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## EDUCATION POLICIES AND MIGRATION REALITIES: UTILIZING A STATE LONGITUDINAL DATA SYSTEM TO UNDERSTAND THE DYNAMICS OF MIGRATION CHOICES FOR COLLEGE GRADUATES FROM APPALACHIAN KENTUCKY

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EDUCATION POLICIES AND MIGRATION REALITIES: UTILIZING A  
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FROM APPALACHIAN KENTUCKY

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DISSERTATION

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A dissertation submitted in partial fulfillment of the  
requirement for the degree of Doctorate of Philosophy in the  
College of Education  
at the University of Kentucky

By  
Charles E. McGrew  
Lexington, Kentucky

Director: Dr. Alan DeYoung, Professor of Education Policy Studies and Evaluation  
Lexington, Kentucky

2013

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## ABSTRACT OF DISSERTATION

### EDUCATION POLICIES AND MIGRATION REALITIES: UTILIZING A STATE LONGITUDINAL DATA SYSTEM TO UNDERSTAND THE DYNAMICS OF MIGRATION CHOICES FOR COLLEGE GRADUATES FROM APPALACHIAN KENTUCKY

Census data indicates people with higher levels of education are leaving Appalachian Kentucky as they do in other rural areas. Aside from anecdotal information and primarily qualitative community studies, there is little quantitative evidence of the factors which may influence these migration decisions. State policies and regional efforts to increase educational attainment of people in the region have focused on producing more college degrees however may be contributing to the out-migration of those with higher levels of education. The study incorporates community level data with demographic, academic, and employment data from a cohort of 2005-06 college graduates from Appalachian Kentucky. The study includes an analysis of migration rates for a variety of different types of graduates and a set of three complimentary logistic regression models developed to understand the impact of individual demographic and academic factors, factors about the communities where these graduates came from, and the factors related to the communities where they went after completing their degrees and credentials to predict likelihood of migrating. This study builds upon previous efforts by providing extensive, externally validated data about a large population of individuals. It leverages sociological, demographic, and neoclassical microeconomic research methods and leverages data from Kentucky's statewide longitudinal data system to serve as an illustration for how these systems can be used for complex statistical analyses.

KEYWORDS: Rural Migration, Brain Drain, Employment Outcomes, Statewide Longitudinal Data Systems, Appalachia

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Charles E. McGrew

March 21, 2013

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## **CHAPTER ONE**

### **Introduction**

Kentucky is one of the poorer states in terms of income and poverty levels. It has one of the lowest levels of educational attainment in terms of the proportion of people with a bachelor's degree or above (U.S. Census, 2010). Poverty and low levels of educational achievement are not evenly distributed through the Commonwealth. Geographically and economically Kentucky can be divided into two major regions. Appalachian Kentucky which includes the Eastern and South-Eastern counties and non-Appalachian Kentucky which includes the remainder of the state.

Appalachian Kentucky is one of the poorest regions in the United States. It includes four of the poorest counties in the United States. Some of these counties have poverty rates in excess of 36 percent (Pollard, 2005). If Appalachian Kentucky were a state it would have the highest poverty rate in the country with one out of every four (24.4%) people living in poverty. If it were a country, it would have a higher level of poverty than Mexico (18.2%) and Romania (21.1%) and roughly equal to Iraq (25%) (CIA, 2012). In non-Appalachian Kentucky as a state it would have a poverty rate (15.2%) equal to the U.S. Average (15.1%) (U.S. Census, 2010).





Persistent poverty, underemployment, underdevelopment, low levels of educational attainment, high rates of health issues and other social problems have plagued the Appalachian region for decades (Eller, 2008; Billings et al., 1999; Currie et al., 2012).

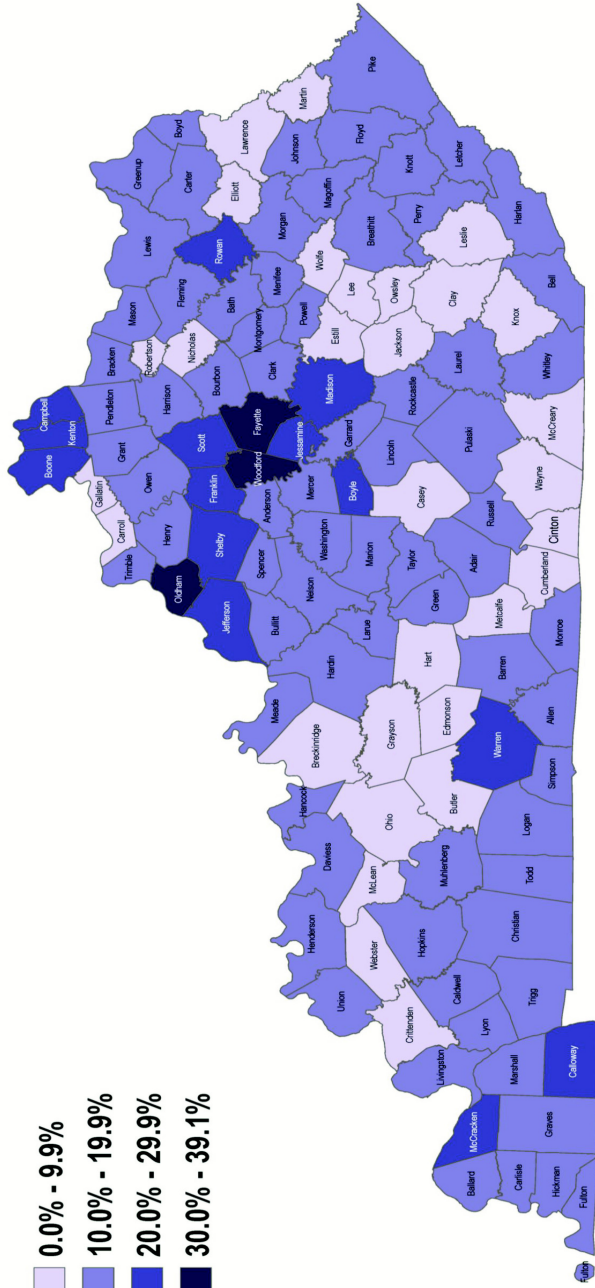
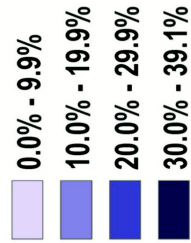
There are a variety of different theories to explain why Appalachian Kentucky is the way it is and how it could be improved. Increasing educational attainment is a common theme. Federal and state policy makers have enacted a number of programs and initiatives to help reduce poverty in the area but growth in Appalachian Kentucky has been much slower than it has been in the other parts of Appalachia (ARC, 2012).

In the past periods of growth in the coal industry with which the region is so closely associated created employment opportunities for unskilled and uneducated laborers. These opportunities coupled with absentee ownership of the region's industries have contributed to underdevelopment in Kentucky's Appalachian counties (Eller, 2008). It has also been suggested that slow growth in the proportion of educational attainment of bachelor's and professional degree holders in Appalachian Kentucky has slowed economic growth in the region (Black et al., 2012).

Policy makers often employ strategies to increase educational attainment as a means of stimulating the economy in poor regions because of the strong link between educational attainment and personal income. As illustrated in figures 1.1 and 1.2, the counties in Kentucky with the highest poverty rates tend to have the lowest levels of educational attainment. Economist Edward Glaeser indicated that since 1970, the

**Figure 1.2: Percentage of Population with a Bachelor's Degree or Higher**

**Percentage of Population with a Bachelor's Degree or Higher**



Source: American Community Survey 2006-2010 5-Year Estