalachia they state that Appalachia has been under the yoke of a single industry type for so long that the people of the region have a feeling of powerlessness and live in a culture of despair (2003, 134). Eller (1982) also makes similar statements, but Glasmeier and Farrigan (2003) seem only to give the negative aspects of the situation. Using the term "culture of despair" could lead one to think that since the people feel powerless then they do not want or try to change, reminiscent of the Culture of Poverty. Nevertheless, Glasmeier and Farrigan show that development in Appalachia is still

slowed by the level of primary industry present. This view allows one to begin to see primary industry (mainly coal) as a constraint on the region.

2.4 Coal: A Social and Geographic Constraint

For more than three generations, the coal industry has influenced life in Appalachia (Edwards et al. 2006). Over the years it has become second nature in Appalachia to live with the destruction of the landscape and to bend to the will of the coal companies (Lewis 1998). Nevertheless, this lifestyle is neither healthy nor widely accepted anymore. During the industrial development of Appalachia, settlement patterns and lands rights were altered, not at the request of the local population but on the demand of big industry (Lewis 1998, Biggers 2006).

Ronald Lewis (1998) shows that the widespread introduction of the railroad had the potential to bring wealth and development to the region. To do so, the railroad companies needed to connect not just large cities, timber camps, and coal mines but as many towns as possible. By interconnecting these small towns with the larger cities, county seats, and the rest of the nation, Appalachia could then become a truly integrated part of the United States. As Lewis shows, however, that did not happen. Railroads bypassed many small towns in Appalachia not because of the mountainous terrain but because of the whims of the railroad companies, which were sometimes controlled or owned by men of great power and local influence (Lewis 1998).

In Randolph County, West Virginia for example, the railroad bypassed the county seat of Beverly in favor of Elkins (Lewis 1998). The railroad was owned by Senators Henry G. Davis and Stephen B. Elkins' Coal and Coke Company. The coal company also sponsored raids of the courthouse in Beverly to steal the public records. These thefts continued for a few months until the courthouse in Beverly was burnt down. National newspapers picked up this story; however, the newspapers reported the story from Senators Henry G. Davis and Stephen B. Elkins' point of view (Lewis 1998).

What can be taken from this story is that personal gain and public gain do not necessarily go hand-in-hand. Lewis (1998) succeeds in showing that Senators Henry G. Davis and Stephen B. Elkins' plans for development in Randolph County were not for the county's growth but for the senators' personal wealth. In turn, the railroad became a social and geographic constraint, instead of a social and geographic benefit. By drawing attention to personal greed, Lewis (1998) adds a new layer to the complexities of development in Appalachia. Now development is not just "us" vs. "them" but a question of increasing profit and how can we get away with it.

Lewis (1998) shows that the region was not backward and violent. Occasional acts of violence did occur when people's way of life was threatened by the coal and railroad companies. This occurred because Appalachians felt that the companies were obligated to support them because of the loyalty and service, they provided the companies. It appears that coal and railroad companies manipulated cultural traits of Appalachian people, to obtain their profits. These cultural traits were a sense of loyalty, pride in one's work, and the willingness to help their fellow citizen. These traits are not exclusive to Appalachians, but the coal and railroad companies used them to their advantage. This resulted in a reorganized region built around an extractive economy. This reorganization constrained the region and allowed for the growth of coal company towns (Lewis 1998).

As coal towns developed, the population started to move toward these new centers of growth. This migration gave the coal companies a labor force and the companies in return provided their workers with shelter, food, and manufactured goods. As the companies gained control they were able to rewrite the economies and culture of the region to suit their needs. The economy was rewritten in a way that replaced the barter and trade/low profit economy with a wage labor/high profit economy. However, the high profits did not go to the workers just the owners of the mines; these owners were often outsiders (Banks 1995). The culture was also changed by the introduction of wage labor. The coal companies also started to build schools,

health clinics, housing, movie theaters and various stores, which provided the people of the region with places to spend their new wages.

By providing this social capital the coal companies were in effect buying the loyalty of their workers, which made them dependent on the coal company for nearly all of their day-to-day needs. Over time, the lure of high wages and modern comforts drew people off the ridge-tops and out of the small hollows. This migration was the final straw that ended self-sufficient farming in Appalachia (Eller 1982).

People did leave their homes in the fashion stated above, but not all. For some the need to move was chosen for them. Coal companies did buy land in the region but most of the time they just bought the mineral rights under a “broad form deed.” These deeds were written in a way that the people of the mountains got to keep their land but the coal companies got the minerals under it. This kind of “upfront money” for minerals the people of Appalachia barely used was seen as a way to make a few extra dollars. Plus, the people got to keep their land and livelihoods. However, the broad form deeds included a clause that allowed the coal companies to extract the minerals in any manner they saw fit. This meant that if a farm was over a coal seam the company owned, the company had the right to evict the people from the land and mine the coal (Drake 2001).

Drake (2001) provides another dimension of the migration story in Appalachia. The power of the coal companies was not just in what they offered in compensation and creature comforts but also in their ability to move whole communities in order to increase profits. Drake (2001) and Banks (1995) allow us to see that the coal companies were able to hide their push for profit under the guise of regional development and progress. This guise came in the form of social capital (roads, towns, hospitals, and school). This allowed the coal companies to gain the population’s trust and also the blessing of federal government, which in turn allowed the coal companies to increase their profits. One area that Drake (2001) and Banks (1995) do not touch on

is how strip-mining impacted the region. By not addressing strip-mining Drake (2001) and Banks (1995) are leaving out an important piece of Appalachia during the last 30 years.

Wagner and Obermiller (2004) offer a look into the life of migrant workers that the coal industry provided for. According to Wagner and Obermiller, although new migrants came from the whole Appalachian region, most of them were from areas close to the new mines or company towns. By showing the highs and low of a boom and bust economy, Wagner and Obermiller (2004) are able to give a clear picture of life in a company town. They show that life was good but over time the coal companies, in order to maintain profits, cut off support for the towns, leaving the towns and their people, who were unaccustomed to running a town by themselves, all alone. This created a power vacuum that was filled by individuals unable to manage the needed changes, and so the region languished for years. By giving a firsthand account of how the region became poor and has stayed poor Wagner and Obermiller (2004) are able to show one reason why Culture of Poverty does not apply to Appalachia. They show instead that Appalachia was a region that became highly dependent on a single industry that was unable to provide long-term support for the social development of the area.

Lorkin (1998) explains that the reorganization of the region, to center around coal, cut through all aspects of life. Lorkin states that in the 1930s it was not worth it to fight the growth of the coal companies because they owned the food and shelter the miners and local people used. Thus, the coal companies could control the movements and limit the rights of the locals (Lorkin 1998, 81). Even as social movements in Appalachia gained support in the 1980s it was “difficult for them to gain legitimacy in the courts, because the justices are related to coal company owners by birth or deed” (Lorkin 1998, 81). With the law on the side of the companies, coal becomes an all-inclusive geographical constraint. This means that coal does not just affect the land but social and legal aspects of life in the region as well.

Today, an example of the tremendous legal and environmental leeway given to coal companies is the extreme version of surface mining, called mountain top removal (MTR). Erik Reece (2006) spent a year documenting the Lost Mountain mine site in Perry County, Kentucky. The devastation of the mountain itself was important in the book but it was not the main topic. Reece (2006) points out that from the moment MTR permits were issued, Lost Mountain became a restricted area. MTR is not only changing the physical landscape in the region but also the social relationship between the people and the coal companies (Reece 2006). By making Lost Mountain a restricted area MTR completely changed the way people use and view that area. By allowing the coal companies to have this power, people are at risk of losing their livelihoods and their areas of recreation.

MTR is a geographic constraint because the mining process fills in headwater streams, disturbs groundwater flow, and destroys wildlife habitats (Reece 2006). As a social constraint MTR affects home values, alters living patterns, damages home and business foundations, and increases the rate of road repair. The main purpose of Reece's book is to show how a MTR site can alter a landscape. In that respect Reece succeeds. However, Reece does not go deep enough. He raises a lot of questions but does not provide many answers. The reason for this could be that Reece is a journalist and the book was written in a journalistic style and not a scholarly research style. The fact still remains that this work has uncovered more side-effects of MTR and has signaled a renewed call for scholarly research on the impact of MTR, both geographically and socially (Reece 2006).

In the same vein as Reece's book, the documentary "Sludge" provides an analysis of MTR and its side-effects in Appalachia. Like Reece's book, "Sludge" is intended for general knowledge and documents the Martin County, Kentucky coal slurry spill that occurred in October of 2000 (Salyer 2005). This spill was the largest man-made environmental disaster east of the Mississippi, until December 2008 when a coal fly ash slurry spill occurred at the Kingston Fossil

Plant (NASA 2008). The event was triggered by the rupture of a slurry pond that released 300 million gallons of coal sludge into Coldwater and Wolfe Creeks (Salyer 2005). The Martin County coal slurry spill was 30 times larger than the wreck of the Exxon Valdez in Alaska (Salyer 2005).

It took six months for the *New York Times* to run a story about the Martin County spill, and that story was buried deep in the paper. Martin County Coal (a subsidiary of Massey Industries) was fined but the fine was reduced 90% to \$5,200. This was not the first time that Martin County Coal's slurry pond broke. It ruptured in 1994 and released 100 million gallons of slurry (Salyer 2005).

Both “Sludge” and *Lost Mountain* demonstrate that the issues illustrated by Purdy (2002) are still current and in need of increased scholarly attention. “Sludge” and *Lost Mountain* show that Appalachia is indeed treated as a sacrifice zone, and OSM and SMCRA are unable to change this situation. With these two works and others like them in hand, researchers have the tools needed to inform the rest of the United States on the issues in Appalachia. This is because “Sludge” and *Lost Mountain* are in popular media styles (documentary and novel), but they have a scholarly slant. Researchers can harness this media and follow them up with scholarly texts in order to raise awareness about Appalachia.

2.5 Conclusions

This literature review has covered the background of the ARC, the changing development of Appalachia and the theories that have driven it, and how coal is a social and geographic constraint. This literature review provides a guidepost to the rest of the thesis. The literature review shows that there is a need to address why Appalachia is seen as a sacrifice zone and to expand the scholarly research on areas that have been covered by popular media sources. In this literature review, I have shown that Appalachia can be and is covered from many angles.

However, research in Appalachia tends to occur in clusters and these clusters are strung out over time. This means that in Appalachia there is a need for continuing research. By providing constant research the region and its people can start to be seen as more than poor, isolated, mountain folk. Just as continuing research and documentation changed commonly held feelings of all sharks being bloodthirsty killers, increased and balanced coverage of Appalachia will provide a starting point for changing the longstanding stereotypes and current economic situation.

CHAPTER III

METHODOLOGY

3.1 Introduction

This study uses both qualitative and quantitative methods to better understand the relationship between coal and poverty in Appalachia. The three questions that structure the research are restated below.

Question 1: What is coal's place in the ARC's discourse of development and how has it changed over time?

Question 2: Can a measure of coal production provide the needed analytical power to explain the coal industry's impact on Appalachian Kentucky?

Question 3: Could the instability of the coal industry be a leading cause for poverty and migration in the region between 1980 and 2000?

3.2 Qualitative Questions

My first research question involves a thematic discourse analysis. Discourse is defined as "a particular form of language with its own rules and conventions and the institutions within

which the discourse is produced and circulated” (Rose 2007, 142). Discourses can be expressed through countless types of visual and verbal images and texts, and also through the practices that those languages permit (Rose 2007, 142). As an institution, the ARC sets the region’s boundaries and establishes its sub-regions, the accepted history of the region, the key areas of interest in the region, and the social and economic needs of the region. By doing so, the ARC has constructed certain discourses that define how and what people think about Appalachia.

Based on my readings, coal is a subject that the ARC touches on, but the ARC seems to maintain a distant relationship with coal. Conducting a thematic discourse analysis will allow me to examine the context in which coal is discussed. Understanding this context will permit me to gauge how important coal is to the ARC and how coal is treated in relation to the development of Appalachia. A discourse analysis is valuable in a geographical study such as this because the ARC discourse over the past 40 plus years has defined the public interpretation of Appalachia. The discourse has determined where the Appalachian region is and what is said about the people of the region themselves.

To answer Question 1, I analyze texts published by the ARC itself. The texts are intended to enable a thematic discourse analysis. The texts I am using are ARC annual reports. Since these reports have been produced every year, there are 47 years of data. Thus, I decided to use three reports per whole decade, in order to get a broad sample instead of using all 47 annual reports. I do not use annual reports from 1966-1969 because all of the sixties are not represented. Also, I alternate between every other odd and every other even year in order to get three annual reports per decade and to have a few back-to-back years to judge repetitiveness in the writing of the annual reports. The years I use are: 1971, 1975, 1979, 1980, 1984, 1988, 1991, 1995, 1999, 2000, 2004, and 2008.

By using ARC annual reports for my thematic discourse analysis I obtain my information about the ARC directly from the ARC. The ARC itself is the best source for this kind of discourse analysis. The annual reports provide a good framework of what the ARC plans for the region and what has been accomplished. This set of texts provides the clearest look at the ARC's discourse and its change or continuity over time.

To carry out a thematic discourse analysis, I follow the six phases of thematic discourse analysis. The six phases are: know your data, formulate codes, search for themes, review themes, define and name themes, and produce a report (Braun and Clarke 2006, 87). Also since some themes emerged as I read the texts, I added them to my list of themes (Singer and Hunter 1999). This method is less common but it enables the researcher to incorporate significant themes that might have otherwise gone unnoticed (Braun and Clarke 2006, 86). The data extracts that I used to code my themes are in Appendix A.1.

This thematic discourse analysis allows me to see how coal is represented. For example, is coal viewed as a resource, as a social and geographic constraint, or as both? It is important to know the place of coal in the discourse of the ARC if we are to understand approaches and philosophies that guide the region's development and to what extent they have changed over time. This analysis paves the way for questions 2 and 3.

3.3 Quantitative Questions

In the following sections I set up questions 2 and 3. These two questions stem from the questions above but allow me to focus more specifically on a single area of Appalachia. Questions 2 and 3 will allow me to see if the levels of coal production in Appalachian Kentucky offer some explanation to the poverty and migration in the region.

3.3.1 Data and Data Manipulation

In order to answer both questions 2 and 3 I needed to choose a time period in which to start my search for data. In choosing a time period, I tried to keep in mind the start date of the ARC, which was 1965, and estimate how long it would have taken for the ARC to be well established in the region (ARC 2010). Also, the Central Appalachian region experienced a boom in the coal industry in the 1970s that carried through to the mid-1980s (ARC 2010). With these facts in hand, I chose a three decadal time period. This means that I use three datasets consisting of the same type of data. The only thing that changes is whether the data are from 1980, 1990, or 2000. By choosing a three decadal time period I am able to show the impact of coal in a decade that coal had a positive impact (1980), and I am then able to show the long term effects of that boom in the other two decades. In order to populate my dataset various data sources were used. A list of these sources can be found in Appendix A.2. Below I list the variables used in each of my datasets (1980, 1990, and 2000).

Dependent Variable

1. Poverty Rate

Independent Variables

1. Tons of coal per person in poverty
2. Coal Severance Tax receipts
3. Median Age
4. Net Migration Rate
5. Percent of the population with a high school diploma or higher
6. Per Capita Income
7. Unemployment Rate

After completing the dataset, the next step was choosing the appropriate method for analysis. For this data I have chosen to use ordinary least squares regression (OLS) (Burt et al. 2009). An OLS regression allows for the measurement of the strength of the causal relationship between the data. These measurements can then help understand or gain insight on data correlations why. However, OLS does come with a few assumptions that need to be met before analysis can begin. First, there needs to be homogeneity of variance. This assumption states that the variance of a population from which different samples are taken must be equal. Second, all data values must be independent from one another. Third, the regression must fit the data. This means that since OLS is a linear model, the data must also be linear. Lastly, the error terms must be normally distributed (Burt et al. 2009, 472-475; Montello and Sutton 2006, 167-168). By meeting these assumptions there is greater confidence in the validity of the results.

Since OLS is a global analysis method, I have also conducted analysis at the local level. One reason to conduct local level analysis is that local analysis allows you to see differences between the subunits of a study area instead of one measurement for the whole study area (Fotheringham et al. 2000, 93). This means that a regression analysis gives one result for the whole study area. A local analysis breaks the study area down to the smallest spatial unit provided (in the case of this study the smallest spatial units are counties). By looking at the local level I will be able to see if there are spatial clusters around the counties that have coal. There are several local analysis models to choose from but for this project I have chosen to use only one. The method that I have chosen is Local Indicators of Spatial Association (LISA). I selected this method because LISA is the clearest and most straight forward method, for me and this project (Fortin and Dale 2009). By adding local statistics I am able to offer a rounded analysis of my study area and data, which in turn provides more detailed results.

By applying these two quantitative methods I am able to see if the ARC needs to take a closer look at coal's impact on the region. With question 2 and 3 I feel that I am able to provide a

starting point in analyzing coal's place in the ARC on a quantitative level. Also, questions 2 and 3 provide balance to the answers found when asking question 1.

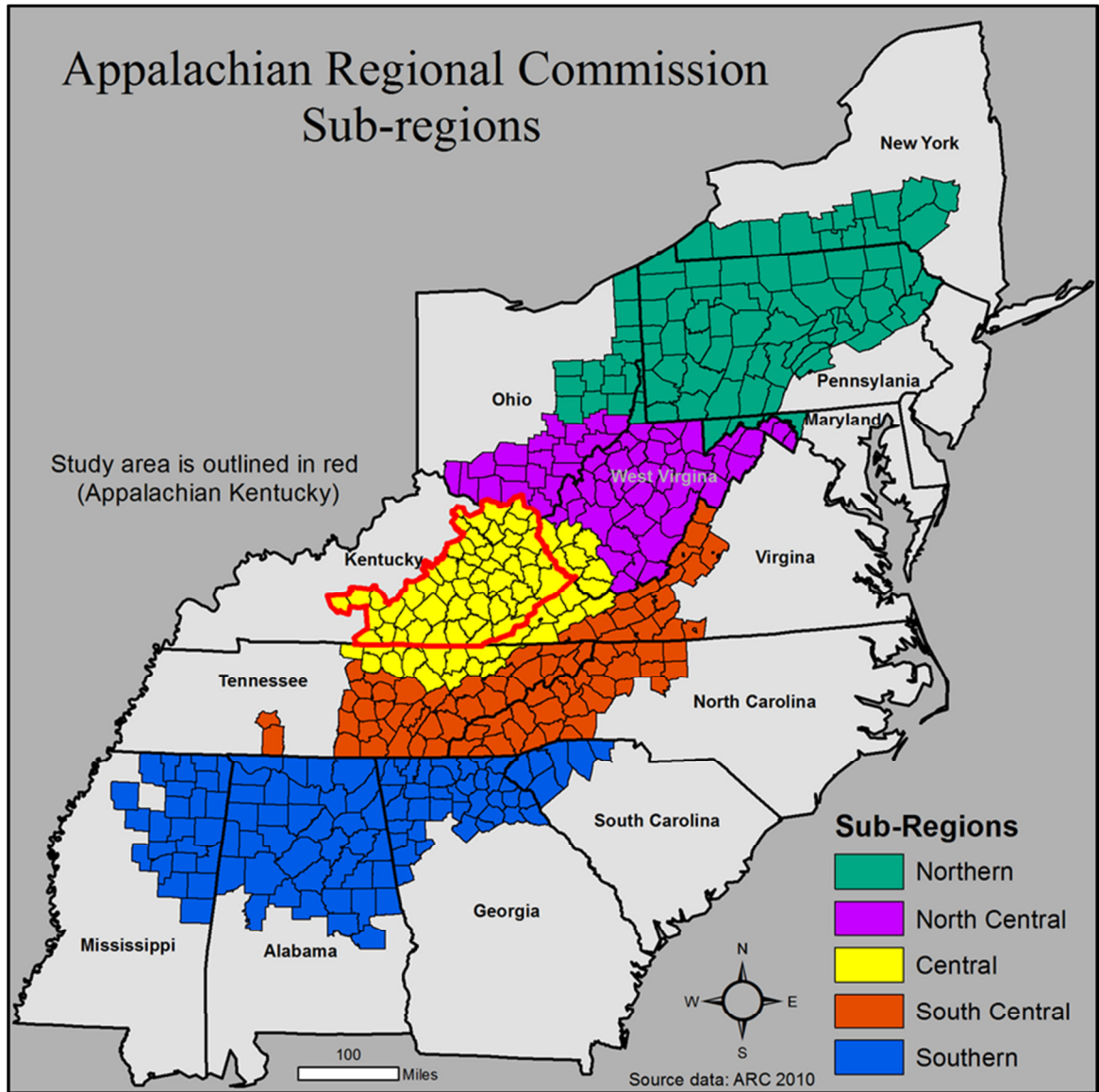
3.3.2 Study Area

Appalachia is a region that has been defined and redefined many times over the last hundred and twenty years. The problem with the Appalachian region is that it is sometimes defined by its physical, political, social, economic characteristics, or by a combination of all of four. Today, the leading definition of the Appalachia region is the definition set by the ARC. The ARC definition is one that combines all four previous definition types. The ARC defines the region as 205,000 square miles in area, which includes all of West Virginia and parts Alabama, Kentucky, Georgia, Maryland, Mississippi, New York, Ohio, Pennsylvania, North Carolina, South Carolina, Tennessee, and Virginia. This definition of Appalachia encompasses 421 counties and includes 23.6 million people, or about eight percent of the U.S. population (ARC 2010). This definition gives the region tangible geographic shape but is not limited to just the spine of the Appalachian Mountains or the central region around West Virginia, Kentucky, Virginia, and Tennessee. One drawback to the ARC's definition is that poverty is a main source of consideration for inclusion (Eller 2008). This means that some of the 13 states were allowed to include counties that were not traditionally thought of as Appalachian counties because of their economic status (Eller 2008). The same can be said of counties that are traditionally defined as Appalachian counties but are left out because of a stronger economic situation (Eller 2008).

After careful consideration it is clear that for questions 2 and 3 the ARC definition of Appalachia is the best fit. This is because it provides a solid geographic base and provides flexibility by including Appalachian Plateau counties as well. Appalachian Plateau counties are needed because questions 2 and 3 focus on Appalachian Kentucky. Appalachian Kentucky includes 55 eastern counties that the ARC has designated "Appalachian." I have chosen Kentucky

because of the high concentration of coal mining and the availability of coal production rates, coal severance tax numbers, and other coal-related data. Also, the ARC's definition of the region closely fits the coal regions of Kentucky and the ARC provides detailed data at the county level for all of the counties in Appalachian Kentucky. Figure 1 below provides a map of the Appalachian sub-regions (ARC 2010). The red outline denotes the study area.

Figure 1: Appalachian Regional Commission Sub-regions



From a quantitative standpoint, the region of Appalachian Kentucky meets the requirements for any statistical quantification (Burt et al. 2009). First, the study area is greater than thirty spatial units and is contiguous (Burt et al. 2009; McGrew and Monroe 2006, 110). Lastly, the error terms show a normal distribution; these results are found in section 5.3 (Burt et al. 2009).

3.4 Conclusions

I feel that by using both a qualitative and quantitative analysis I am able to explain coal and its relationship with the ARC and Appalachian Kentucky better than if I were to just use one approach. Data sources for all following sections are included in the reference section. This is accomplished by using a thematic discourse analysis to uncover the themes behind the ARC's management of the region and specifically how the ARC manages coal. Also, by providing a variable analysis, an OLS regression, and a LISA analysis I provide a quantitative angle to support the qualitative finding. This allows me focus on my questions and in the end form stronger conclusions.

CHAPTER IV

ANALYZING THE ARC'S DISCOURSE

4.1 Introduction

The intent of this chapter is to answer the question: “what is coal’s place in the ARC’s discourse of development and how has it changed over time?” By answering this question I provide insight into the nature and the strength of the ARC’s commitment to addressing coal in the quest to improve Appalachia. Also, this question provides a foundation in addressing whether coal’s instability and level of production impacts poverty and migration in Appalachian Kentucky.

In this thematic discourse analysis I use twelve annual reports. I have done this for the purposes of manageability because the ARC spans 47 years. I have spaced the twelve annual reports in order to obtain three reports per decade. The years I have chosen are: 1971, 1975, 1979, 1980, 1984, 1988, 1991, 1995, 1999, 2000, 2004, and 2008.

During my analysis I identified four themes. These themes fall into two distinctive time periods: time period 1, 1971-1980 and time period 2, 1984-2008. What makes these time periods different is the content that is found in the annual reports.

Time period 1 coincides with the early stage of ARC development and there are two prominent themes at work. These themes are that isolation and the road network have set the region apart, and energy investment brings coal center-stage but coal is not the only cause of Appalachia's economic fluctuation. The discourse in time period 1 uses Appalachia's past to help develop a plan for the present. In this time period there is very little future planning outside of road network development and new energy and manufacturing jobs. Also, this during this time the ARC is greatly affected by the national energy crisis. As a result, this time period focuses on coal development. This focus on coal is a driving force on the ARC's discourse between 1971 and 1980.

The discourse in time period 2 invokes two themes that are vastly different from the themes covered in time period 1. These themes are community involvement and economic diversification. The shift to these themes indicates wholesale shift in priorities in the ARC. The shift shows that the ARC no longer invests large amounts of time and money on the past developmental issues of Appalachia. Instead the ARC turns its focus on development of education, telecommunication infrastructure, and community involvement (1984). In general the ARC discourse emphasizes investment in Appalachia's present and future needs and pays little attention to past issues in Appalachian development.

This shift in priorities in ARC's annual reports was abrupt, and there is little in the annual reports themselves to explain the shift. In light of this shift, my analysis is two-staged. In the following sections I outline all four themes. Then I elaborate on the two time periods and describe why the development in each pair of themes is different. This shift in priorities made analysis difficult but informative.

4.2 Isolation and the Road Network

As the title of this section suggests, overcoming isolation and building a road network are main concerns of the ARC. However, before proceeding, the reason why isolation and a poor road network existed must be addressed. These reasons come directly from the ARC's annual reports.

According to the ARC "the people that settled in Appalachia were, by and large, a stern people accustomed to hardship and eager to find freedom and a new home" (1975, 5). With this quote the ARC is showing that the people in Appalachia were seeking a separate and different life from that of their homelands. At first glance, this is not any different from why people came to America in the first place. What makes the people in Appalachia different (according to the ARC) is that these people decided to stay in the mountains. The ARC states that "people stayed in the mountains because there they weren't answerable to any government or hemmed in by too many people" (1979, 2). One can understand that being free to live your life the way you want to be is a goal for most people. However, the ARC in these quotes makes the freedom to live free from excessive government control, an alien concept to a nation that was founded on that very same idea. What makes these quotes even more confusing is that the ARC says that the Appalachian people did fight for the United States in the Revolutionary War, the Indian Wars (before and after the Civil War), they fought on both sides of the Civil War, and volunteered in large numbers in every other conflict the United States was involved in (1975). By stating that the Appalachian people did answer the nation's call to arms in every major conflict, the ARC shows that the people of the region were answerable to a government and were willing to die for this country. So why is isolation pushed by the ARC? Isolation appears to be pushed because of the myth of the mountain barrier (ARC 1971).

According to the ARC, “no analysis of the regional problem has failed to identify the historic and persisting barrier-effect of its mountain chains as a primary factor in Appalachian underdevelopment” (ARC 1971, 41). According to this line of reasoning, Appalachia was doomed from the time of its settlement because of the mountains. However, people did settle in the Appalachian Mountains.

Also, the ARC does not mention any development that may have taken place when the first settlers arrived. This development included roads, a postal system, churches with circuit riding preachers, a judicial system with circuit riding judges, and community markets (Eller 1980). The ARC’s response is that, “limited access to the region discouraged new investments because the narrow, winding roads distorted time-distance travel, inhibiting potential industrial developers because of the problems involved in getting products to market” (1975, 6).

By clinging to this idea of limited access, the ARC in effect promotes the view that the region was separate from the rest of the country. So, by building an integrated highway system, the ARC hopes to connect the region and improve Appalachia’s situation (ARC 1979). The ARC explains that this is needed because “narrow twisting roads have limited Appalachian’s social and cultural horizons and their access to education, health care, and other vital services, and also discouraged new industrial development of any kind” (ARC 1979, 4). A new highway system has benefited the region but the way in which the ARC states this blends cultural determinism and environmental determinism.

The ARC claims that isolation in Appalachia was created by the mountains, by the lack of modern highways to connect the region with the rest of the country, and by the population’s pride, independence, and skepticism. What is strange about this is that the ARC is blending the theories of cultural determinism, derived from the Culture of Poverty, and environmental determinism. This blending is improbable because these two theories were, and are still,

theoretical opposites. However, the ARC is able to use both of them to paint Appalachia as set apart from the rest of the country and in need of help. The environment can and does affect human development but the ARC claims that the environment completely cut off all development in the region. As shown in section 2.4, the discussion on coal as a social and geographic constraint, this was not the case. It appears that the ARC, despite its contributions to greater inter-governmental cooperation, took a conventional view of the region, which at times is anti-Appalachian. In addition, the ARC's analysis of isolation barely mentions the fact that the region was developed by the coal industry. The coal industry did invest in roads and rail lines to connect the region with national markets. By the lack of information on past development, the ARC seems to be focusing on the stereotypical image of Appalachia, which shows the region as a place untouched by time and if development existed it was fleeting.

Careful consideration of this statement "no analysis of the regional problem has failed to identify the historic and persisting barrier-effect of its mountain chains as a primary factor in Appalachian underdevelopment," reveals that it can be seen in two ways (ARC 1971, 41). First, one can claim that since all past analysis shows that the barrier-effect is a primary factor in Appalachian underdevelopment, then that is the main cause of poverty. The second way of understanding this statement is by acknowledging that the barrier-effect may limit development, but with money and determination development can happen. As an example, the coal industry achieved development in the region, albeit uneven development. In contrast to the ARC discourse, development did occur in the region before the ARC. This shows that the high cost of development does not limit development if the profits outweigh the costs. By using a discourse that portrays Appalachia as isolated and in need of help the ARC creates a mixed signal. This causes confusion and distrust, making it hard for the people of the region to fully endorse ARC programs and projects. This kind of discourse also misrepresents the region, leading to the acceptance of modern stereotypes of the region.

4.3 Energy Investment Brings Coal Center-Stage but Coal is not the Only Cause of Poverty in Appalachia

In the Appalachian Regional Development Act, energy investment, development, and production were not a priority and not included in the original goals of the ARC (ARC 1980). However, the energy crisis of the 1970s pushed these areas of interest in Appalachia to the forefront of national energy needs. By 1975 the ARC was amended by Congress, expanding its authority and responsibilities to include the investment in, the development of, and the production of energy resources. This new authority allowed the ARC to complete preliminary studies aimed at accommodating increased energy production (ARC 1980, 32). In the ARC's own words; "in the current national energy situation, the Appalachian coal industry has once again become vitally important to the nation" (ARC 1975, 2). While the nation demanded more coal and other resources from Appalachia, the ARC held that the needs should be met in a way that allowed Appalachia to benefit economically and with few environmental side effects (ARC 1975).

It is true that the ARC called for a diverse energy plan. This plan involved coal but was open to alternative energy sources such as wind, hydroelectric power, and natural gas (ARC 1980). In the 1970s and early 1980s large-scale implementation of these alternative forms of energy was in the developmental stages and coal, by virtue of its long history of use, became the only attainable choice. This is reflected when the ARC states that "given the national energy priority, coal continues to be a top regional priority" (1980, 35). In the annual reports the ARC stresses that the national energy crisis has given new life to the Appalachian coal industry and that in turn gave new life to the region. According to the dataset there are 147 data extracts; out of these data extracts 49 refer to the development of coal and 11 refer to the development of alternative energy sources. However, only 11 of the 49 of the development of coal extracts were addressed in the annual reports after 1984. This brief quantification of my data extracts shows

that the ARC did use the national energy crisis to work redevelopment of the coal industry into its discourse.

4.3.1 Coal's Impact on Appalachia's Economy

The section above illustrates that the ARC saw coal as a means to bring new development to the region, as long as it was controlled by placing new environmental safeguards on mining and coal-fired power plants (ARC 1980). Yet, at the same time the ARC claims that;

Coal alone was not responsible for the economic depression that beset the region. Rather, it was the coal "bust" in combination with significant and concurrent downturns in all major segments of the sub-regional economies that plunged Appalachia into so prolonged and devastating a decline (ARC 1980, 4).

The coal bust that is mentioned in the data extract above took place in the 1950s and 1960s, when coal prices bottomed out because of cheap oil. During this time Appalachians and businesses alike migrated out of the region. The above data extract is a problem because it says that coal is not the sole driver of the Appalachian economy but the ARC also holds that coal can save and restart the Appalachian economy. This divide is confusing and the use of phrases like these points to a discourse that is inconsistent, even contradictory, in its portrayal of coal.

The following data extracts show the ARC is conflicted by scale. The ARC tries to address Appalachia as one region. However, the ARC does not show the sub-regional scale in the same detail. It appears that the ARC is too focused on regional image of Appalachia, that the sub-regions become overlooked. By not providing a detailed analysis of its sub-regions the ARC has left the door open for this type of research. This study seeks to fill this gap in the research.

Throughout the annual reports the ARC calls for "smart" development of coal in Appalachia. The ARC wants to develop coal in a way that is safe for the environment and the

people, as well as economically viable. However, with limited research at the sub-regional level the ARC is not addressing the goals its set in its discourse.

First, the ARC claims that “Central Appalachia was hardest hit by the switch from coal to oil because of its unique dependence upon mining” (ARC 1980, 4). Secondly, the ARC states that “the most rugged, hard-to-reach part of the region, Central Appalachia, had never been able to build the economic diversity needed to withstand periodic downturns in its major industry” (ARC 1980, 4). In the first quote “unique dependence upon mining,” shows that Central Appalachia is closely linked with the coal industry and the sub-region requires greater attention to diversification and sustainable coal development. The ARC must show they are willing to break the coal industry’s control of Central Appalachia’s economy; as of now its discourse is set to do just that but in practice it has not happened. In the second quote the ARC is placing considerable emphasis on environmental causes of the lack of economic diversity in Central Appalachia. The ARC does show that they feel the coal industry’s bust in Central Appalachia helped to drive the region into greater poverty but do not commit to it completely. This is because between 1971 and 1984 the ARC’s discourse heavily favored the development of the coal industry. So when the coal industry started to bust once again, the ARC was, and still is, slow to recognize the economic loss in the coal mining sector. However, the ARC does states that “the mining industry has for many years been a major employer of Central Appalachian labor” (ARC 1975, 22) and that “most of the industry (coal) was controlled by “outside” interests, as well, so that little of the profit remained in the region” (ARC 1979, 3). These two quotes also show that prior to 1984 the ARC was using a version of the Internal Colonization Theory in its process of regional development. However, by 1984 the ARC’s discourse shifted slightly and coal and energy development was minimized.

During the energy crisis of the 1970s, two of the three Appalachian sub-regions and the rest of the nation experienced a recession. According to the ARC,

Central Appalachia did not respond negatively to the recession conditions of 1970-71. Instead of stagnation or an employment decline during this period, Central Appalachia experienced a significant acceleration in growth, which continued throughout the more expansionary years of 1972-1973 (ARC 1975, 22).

To back up the quote above, the ARC states that Central Appalachia had “lost 7% of its population in the 1960s, but rebounded with the highest growth rate, of the three sub-regions, 21%, in the 1970s.” Also, Central Appalachia had the lowest per capita personal income level in 1965. Yet, between 1965 and 1979 Central Appalachia experienced the most rapid increase, 52 to 71% of the U.S. average (ARC 1980, 6-7). According to the ARC, the gain in population and rising per capita personal income were great achievements. However, these achievements were a direct result of increased coal production and when that production ebbed in the 1980s so did the growth (ARC 1984). With this in hand, the ARC did not blame the failing economy in Central Appalachia on the decreased demand of coal. The ARC instead just did not explain why it happened at all. However, they did proceed to retool the agency.

It appears that the ARC holds mixed feelings about the coal industry in Appalachia. The ARC wants to show that coal alone is not responsible for Appalachia’s problems but in my analysis, coal and the coal industry appear to have a large influence on Central Appalachia. This is because out of all the data extracts dealing with Central Appalachia nearly all of them deal with coal or the loss/gain of economic stability during the coal industry’s boom in the 1970s and bust in the 1980s. One can assume that the problems of one sub-region do not affect the other sub-regions but doing so is claiming that there is no interaction between sub-regions. The ARC is correct in saying that many aspects of economic distress played into Appalachia’s decline but I do not agree with how the ARC addressed the problem. The ARC, in all its posturing, does not directly state that coal affects Central Appalachia, even though they have the required data. This tells me that the ARC in the 1970s was out to foster economic growth in the region at any cost, no

matter what was said about slow, clean, and sustainable growth. This became evident in the 1980s when nearly all the growth of the 1970s was lost, especially in Central Appalachia.

During time period 1 the ARC discourse focused on energy development and correcting past problems, namely the region's isolation. However, I found that the ARC's language invokes a mix of Internal Colonization and the Culture of Poverty. This mix does appear to lean toward Internal Colonization but applying some of the commonly accepted views of Appalachia the ARC is not proactively changing the nation's image of the region, just reinforcing it. By the end of the 1970s and early into the 1980s the ARC continued this discourse, but by 1984 the ARC abandoned energy diversification in favor of economic diversification, this shift is explained in section 4.5.

4.4 Community Involvement

Time period 2 starts in 1984. This time period marks a change in the ARC discourse. No longer are the annual reports written in a way that directly invokes the Culture of Poverty or Internal Colonization. Also, the ARC no longer includes detailed research on coal and other energy investment in its annual reports. Instead, the ARC turns to community involvement and economic diversification.

Since 1984 the ARC has opened up to the communities that it serves. Instead of funding projects based on ARC studies alone, the ARC called for meetings and interviews with community members and civic leaders in order to tailor the ARC to better fit the communities it serves. By increasing openness to citizen participation, the ARC attempts to correct the confusion of its past programs and projects.

There are two reasons why the ARC might have started to listen to the Appalachian people. First, it makes sense to listen to Appalachians who know their region and know what

forms of development are needed. Secondly, the ARC had become somewhat detached from local issues. The following quote points at the latter issue:

During FY 2000, ARC devoted much of its energy to building a consensus for an expanded program to help Appalachia's remaining economically distressed counties become more competitive. In, addition, the Commission focused on identifying new partners to spur development of more homegrown businesses in Appalachia and engaged in a number of other collaborative efforts to benefit the region (ARC 2000, 5).

This data extract was used because it best frames the ARC's desire to find a new direction. Also, for an organization rebranding itself to foster increased community participation, the ARC made no mention of community contributions until 1995, which is ten years after the organization made the call for community involvement.

The ARC community meetings are very small and limited for an organization trying to improve life for nearly 24 million people. An example of this is given in the following quote: "The Commission conducted community meetings from May through August in seven states. More than 750 people attended the meetings, including three Appalachian governors and the ARC federal co-chairman" (ARC 2000, 5). For an open public meeting, 750 people is a good draw but that number is weakened by the fact that the 750 participants were stretched over seven states. These open meetings seem to limit the ARC's reach, and in response to this the ARC has also used an approach that focuses on key community members and leaders. For example, "the ARC identified 32 key issues facing the region and polled some 1,000 community leaders and citizens in five field forums on their significance" (ARC 2004, 8). This last approach is a better fit because it can reach more people and provide greater details to make decisions on new programs and projects.

Along with increased community involvement, the ARC also started a strategic planning process in 1995. These strategic plans range from 5 to 6 years and are intended to be signposts in the path to development. In order to develop the first strategic plan;

The ARC went into the region and listened to more than 2,000 Appalachians. Through four interstate town meetings, 13 focus-group discussions, nine consultations, and extensive research, they learned the region anew; the hopes, dreams, challenges, and opportunities the communities embrace (ARC 1995, 5).

By learning the region anew the ARC is able to better understand the region's needs and to make plans for the region's future. However, the annual reports do not provide in-depth details on what the strategic plans will or might include. Also, it is unclear if these strategic plans take away some of the detail previously provided by the annual reports. Putting aside these issues, increasing the level of local input has only helped to strengthen the ARC.

While community input has greatly strengthened the ARC, there are two issues not addressed in the annual reports, which should have been high-priority concerns for the people of Appalachia. These two issues are coal and roads. As issues that carry as much baggage as these two do, it is hard to believe that people did not talk about them. The ARC, in the annual reports, does talk about road construction projects but leaves out any comments by community leaders and members. This is strange because as an agency the ARC is trying to get the community involved. As noted in sections 4.2 and 4.3, the ARC's discourse is inconsistent. In the annual reports the ARC is calling for community involvement but does not include abstracts, notes, or any documentation of what took place in these community meetings. Once again the ARC is unable to completely follow through on its discourse. The lack of findings is something that the ARC needs to address if it continues to claim full citizen participation.

4.5 Economic Diversification

In the ARC's efforts to diversify Appalachia's economy, the ARC has employed "education programs tailored to the needs of expanding small business, tourism, the service

sector, or other industries” (ARC 1988, 7). The main area of ARC interest for economic development in the Appalachia is tourism and its supporting services (ARC 1991). Tourism is an extension of the service sector and the ARC states that, “service sector average wages are often considerably lower than those in the manufacturing and mining sectors” (ARC 2004, 26). Once the ARC concluded that the service jobs, such as retail, food service, and hospitably services, could not provide the same living standard as manufacturing and mining jobs, one would think that the ARC would reconsider its attention to tourism and its supporting services. Yet, due to the fact that service sector jobs are the easiest to bring in to a distressed region, the small economic boost is needed in the short term, but is not a long term fix to the economic problems of the region. In Appalachia much of the heavy industries such as, goods manufacturing, mining, textiles, and steel, have, and to a smaller scale still do, provide a high pay and full benefits.

As the economic situation in Appalachia changes it becomes clearer that heavy industries will continue to decrease, and some industry will step in and take their place. What the ARC is not clear on is what industry will take the place of the heavy industries. As of right now the leading candidate is the lower end of the service sector (food service and big box retail chains). These service jobs should only be short-term fixes because they do not provide the same level of financial security that the heavy industry jobs and higher end service jobs (hospitals, law offices, and many others) do and in a region cursed with poverty and economic hardship that is a problem.

By the 2000s the ARC was reporting that “Appalachia’s traditional economic sectors were in decline and the ARC has worked to help the region develop the skills and infrastructure it needs to be economically competitive today and in the future” (ARC 2004, 6). The problem with this is that the “help” is in the form of increased tourism advertisement, “which includes a driving tours map, created in partnership with the National Geographic Society and a companion Web site” (ARC 2008, 5). By continuing to push growth in a sector that cannot support the same living

standard as heavy industry jobs, the ARC is providing growth but growth that only provides a stop-gap for poverty and economic distress.

During this focus on tourism and an increased service sector, the coal industry once again bottomed out, but not in the same way as the 1950s and 1960s. This time, employment fell but production did not greatly diminish. The ARC addressed this in the 2004 and 2008 annual reports but these references are over 20 years after the bust. Also, these data extracts only state that the bust happened but offer no response to what it means for the region. The disregard of significant employment loss is unprecedented and makes one wonder what the ARC has been researching over the last 20 years.

Overall the ARC's discourse between 1984 and 2008 is a mixed message. With the ARC no longer addressing coal and other energy investments, the ARC appears one-sided and out of touch. By not addressing coal in its discourse after 1984 the ARC falls in to the trap of allowing Appalachia to be viewed as a sacrifice zone. This is because in the ARC's driving tours map of the region, the Central Appalachian coal region does not have many points of interest outside of reconditioned coal towns and mines. This new discourse allows for Central Appalachia to be set part from the other sub-regions. By doing this it appears that the ARC is using its discourse to detach the agency from coal. The ARC is detached from coal because it only uses reconditioned coal towns and mines to show the history of the region and not to inform the visitors on how coal and the coal industry impact the region today.

Economic diversification is the greatest hope for the region. However, the ARC still has a lot to learn and needs to rethink its push for tourism and a large service sector. One form of economic diversification that shows promise is the ARC's push for locally-owned small business, increased agriculture, and craft goods. A few of these paths may fall under the service sector umbrella but since all are locally-owned a larger share of the profits stay in the region. Also, these

new business may offer better support for their employees than big box stores like Wal-Mart and Lowe's. Moreover, these industries are not completely reliant on the outside world like tourism but provide the region with a competitive niche on the global market and make Appalachia attractive to a wealthier class of tourists. By increasing locally-owned and operated production the region can begin to better itself, a process that would fall in line with the ARC-redefined goals (ARC 2010). These new goals make self-sufficiency a part of the ARC's discourse. This addition of self-sufficiency is not new, but a resurrection of part of the ARC's discourse that was minimized in many of the annual reports from 1971 to 1984. I feel that this rearrangement of the ARC's discourse allows the ARC greater flexibility and once and for all allows the region to make steps to break away from coal.

4.6 Shifting Priorities

In my dataset I found two time periods that reflected different discourses in the ARC. Time period 1 included my first two themes and time period 2 included the last two. The main focus of the shift was the abandonment of discussion on coal. The shift took place in 1984 but may have been sooner taking into account all annual reports. The first question that needs to be asked is why the shift happened? Second, why did the focus on the environment and coal get minimized? By asking and answering these two questions I hope to explain why the ARC's developmental focus changed.

The annual reports do not provide a clear reason for this shift but there are two possibilities that go hand in hand. These are the election of Ronald Reagan in 1980 and the massive budget cuts he and his administration enacted in the first few years of his first term. As I mentioned above direct reference was not in the annual reports but a passing reference was made in the 1982 annual report, stating that a finish-up program had been initiated because funding for the ARC would be stopped after all capital projects had been completed. This disbandment of the

ARC did not happen, yet none of the annual reports state how or why the ARC was saved. However, the budget cuts severely crippled the ARC's ability to fund projects and programs.

This is the point at which we see the ARC start to focus on mainly highway and some non-highway programs. No longer did the ARC spend time and money on past problems of the region because doing so would take up too much of its limited budget. By focusing on what the current administration felt was relevant, the ARC was able to keep its federal funding. By making these compromises the ARC was able to continue its mission to improve the lives of the people of Appalachia. However, these compromises came with a price.

The price of these compromises was the minimal attention given to the environment and most notably coal. Before 1984 most of the annual reports had a section entitled "Energy, Environment, and Natural Resources." This section highlighted the past year's projects and programs that focused on these three areas and how they were impacting the region. Although in many of the annual reports this section was brief, it was still present. This showed that the ARC was active in its mission to understand how energy, the environment, and natural resources have and will affect the region.

Since 1984, I was only able to code 11 extracts that mentioned coal and the environment. Three extracts are repeated statements about the EPA's brownfields clean-up program, another three are indirect statements about the downturn of the traditional Appalachian economy; three more are directly about the declining employment in the coal industry, and the last two discuss alternative energy investments. In comparison between 1971 and 1984 I was able to code over 49 extracts that dealt with coal and the environment either directly or indirectly.

After seeing the minimal coverage of coal and the environment since 1984, it is still unclear why this happened. The only reason that seems to fit is that the national energy crisis was over and investment in coal and environmental research was no longer necessary. Also, since coal

and environmental research was no longer a national priority the ARC had little choice but to cut them out because of the need to show the federal government that they were doing relevant research.

It appears that the shift in priorities at the ARC might have been involuntary. The shift could have been mandated by the Reagan administration and later carried on by George H.W. Bush and his administration. The silver-lining is that since 2000 the ARC annual reports have been providing more detail on research, programs and projects, on the same level as they did before 1984. Discussion about coal and environmental research has gained the least, but over time these areas should gain more interest, mainly because of the current energy crisis. The future of Appalachian coal is at the mercy of the national energy needs. Coal will be relevant as long as oil prices are high and alternative energy sources are still too small in number to supply large amounts of energy. This means that the coal industry in the ARC's mind is not only vulnerable to a boom and bust economic cycle, but also a boom and bust research cycle.

4.7 Conclusions

What is coal's place in the ARC's discourse of development and how has it changed over time? It would seem that coal is something that the ARC sees as important only when it is on the nation's mind. Since 1971 the ARC has said that coal is not the only cause of poverty in the region but then shows that in Central Appalachia it is a major cause for the economic situation. This lack of attention to the sub-regional scale is what is missing in the ARC's discourse, on how the ARC has handled coal and the coal industry prior to 1984. After 1984 coal and the coal industry are barely mentioned at all. It is one thing to talk about coal in a confusing manner but to not mention it at all is misleading. Although the ARC did show that coal does impact Central Appalachia, to suddenly not mention coal at all makes one wonder why.

In conclusion, it is clear that the ARC is subject to the current political administration and that some administrations limit the budgets of organization like the ARC. This political game is one factor that is driving the ARC position on coal; the other is energy needs. As mentioned earlier, coal is given a boost by the current energy needs but as soon as that increased need decreases, so does any interest in Appalachia.

Overall the changes in priorities after 1984 were needed. The ARC has long attempted to develop Appalachia, but the people of the region have had little to no say in what was needed to be developed in the region. The increased community involvement was the best move the ARC could make but the ARC still managed to bumble it. Community involvement is great but when an issue like coal is nowhere to be found in the annual reports and no claim is made that the citizens were talking about needed improvements to control the coal industry is astonishing. This is despite the fact that there are numerous grassroots organizations such as the Kentuckians for the Commonwealth and Mountain Justice that are calling for community action against coal company control.

Between 1971 and 2008 the ARC's discourse changed. Until 1984 the ARC's discourse focused on energy development and did so with a mix of Culture of Poverty and Internal Colonization language. After 1984, the ARC no longer used Culture of Poverty and Internal Colonization language but dropped its detailed discussion of coal and energy investment. With this in mind, the ARC is need of a review of its annual reports. By reviewing these reports, a understanding of the ARC's past development plans is found and the ARC can make adjustments in order not to repeat the same mistakes.

Geographically the ARC's discourse continues to set Appalachia apart. For the most part, being set apart is just a way to bring interest to the region, such as using the terms Midwest, Northeast, or Southwest. However, there is a difference when one uses the term Appalachia.

Appalachia, unlike Midwest, Northeast, or Southwest, still carries with it a negative image. This image still involves isolation, poverty, and coal. Even after 47 years of the ARC this negative image of Appalachia is still present. By not dispelling the contemporary image of Appalachia, the ARCs discourse helps to enforce this image.

Since coal does have a place, no matter how tentative, in the ARC's discourse, the next step is to analyze coal's place quantitatively. My last two research questions provide the framework for this analysis. By conducting this quantitative analysis I hope to provide a balance to the findings in chapter 4.

CHAPTER V

COAL'S IMPACT ON APPALACHIAN KENTUCKY POVERTY AND MIGRATION

5.1 Introduction

The goal of this chapter is to illustrate how coal interacts with poverty and migration. In the process of reaching this goal I answer my second and third research questions. Those questions are:

Question 2: Can a measure of coal production provide the needed analytical power to explain the coal industry's impact on Appalachian Kentucky?

Question 3: Could the instability of the coal industry be a leading cause for poverty and migration in the region between 1980 and 2000?

Answering these two questions provides a framework and a direction for my quantitative analysis. This chapter is broken into seven subsections. By setting up the chapter in this fashion I am able to build up to a regression analysis by showing the steps needed to be sure my datasets meet the requirements for regression. Once the regression analysis is completed, I then move to local statistics. Analyzing the local patterns provides a closer look at the spatial pattern of each variable.

In closing, this chapter summarizes the results found in the previous subsection and provides overall analysis of the results. This analysis addresses whether I was able to answer my two research questions and if further research is needed. Yet, before conclusions can be discussed I must take a closer look at the individual variables.

5.2 Individual Variable Analysis

By examining the individual variables I am able to see if there is a spatial pattern to the variables. Yet, since I have three datasets this could become very complicated if I were to describe all the variables for dataset 1980, then 1990, and then 2000. Therefore, I have grouped the variables in a way that allows a reader to see the pattern of the variable and to see how that pattern changes between each decade. So, Poverty Rate 1980, 1990, and 2000 are analyzed together. To make this process a little more simplified, I have split the variables into dependent and independent classes. Doing this makes it clear that my dependent and independent variables are separate.

The following figures in this section are classified using a manual equal interval method. This means that each class has the same interval. However, some of the variables have a class or two that are not at equal intervals. These variables include median age, net migration, percent of the population with a high school diploma or higher, and per capita income. The reason for these unequal intervals is that by 2000 the median age had increased to the point that the first two classes needed to be adjusted to keep the scale close to the scales for 1980 and 1990. For net migration, the ranges of positive and negative values are so extreme from dataset to dataset that a single equal interval scale is hard to create, but I have done by best to keep the classes equal. Next, the percent of the population with a high school diploma or higher increases so greatly from 1980 to 2000, so that a few classes include only one value. This is done in order to preserve the equal intervals in the other classes. Lastly, the scale for per capita income in 2000 is slightly

different because the lowest income is no longer below \$10,000. I adjusted the two classes to account for this.

At the end of this subsection I compile my analysis and determine if the visual spatial patterns of the independent variables match the visual spatial patterns of the dependent variable (poverty). The goal of this subsection is to provide a base of inquiry. This base is the foundation on which a regression analysis can be built. Without knowing if there are interesting patterns in the data, doing a regression analysis is like stumbling for a light switch in the dark. By turning on the lights and comparing the spatial patterns, I can better predict if a regression analysis is necessary (Burt et al. 2009).

5.2.1 Dependent Variable

Figure 2 below shows poverty rate by county in Appalachian Kentucky for the 1980 dataset. This map shows that the highest rates of poverty are in the center of the study area. There are also a few higher poverty counties on the Kentucky-Tennessee border. The counties with lower poverty rates are along the West Virginia and Virginia border, as well as along the west central border (these are the counties closest to Lexington, KY). In this figure and all of the other individual variable figures, when I refer to higher rates, this means the top two classes, and when I refer to lower rate, it means the lower two classes.

Why do we see this pattern? First, Appalachian Kentucky can be broken into three parts. The easternmost part is the coal region, the westernmost part is an agricultural/urban region, and the center is a heavily forested region (Edwards et al. 2006). According to Figure 2, the coal and agricultural industries provide better opportunities than the forest industry, in 1980.

Figure 3 shows poverty rate by county in Appalachian Kentucky for the 1990 dataset. In 1990 there are more counties in the two high poverty classes than Figure 2. Figure 3 shows that the highest rates of poverty are in the center of the study area. Also the poverty rates for the

southeastern and eastern parts of the study area have increased. This leaves the western part of the study area with the lowest poverty rates.

The economic modes addressed for Poverty Rates in 1980 still hold in 1990. However, poverty rates have increased region wide. Figure 3 suggests that between 1980 and 1990 the economy in Appalachian Kentucky contracted allowing for poverty rates to increase. This figure shows that a regression to analyze a cause for this increased poverty is needed.

Figure 4 below shows poverty rate by county in Appalachian Kentucky for the 2000 dataset. This figure visually suggests that poverty in Appalachian Kentucky has decreased. However, for many of the counties the poverty rate is still above 20 percent. This map shows that the highest rates of poverty are still in the center of the study area. Overall, the poverty situation in Appalachian Kentucky did improve from 1990 to 2000.

In looking at Figures 2-4 an overall pattern starts to emerge. This pattern shows a gradual northern and eastward progression of high poverty rates. This progression may be a direct result of the coal industry bust in the mid-1980s (ARC 2010). However, this assumption is indirect and is open to debate. By analyzing the independent variables I hope to find support for this assumption.

Figure 2: Percent of Population in Poverty 1980

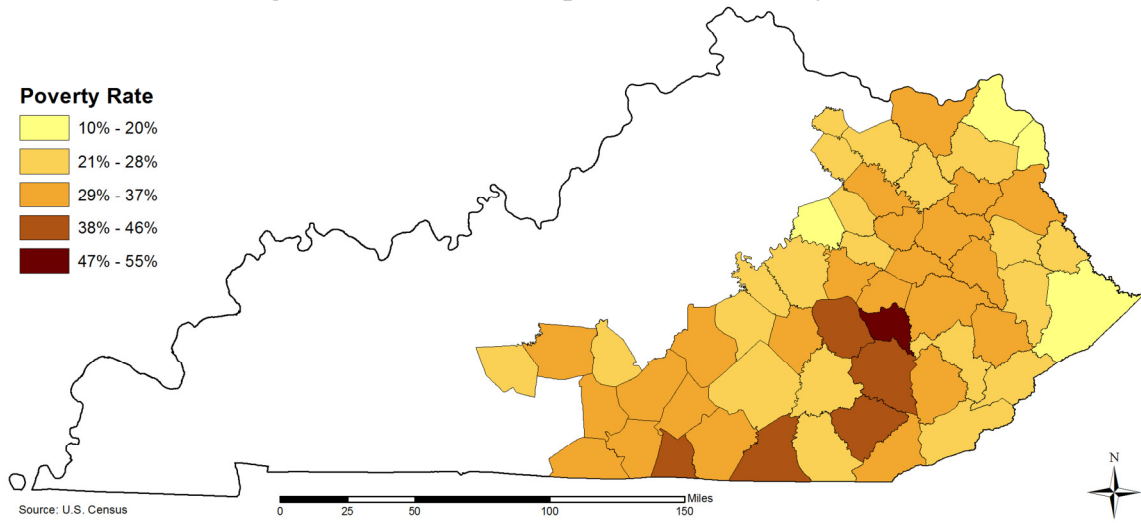


Figure 3: Percent of Population in Poverty 1990

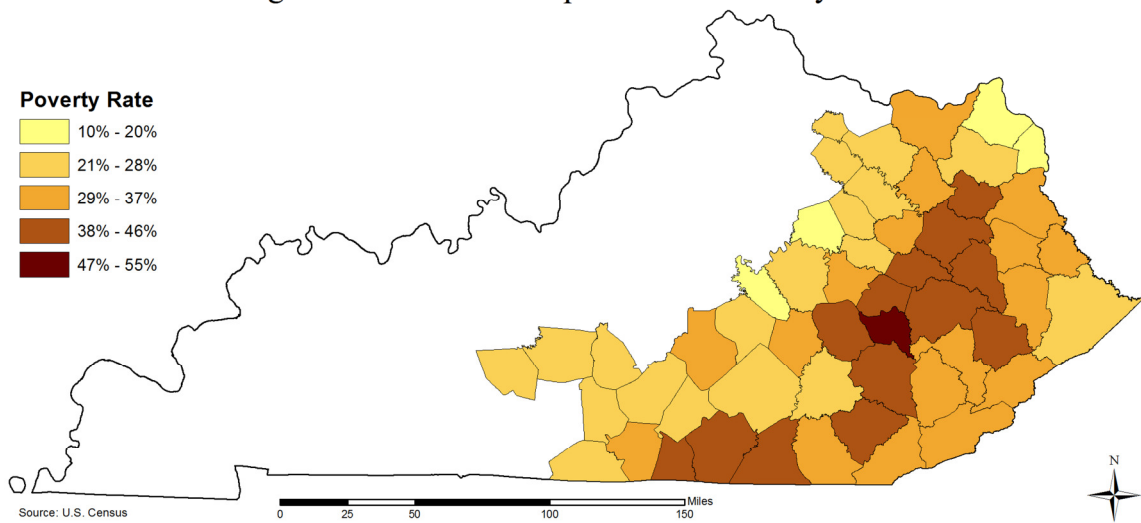
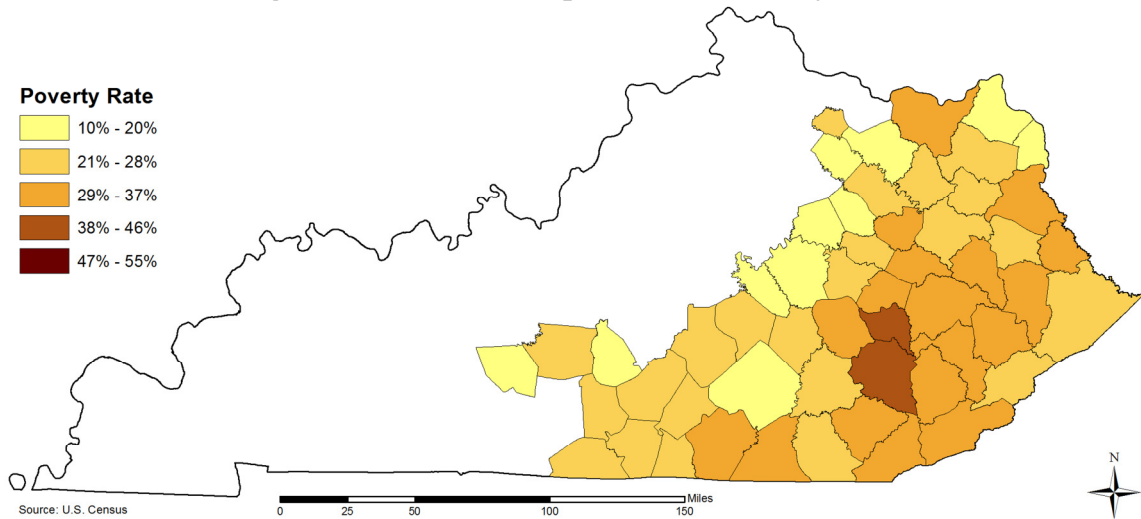


Figure 4: Percent of Population in Poverty 2000



5.2.2 Independent Variables

The pattern shown in Figure 5 depicting per capita coal production is not surprising. This is because in Appalachian Kentucky the coal is mainly in the eastern and southeastern part of the state. However, the Eastern Kentucky coal seams do extend into the center and northeastern part of the state. What is surprising is the fact that counties with high poverty rates also have a high rate of coal production. This find is one step in linking coal production to poverty.

Figure 6, showing 1990 per capita coal production, does not visually differ much from Figure 5. The difference is in the coal rate. All across Appalachian Kentucky, coal production has decreased but the counties with the highest rates are still the same as in 1980, except one. The exception is Breathitt County, Kentucky, this county fell to under 200 tons of coal per person in 2000.

Similarly, there is little visual difference between Figures 5-7. Figure 7 does show that a few counties moved to the middle category and one county in the middle category increased production enough to move to the next higher class. The real difference between Figures 5-7 is the decrease in coal production, between 1980 and 1990. By 2000, only a few counties are above

the middle class. This visually shows that production over the 30 years of this study has tapered off.

Figure 5: Tons of Coal Per Person 1980

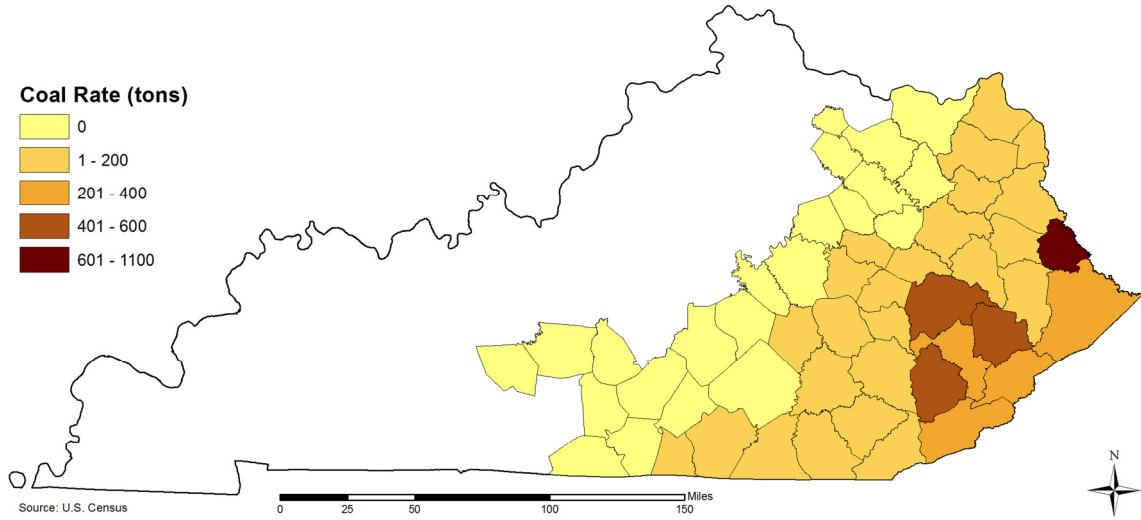


Figure 6: Tons of Coal Per Person 1990

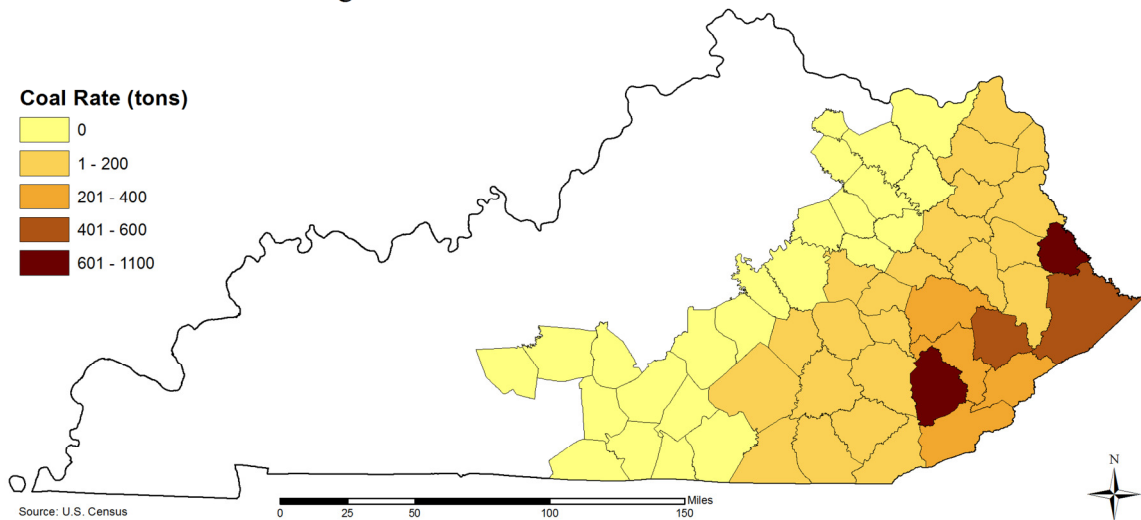
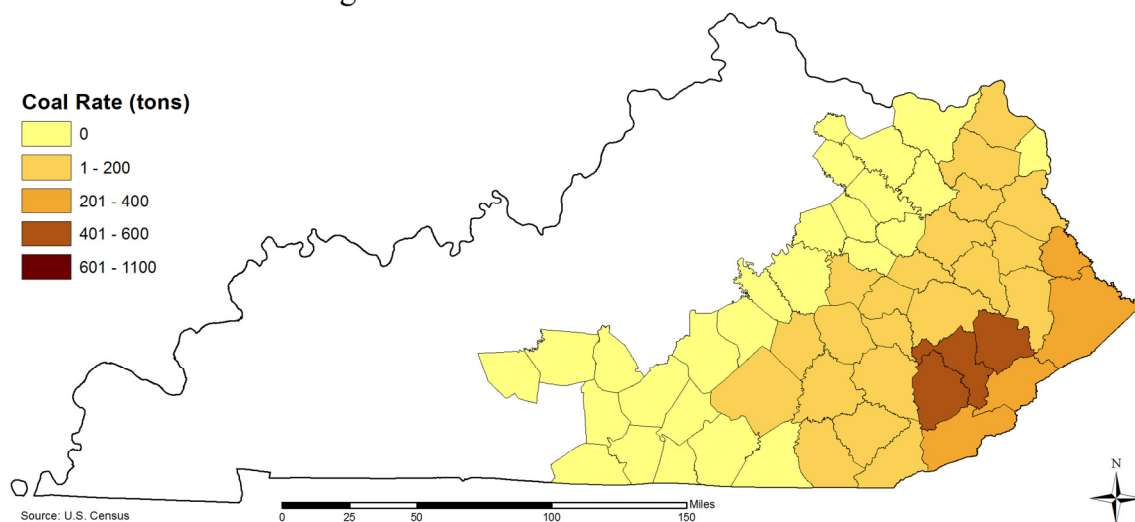


Figure 7: Tons of Coal Per Person 2000



Figures 8-10 show the decadal average of the coal severance tax taken from the coal industry and given to the counties as compensation for lost economic potential. Later in this chapter a decision will be made whether to keep both variables or to use only one of them. One problem with Figures 8-10, is the scale. The range for these figures had to be stretched to \$125,000,000 because of an outlier (Pike County). Yet, Pike County does show a direct impact of decreased coal production. This is because the coal severance tax receipts for Pike in 1980 were around \$125,000,000 but by 2000 were cut to around \$41,000,000. This drop in economic compensation may have an impact on poverty. Later in this chapter I discuss if there is indeed a relationship between poverty and the coal severance tax.

Figure 8: Coal Severance Tax 1980

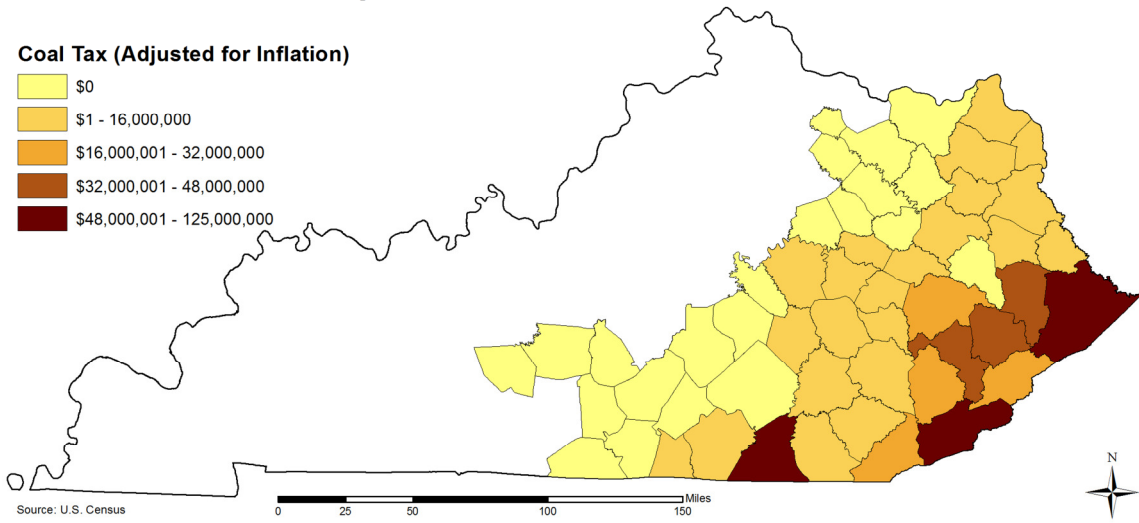


Figure 9: Coal Severance Tax 1990

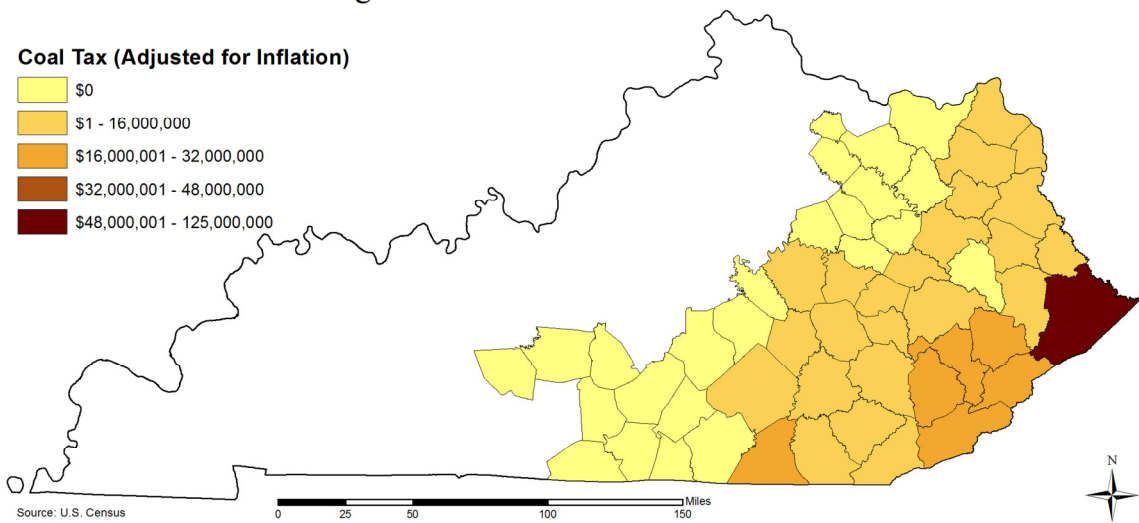


Figure 10: Coal Severance Tax 2000

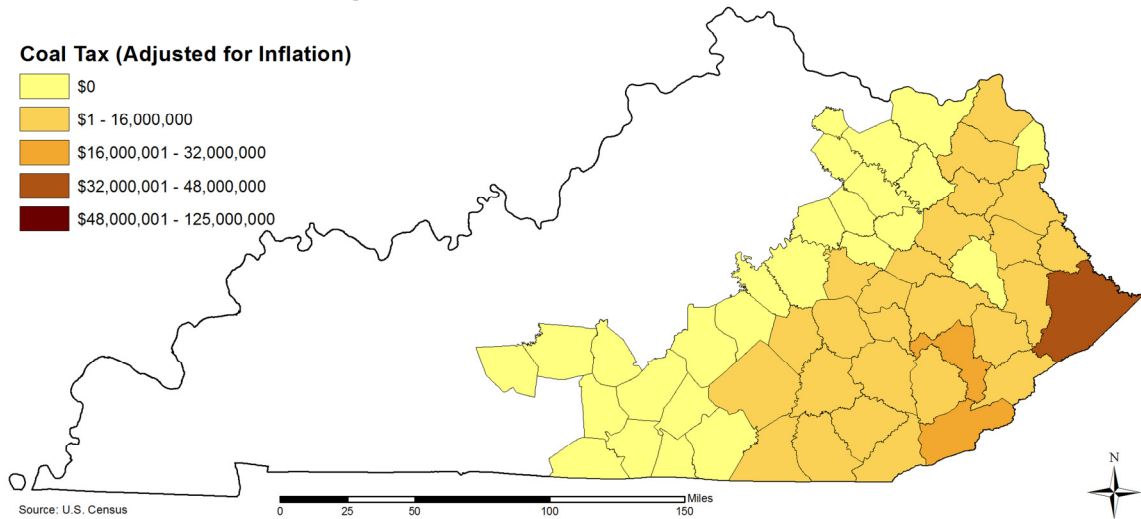


Figure 11 shows that the highest median age in Appalachian Kentucky is in the southwestern part of the region. High values also extend up the western edge of the region. The rest of the region fits into the first three classes, with the lowest median age being concentrated in the easternmost part of the region.

Figure 12 shows that the highest median age is in the southwestern part of the region. High values also extend up the western edge of the region and east long the Ohio River. The rest of the region fits into the middle category. In Figure 12 there is only one county (Rowan) in the lowest class. This can be explained because Morehead State University is in Rowan County.

In 2000 nearly all of the counties in the study area are in the top two classes. The remaining four counties contain either a university or some other higher educational institution lowering the median age.

Overall from 1980 to 2000 there has been an increase in median age for Appalachian Kentucky. The reasons for this are not directly clear but can be narrowed to a few possibilities. The first possible answer involves natural aging without a high birth rate. The second possible answer involves natural aging with a high out-migration of the younger population. The third

possibility involves natural aging with an in-migration of an older population and a high out-migration of the younger population. The lastly all these possibilities involve an age gap. Before 1980 there was a high in-migration of young workers but after the bust of the coal industry in the mid-1980s they departed, leaving an age gap in the population. All four of these answers are plausible but none were tested. They were not tested because to answer for increasing median age does not directly fit with the goal of this thesis. However, future investigation in this area is required. This is because the ARC has also discovered this problem and found that it is hampering its efforts to diversify the Appalachian economy (ARC 2004). The ARC believes that with an aging population in Appalachian Kentucky new businesses are unable or unwilling move to the region because the current population would not support the workforce need for the new businesses and would not provide the proper consumer base (ARC 2004).

Figure 11: Median Age 1980

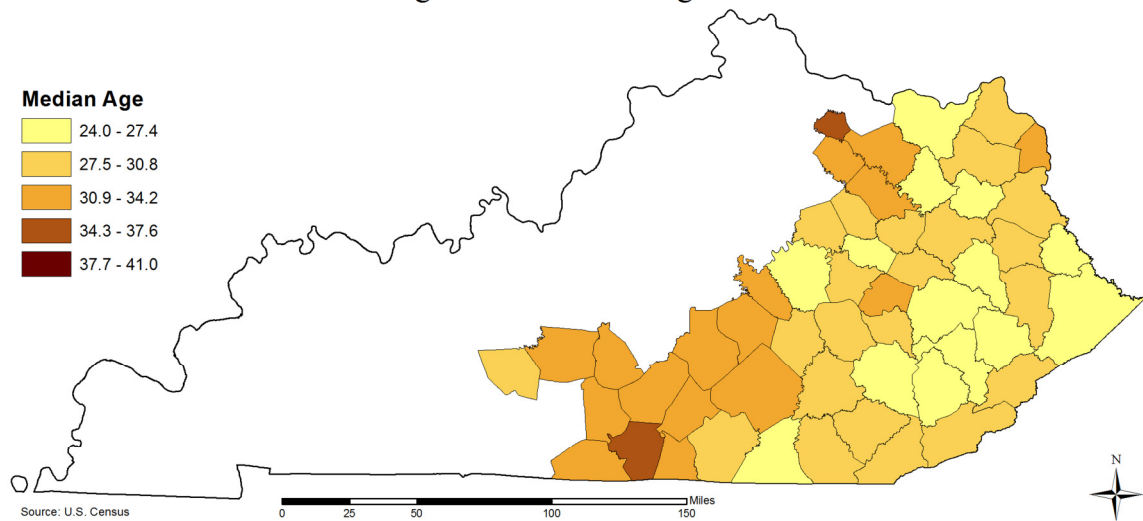


Figure 12: Median Age 1990

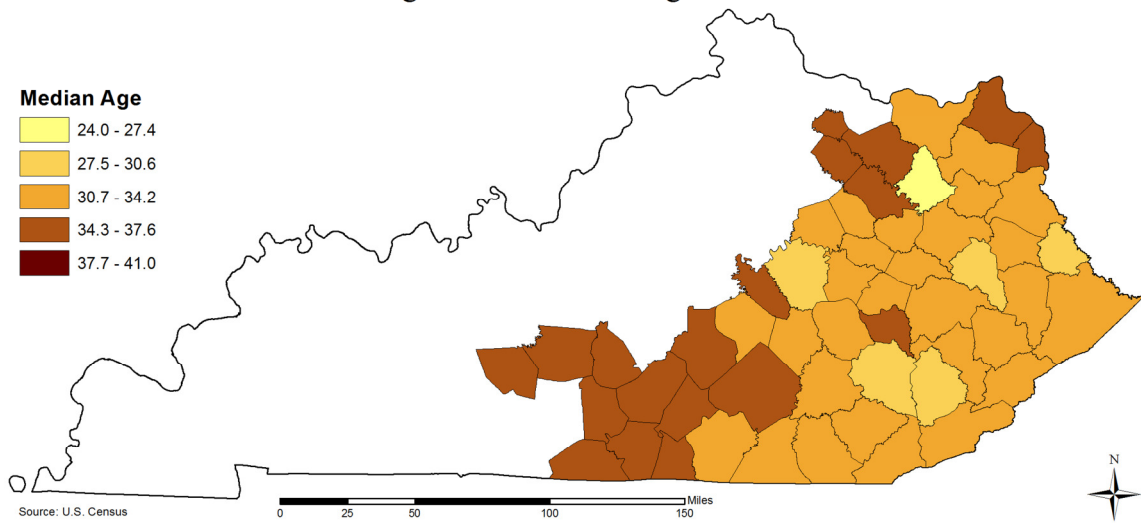


Figure 13: Median Age 2000

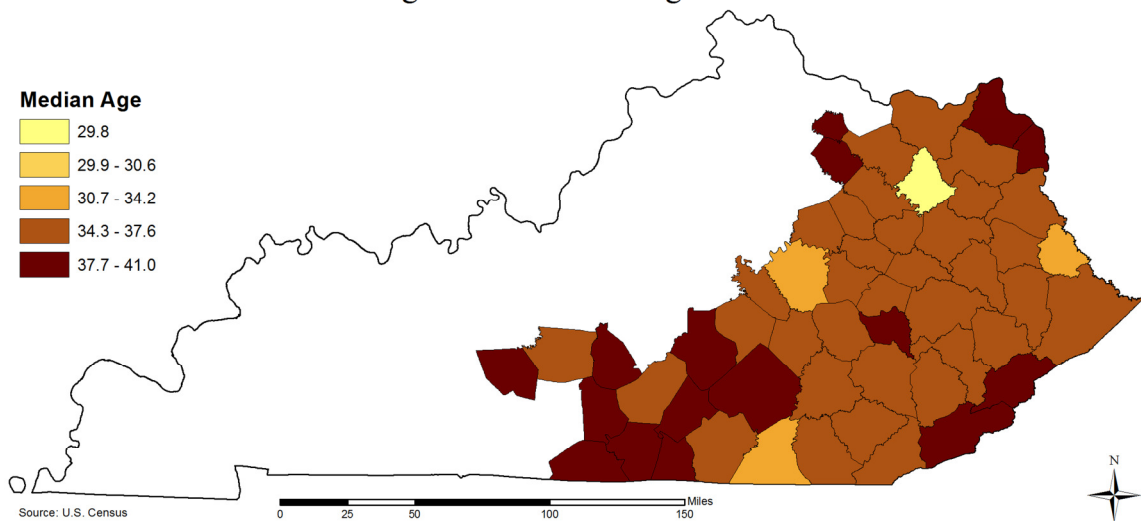


Figure 14 shows that nearly all of Appalachian Kentucky experienced positive net migration in 1980. The highest gains came in the north central part of the region, along the Virginia/Tennessee border and in the westernmost county in the study area. The lowest increases are seen in the western part of the region. Also, these positive net migration rates provide some support as to why the median age in 1980 was low in eastern Kentucky. This is because as the coal industry was booming it drew in younger workers, thus lowering the median age of the region.

Figure 15 shows that people in Appalachian Kentucky are migrating out of the coal region (the easternmost counties in the study area). These net migration rates seem to follow the pattern of the bust in the coal industry.

Figure 16 shows a similar pattern to Figure 15. This means that there was a negative net migration and it took place in the eastern part of the region. After one decades of net migration increase, counties in the eastern part of the region lost as much as 14-17 percent of their populations, in the following to decades.

The pattern shown in Figures 14-16 closely mirrors the pattern seen in Figures 2-4. This shows that a thriving economy attracts new residents but as soon as the region loses some of its economic stability people leave. This process seems to lag behind the poverty rate because the coal boom and the need for workers ended in the mid-1980s (ARC 2010) but the positive net migration did not end until 2000.

Figure 14: Net Migration Rate 1980

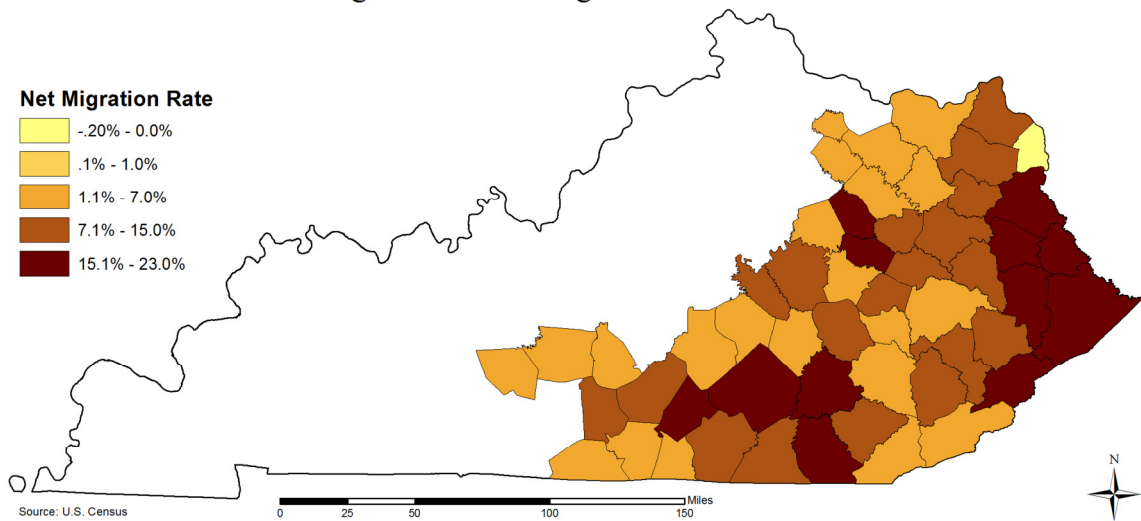


Figure 15: Net Migration Rate 1990

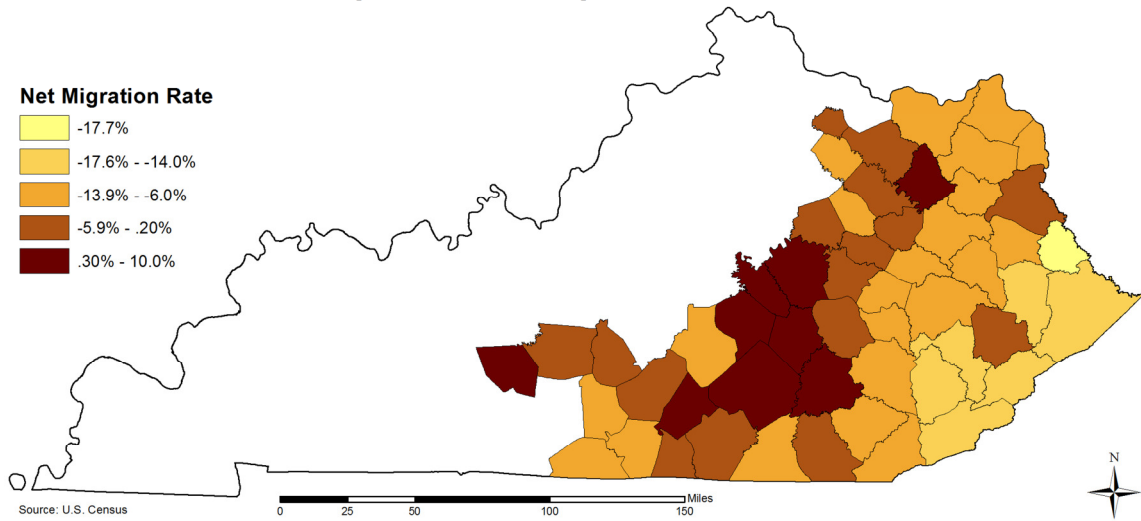
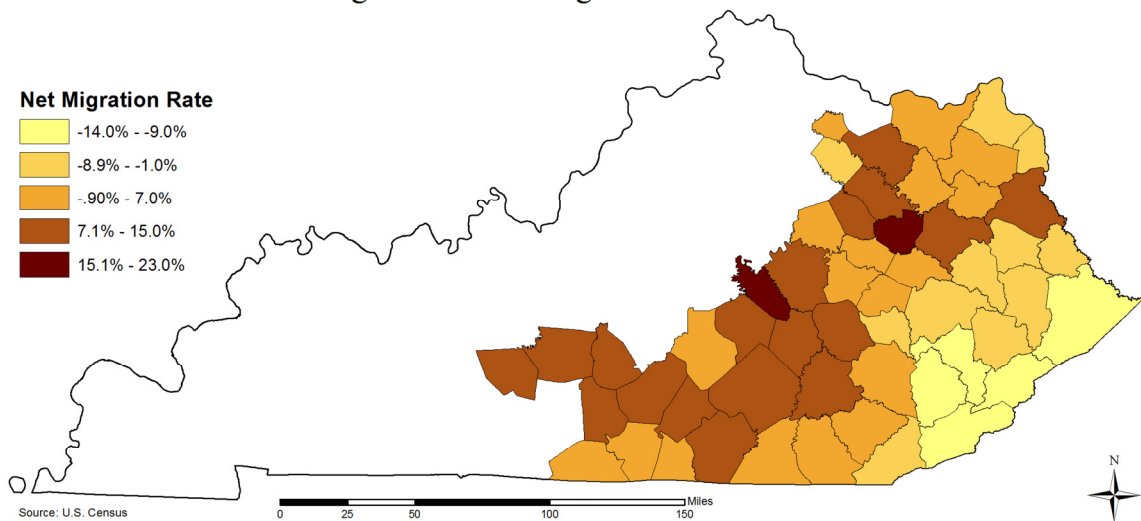


Figure 16: Net Migration Rate 2000



Since the pattern in Figures 17-19, depicting education rates, is very similar I will discuss the figures together. In all three maps there is a circular pattern. The center of this ring has the lowest education percentage. The reason for this is explained in the analysis of per capita income shown in, Figures 20-22. The greatest difference between these three maps is the dramatic increase in education levels. In 1990 the lowest class and in 2000 the lowest two classes had to be adjusted because the education level had increased above 36 percent in 1990 and in 2000 the lowest class is 49 percent. This shows that Appalachian Kentucky has made great advances in

educational attainment but the central part of the region is still lagging behind. The central part of the region did also see an increase in education level but the level is still not as high as the rest of the region. However, one explanation is that the education level in this area was very low to begin with. Also, this area according to Figures 17-19 did experience the greatest increases in educational attainment.

Figure 17: Percent of Population with a High School Diploma or Higher 1980

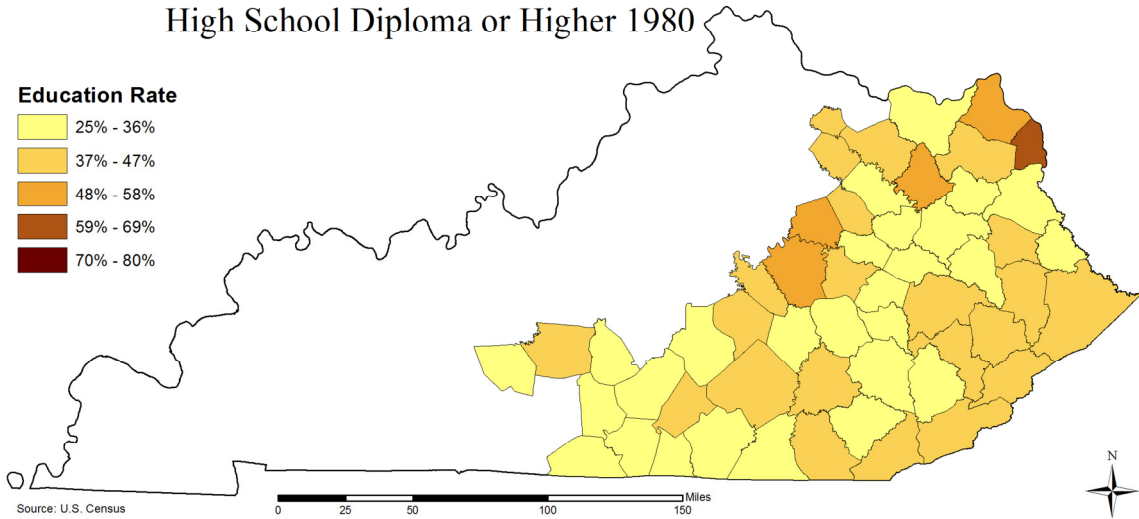


Figure 18: Percent of Population with a High School Diploma or Higher 1990

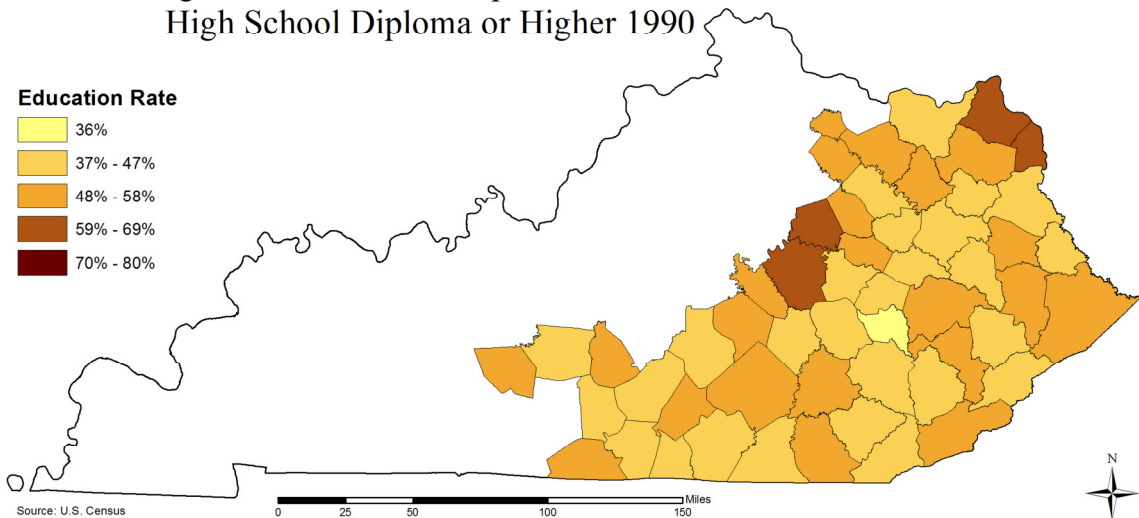
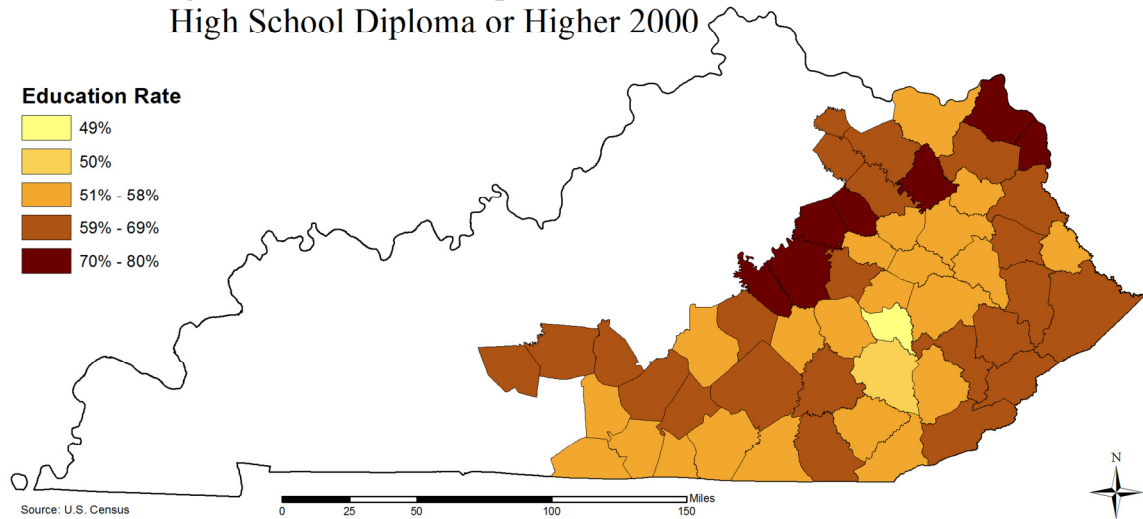


Figure 19: Percent of Population with a High School Diploma or Higher 2000



The pattern in Figure 20, showing per capita income, is similar to that of the pattern found in Figures 17-19. This shows that education attainment is related to income. This is because the counties with low per capita income (PCI) experience low education levels. However, in Figure 21 the ring of higher PCIs starts to diminish and higher PCI values start to move west.

Figure 22 shows that in 2000 the highest PCIs follow a diagonal pattern from the southwestern edge of the region to the Ohio River. Also the ring of high PCIs is nearly gone, leaving most of the eastern part of the region with the lowest PCIs.

Overall PCIs did increase between 1980 and 2000 but the pattern changed. The pattern showed a westward trend, the opposite of the poverty rate, shown in Figures 2-4. This pattern suggests that there is instability in some of Appalachian Kentucky's local economies, most notably those associated with the coal industry. Also, it seems that PCI and education are closely related. Whether I use both variables or just one of these variables is detailed in section 5.3.

Figure 20: Per Capita Income 1980

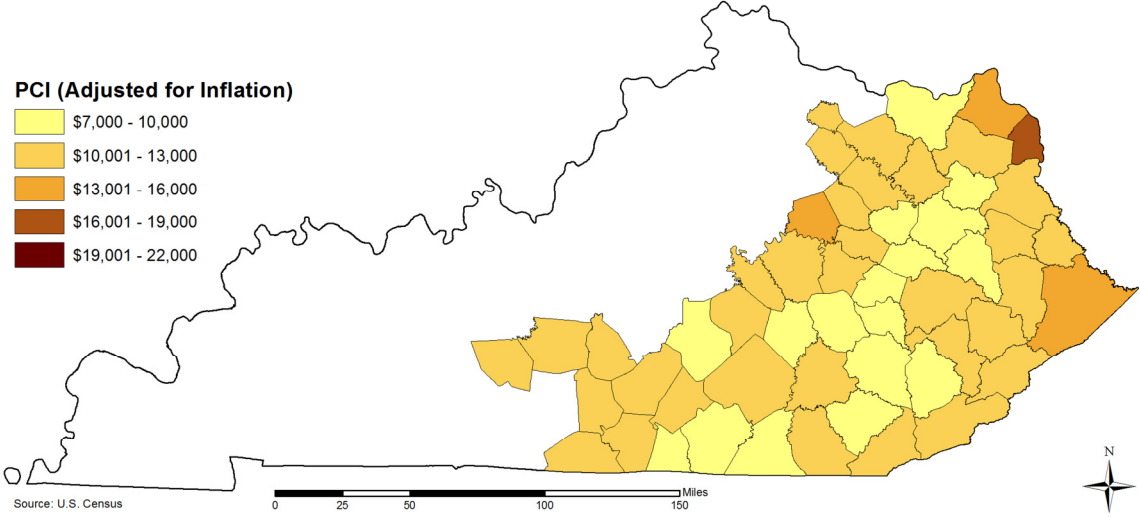


Figure 21: Per Capita Income 1990

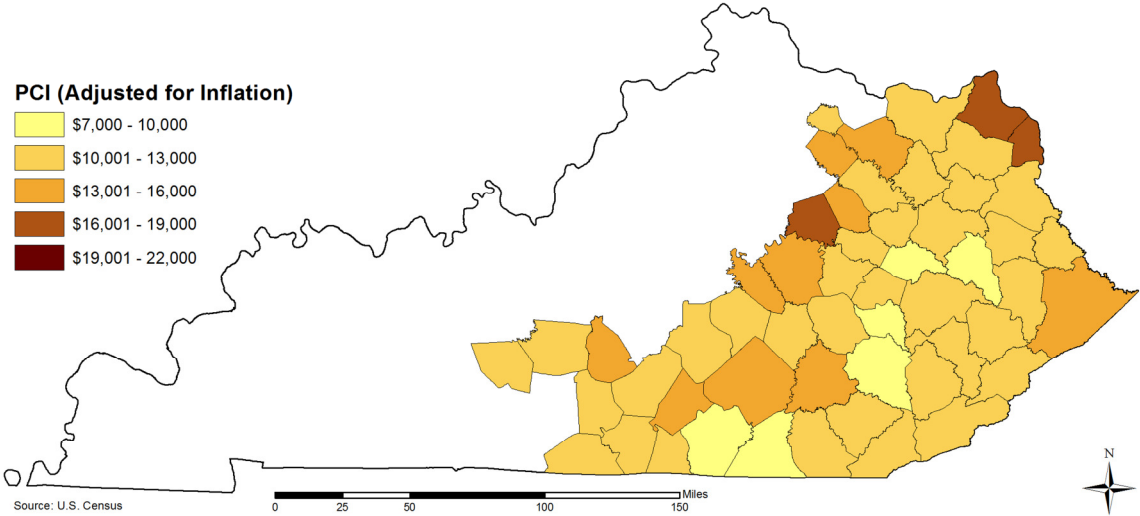
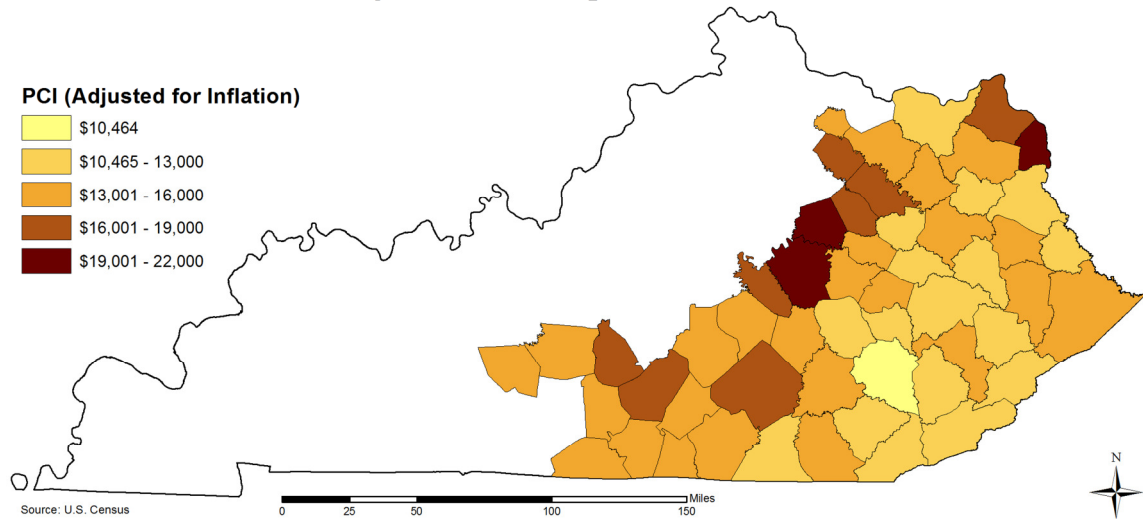


Figure 22: Per Capita Income 2000



In Figure 23 the highest unemployment rates are in the north central part of the region. The lowest unemployment is found on the northwestern edge of the region, near Lexington. Figure 24 shows that in 1990 unemployment decreases in the region, but the pattern moves east and expands to cover nearly all of the eastern part of Appalachian Kentucky. The pattern in Figure 25 is very different that the pattern in Figures 23 and 24. This is because unemployment has dropped to less than 12 percent and only a few pockets of counties are around 12 percent.

It is clear from Figures 23-25 that unemployment rate decreased each decade and the pattern changed as well. However, this shows that employment is still concentrated in a few parts of the region. This is made clear when unemployment rates moved east in 1990 and then returned to the center in 2000. It is clear because employment in the east is dominated by the coal industry and in 1990s the coal industry was still weak from the economic bust in the mid-1980s and could not employ as many people as it had in the past. However, by 2000 it appears that the coal industry's ability to employ workers had improved.

Figure 23: Unemployment Rate 1980

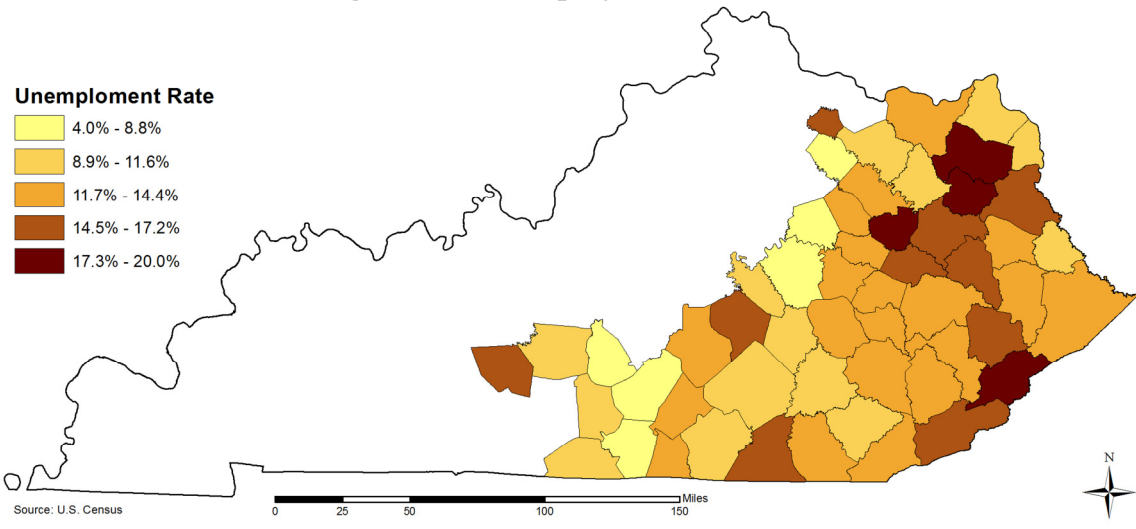


Figure 24: Unemployment Rate 1990

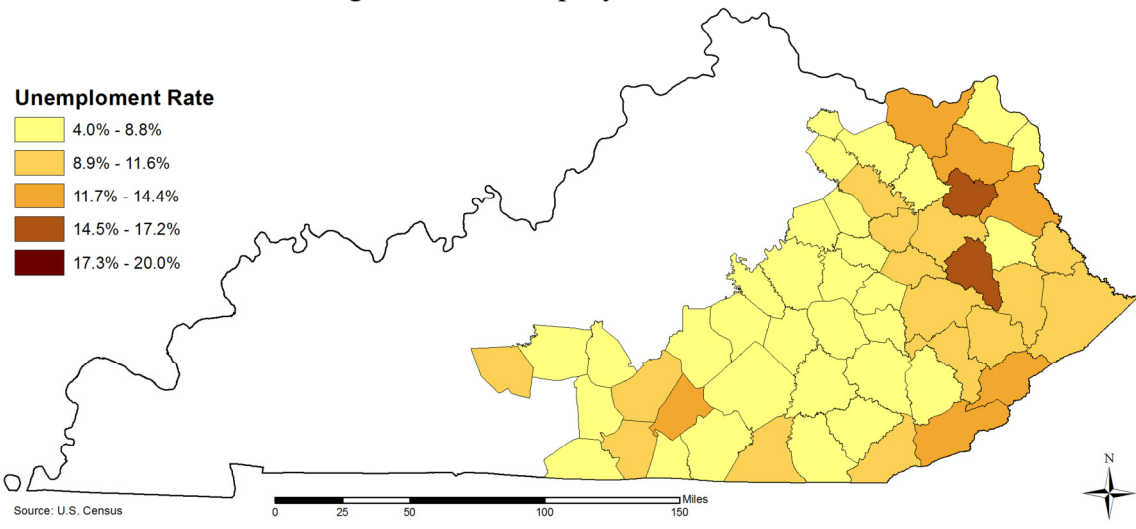
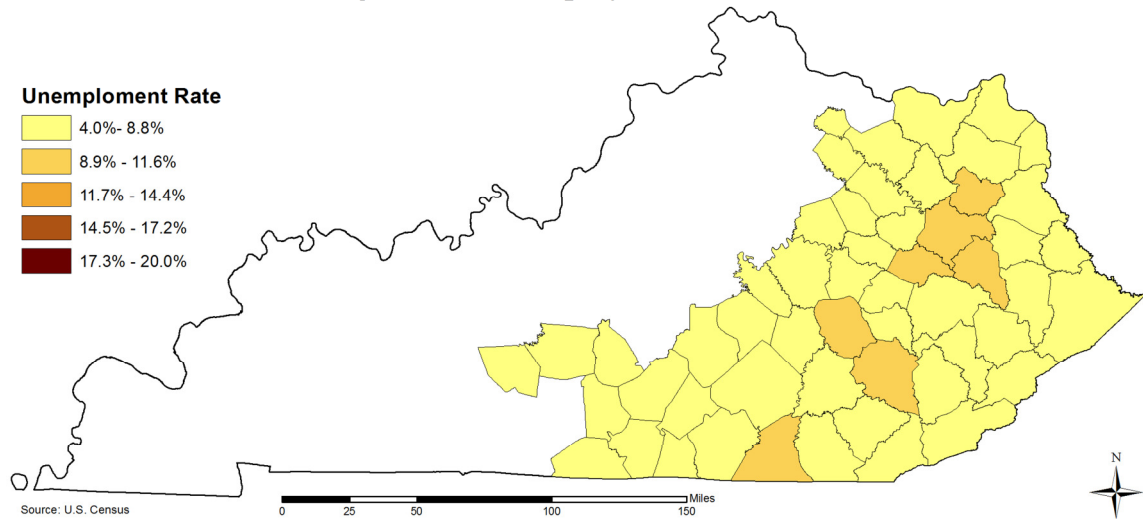


Figure 25: Unemployment Rate 2000



5.2.3 Individual Variable Analysis Results

Overall, the patterns found in this individual variable analysis show that there is a case for further analysis. As noted earlier, Figures 2-4 show an eastward trend of increasing poverty rates. By themselves these figures do not explain much, but paired with three other variables that show the opposite pattern, an interesting pattern emerges. The three variables are Median Age, Net Migration, and PCI. Out of these variables PCI seems to be the strongest. Later in the chapter an Exploratory Data Analysis (EDA) and the OLS Regression provide more answers as to why there is a relationship between poverty and these three variables. Until then these three variables are the most likely to be the best predictors of poverty in Appalachian Kentucky for my three datasets.

5.3 Exploratory Data Analysis (EDA)

An EDA allows me to provide evidence that my dataset can be analyzed in an OLS regression. An EDA provides the need information to address the four following regression assumptions.

1. The regression must fit the data.
2. No multicollinearity exists between variables.
3. There must be homogeneity of variance.
4. The error terms must be randomly distributed.

Appendix A.3 includes the figures I used to conclude that my dataset did meet all four regression assumptions. However, assumption 4 is assessed in section five of this chapter.

The rest of this subsection is broken up in to three parts. The parts are 1980, 1990, and 2000. These subsections cover an abbreviated EDA. The EDA may be abbreviated but all required parts are covered.

5.3.1 1980

The Pearson's Correlation in Table 1 shows the relationship between the variables. It not only shows the relation between poverty rate and the seven independent variables but the relationship between all variables. First, I look at the relationship between poverty rate and the independent variables. Table 1 shows that three independent variables strongly relate to poverty rate. These variables are percent high school degree or higher, PCI, and unemployment. Both the Pearson's r for percent high school degree or higher and PCI is negative, meaning that as they increase poverty rates decrease. For unemployment, the Pearson's r is positive, meaning that as unemployment increases poverty rates also increase.

However, there is a problem. In looking at the other relationships I found that four independent variables have a strong relationship between one other independent variable. These relationships are percent high school degree or higher with PCI and tons of coal per person in poverty with coal tax. In order to meet assumption 2, I must cut one of each of the variables. I chose to cut percent high school degree or higher because the Pearson's r was lower than PCI's and PCI's pattern in Figures 20-22 is closer to the pattern of poverty. As for tons of coal per person in poverty and coal tax, the task of cutting one is much harder. In the end I chose to cut tons of coal per person in poverty. This is because the variables are very close and the coal tax

data seems to be more reliable. The coal tax data is more reliable because it is a single measure of coal production and is not directly tied to another variable.

Table 1: Pearson's Correlation 1980

Pearson's Correlation Table		Dataset 1980						
	1.	2.	3.	4.	5.	6.	7.	8.
1. PovRate80	1	--	--	--	--	--	--	--
2. PctHSorhigher80	-0.829**	1	--	--	--	--	--	--
3. TonsPerPerson80	0.104	-0.144	1	--	--	--	--	--
4. AjCoalTax80	-0.047	-0.064	0.890**	1	--	--	--	--
5. AjPerCapIn80	-0.890**	0.866**	-0.018	0.103	1	--	--	--
6. MedAge80	-0.137	0.034	-0.501**	-0.391**	0.065	1	--	--
7. AvgUnEmployRate80	0.302	-0.421**	0.256	0.197	-0.374**	-0.287*	1	--
8. NetMigRate80	-0.109	0.022	0.126	0.121	0.088	-0.283	0.088	1
** Significant at the .01 level (2-tailed)			* Significant at the .05 level (2-tailed)					

5.3.2 1990

The Pearson's Correlation in Table 2 shows that six independent variables strongly relate to poverty rate. All the variables but coal tax have a significant relationship with poverty. All the variables but tons of coal per person in poverty and unemployment have a negative relationship with poverty rate.

In looking at the relationships between the independent variables, the same four independent variables as in the 1980 dataset have a strong relationship. I have chosen to treat the 1990 dataset the same way I as treated the 1980 dataset and cut tons of coal per person in poverty and percent high school diploma or higher.

Table 2: Pearson's Correlation 1990

Pearson's Correlation Table								Dataset 1990	
	1.	2.	3.	4.	5.	6.	7.	8.	
1. PovRate90	1	--	--	--	--	--	--	--	
2. PctHSorhigher90	-0.797**	1	--	--	--	--	--	--	
3. TonsPerPerson90	0.271*	-0.183	1	--	--	--	--	--	
4. AjCoalTax90	-0.119	-0.078	0.878**	1	--	--	--	--	
5. AjPerCapIn90	-0.890**	0.880**	-0.246	-0.119	1	--	--	--	
6. MedAge90	-0.431**	0.128	-0.359**	-0.256	0.371**	1	--	--	
7. AvgUnEmployRate90	0.415**	-0.380**	0.240	0.203	-0.416**	-0.253	1	--	
8. NetMigRate90	-0.394**	0.304*	0.501**	-0.467**	0.274*	0.209	-0.406**	1	
** Significant at the .01 level (2-tailed)				* Significant at the .05 level (2-tailed)					

5.3.3 2000

The Pearson's Correlation in Table 3 shows that five independent variables strongly relate to poverty rate. All the variables but coal tax and median age have a significant relationship with poverty. Three variables have a positive relationship with poverty and four have a negative relationship. In looking at the relationships between the independent variables, the same four independent variables as in the 1980 dataset and the 1990 dataset have a strong relationship. I have chosen to treat the 2000 dataset the same way the other two datasets and cut tons of coal per person in poverty and percent high school diploma or higher.

Table 3: Pearson's Correlation 2000

Pearson's Correlation Table								Dataset 2000	
	1.	2.	3.	4.	5.	6.	7.	8.	
1. PovRate00	1	--	--	--	--	--	--	--	
2. PctHSorhigher00	-0.816**	1	--	--	--	--	--	--	
3. TonsPerPerson00	0.259	-0.149	1	--	--	--	--	--	
4. AjCoalTax00	0.159	-0.067	0.879**	1	--	--	--	--	
5. AjPerCapIn00	-0.890**	0.864**	-0.283*	-0.165	1	--	--	--	
6. MedAge00	-0.208	-0.003	-0.460**	-0.005	-0.169	1	--	--	
7. AvgUnEmployRate00	0.670**	-0.667**	0.162	0.081	-0.704**	-0.147	1	--	
8. NetMigRate00	-0.412**	0.218	-0.605**	-0.547**	0.350**	-0.069	-0.291*	1	
** Significant at the .01 level (2-tailed)				* Significant at the .05 level (2-tailed)					

5.3.4 EDA Results

By conducting an EDA I have found that my datasets are ready for regression analysis. In doing the EDA the hardest part was cutting variables, especially cutting the variable tons of coal per person in poverty. However, this was done in order to be consistent and keep the datasets the same. By keeping my datasets the same I am able to make comparisons between the results of each OLS regression.

5.4 Regression Analysis

As stated in 3.3.1, I use an OLS regression to analyze the relationship between poverty, migration, and coal. The two most common methods are Enter, where all variables are included in the model, and Stepwise, where the most significant variables are included. I use the Stepwise method because it provides the same significant variables as the Enter method and eliminates variables that do not have a significant influence on poverty.

5.4.1 Stepwise Regression Results

Table 4 below displays the regression results for the 1980 data set. Overall, the regression is very strong in 1980 with an R^2 of 0.792. This shows that in 1980 the relationship between poverty and the independent variables is well predicted. However, the Stepwise method only showed PCI to be significant. It is surprising that with only one variable in the model the R^2 was still above 0.75. Since, the other independent variables are not significant, additional independent variables need to be added, if this project leads to future research.

Table 5 below displays the regression results for the 1990 data set. Overall, the regression is very strong in 1990 with an R^2 of 0.817. Table 5 also shows that in the 1990 dataset two variables are significant. These variables are PCI and Net Migration. With the addition of Net Migration the regression for the 1990 dataset does predict the relationship with poverty better

than the regression for the 1980 dataset. Yet, in the 1990 dataset PCI is still the greatest contributor to the high R^2 value.

Table 6 below displays the regression results for the 2000 data set. Overall, the regression is very strong in 2000 with an R^2 of .793. The R^2 value for the 2000 dataset is on par with the R^2 of the 1980 dataset because once again PCI is the only significant variable. This result shows that PCI is the most constant predictor of poverty in Appalachian Kentucky for the 2000 dataset.

Table 4: Stepwise Regression 1980

Stepwise Regression 1980				
R^2	0.792	Regression Model 1	Sig.	VIF
Adjusted R^2	0.788	AjPerCapIn80	0.000	1.000

Table 5: Stepwise Regression 1990

Stepwise Regression 1990				
R^2	0.817	Regression Model 1	Sig.	VIF
Adjusted R^2	0.810	AjPerCapIn90	0.000	1.000
		Regression Model 2	Sig.	VIF
		AjPerCapIn90	0.000	1.081
		NetMigRate90	0.012	1.081

Table 6: Stepwise Regression 2000

Stepwise Regression 2000				
R^2	0.793	Regression Model 1	Sig.	VIF
Adjusted R^2	0.789	AjPerCapIn00	0.000	1.000

5.4.2 Regression Results

Section 5.4.1 demonstrates that all three regression models are able to provide a strong relationship between poverty and one or two independent variables. It is clear that PCI is has the strongest relationship and this should have been expected because poverty rate are based on income. It is surprising that the coal tax variable was not significant. However, the reason for this could be explained by the fact that not every county in Appalachian Kentucky produces coal and therefore does not receive money from the coal severance tax.

These regressions do provide a base for future research. This is because so much of the economy in Appalachian Kentucky is based on extractive industries such as coal; PCI can be seen as an indirect coal variable (Roemaker 2001). The results would have been stronger if the coal tax variable was significant.

During the course of this regression I found that the results are slightly misleading. This is because the most significant variable is PCI and income is used in the calculation of poverty. This inherent relationship seems to have inflated my R^2 values. Yet, when PCI is cut the R^2 drops below 0.20 and becomes insignificant in the eyes of most social scientists (Burt et al. 2009). I have kept PCI in to show the results that I have found, but to answer whether or not a coal variable provides an answer for the poverty in Appalachian Kentucky, I would have to say no.

5.5 Residual Analysis

In this subsection I discuss the residuals from each regression. By analyzing the regression pattern I am able to see if the regressions fit the data provided. Also by mapping the residuals I am able to address spatial autocorrelation in my models. Autocorrelation is of interest in this study because if my models prove to have autocorrelation then the models could be biased and therefore devoid of any analytical value.

According to Figure 26 the regression model for the 1980 dataset fits best in the southwestern part of my study area. This is because the closer the residuals are to zero the better the fit. So in the southwestern part of the study area there is a cluster of the middle category. As for autocorrelation, the residuals visually appear to be random. The pattern is random because there is a mix of values. The pattern is random but it does seem to lean to positive autocorrelation because of the cluster of positive values in the south. Yet, I feel that this model is unbiased and is analytically viable.

According to Figure 27 the regression model for the 1990 dataset fits best in the south central part of my study area. As for autocorrelation, this model shows slight positive autocorrelation. However, I feel that this slight positive autocorrelation does not bias this model because there is still a mix of values in the center of the study area.

The pattern in Figure 28 does not have as much positive autocorrelation as Figure 27 but it is still present on a very small scale. Nevertheless, Figure 28 does show that this model best fits eastern part of the study area.

5.5.1 Regression Residual Results

Overall Figures 26-28 do not show a consistent fit. Rather, they show a moving pattern. Through the three decades the area that best fits the regression model moves east. This is important because this means that something in my 1990 and 2000 dataset is pulling that pattern east. It is hard to determine the direct cause but by 2000 the best fit area is close to the coal region in Appalachian Kentucky. This may mean that coal is having an unseen impact on the other variables in this analysis.

Figure 26: Stepwise Regression Residuals 1980

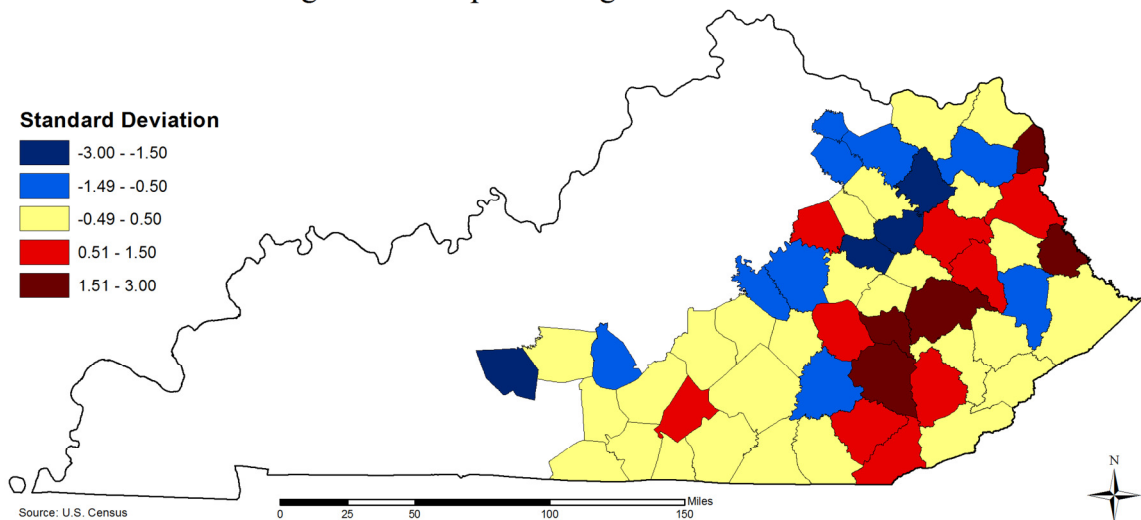


Figure 27: Stepwise Regression Residuals 1990

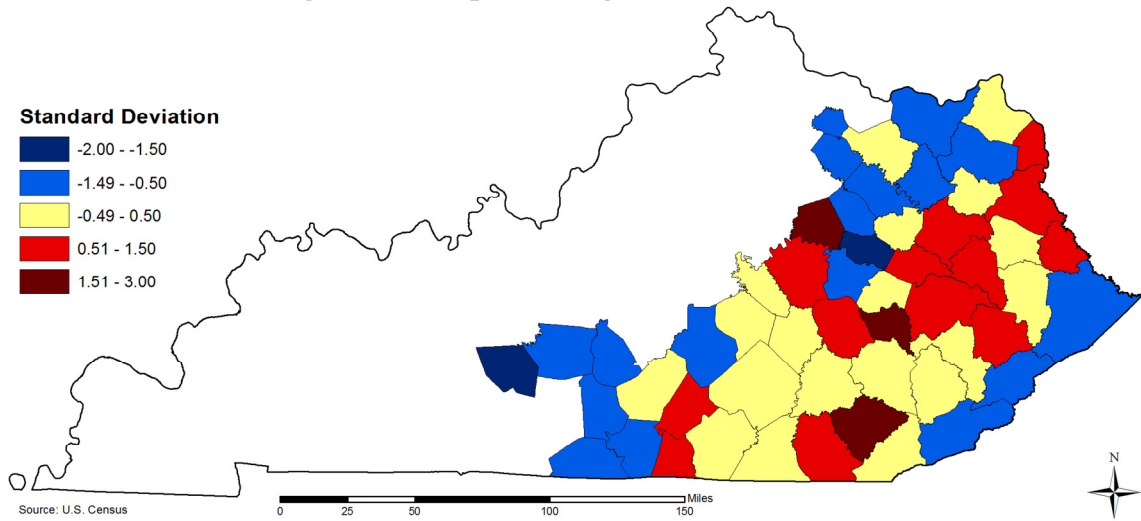
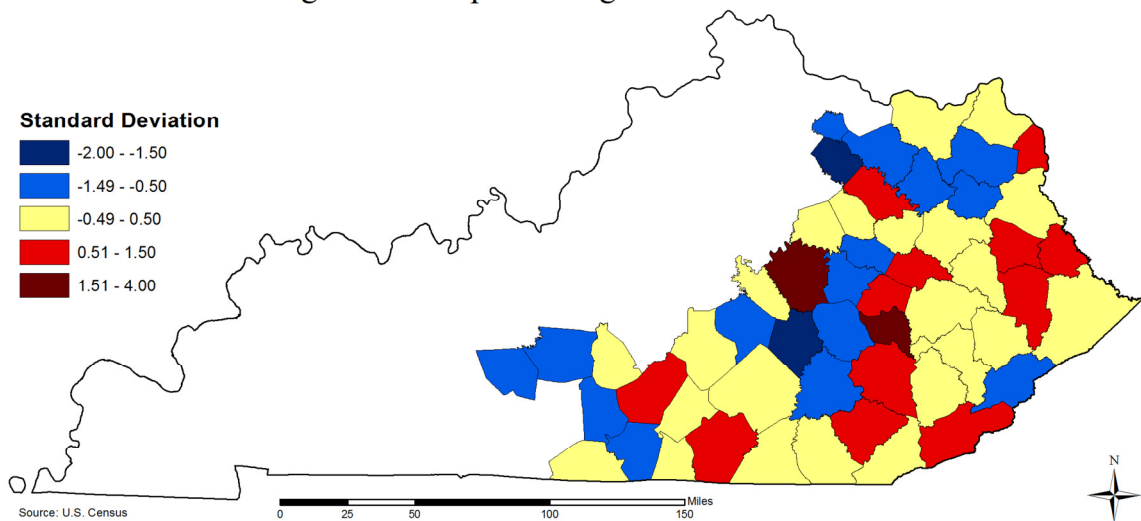


Figure 28: Stepwise Regression Residuals 2000



5.6 Local Statistics

By analyzing local statistics I am able to see autocorrelation in more detail. The local statistic employed in this section is Anselin's Local Indicator of Spatial Association (LISA). LISA "is a local value of the global Moran's I statistic" (Burt et al. 2009, 560). By finding local clusters of variables I am able to judge if my regressions are influenced by these clusters.

5.6.1 Dependent Variable

In Figure 29 there is a cluster of High-High (HH) in the center of the region and one county in the HH class in the south. Also there are a few Low-Low (LL) counties on the Ohio River and on the western border. The LL counties are counties with large suburban populations or contain a large city. As for the HH counties, they are rural counties in the most forested part of the state. Figure 29 show that urban areas in Appalachian Kentucky are not as poor as rural areas.

Figure 30 shows nearly the same pattern as Figure 29. However, there are a few differences. There is one less LL county on the Ohio River and two LL counties were added on the western border. The biggest difference is in the number of HH counties. The HH counties now follow the Daniel Boone National Forest. One thing is still clear: the urban/rural pattern is still in play.

Figure 31 shows that by 2000 there are a few more LL counties in the west and the center of the region has stabilized, because there are fewer HH counties. Overall the pattern is still the same as Figures 29 and 30.

The clustering patterns shown in Figures 29-31 indicate that poverty around the major cities of Appalachian Kentucky tend to cluster with low rates. As for the HH counties, the swing in the number of counties in the cluster could be caused by the instability in the local economy. This means as the poverty rate increases or decreases in a county, that county may no longer be similar to its surrounding counties and therefore no longer included in the cluster.

Figure 29: LISA Analysis - Percent of Population in Poverty 1980

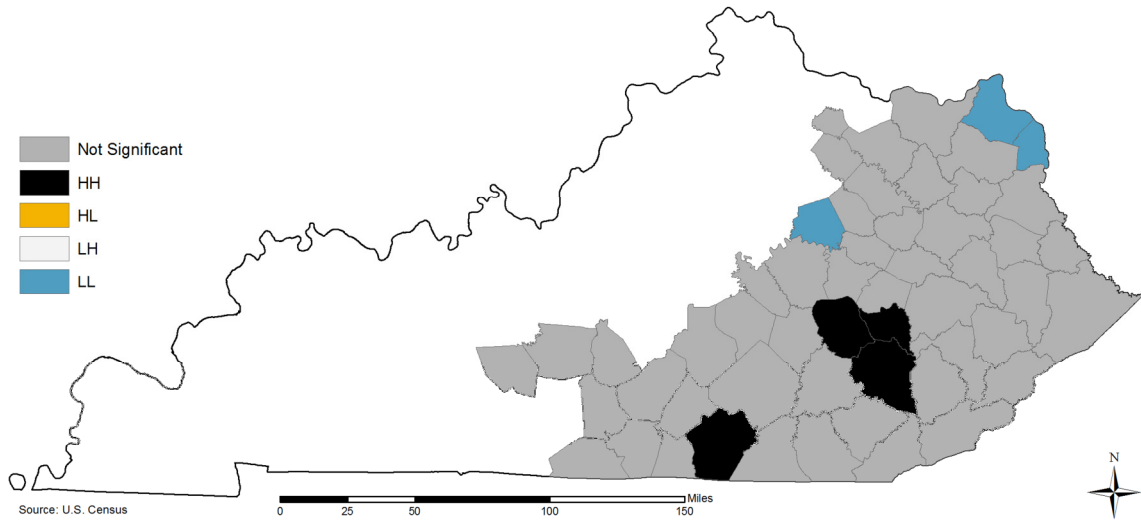


Figure 30: LISA Analysis - Percent of Population in Poverty 1990

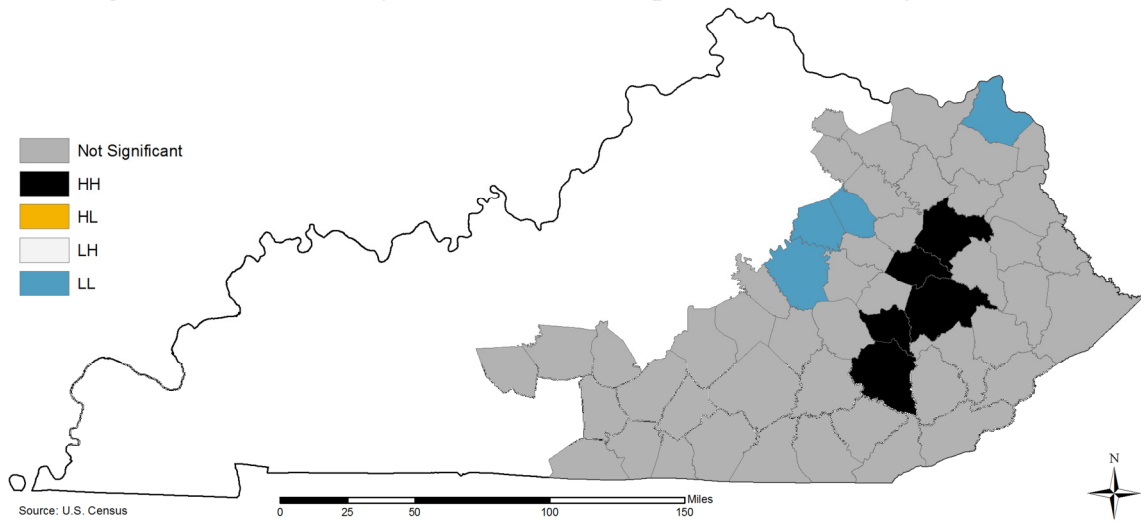
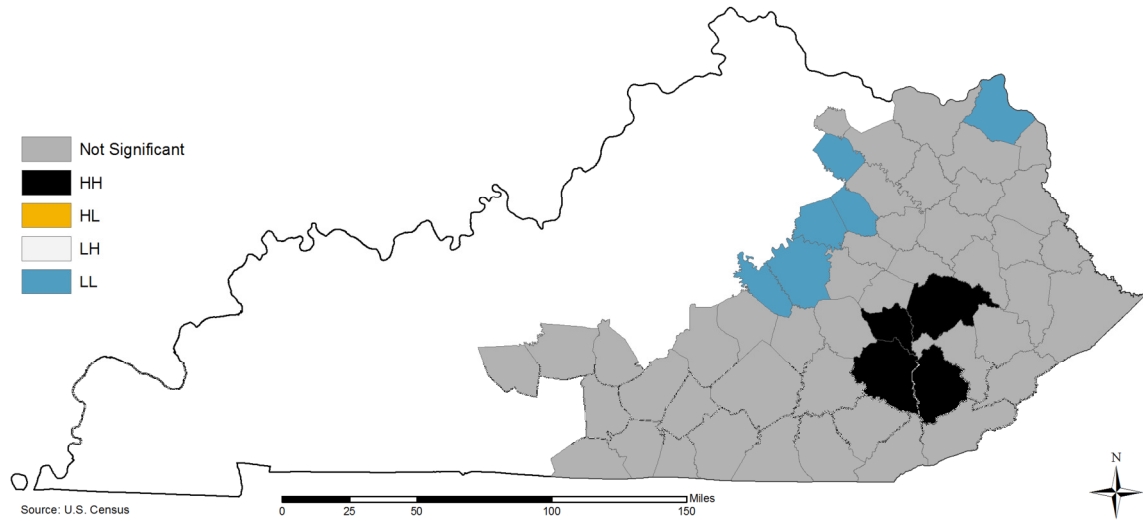


Figure 31: LISA Analysis - Percent of Population in Poverty 2000



5.6.2 Independent Variables

The following figures have nearly the same pattern and are discussed together. Figures 32-34 show a HH cluster in the southeastern part of the study area. These counties are the largest producers of coal in Appalachian Kentucky and this area has relatively high poverty rates. Between the three figures there is one difference. Figures 32 and 33 lose two counties and it is not clear why. It could be that the ratio of tons of coal per person in poverty changed enough to make these two counties not significant.

Figure 32: LISA Analysis - Tons of Coal Per Person 1980

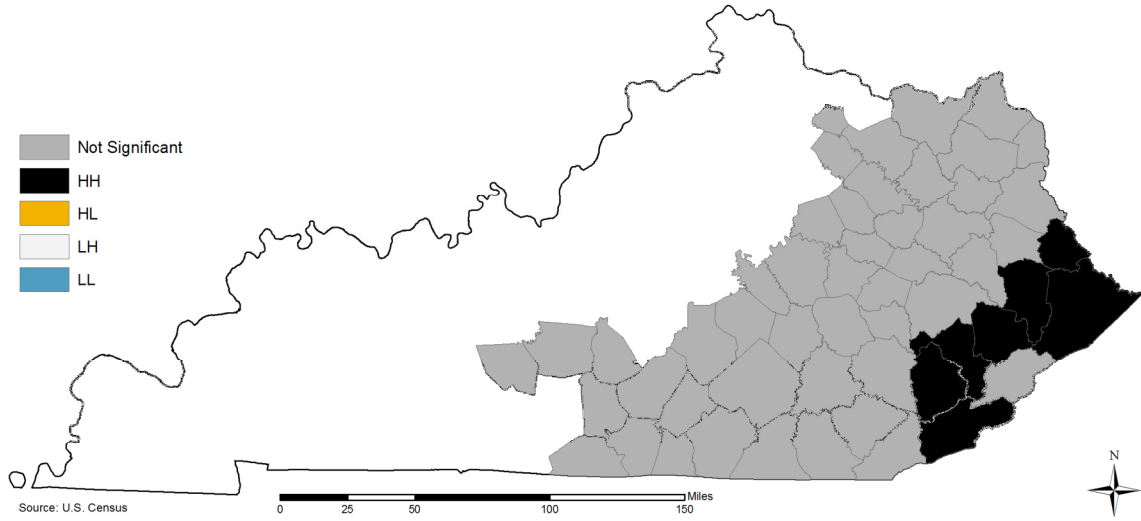


Figure 33: LISA Analysis - Tons of Coal Per Person 1990

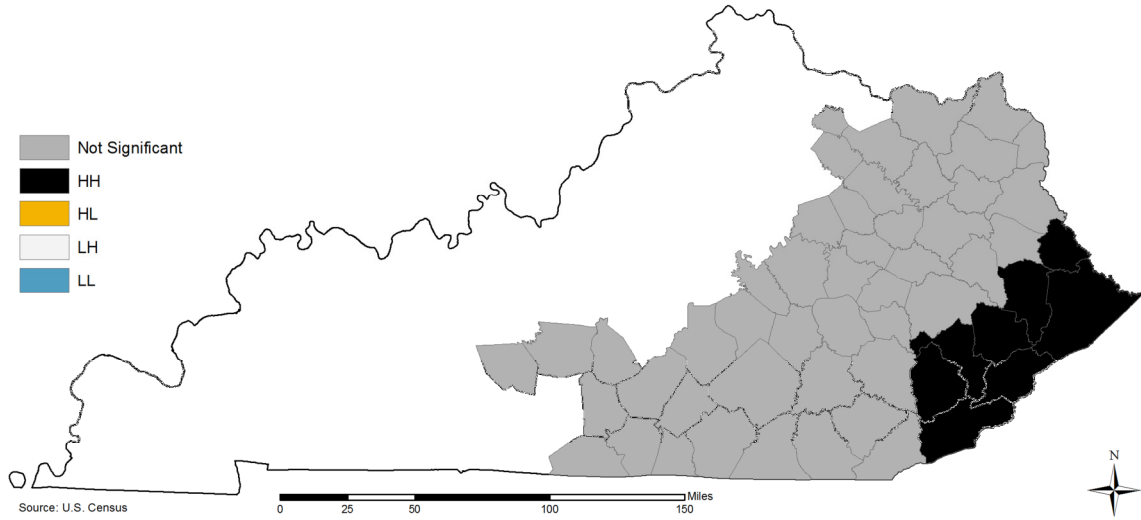
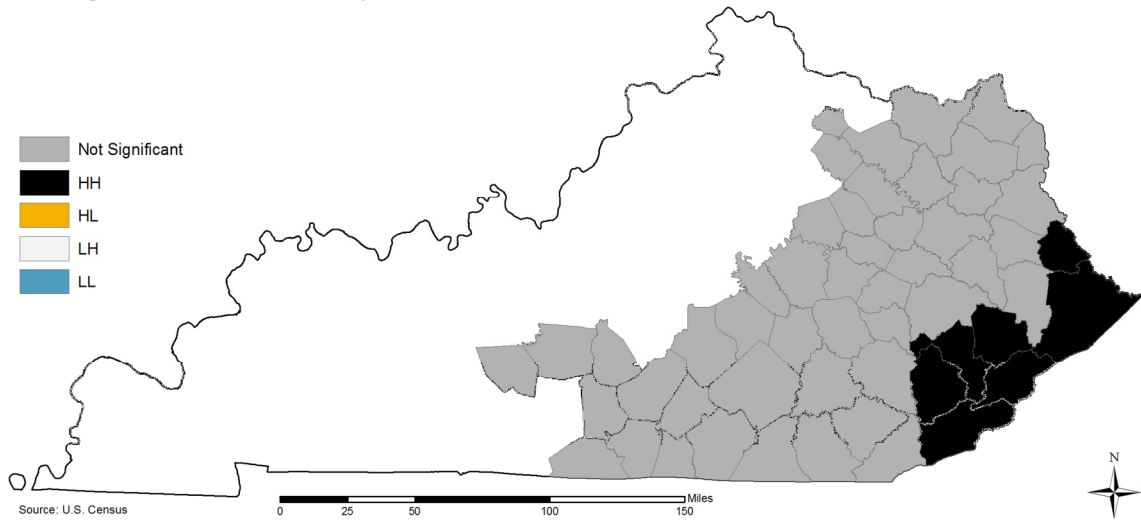


Figure 34: LISA Analysis - Tons of Coal Per Person 2000



Below, Figures 35-37 have the nearly the same pattern not only as each other but also as Figures 32-34. Also, the explanation for the patterns in Figures 35-37 is dependent on coal production. If coal production slows, the amount of tax received decreases, thus making a county significant or not. Also the closeness of the patterns in Figures 32 through 37 makes it clear that these variables are closely related.

Figure 35: LISA Analysis - Coal Severance Tax 1980

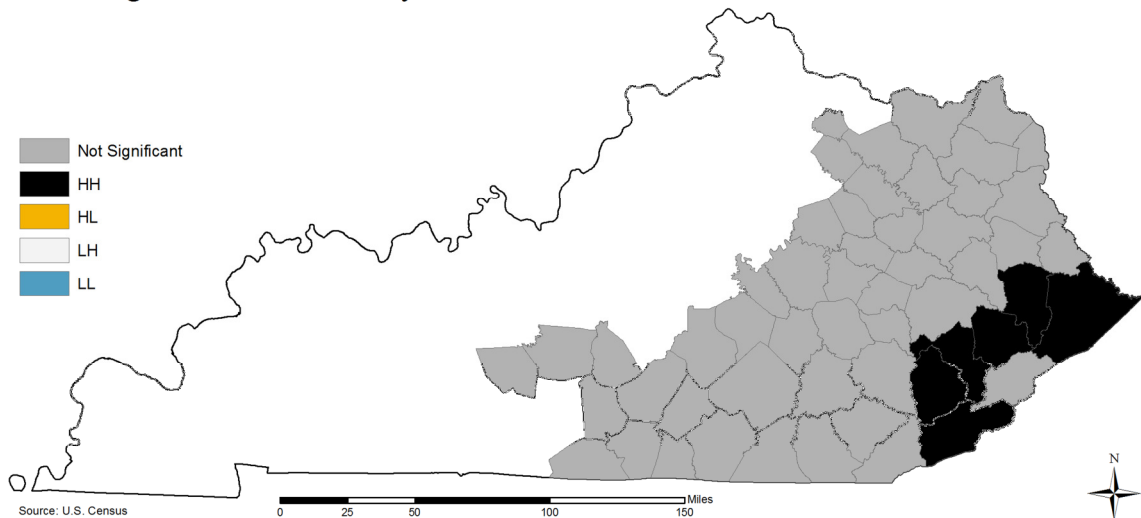


Figure 36: LISA Analysis - Coal Severance Tax 1990

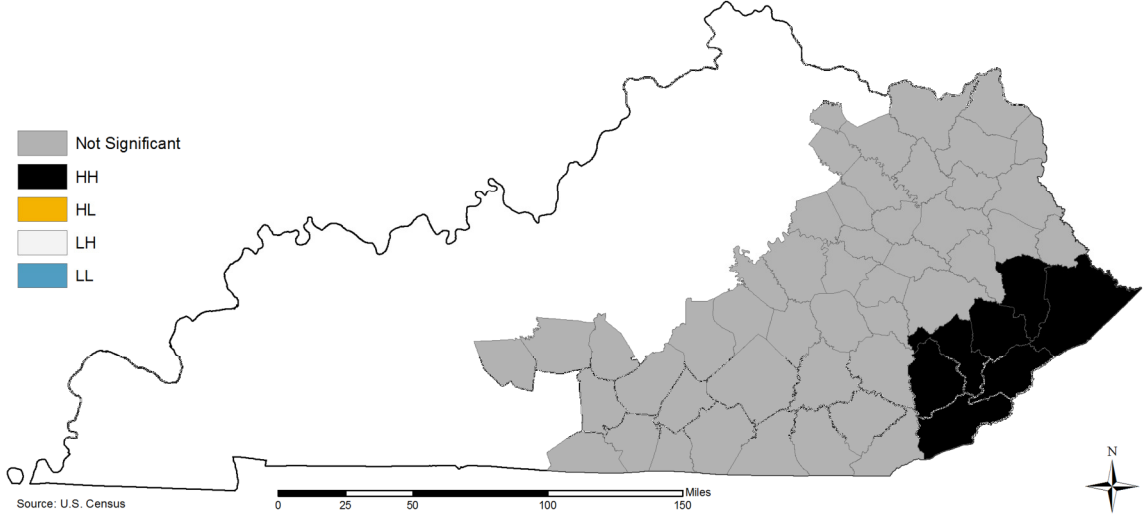
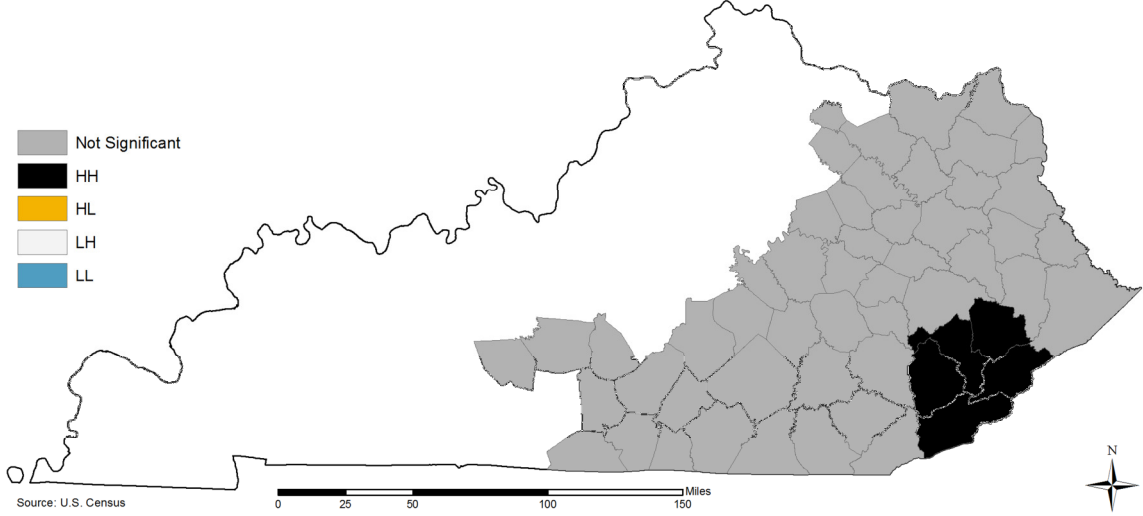


Figure 37: LISA Analysis - Coal Severance Tax 2000



Below, Figure 38 shows a HH cluster in the southwestern part of the study area. This cluster reinforces what was found in Figure 11. This is because the southwestern part of the study area has the highest median ages. The same pattern holds for Figure 39, because Figure 12 also shows that western part of the study area has the highest median ages. Also the LL cluster in Figure 38 is the area of lowest median age in Figure 11. The LL cluster does not show up in

Figures 39 and 40 because the median age of Figures 12 and 13 greatly increases between 1980 and 2000. However, Figure 38 does have one county (Madison) with a LH value. This means that Madison County displays negative autocorrelation. However, this is explained by the presence of Eastern Kentucky University in Madison County. However, the LH value does not carry over to Figures 39 and 40. The most interesting part about Figures 38-40 is that by 2000, only one county is in the HH class. This is interesting because it would appear that the region is becoming more homogeneous in its median age range and that median age is high.

Figure 38: LISA Analysis - Median Age 1980

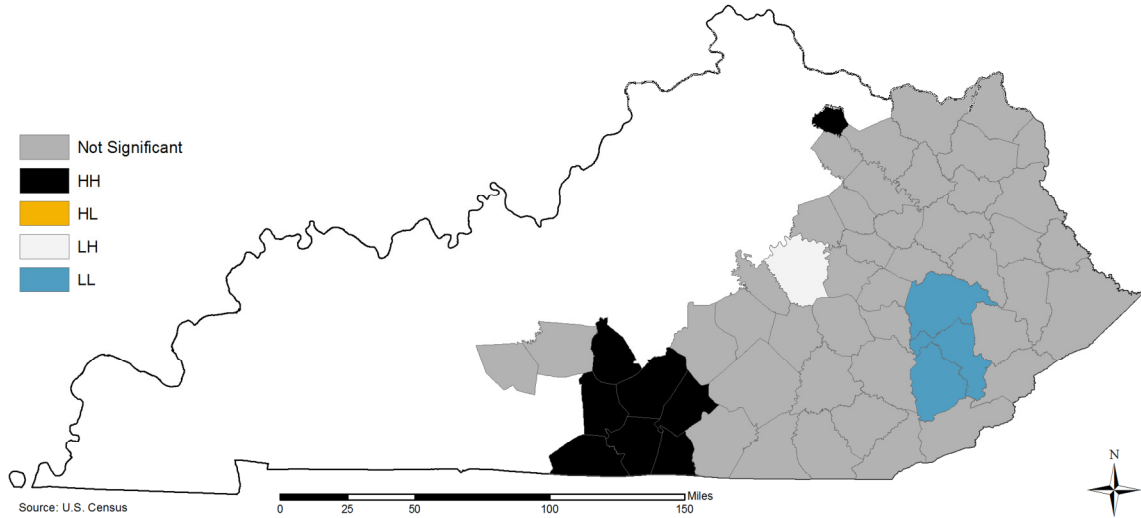


Figure 39: LISA Analysis - Median Age 1990

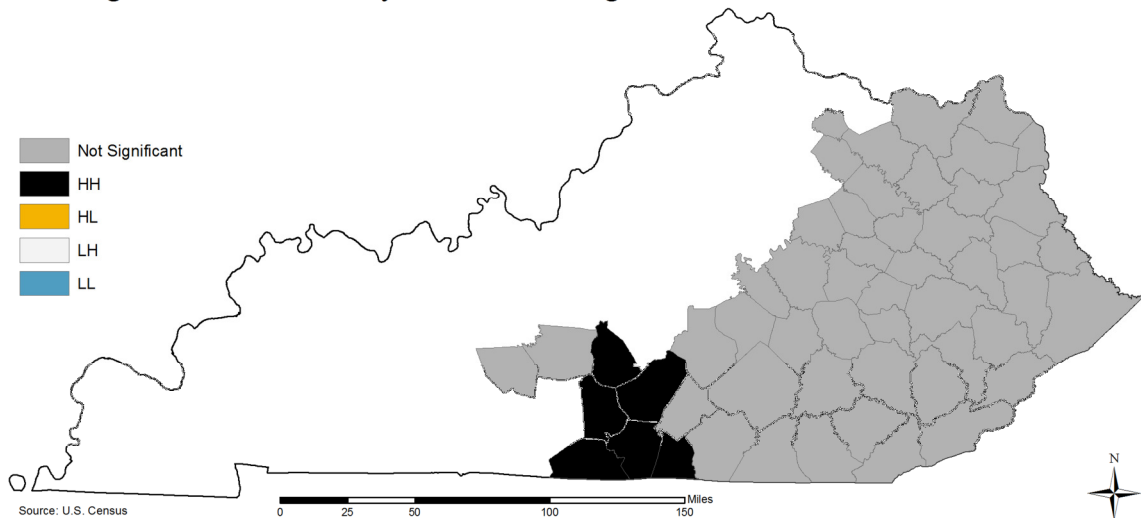
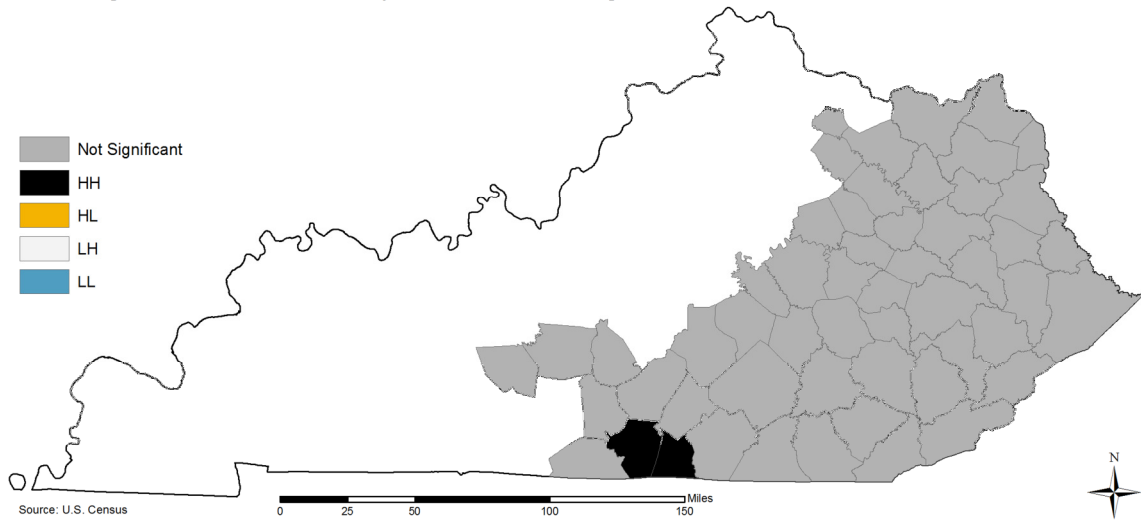


Figure 40: LISA Analysis - Median Age 2000



Below, Figure 41 shows that there is HH positive spatial autocorrelation in the study area along the West Virginia border and in the south. This HH cluster is accurate because it includes an area of high net migration as shown in Figure 14. Figure 42 shows a LL cluster along the West Virginia and Virginia border, and Figure 15 shows that area to have the lowest net migration rates. Figure 43 shows that nearly all of the eastern part of the study area lost population and Figure 16 shows the lowest net migration rates in that area as well. Overall Figures 41-43 are similar to Figures 14-16.

Figure 41: LISA Analysis - Net Migration Rate 1980

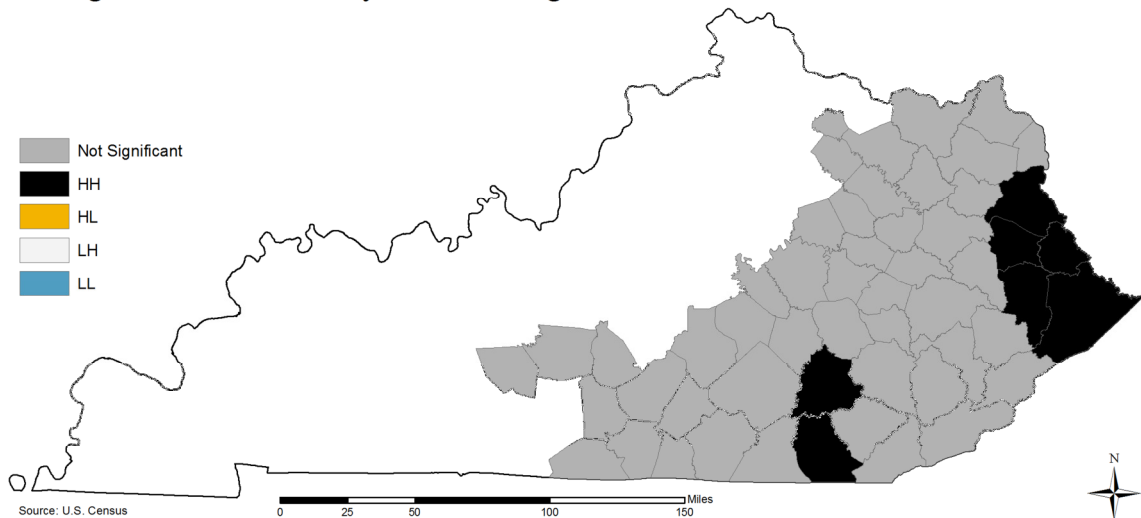


Figure 42: LISA Analysis - Net Migration Rate 1990

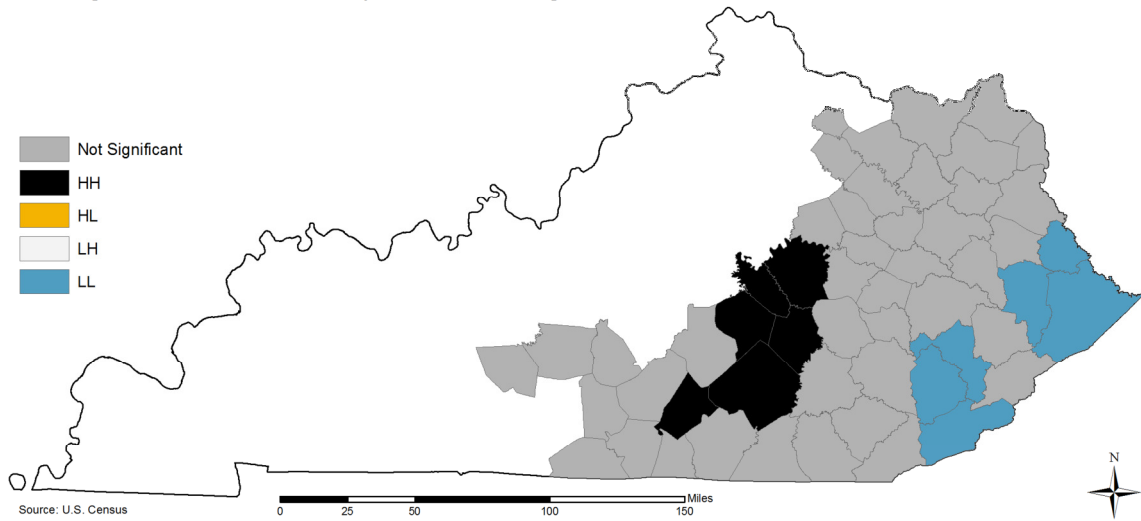
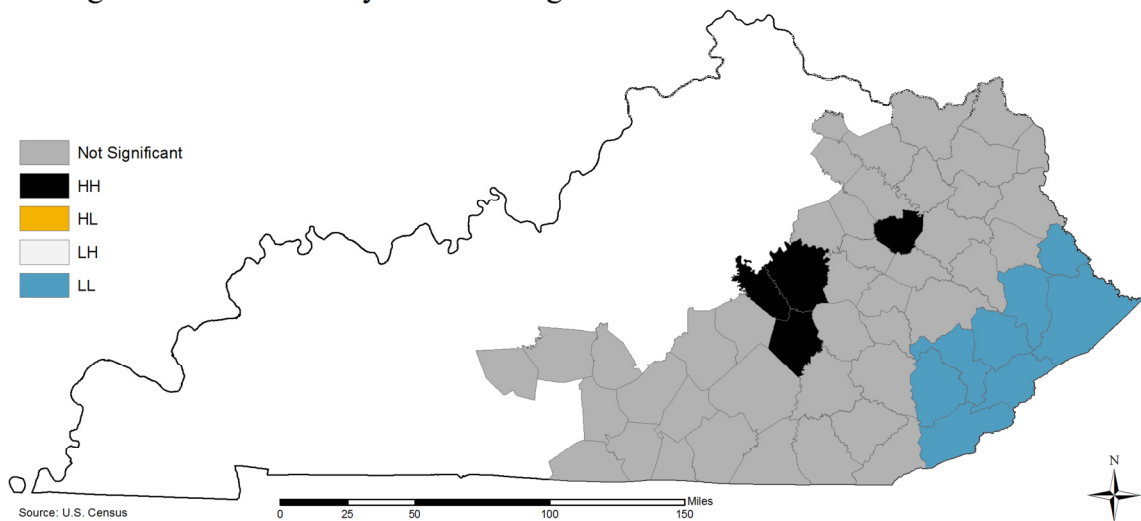


Figure 43: LISA Analysis - Net Migration Rate 2000



In Figure 44 below there is HH clustering along the Ohio River and along the west central border. This positive spatial autocorrelation of education is a result of the proximity to large urban and suburban areas. This is because in these areas there is a greater access to education. There is a LL cluster of positive spatial autocorrelation in the center of the study area. This single county is Owsley County and it stands out because in my 1980 dataset Owsley County had the lowest education level in the study area. Figure 44 also shows a cluster of High-Low (HL), which is negative spatial autocorrelation. The only county in this cluster is Rowan

County. The presence of negative spatial autocorrelation is not unexpected because Rowan County is the home of a moderate size university (Morehead State University).

The HH pattern in Figure 45 is identical to the HH pattern in Figure 44 and the reasons for these patterns are the same. Figure 45 differs by showing an increased LL cluster. This could mean that the LL area is experiencing harder economic times.

Figure 46 shows that by 2000 the HH cluster on the west central border grew by one county. This could be because that area is experiencing economic growth and that growth is opening doors for greater education. Also the HH cluster along the Ohio River is unchanged since Figure 44. In Figure 46 the LL cluster changed a little but is still centered on Owsley County.

Overall, Figures 44-46 show that higher education levels are associated with urban and suburban areas. One thing that is interesting is that the HL cluster in Figure 44 does not hold in the other figures. This could mean that enrollment at Morehead State has decreased or that the university is raising the education level of the region, making Rowan County insignificant.

Figure 44: Lisa Analysis - Percent of Population with a High School Diploma or Higher 1980

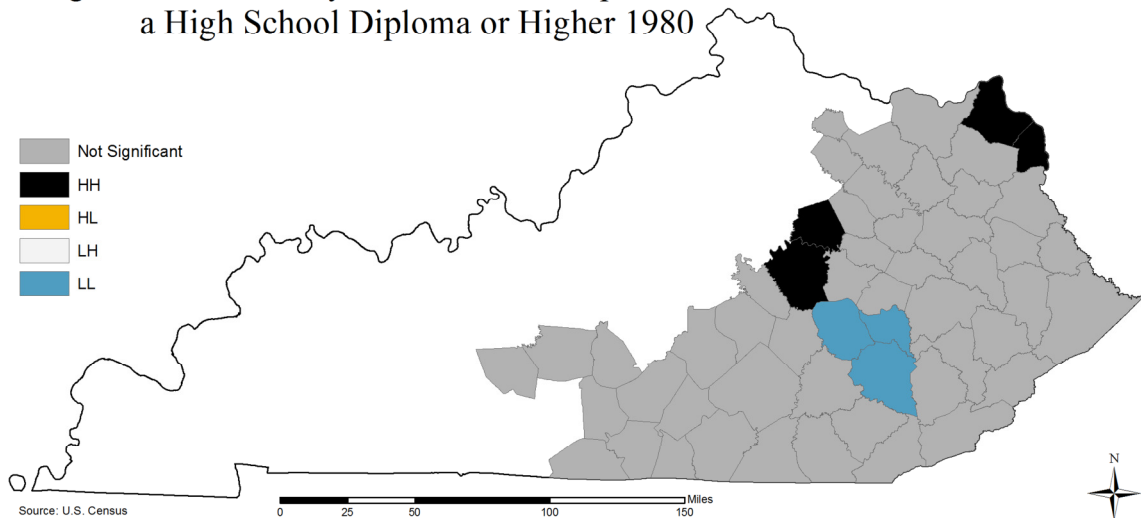


Figure 45: Lisa Analysis - Percent of Population with a High School Diploma or Higher 1990

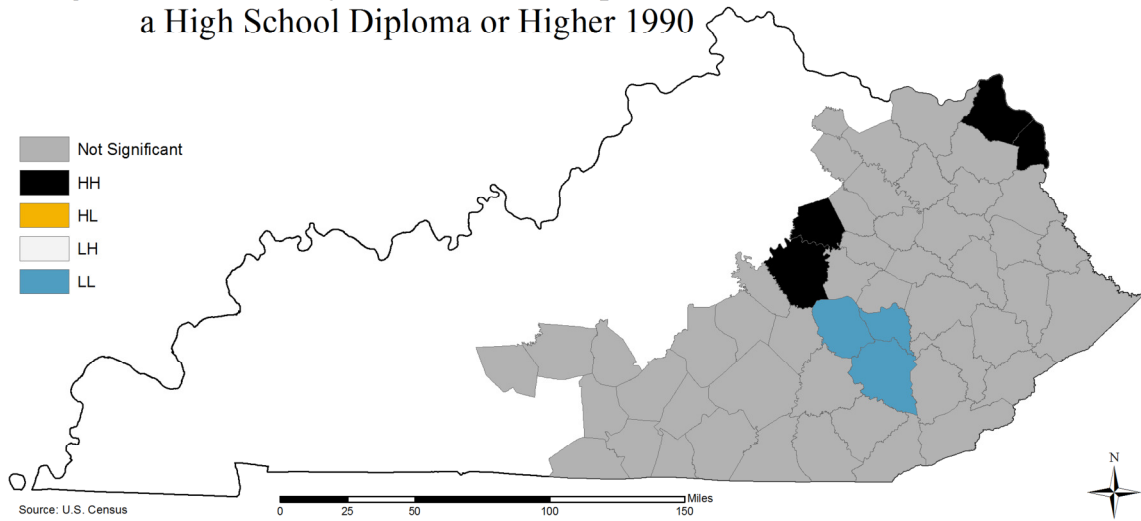
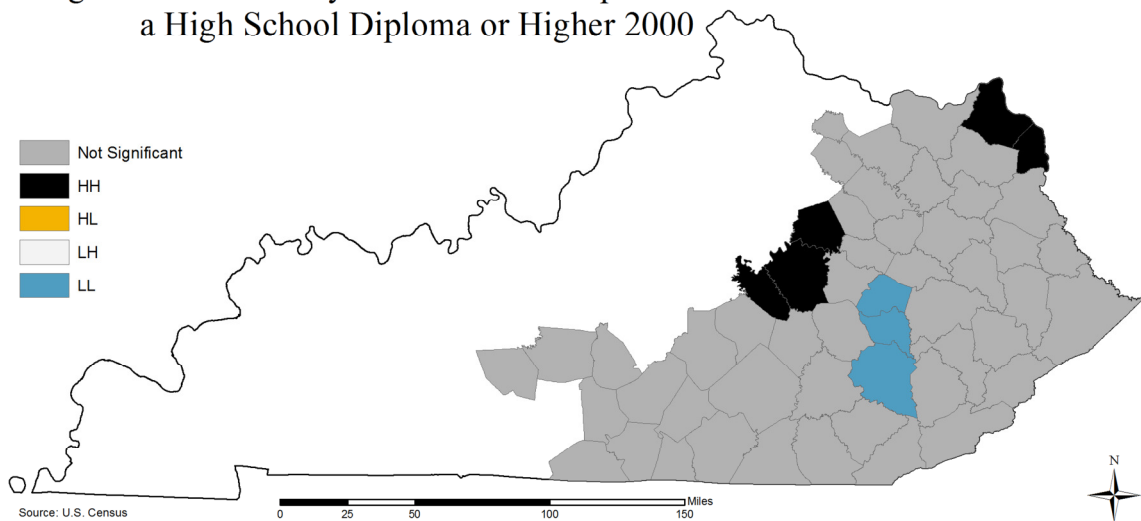


Figure 46: Lisa Analysis - Percent of Population with a High School Diploma or Higher 2000



Below are Figures 47- 49. These figures show the local pattern of PCI and that pattern mirrors the pattern seen in Figures 44- 46. The main difference is in Figure 49. Figure 49 is different because the HH cluster on the west central border near Lexington has grown. Also the LL cluster no longer contains Owsley County. This is strange because Owsley County is still in the LL education cluster in Figure 46 but Owsley County in 2000 was no longer the lowest

income county. It had moved up to 45th place out of 55. In all, the similar patterns in Figures 44 through 49 show that education and PCI go hand and hand.

Figure 47: LISA Analysis - Per Capita Income 1980

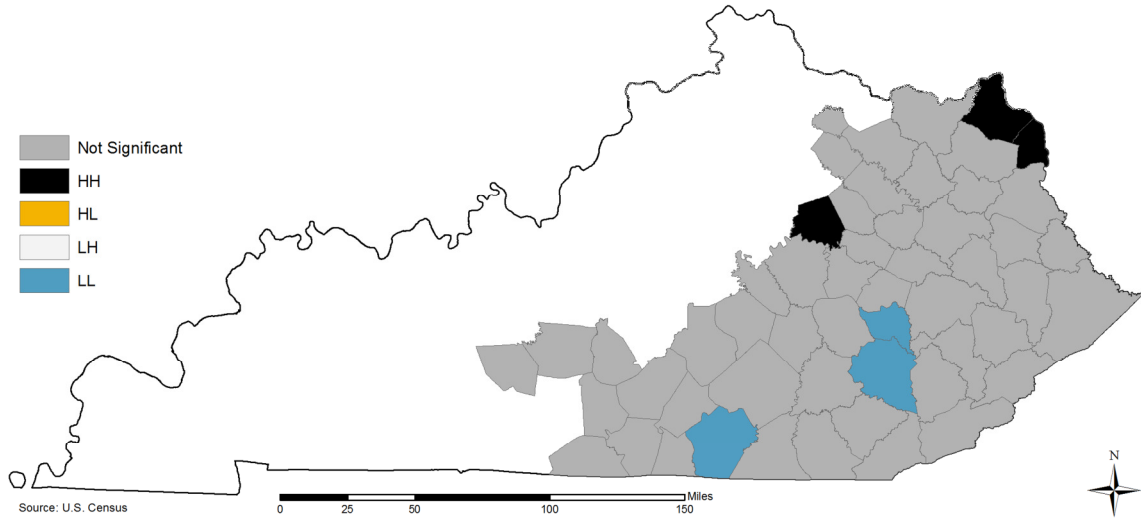


Figure 48: LISA Analysis - Per Capita Income 1990

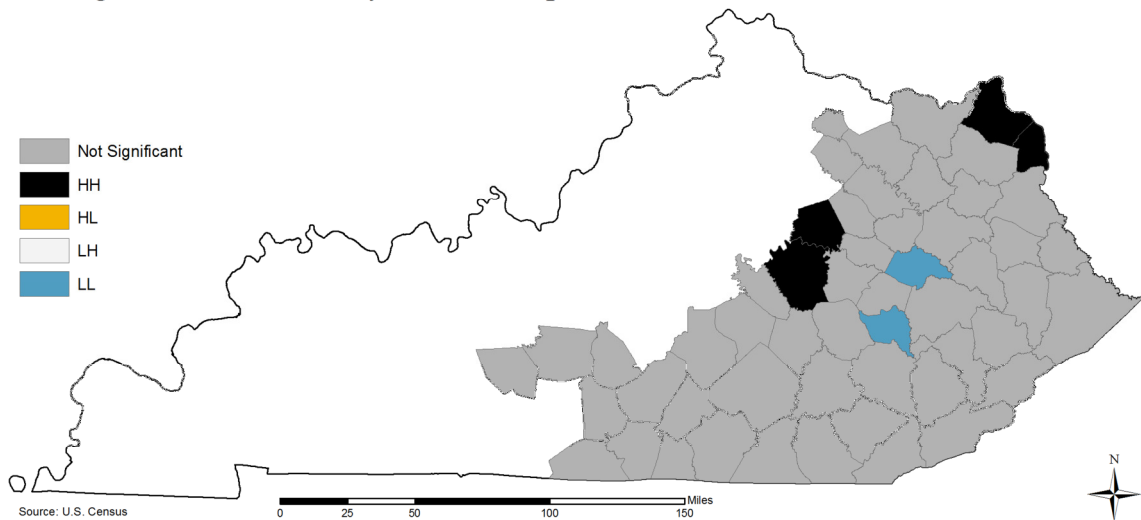
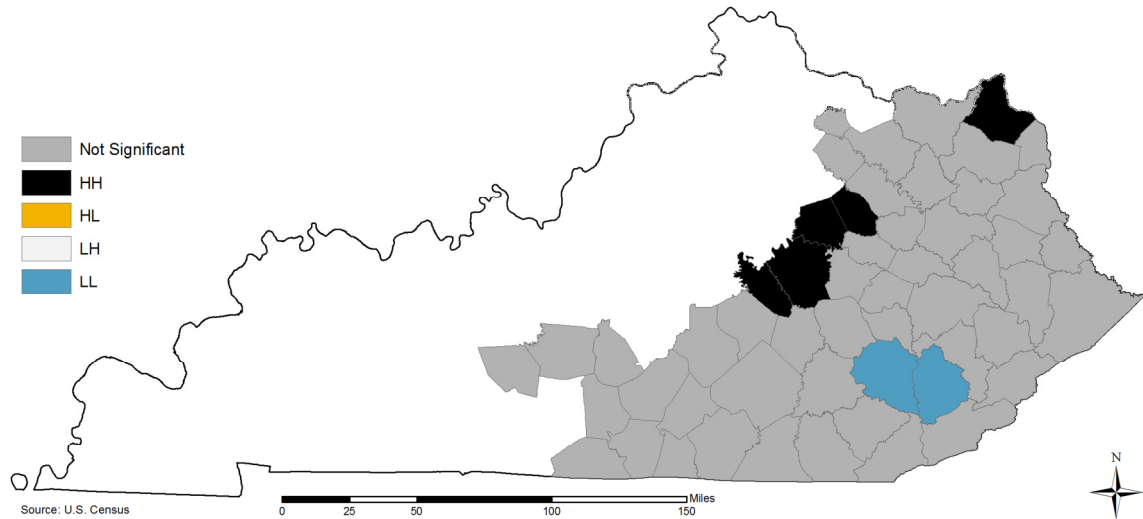


Figure 49: LISA Analysis - Per Capita Income 2000



Out of all the previous figures, Figures 50- 52 have the greatest variation of spatial autocorrelation. This is because when there is a pocket of significant negative spatial autocorrelation, it is surrounded by the corresponding significant positive spatial autocorrelation. This can be seen in Figures 50 and 51. In Figure 50 Rowan County is a pocket of LH, meaning that Rowan County has low unemployment and the surrounding area has high unemployment. This is reinforced when the main cluster of HH in Figure 50 is right below the LH cluster. This could mean that Rowan County and mainly Morehead State University are drawing their workers from these counties. The LL cluster is harder to determine. The only conclusion is that these counties are closer to areas with an employment need.

Figure 51 shows nearly the same pattern as Figure 50 but has added a new negative spatial autocorrelation cluster. This negative spatial autocorrelation cluster is an HL cluster and is right above the Low-High (LH) cluster. The reasons for this HL cluster could be the result of people traveling out of the county for employment, or because the major source of employment in this county (Lewis) has closed, or a combination of both. In Figure 51 the LH cluster is the same but the HH cluster has shifted. Also, the LL cluster has moved to center around the western border.

In Figure 52 the HH cluster moves back south of the LH cluster, all while the LH cluster stays in Rowan County. Other than the shifting HH cluster and the diminished LL cluster, Figure 51 is nearly the same as Figures 50 and 52; also the reasons for the patterns stay the same.

Figure 50: LISA Analysis - Unemployment Rate 1980

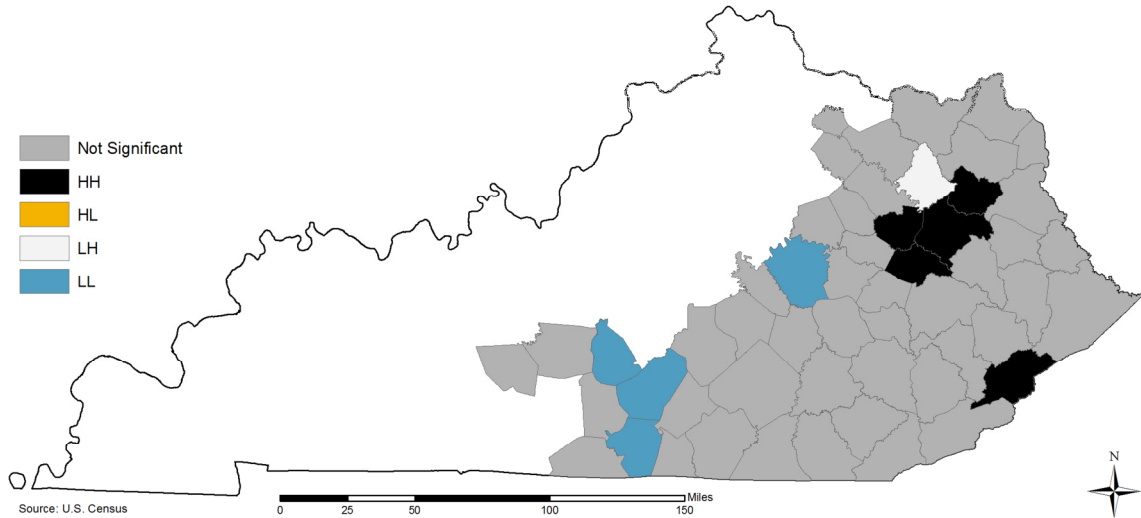


Figure 51: LISA Analysis - Unemployment Rate 1990

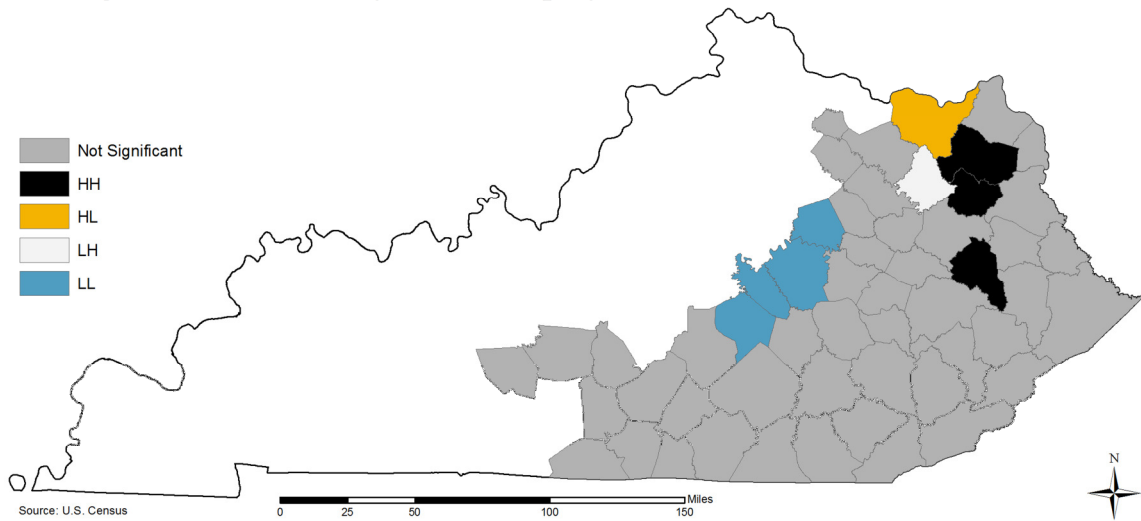
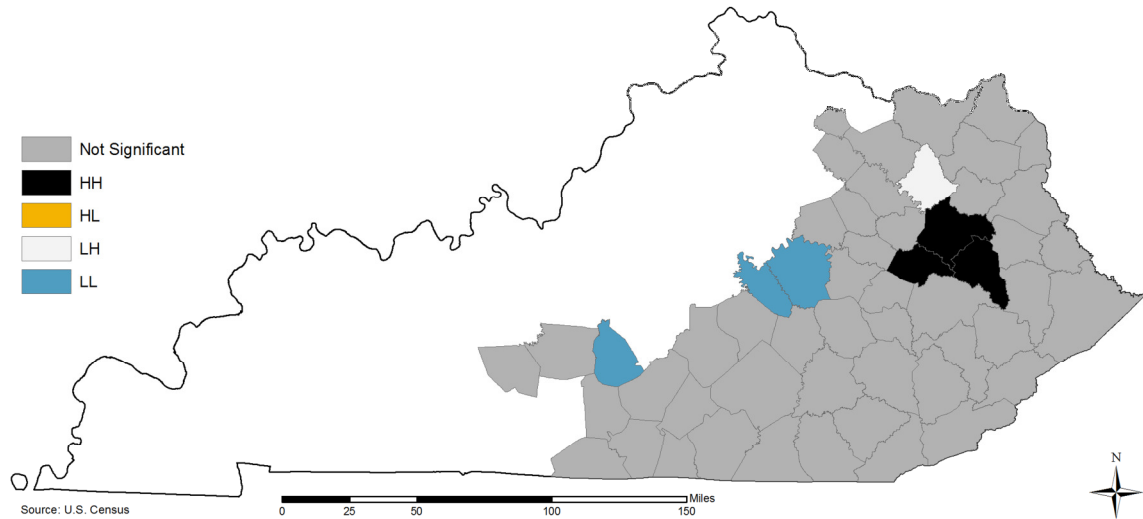


Figure 52: LISA Analysis - Unemployment Rate 2000



5.6.3 Local Statistics Results

Overall the LISA analysis has provided two points of interest. First, LISA made it possible to see that the PCI variable and percent high school diploma or higher variable have nearly the same pattern. Also LISA shows that the coal tax variable and the tons of coal per person in poverty variable have a similar pattern as well. This allows me to have greater confidence in my decision to cut both the percent high school diploma or higher variable and the tons of coal per person in poverty variable from the regression. The second point of interest is that outside of the directly coal-related variables, the coal region of Eastern Kentucky did not stand out in any HH or LL cluster. This could be because there is not enough difference in the other variables for significant HH or LL clusters to appear. An answer to this question at this point is out of the reach of this thesis.

Outside of what is discussed above, LISA allows me to see that there are very few local patterns of interest. This also enforces the minimal findings in both the independent variable analysis and the OLS regression. This is not to say that what was found is not important, it just means that these findings are not as strong as the findings in the thematic discourse analysis.

5.7 Conclusions

The goal of this chapter was to answer the following two questions: can a measure of coal production provide the needed analytical power to explain the coal industry's impact on Appalachian Kentucky and could the instability of the coal industry be a leading cause for poverty and migration out of the region between 1980 and 2000? In the next paragraphs I will discuss each of my questions in detail, and whether my analysis provides enough information to answer them.

The answer to the first question about the analytical power of would have to be no. This is because neither of the coal-related variables (coal tax or tons of coal per person in poverty) was found to have a significant relationship with poverty in the OLS regression. If the relationship with poverty was solely a measure of coal production then the regression analysis would have shown that. This was not the case. Tables 4-6 show that the variable with the strongest relationship with poverty was PCI. This is not a complete failure because in Appalachian Kentucky, especially in the southeastern part, the coal industry is a leading employer (Roemaker 2001). Saying that this is not a complete failure does not entirely mean it was a complete success either. This is because of the inherent relationship between poverty and PCI. No matter the situation, very low income levels have the possibility to lead to higher levels of poverty. It is true that Appalachian Kentucky's population is heavily dependent on the coal industry for their income, but the link is weak in this study and further research is needed to fully realize this link.

However, this study is able to show clear evidence of the boom and bust cycle that plagues the coal industry of Appalachian Kentucky. This cycle is seen when comparing Figures 2-4 with Figures 20- 22. Figures 2- 4 show high poverty rates moving east between 1980 and 2000, then Figures 20- 22 show higher PCI's moving west in the same time period. This illustration of the boom and bust cycle directly provides part of the answer to my third question.

It would appear that the instability of the coal industry is a leading cause for poverty and migration in the region between 1980 and 2000. As stated above, poverty increases as PCI decreases. Also, the migration half of question three is also met. This part of the question was not directly answered in my regression but can be seen visually in section 5.2.2. The net migration figures are Figures 14, 15, and 16. These figures show that as you move from decade to decade, positive net migration decreases and negative net migration increases. This visually aligns with the increases in poverty rates, decreases in PCI's, and decreases in both coal-related variables. This means that coal and the coal industry has the ability to bring people to the region when they have a need for employees, but when the situation reverses those new people do not have any strong ties to the region and move to areas that meet their needs. I am not saying that this pattern is unique to Appalachian Kentucky but this region's migrations patterns are slightly different than the patterns seen in other parts of the United States. It is different because of booms and bust cycles. Even when agencies such as the ARC attempt to stabilize the region the boom and bust cycle still prevails, although the intensity of the effect may be dulled, meaning that other sectors of the Appalachian economy (services and agriculture) are fostered by the ARC and these sectors provide a little relief.

Also, since the boom and bust cycle is still evident in this quantitative analysis this raises a new question. This question is how are ARC policies combating the cycle of boom and bust? It is true that a direct measure of coal production did not help to explain the coal industry's impact on the region, but I feel that this analysis still provides enough analytical power to make a decision on the coal industry's impact. I have to say the coal industry does impact the region and the boom and bust cycle is its main weapon. In the end, if Appalachian Kentucky cannot break the boom and bust cycle the future looks bleak.

Chapter VI

HOW FAR HAVE WE COME? HOW MUCH FURTHER DO WE HAVE TO GO?

6.1 Introduction

Throughout this thesis I have addressed three questions. These questions are:

Question 1: What is coal's place in the ARC's discourse of development and how has it changed over time?

Question 2: Can a measure of coal production provide the needed analytical power to explain the coal industry's impact on Appalachian Kentucky?

Question 3: Could the instability of the coal industry be a leading cause for poverty and migration out of the region between 1980 and 2000?

First, this chapter highlights the limitations in this study, next, I provide a recap of the qualitative and quantitative results, and lastly, I conclude with the relevance of this work.

6.2 Limitations of this Study

This thesis does have a few limitations. First, question 1 has a different timeframe and study area than questions 2 and 3. This difference is not detrimental to my argument but allows

me to show the breath of the ARC and then to focus on a time period of change in the region. Second, due to the time needed for data collection and analysis, the scope of this project and specifically questions 2 and 3 is limited to Appalachian Kentucky. Also, the years covered are 1980, 1990, and 2000. The project is limited to Appalachian Kentucky due to the large number of distressed counties (ARC 2010) and because of the large number of coal-producing counties. I cover the years 1980, 1990, and 2000 for two reasons. First, the census years 1980, 1990, and 2000 are the most readily available. Secondly, the ARC has provided data from these three census years. The next limitation is that of the coal data. The coal data used covers the years 1980, 1990, and 2000 but is limited to percent surface mined coal and percent underground mined coal per county. Since the available data are at the county level, this project was conducted at the county level. It would be nice to see the interaction of coal and poverty at a smaller geographic scope but it is unfeasible with the available data.

In looking at the interaction of coal with poverty this project is not directly stating why poverty exists, just that coal may help explain why it exists in a given county. This means that I am not giving a theoretical reason of why there is poverty; just that poverty and coal are closely linked. Also, question 1 helps in showing where the ARC incorporates coal into its development discourse and provides a basis to make changes if needed. The final limitation of this project is that of the quantitative analysis. I have chosen to limit my analysis to ordinary least squares regression (OLS). This is done because I have the most experience with this analysis tool and it provides reliable and easily interpreted results.

6.3 Coal's Place in the ARC's Discourse of Development

In the process of answering this question, I found four themes that allowed for my analysis. These four themes as mentioned in section 4.1 are: (1) isolation and the road network have set the region apart; (2) energy investment brings coal center-stage but coal is not the only cause of Appalachia's economic fluctuation; (3) community involvement; (4) economic

diversification. In my analysis, I also discovered a shift in the priorities of the ARC. The shift happened around 1984. The shift meant that the first two themes were most pertinent to time period 1 and the last two represent time period 2.

As revealed by the first two themes, the ARC discourse is focused on what happened in Appalachia's past and how it could be corrected. One problem is that the ARC uses both cultural determinism and environmental determinism to explain Appalachia. This seems counter-productive because cultural determinism was created to refute environmental determinism and one would think the two theories could not be used to explain one region. Curiously, both theories were part of the ARC discourse. The theme that isolation and the road network have set the region apart opens the door for the theme of energy investment. This is because the ARC discourse allows reader to believe that any and all types of development benefit Appalachia.

The theme that energy investment brings coal center-stage but coal is not the only cause of Appalachia's economic fluctuation illustrates that the ARC discourse presents a mixed message about coal. However, the ARC is content on describing coal at the regional level. By doing this the ARC overlooks the local sub-regional influence of coal. The ARC does include research in their annual reports that would allow them to analyze subregions such as Central Appalachia, but the ARC does not include such analysis.

This oversight has opened a door for this study. By finding this gap in knowledge, this study acts as a call to arms, for research on the impacts of coal in the ARC's discourse, at the sub-regional level. Also, by concluding that the ARC has minimized coal in its discourse after 1984, this study is able to be a guide post, to the ARC that it is starting stray from its energy investment goals. Straying from energy investment goals may not be the worst thing to do, but by not addressing the social and economic impacts of coal on the sub-regional level, the ARC is restricting the economic development efforts of these communities.

As I have mentioned after 1984 the ARC's discourse starts to change. This is where the last two themes come into play. Both community involvement and economic diversification were needed areas of concentration for the ARC but they came with a steep price. The price was the loss of the discussion of coal and the other traditional Appalachian industries. When the ARC states they used community inputs on new policies it is unclear how deep they went, meaning that if the ARC does not include abstracts or research from community meeting, one cannot tell if community inputs are being used. Since organizations like Kentuckians for the Commonwealth and Mountain Justice have been encouraging community support against coal company power and increased surface mining, the ARC has a pool of experienced community organizers to draw from. Also, these organizations have a large base in the Appalachian coal region, which would have attended the ARC's community focus groups and town hall meetings. By not consulting or showing that these organizations were consulted the ARC is not serving the people of Appalachia.

Since 1984, when the ARC talked about economic diversification, its discourse has emphasized tourism and the service sector. In time, the ARC stated that the service sector did not provide the same level of pay and benefits as traditional heavy industry jobs but the ARC is still pushing tourism for the region. The problem is that tourism is just a specialized branch of the service sector. By pushing tourism and the service sector the ARC may be restricting the economic strength of the region. The ARC is using tourism and the service sector as a strategy for breaking the single-minded reliance on energy resources but in doing so the ARC is just shifting the single-mindedness to tourism and the service sector. The ARC does this by changing its discourse, so that coal and other heavy industries are no longer mentioned. Also, many of the added service sector jobs are in food service, retail, and hospitality services.

These jobs often do not provide the same level of pay or benefits as coal mining. This can limit economic attainment. To its credit however, the ARC, in its push toward service sector jobs

has also provided development funds for local small businesses, which include local crafts, farmer's markets, and locally owned merchandise shops. This is because by supporting locally owned and operated businesses more of the profit stays in the region and the local community is able to thrive on the increased tax base and locally available goods.

The ARC, like any other government agency, is subject to the elected officials in charge and public opinion. When President Reagan took office in 1980 he did not push national energy development because the energy crisis was ending. This meant that in Appalachia, the ARC no longer invested large amounts of time and funds in energy development, which marked the end of coal as major part of ARC discourse. After the energy crisis was over the majority of the United States public became increasingly uninterested in national energy development, because foreign oil was once again cheap and abundant. This led the ARC to change its discourse to community involvement and economic diversification in order to meet the national pattern of development and shifting public interests.

It would appear that coal's place in the ARC is an uneasy one. Coal is seen as both a problem and a blessing. When the demand for coal is high, so is the ARC's attention to how it can benefit the region. Yet, when the demand is low, the ARC's position is not as clear. Prior to 1984 the annual reports did provide some evidence that coal is a leading cause of poverty in the region, while stating that increased coal production must be managed in order to balance economic gains with social and environmental stability. However, after 1984 the ARC no longer spoke of coal as a cause of poverty and did little to balance economic gains with social and environmental stability. The ARC did do one thing of note, however. They cut the coverage of coal related topic in the annual reports to a bare minimum. This shows that coal's central place in the ARC's discourse is minimized. By changing how coal is represented in the annual reports, the ARC may have changed its discourse in order to keep its federal funding. In time, public opinion on coal and its impact on Appalachia may change enough so that the ARC can research this topic

no matter which way the political winds are blowing at the federal level. Until then, the ARC can only hope for a federal government that has an open policy on what is considered relevant and beneficial research.

6.4 Can a Measure of Coal Production Provide the Needed Analytical Power to Explain the Coal Industry's Impact on Appalachian Kentucky?

In reviewing question 1 above, I attempted to see if a measure of coal production can provide the needed analytical power to explain the coal industry's impact on Appalachian Kentucky. However, the need and the ability to prove it are two different things. During my quantitative analysis, I started with two measures of coal production, coal severance tax and tons of coal per person in poverty. During my Independent Variable Analysis and EDA I decided to cut the variable tons of coal per person in poverty because it correlated highly with coal severance tax. Plus, when mapping both of these variables, they appeared to have the same pattern. With this in mind, I came to the conclusion that these variables would work similarly in an OLS regression.

After I ran all three OLS regressions it became clear that coal severance tax did not greatly influence poverty in Appalachian Kentucky. This is because coal severance tax was not significant in the regression. This means that a measure of coal production did not provide the needed analytical power to explain the coal industry's impact on Appalachian Kentucky. Given the fact that poverty measures are based on income, it is not surprising that there was one variable that explains nearly 80 percent of poverty in Appalachian Kentucky, in all three regressions. That variable is Per Capita Income.

In my analysis of the ARC and its annual reports I found that the ARC did see that coal's major role in Appalachia as that of an employer, meaning that the region's incomes are linked to coal production. This means that PCI in Appalachian Kentucky can be seen as an indirect coal

production variable. However, these findings are tenuous at best, because of the inherent relationship between poverty and income. This means that as long as poverty is measured based on income thresholds, income will predict poverty on some level. To address this I did run my regressions without PCI, but the results were weak at best. For the 1980 dataset no variables were found to be significant and as for datasets 1990 and 2000 only net migration was significant but this variable barely explained 20 percent of the relationship with poverty. For a geographer this relationship is not strong enough (Burt et al. 2009).

In the end, quantifying coal's impact is as difficult as determining its impact on the ARC discourse. There is a relationship between coal and poverty but it runs much deeper than a regression analysis can show. Coal seems to be so ingrained in the economy and social structure of the region that it is difficult to see coal's interaction with these systems.

6.5 Could the Instability of the Coal Industry be a Leading Cause for Poverty and Migration Out of the Region between 1980 and 2000?

The instability of the coal industry would appear to be the greatest cause for poverty and migration for Appalachian Kentucky between 1980 and 2000. This is because the analysis of the ARC's annual reports, the independent variable analysis, the three regressions, and the LISA analysis all show that the boom and bust of the coal industry does affect poverty and migration. These results are not completely original, but they do show that the ARC was unable to change the boom and bust nature of the coal industry. By seeing both the qualitative and quantitative analysis in agreement it is clear that there is a relationship between instability, poverty, and migration. However, the extent to which the ARC is aware of this remains unclear since none of the research projects mentioned in the annual reports perform a quantitative study like the one I have completed. This is strange because I feel a basic regression analysis would be one of the first things an organization such as the ARC would perform, in order to better understand the relationship between the socio-economic variables and coal data it has collected.

6.6 Relevance of this Study in Contemporary Appalachian Research

Over the last 47 years the ARC has been the leading institution in Appalachian development. In those 47 years the ARC has had some success. However, that success is limited to highway development and a few social programs. The goal of this thesis is to provide a common ground for both the analysis of the ARC and the analysis of variables that may affect poverty in Appalachia. This is needed because it appears that the ARC is unable to address coal's role in Appalachia because of its inability to show the current government, and the nation at large, that coal is more than just an energy source. By showing coal's significance as a social and geographic constraint and not just an energy source, the ARC would be able to provide more funding on research to analyze coal's relationship with poverty and migration. However, if the ARC is to succeed in this venture it needs to clear the hurdles for government bureaucracy and the power and influence of coal lobbyists. These two hurdles are steep but if the ARC can muster the support of the not just the people of Appalachia but the nation at large, it has a great chance.

By analyzing more aspects of the region both qualitatively and quantitatively I am able to provide an analysis of the region that is balanced and more holistic. Since the problems of Appalachia have more than one cause and these problems run deep, a holistic and interdisciplinary approach is the only way to deal with the problems. The ARC has started this process by increasing community involvement, but they need to go further and include all the grassroots organizations in the region. By doing this the ARC will be more effective in gathering the opinions of people in the region.

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APPENDICES

A.1: Qualitative Themes and Data Extracts

Themes

1971-1980

Isolation and the road network have set the region apart
Energy investment brings coal center-stage but coal is not the only cause of
Appalachia's economic fluctuation

1984-2008

Community involvement
Economic Diversification

Data Extracts

Code Groups 1971-1980

Development Group

Low development – Large areas of relatively dense populations were without adequate roads, a barrier to access to services and jobs and an impediment to economic growth (ARC 1971, 5)

Development – Development activity in Appalachia, declared the President's Appalachian Regional Commission in 1964, cannot proceed until the regional isolation has been overcome (ARC 1971, 41).

Dependence – Since the ARC came into being in 1965, much of its efforts have been devoted to improving the mix of economic activities so that the region can overcome the heavy dependence in large areas on extractive industry (ARC 1971, 50).

Treatment – Thus, it can be seen that the ARC is responding to the environmental problems and the potential economic gains from recreation pointed to in 1964 (ARC 1971, 50).

Cycle of Poverty – By the late 1950s Appalachia could no longer break out of this circle of poverty by itself (ARC 1975, 6).

Growth – The employment growth trend produced by Central Appalachia has been somewhat inconsistent with the national pattern and that of the other sub-regions (ARC 1975, 22).

Development change – It wasn't until the Industrial Revolution in the late 1800s that Appalachia began to undergo significant socioeconomic change. And the reason was coal (ARC 1980, 3).

Stupid Mountain People – Unsophisticated in the ways of the new industrial society, Appalachian became not the entrepreneurs but the laborers (ARC 1980, 3).

Not just coal – So coal alone was not responsible for the economic depression that beset the region. Rather, it was the coal “bust” in combination with significant and concurrent downturns in all major segments of the sub-regional economies that plunged Appalachia into so prolonged and devastating a decline (ARC 1980, 4).

Growth – The Appalachian population growth in this decade (1970-80) was the largest of any recent decade; the rate of growth (11.1%) was just under the national rate of 11.4% (ARC 1980, 6).

Growth – Among the sub-regions, Southern Appalachia has had the largest growth of population in each decade, accelerating from 10% gain in the 1960s to nearly 19% in the 1970s. Northern Appalachia, with the largest total population, had the slowest growth, only 0.3% in the 1960s, and only 4% in the past decade. Central Appalachia lost 7% in the 1960s, but reversed the highest growth rate, 21%, in the 1970s (ARC 1980, 6)

Income – Central Appalachia, the sub-region with the lowest per capita personal income level, experienced the most rapid increase – from 52 to 71% of the U.S. average over the thirteen years (1965-1979) (ARC 1980, 7).

Road Network Group

Transportation Network– its cities and town, its areas of natural wealth and its areas of recreation and industrial potential must be penetrated by a transportation network which provides access to and from the rest of the nation and within the region itself (ARC 1971, 41).

Mountain Barrier – No analysis of the regional problem has failed to identify the historic and persisting barrier-effect of its mountain chains as a primary factor in Appalachian underdevelopment (ARC 1971, 41).

Bypassed – When the interstate highway system was developed over the past decade and a half, the major routes through the land in the region – I-70, I-40, I-81, and I-75 – tended to follow the well-established corridors and did not open up isolated, but heavily populated areas which had been historically bypassed by adequate roads (ARC 1971, 41).

Access – There is evidence that the primary purpose of this highway system – long-range economic development of the region – is being accomplished. For example, new industrial plants have appeared in the region, and the majority of these plants have been located within a few minutes of the new highways (ARC 1975, 2).

Limited Development – Limited access to the region discouraged new investments. Narrow, winding roads distorted time-distance travel, inhibiting potential industrial developers because of the problems involved in getting products to market (ARC 1975, 6).

Lack of roads – Poor transportation also directly affected the lives of the citizens by limiting their access to existing human services and isolating them from the social and cultural changes taking place in the rest of the country (ARC 1975, 6).

Isolation – And there was the one factor that strapped the economy of the entire region: isolation. The same narrow twisting roads that limited Appalachian's social and cultural horizons and their access to education, health care, and other vital services, also discouraged new industrial development of any kind (ARC 1979, 4).

Isolation – The same narrow twisting roads that limited Appalachians' social and cultural horizons and their access to education, health care, and other vital services, also discouraged new industrial development of any kind (ARC 1980, 4).

Access – The Interstate Highway System that was to link the nation coast to coast skirted Appalachia in favor of connecting more densely populated urban areas (ARC 1980, 4).

Cost – The cost – many times the national per-mile average – was well beyond the states' means (ARC 1980, 4).

Other means of travel – Railroads were on the decline nationwide, and commercial air service, growing rapidly almost everywhere else, skipped over the region (ARC 1980, 4).

Roads – In the energy crises of the 1970s, ARC helped fund access roads to nuclear plants, oil storage facilities, and to coal mines (ARC 1980, 17).

Old problem – An old Appalachian problem reemerged with the revival of the coal industry in the 1970s: the need for building and resurfacing coal haul roads (ARC 1980, 17).

Haul roads – The ARC takes the position that, if the region is to substantially increase its production of coal to the benefit of the nation, then the nation must be willing to assume a reasonable share of the additional financial outlay necessary to make increased coal production possible (ARC 1980, 17).

Invest and Diversify Group

Diversify – Congress expects that the region will generate a diversified industry, and that the region will then be able to support itself, through the workings of a strengthened free enterprise economy (ARC 1971, 12).

Investment – The act directed that investment be concentrated in areas with a significant potential for future growth where the return on the public dollars invested will be the greatest (ARC 1971, 30).

Directing investment – approximately 60% of the Commissions investments so far have been placed in the area with significant potential for future growth. The remaining 40% have been in outlying areas to upgrade the health and education of the rural population (ARC 1971, 30).

Environment Group

Natural Beauty – Appalachia has natural advantages which might normally have been the base for a thriving industrial and commercial complex (ARC 1971, 48).

Beauty does not pay – Yet this natural endowment has benefitted too few of the ... people of Appalachia... (ARC 1971, 48)

Reclamation – However, a massive job of environmental reclamation is still needed in Appalachia. This can only be accomplished if systematic environmental plans for the region are developed (ARC 1971, 51).

Impact – These principal and often interrelated impacts include: air pollution from underground mine fires and burning waste piles; surface water pollution by silt and acid mine drainage; and ground water pollution and land degradation resulting from surface subsidence, unreclaimed strip-mines and mining waste piles (ARC 1971, 50).

Spread of pollution – Pollution, like poverty, is not a respecter of state border; thus the need for a regional approach to the problem (ARC 1971, 52).

Coal/Mining Group

Research – The Commission began a series of studies focused on finding ways to solve the health and safety and manpower problems in the coal regions of Appalachia, and on determining the effects of various public policies on coal mining industry (ARC 1971, 9).

Mining – Coal mining, past and present, has a damaging effect on the region's environment (ARC 1971, 50).

Continuing damage – Damage to the environment still occurs in Kentucky although the state has enacted laws to control surface mining of coal (ARC 1971, 51).

Control – Commission contributions included specific provisions for the protection of public and private property; provisions for strengthening state governments by placing primary responsibilities for regulation and control of mining activities at the state level with the federal law and its resultant regulations providing guidelines for such action; and provisions for financial assistance to the states for the development, implementation, and enforcement of state programs for mining control (ARC 1971, 51-52).

Renewed importance of Coal – The region must learn to use effectively the renewed importance of coal, in this period when energy production and distribution are critical in the nation, both to fuel its economy and to diversify its industrial base – but, at the same time, to protect the Appalachian environment and to preserve the region's cultural heritage (ARC 1975, 4).

Discovery of Coal – Speculators from the outside were quick to take advantage of unsophisticated Appalachians, who did not realize the financial implications of the discovery (ARC 1975, 6).

Mechanization – Lessening demand for coal, coupled with improved technology, closed many mines and mechanized others to the point that where many fewer miners were needed to produce the same amount of coal (ARC 1975, 6).

Coal growth – However, unlike the other two sub-regions and, on average, the nation, Central Appalachia did not respond negatively to the recession conditions of 1970-71 (ARC 1975, 22).

No stagnation – Instead of stagnation or an employment decline during this period, Central Appalachia experienced a significant acceleration in growth, which continued throughout the more expansionary years of 1972-1973 (ARC 1975, 22).

Coal Employment – The mining industry has for many years been a major employer of Central Appalachian labor (ARC 1975, 22).

Coal in the ARC – From its beginning, the ARC has recognized that Appalachia’s coal – and its other natural resources – are important national assets, and that the region has an obligation to develop and use these resources effectively (ARC 1975, 37).

Coal in the ARC – But the ARC has also insisted that this development must take place in a way that will improve the quality of life for the people of Appalachia – furnishing new jobs and keeping the region’s environmental integrity intact (ARC 1975, 37).

Coal in the ARC – The Senate Public Works Committee has commented that:

While the crucial energy needs of our country present Appalachia with a new opportunity to assist the Nation, there may also be a new responsibility to assist the region so as to assure that accelerated coal production will lead to sound development, conservation, and self-sustaining economic growth (ARC 1975, 37).

New coal – Site finding and Infrastructure will identify the promising locations for coal-cleaning, -liquefaction, and -gasification plants in Appalachia, and then determines how the building and operation of such plants would affect the environment, economy, and social fabric of the areas involved (ARC 1975, 38).

Outside control – Most of the industry (coal) was controlled by “outside” interests, as well, so that little of the profit remained in the region (ARC 1979, 3).

Unemployed coal miners – Despite the nation’s energy crisis, coal production was down considerably, and, as a result, unemployment, among coalminers was on the increase. In nine coal-producing counties of West Virginia and Kentucky, 1979 unemployment was estimated at 10 percent or more (ARC 1979, 7).

Social and Environmental costs – ARC (in 1975) also stated that a national commitment was needed to help the region meet the social and environmental costs attendant upon increased production of coal (ARC 1979, 32).

Use of Coal – Although coal had long been known to exist in the region (in had in fact been used by the Indians before the white man arrived), its extensive use as a source of energy started only after the Civil War (ARC 1980, 3).

Coal’s importance – with the coming of the Industrial Revolution, coal became the fuel that fired the furnaces of the nation (ARC 1980, 3).

Stupid Mountain People – Unfortunately, the mountain people didn’t realize the implications of their mineral wealth (ARC 1980, 3).

Selling – Many sold their land and/or mineral rights for pennies an acre to “outsiders.” (ARC 1980, 3)

Coming of the Mines – The mines were welcomed nonetheless, for the population, though widely scattered, had outgrown the food supply. Mining coal was a needed alternative to squeezing a living from the depleted land (ARC 1980, 3).

Boom and Bust – Coal quickly became a major industry, particularly in the Central Appalachian Mountains. But because the industry was so sensitive to fluctuations in the national economy, it also quickly developed a boom-and-bust cycle (ARC 1980, 3).

Little Profit – Most of the industry was controlled by “outside” interests, as well, so that little of the profit remained in the region (ARC 1980, 3).

Prolonged bust – When oil fooled the American marketplace in the 1950s, displacing coal as the nation’s primary source of energy, Appalachia found itself faced with the prospect of a prolonged economic “bust.” (ARC 1980, 3)

Hard Hit – Central Appalachia was hardest hit by the switch from coal to oil because of its unique dependence upon mining (ARC 1980, 4).

Righting wrongs – Although the assumption in 1965 was that coal production would continue, and even be likely to increase, the ARC gave priority to diversifying economic opportunities, and to righting the environmental wrongs that had accumulate over decades of careless mining (ARC 1980, 32).

Coal as employer – looking at the future of coal in the regional economy, PARC noted the rapid rate at which mechanization was reducing mining jobs and concluded that the region could no longer rely upon it as a major employer (ARC 1980, 32).

Priority – However, that priority encompasses not only increased production of coal but also the associated social and environmental costs; promotion of appropriate new technology; transportation costs; and the advocacy of national ARC’s concern for environmental policies (ARC 1980, 35).

Isolation Group

Isolation – Appalachia’s potential can never be realized until its isolation in overcome (ARC 1975, 2)

Population Gaps – Appalachia’ population is generally more scattered than the national population. About 45% of the region’s population lived in dispersed locations in 1970, compared to a national average of only 22%. The delivery of public services is thus both more difficult and more costly in the region than in the nation as a whole (ARC 1975, 4).

Isolation – They fought in the Revolutionary War – probably as much for freedom from the imposition of government as for the formation of a new nation. Set apart and independent in their mountains, Appalachians had little contact with any form of governance, old or new (ARC 1975, 5).

Transportation – Isolation and Appalachia are almost synonymous. Settlements tend to be sparsely scattered in the valley floors or cling tenaciously to the upthrust landscape (ARC 1975, 28).

ARC and the long road – As a result of all these deterrents, the isolated, but largely populated, rural areas of the region were not opened up when the ARC was established in 1965 (ARC 1975, 28).

Reality – In reality, however, Appalachia existed for generations as a region apart, isolated physically and culturally by its impenetrable mountains (ARC 1979, 2).

Isolation – No analysis of the regional problem has failed to identify the historic and persisting barrier-effect of its mountains chains as a primary factor in Appalachian underdevelopment (ARC 1979, 14).

Difference – The Mountains imposed an economy of scarcity and a hardy lifestyle that nurtured independence and aversion to rules and regulations (ARC 1980, 3).

Difference – The result was an economic, political, and social structure vastly different from the interdependent and relatively prosperous society of the flatlands (ARC 1980, 3).

Hard-to-reach – The most rugged, hard-to-reach part of the region, Central Appalachia had never been able to build the economic diversity needed to withstand periodic downturns in its major industry (ARC 1980, 4).

Isolation – And there was one factors that strapped the economy of the entire region: isolation (ARC 1980, 4).

Isolation – No analysis of the regional problem has failed to identify the historic and persisting barrier-effect of its mountains chains as a primary factor in Appalachian underdevelopment (ARC 1980, 15).

Energy Group

Energy – This research has been used by the Appalachian states, the local development districts, various federal agencies and industries in a variety of ways: to help arrive at planning and policy decisions; to formulate state laws and regulations; to help plan and carry out environmental control projects, and to determine where new energy markets will be (ARC 1975, 2).

Energy crisis – In the current national energy situation, the Appalachian coal industry once again has become vitally important to the nation (ARC 1975, 2).

Energy Research – A major study, funded by ARC, the President's Council on Environmental Quality and the National Science Foundation, predicted that coal production in Appalachia will, at the least, double – and could quintuple – over the last quarter of this century. The study pointed out that the Appalachian states must shape this growth if they are to obtain the greatest benefit from it (ARC 1975, 2).

Energy – Today's national energy crisis has focused attention on Appalachian coal – where it is, what its quality and sulfur content are, how to get it out of the ground, how to reclaim the land after mining (ARC 1975, 37).

No direct involvement – In addition, PARC also recommended against any direct involvement in energy production, specifically gas and generation of electricity (ARC 1980, 32).

New involvement – The same year (1975), the Congress amended the ARC's legislation, expanding its authority and responsibilities in the area of energy production. With this new authority, ARC undertook a series of preliminary studies aimed at accommodating increased energy production (ARC 1980, 32).

Energy areas – Three specific areas where the ARC could have the most effect were defined – increased production and use of coal, energy conservation, and the development of other alternatives to oil (ARC 1980, 33).

Energy areas – While coal is the region's major energy resource, ARC has not limited its energy interests to coal alone (ARC 1980, 33).

Priority – Given the national energy priority, coal continues to be a top regional priority (ARC 1980, 35).

Historic Group

Past Appalachia – Pride, independence, skepticism, and isolation are reflected in Appalachia's history and folklore, and they remain dominant characteristics of the region's culture today (ARC 1975, 5).

Settlement – The majority of those who settled were Scotch, Irish, Welsh, and English – with a few Germans and Huguenots (ARC 1975, 5).

People that settled – They were, by and large, a stern people accustomed to hardship and eager to find freedom and a new home (ARC 1975, 5).

Divided loyalties – Again, Appalachians Fought in Indian warfare in the old Southwest in the early 1800s and later in the Civil War, when divided loyalties resulted in divided states – a severe enough division to cause the western counties of Virginia, alienated from the rest of the state by mountains and convictions, to move to form the free and separate state of West Virginia (ARC 1975, 5)

War and Isolation – And again when the wars were over, Appalachians reverted to their traditional ways (ARC 1975, 5-6).

Unchanged – From the time the first wave of pioneers challenged the mountain in the early 17th century until the Industrial Revolution hit America, the region remained largely unchanged (ARC 1979, 2).

Why people stayed in the mountains – Here they weren't answerable to any government or hemmed in by too many people too close at hand (ARC 1979, 2).

Why the region became important – When Appalachia did finally capture the nation's attention, it happened almost by accident. In 1960, the Presidential hopefuls waged an intense campaign in West Virginia. The national television and press that followed the campaign into the mountains

gave America its first intimate look a widespread poverty in the rich nation in the world (ARC 1979, 5).

Settlement – From the time the first wave of pioneers challenged the mountains in the early 17th century until the Industrial Revolution hit America, the region remained largely unchanged (ARC 1980, 2).

Self-sufficiency – The game and small patches of tillable land provided ample sustenance.

Settlement - Attracted by the self-sufficiency of mountain life, they settled in tiny hollows and long marrow valleys (ARC 1980, 2).

Settlement – Here they weren't answerable to any government or hemmed in by too many people too close at hand (ARC 1980, 2).

Involvement – While many fought the war for independence, few sought active roles in the new family of states. Later, when the states chose up sides for the Civil War, so did the mountain people – but with some unexpected results (ARC 1980, 3).

Miscellaneous Group

Migration – One of the most striking changes in Appalachia has been a reversal of its population tide: the region is no longer losing population every year (ARC 1975, 1).

Education – Recently, ARC has funded a wide range of career education courses for both the secondary and post-secondary student population (ARC 1975, 3).

Exodus – The result was predictable – people left the region en masse (ARC 1975, 6).

Region of contradictions – Appalachia is a region of contradictions. Even the adjectives so often used to describe it are paradoxical: rich yet poor; exploited yet underdeveloped; scarred yet beautiful (ARC 1979, 2).

Rich in resources but not in wealth – Thrust up between the heavily populated, industrial East Coast and the thriving Midwest, Appalachia, with abundant resources and a prime geographic location, theoretically should have benefited richly by doing business with its neighbors on both sides (ARC 1979, 2).

New power – That same year (1975), the Congress amended the ARC's legislation, expanding its authority and responsibilities in the area of energy production (ARC 1979, 32).

The Place – Thrust up between the heavily populated, industrial East Coast and the thriving Midwest, Appalachia, with abundant resources and a prime geographic location, theoretically should have benefited richly by doing business with its neighbors on both sides, in reality, however, Appalachia existed for generations as a region apart, isolated physically and culturally by its impenetrable mountains (ARC 1980, 2).

Poverty – Poverty ran deeper than any unemployment rate could reflect, however. It touched every aspect of human existence (ARC 1980, 4).

Brain drain – People – among them many of the best educated, most skilled, the young and the able-bodied – had left the region in large numbers (ARC 1980, 5).

City live – While many did find work and a new life, others found city life alien, unwelcoming. They were generally Central Appalachians, proud mountain people who environmental and cultural heritage made them oddities in an urban setting (ARC 1980, 5)

Outmigration – In the 1950-60 decade, the region lost one-eighth of its population by outmigration (ARC 1980, 6).

Code Groups 1984-2008

Development Group

Critical needs – Using its area development appropriation of \$43 million, the ARC made significant gains for the second year in targeting three broad areas: creating and retaining jobs in the region, giving special assistance to Appalachia's neediest counties, and improving health care (ARC 1984, 1).

Budget cuts – ARC's finish-up program is the result of a plan designed by the Appalachian governors in 1981 in response to a Reagan Administration proposal that the ARC be terminated immediately (ARC 1984, 1).

Slow to recover – One of the major reasons that the region has persistently higher unemployment rates than the nation is that Appalachia still has disproportionately high levels of coal-mining and manufacturing employment and disproportionately low levels of employment in the services sector, which seems to be relatively immune to the ups and downs of the business cycle (ARC 1984, 5).

Drop off – Coal and old-line manufacturing activities such as primary metals, lumber, stone, clay, and glass, textiles, and apparel are particularly subject to foreign competition and are usually affected by any overall decline in economic activities nationally (ARC 1984, 1).

Service industry – High levels of services employment are usually associated with high levels of urbanization – a fact that explains why the region, which is significantly less urbanized than the nation, seems to have a relatively lower level of business, financial, and personal services activities (ARC 1984, 5).

Distressed – Since 1983, ARC has provided special funds for the region's poorest counties. In FY 1988, 90 counties qualified for distressed county status on the basis of low per capita income and high rates of poverty and unemployment. As in past years, the program focuses on providing badly needed public facilities, especially systems to furnish clean drinking water and waste disposal to maintain a healthier environment. Under previous program guidelines, most of these counties were too poor to qualify for federal assistance to fund these facilities (ARC 1988, 8).

What is the ARC – ARC-funded programs include construction of an interstate-quality highway system, education and job training, health care, water and sewer systems, housing, and other essentials of comprehensive economic development (ARC 1995, 3).

Building blocks – As the year ended, the planning process had begun to identify new directions in such areas as transportation, education, health care, technology, infrastructure, and leadership –

the building blocks of economic development that ARC will use to help make the people of Appalachia more self-reliant and the region's local economies self-sustaining (ARC 1995, 5).

Economy – The region has been battered by structural economic shifts because it's disproportionate reliance on extractive industries and manufacturing (ARC 2004, 26).

Road Network Group

Reduce isolation – Reduced the region's isolation by opening nearly 2,500 miles of new, modern highways, which represent approximately 80% of the Appalachian Development Highway System (ADHS). The ADHS replaces a network of worn, narrow, winding two-lane roads that snaked through narrow stream valleys or over high, rugged mountain (ARC 2004, 11).

Invest and Diversify Group

Regional Program Initiatives – Education programs tailored to the needs of expanding small business, tourism, the service sector, or other industries (ARC 1988, 7).

Area Economic and Human Resource Development – Encouraging the creation, retention or expansion of commercial, industrial, agricultural, forestry, and service enterprises (ARC 1988, 6).

Diversifying Appalachia – Thirty-seven local development districts brought to the meeting the home-grown products of 234 Appalachian manufactures, including such diverse items as shoes, pasta, outboard motors, machine tools and fine wines. The purpose of the exposition was to demonstrate the capacity of the largely rural Appalachian Region to compete with any other region in the nation in the quality and variety of its products (ARC 1988, 4).

Tourism – A major focus for economic development in many Appalachian States is tourism (ARC 1991, 4).

Tourism – ARC has recently begun to explore new ways to promote the region's powerful beauty and rich cultural history (ARC 1988, 7).

Extractive – The member states of the ARC are interested in increasing "value added" employment as an alternative to employment in the traditional extraction and export of raw materials. Studies that focus in depth on individual industries are an ongoing part of the ARC research program (ARC 1988, 15).

Progress – The ARC celebrated its 30th anniversary year in 1995 by launching a top-to-bottom strategic planning process. We went into the region and listened to more than 2,000 Appalachian. Through four interstate town meetings, 13 focus-group discussions, nine consultations, and extensive research, we learned our region anew – the hopes, dreams, challenges, and opportunities our communities embrace (ARC 1995, 5).

Decline – With employment levels in Appalachia's traditional economic sectors of apparel manufacturing, mining, textiles, and steel continuing to decline this past year, the Commission worked to help the region develop the skills and infrastructure it needs to be economically competitive today and in the future (ARC 2004, 6)

Jobs – Employment losses in non-durable goods and manufacturing and resource-based industries have been severe and have disproportionately impacted much of the region (ARC 2004, 26).

Jobs – Some of these declines have been offset by employment growth in service sectors, but service-sector average wages are often considerably lower than those in the goods-producing sector (ARC 2004, 26).

New economy – Complementing the tourism grant competitions was the March release of the new Driving Tours Appalachia map, created in partnership with the National Geographic Society. The map distributed in the April issue of *National Geographic Traveler* magazine as well as to target audiences in the Region, features 28

Appalachian driving trails including a broad array of historical, archaeological, cultural, and scenic sites. A companion Web site, www.visitappalachia.com, offers downloadable maps of the driving tours and other features to help travelers plan driving vacations in Appalachia (ARC 2008, 5).

Environment Group

Environment – The EPA and the ARC worked together to inform Appalachian communities about economic development funds available under EPA’s “brownfields” clean-up program (ARC 1999, 6).

Environmental cleanup – The U.S. EPA and the ARC signed a formal agreement to work together to inform Appalachian communities about the availability of economic development funds under EPA’s “brownfields” clean-up program. The goal is to help rural Appalachian communities clean up and reuse contaminated, abandoned areas such as rail yards, former gasoline stations, factories, lumber mills, and food processing plants (ARC 2000, 5).

Environment – Three of the six communities targeted in EPA’s new Brownfields Federal Partnership Mine-Scarred Lands Initiative are in Appalachian areas of Virginia, West Virginia, and Pennsylvania (ARC 2004, 6).

Coal/Mining Group

Coal Mining – Appalachian coal-mining employment has fallen from 101,500 workers in 1987 to 46,000 in 2003, largely because of productivity gains. The Energy Information Administration has projected that over the next decade, mining jobs in Appalachia could fall to as low as 22,000, or even lower (ARC 2004, 26).

Coal Mining – Appalachian coal-mining employment experienced a slight recovery in 2005, when total employment rose to over 53,000 jobs, up from 49,000 in 2004. However, more recent state data indicate some retrenchment in 2006, especially in central Appalachia (ARC 2008, 25).

Energy Group

New Energy – In July, the Commission selected nine projects for funding through a grant competition intended to help communities revitalize their economies by leveraging renewable-energy and energy-efficiency resources. This funding, totaling \$546,000 is in addition to the \$605,000 provided to 12 projects through a similar grant competition in FY 2007, for a total of almost \$1.2 million in energy-related grants. The projects funded will help advance the production and use of renewable-energy products, such as biofuels, biomass, and solar or wind energy; expand the start-up of “clean energy” businesses; and promote the use of energy-efficient buildings (ARC 2008, 5).

New energy initiative – We are pleased to note that in FY 2008, Congress completed work on legislation reauthorizing the Commission for the next five years, through FY 2012. The legislation renews ARC’s existing authorities and establishes a new economic and energy development initiative to focus on the creation of energy-related job opportunities as outlined in ARC’s 2006 energy “blueprint,” *Energizing Appalachia: A Regional Blueprint for Economic and Energy Development*. The legislation also requires the designation of economically “at-risk” counties in the Appalachian Region and permits ARC to fund up to 70 percent of the cost of projects in those counties. In addition, it stipulates that earmarks come out of the Appalachian states’ funding allocations, and it adds ten counties to the Region (effective in FY 2009). President George W. Bush signed the legislation into law on October 8, 2008 (ARC 2008, 7).

Isolation Group

Isolation – The region’s isolation and difficulty in adapting to changes over the past decades and in retooling to be competitive are major factors contributing to the gap in living standards and economic achievement between the region and the rest of the country (ARC 2004, 26).

Miscellaneous Group

President to Appalachia – Your visit to eastern Kentucky with ARC Federal Co-Chairman Jesse White and Kentucky Governor Paul E. Patton represented the first time in more than three decades that a president has come to Appalachia to address its economic potential (ARC 1999, 5).

What was done – During FY 2000, ARC devoted much of its energy to building a consensus for an expanded program to help Appalachia’s remaining economically distressed counties become more competitive. In addition, the Commission focused on identifying new partners to spur development of more homegrown businesses in Appalachia and engaged in a number of other collaborative efforts to benefit the region (ARC 2000, 5).

More meetings – The Commission conducted community meeting from May through August in seven states. More than 750 people attended the meetings, including three Appalachian governors and the ARC federal co-chairman (ARC 2000, 5).

Community – Using an approach that drew on citizen participation, ARC identified 32 key issues facing the region and polled some 1,000 community leaders and citizens in five field forums on their significance (ARC 2004, 8).

Priorities over time – Early, pioneering programs included initiatives in environmental cleanup, hospital construction, vocational education, and rural health care (ARC 2004, 16).

Priorities over time – These were followed by various initiatives in business development, telecommunication infrastructure, and tourism development (ARC 2004, 16).

Priorities over time – Throughout the years, ARC has consistently maintained a focus on the construction of development highways and basic water and waste management facilities (ARC 2004, 16).

Recent economic focus – Accordingly, ARC has emphasized a wide-ranging set of priorities in its grant activities. Projects in recent years have focused on business development, telecommunications and technology infrastructure and use, educational attainment, access to health care, and tourism development. ARC has consistently maintained a focus on the

construction of development highways and basic water and waste management facilities (ARC 2008, 15).

Ageing - Demographic shifts between 1990 and 2000 have led to a decline in the Region's share of the "prime-age" workforce, or those between the ages 25 and 55, who are entering or reaching their peak earnings potential. Erosion of this segment of the workforce has contributed to the reversal of the Region's gains in per capita income, and at the local level has led to declines in the tax base. Meanwhile, the Region still confronts significant concentrations of high poverty, unemployment, low income, and outmigration (ARC 2004, 26).

A.2: Metadata

Dependent Variable

1. Poverty Rate for 1980, 1990, and 2000 - This variable was obtained directly from the ARC. The ARC describes poverty rate as the ratio of persons below poverty level to the total number of persons for whom poverty status has been determined (2010).

Independent Variables

1. Percent of the population with a high school diploma or higher 1980, 1990, and 2000 – This variable was obtained directly from the ARC. The ARC describes percent of the population with a high school diploma or higher as the percentage of adults, 25 years and over, completing 12 years or more of school (2010).

2. Median Age 1980, 1990, and 2000 – This variable was obtained directly from the U.S. Census Bureau (2010). Median age is a measure that divides the age distribution in a stated area into two equal parts: one-half of the population falling below the median value and one-half above the median value (U.S. Census Bureau 2010).

3. Tons of coal per person in poverty 1980, 1990, and 2000 – This variable is a ratio of tons of coal produced to the total number of persons for whom poverty status has been determined.

4. Average Coal Severance Tax receipts for 1980, 1990, and 2000 – This variable is a ratio of tons of coal produced to coal price per ton to coal tax. I have also adjusted PCI for inflation in the year 2003. I chose the year 2003 because 2003 was the last year available to use for the NASA inflation calculator.

5. Percent of unemployment 1980, 1990, and 2000 – This variable was obtained directly from the U.S. Census Bureau (2010). Unemployment rate is the number of unemployed persons as a percentage of the civilian labor force (U.S. Census Bureau 2010).

6. Per Capita Income (PCI) 1980, 1990, and 2000 – This variable was obtained directly from the U.S. Census Bureau (2010). This measure of income is calculated as the personal income of the residents of a given area divided by the resident population of the area (U.S. Census Bureau 2010). I have also adjusted PCI for inflation in the year 2003. I chose the year 2003 because 2003 was the last year available to use for the NASA inflation calculator.

7. Net Migration Rate for 1980, 1990, and 2000 – This variable was obtained directly from Fuguitt et al. (2010) for 2000, Voss et al. (2005) for 1990, and White et al. (1987) for 1980. Net migration is the difference between the number of people moving into an area and the number moving out over time. These three projects measured net migration using the residual method, which is net migration is equal to the population change over the period minus the natural increase (births-deaths) (Fuguitt et al. 2010, Voss et al. 2005, White et al. 1987).

A.3: EDA Background Data

Regression Assumptions

Tables 7-9 are intended to address assumption 1 for datasets 1980, 1990, and 2000. By knowing if the variables are normal I know if an OLS regression fits the data. This is because OLS is a linear regression model and needs normal variables to be effective. Also, throughout the rest of section 5.3 when a significance level is shown, I accept it if it met my preselected alpha of .05. I have chosen .05 as my alpha level because it is a common standard for the social sciences (Montello and Sutton 2006).

In Table 7 there are three variables that are normal according to the Kolmogorov-Smirnov test and there are two variables that are normal according to the Shapiro-Wilk test. For the 1980 dataset it is clear that Median Age and Unemployment are normal because both tests confirm it. However, the question is with PCI. I have chosen to accept PCI as normal because it is confirmed by at least one test. I use the same rule for the 1990 and 2000 datasets.

In Table 8 there are three variables that are normal according to the Kolmogorov-Smirnov test and there are three variables that are normal according to the Shapiro-Wilk test. For the 1990 dataset it is clear that Median Age and Net Migration Rate are linear because both tests confirm it. PCI and Unemployment are normal in one test.

In Table 9 there are two variables that are normal according to the Kolmogorov-Smirnov test and two variables that are normal according to the Shapiro-Wilk test. For the 2000 dataset it is clear that Unemployment and Net Migration Rate are linear because both tests confirm it.

Table 7: PASW Normality Results Table for 1980 Dataset

Tests of Normality						
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
1. PovRate80	0.070	54	0.200*	0.989	54	0.890
2. PctHSorhigher80	0.165	54	0.001	0.902	54	0.000
3. TonsPerPersonInPov80	0.346	54	0.000	0.608	54	0.000
4. AjCoalTax80	0.340	54	0.000	0.521	54	0.000
5. AjPerCapIn80	0.105	54	0.200*	0.933	54	0.005
6. MedAge80	0.056	54	0.200*	0.980	54	0.496
7. AvgUnEmployRate80	0.067	54	0.200*	0.981	54	0.532
8. NetMigRate80	0.119	54	0.055	0.941	54	0.100
a Lilliefors Significance Correction * This is a lower bound of the true significance						

Table 8: PASW Normality Results Table for 1990 Dataset

Tests of Normality						
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
1. PovRate90	0.084	54	0.200*	0.981	54	0.558
2. PctHSorhigher90	0.120	54	0.051	0.936	54	0.006
3. TonsPerPersonInPov90	0.382	54	0.000	0.543	54	0.000
4. AjCoalTax90	0.375	54	0.000	0.460	54	0.000
5. AjPerCapIn90	0.102	54	0.200*	0.947	54	0.019
6. MedAge90	0.088	54	0.200*	0.972	54	0.241
7. AvgUnEmployRate90	0.127	54	0.029	0.958	54	0.055
8. NetMigRate90	0.065	54	0.200*	0.972	54	0.225
a Lilliefors Significance Correction * This is a lower bound of the true significance						

Table 9: PASW Normality Results Table for 2000 Dataset

Tests of Normality						
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
1. PovRate00	0.059	54	0.200*	0.991	54	0.949
2. PctHSorhigher00	0.147	54	0.005	0.931	54	0.004
3. TonsPerPersonInPov00	0.392	54	0.000	0.508	54	0.000
4. AjCoalTax00	0.373	54	0.000	0.444	54	0.000
5. AjPerCapIn00	0.107	54	0.182	0.942	54	0.011
6. MedAge00	0.125	54	0.035	0.924	54	0.002
7. AvgUnEmployRate00	0.099	54	0.200*	0.962	54	0.086
8. NetMigRate00	0.091	54	0.200*	0.975	54	0.327
a Lilliefors Significance Correction * This is a lower bound of the true significance						

1980

Figure 53: PASW Histogram of 1980 Stepwise Regression Residuals

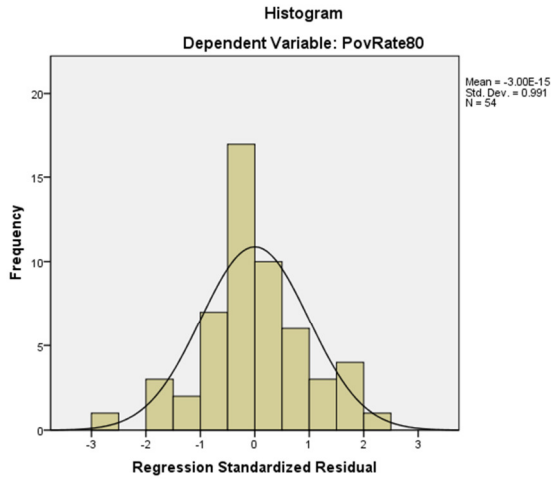


Figure 53 shows the distribution of regression residuals. A normal distribution confirms that the regression model is a good fit for the dataset. As Figure 53 shows, the residuals are normally distributed for the 1980 dataset.

Figure 54: Homoscedasticity Test 1980

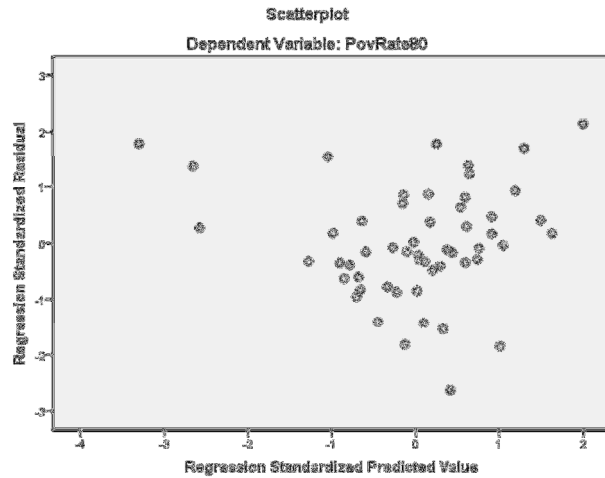


Figure 54 is the last figure in this subsection and is intended to answer assumption 3. Figure 54 shows that there is slight heteroscedasticity. This is due to the points on the left side of the graph. However, I feel that the rest of the points show homogeneity of variance and I can move to the next dataset.

1990

Figure 55: PASW Histogram of 1990 Stepwise Regression Residuals

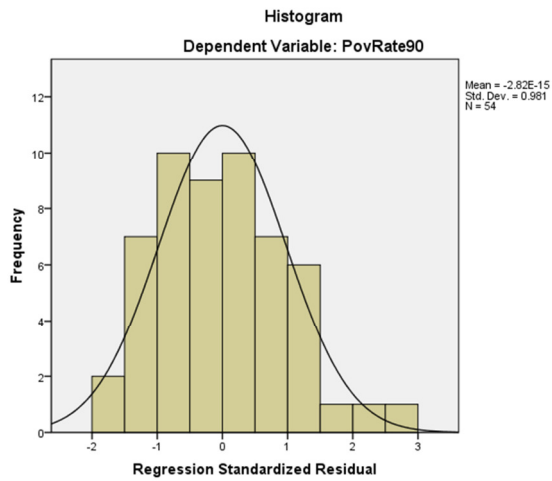


Figure 55 shows the residuals are normally distributed for the 1990 dataset. This normal distribution confirms that the regression model is a good fit for the dataset.

Figure 56: Homoscedasticity Test 1990

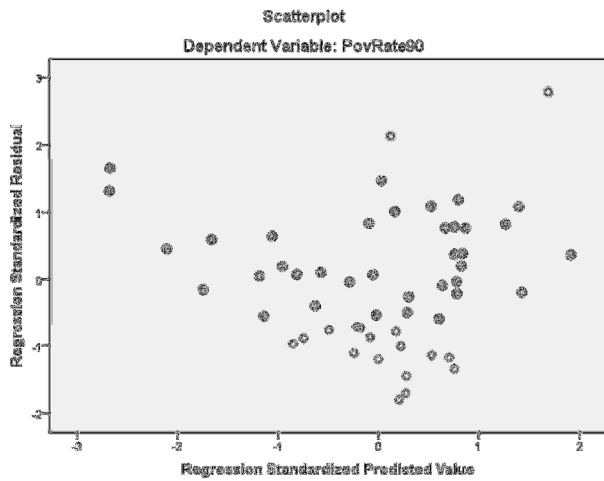


Figure 56 shows that there is heteroscedasticity. This is due to the points on the left side of the graph. However, feel that the rest of the points show homogeneity of variance and I can move to the next dataset.

2000

Figure 57: PASW Histogram of 2000 Stepwise Regression Residuals

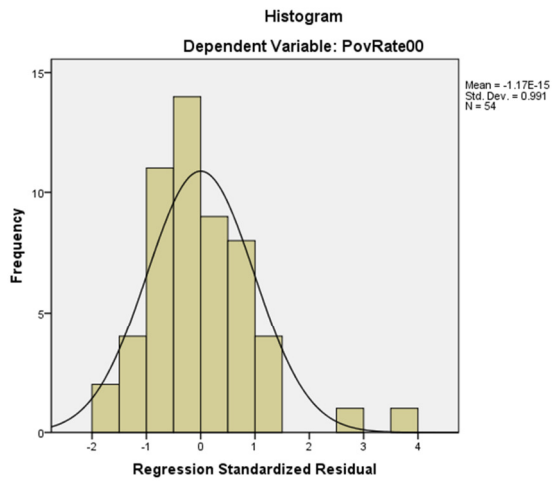


Figure 57 shows the residuals are normally distributed for the 2000 dataset. This normal distribution confirms that the regression model is a good fit for the dataset.

Figure 58: Homoscedasticity Test 2000

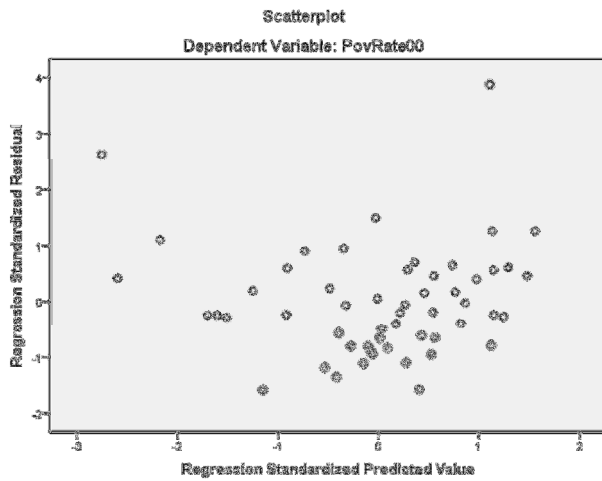


Figure 58 shows that there is heteroscedasticity. This is due to the points on the left side of the graph. However, feel that the rest of the points show homogeneity of variance.

VITA

Nicholas James Rose

Candidate for the Degree of

Master of Science

Thesis: DETERMINING COAL'S PLACE IN THE APPALACHIAN REGIONAL COMMISSION: IMPACT ON POVERTY AND MIGRATION IN APPALACHIAN KENTUCKY

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Completed the requirements for the Master of Science Geography at Oklahoma State University, Stillwater, Oklahoma in July, 2011.

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Pages in Study: 127

Candidate for the Degree of Master of Science

Major Field: Geography

Scope and Method of Study:

The purpose of this study is to analyze the role of coal in the Appalachian Regional Commission's (ARC) discourse and to analyze the influence of coal on poverty and migration in Appalachian Kentucky. This is accomplished by using a thematic discourse analysis to discover coal's role in the ARC's discourse. Ordinary Least Squares (OLS) regression is used to analyze coal's influence on poverty and migration in Appalachian Kentucky.

Findings and Conclusions:

During the course of my research I found four key themes that help to explain the ARC's discourse. These four themes are: (1) isolation and the road network have set the region apart; (2) energy investment brings coal center-stage but coal is not the only cause of Appalachia's economic fluctuation; (3) community involvement; and (4) economic diversification. After analyzing these four themes my conclusion is that coal has an important role in the ARC's discourse, as long as coal is important at the national level. Also, this study highlights a shift in the ARC's discourse in 1984, which moves the agency away from detailed analysis of the coal industry.

According to my findings, coal's influence on poverty and migration in Appalachian Kentucky is minimal. During my OLS regression I discovered that a direct coal variable, such as the coal severance tax, is not significant in determining poverty. The variable that provides the most explanation is per capita income. This relationship confirms the commonly held fact that poverty and income are related. However, these results do show that there is instability in the region and this instability contributes to poverty in Appalachian Kentucky.

This thesis provides a common ground for both the analysis of the ARC's discourse and the analysis of variables that may affect poverty in Appalachia. By showing coal's significance as a social and geographic constraint and not just an energy source, this study supplies information the ARC may be able to use to provide a more balanced assessment of how coal impacts the region.

ADVISER'S APPROVAL: Dr. Alyson L. Greiner
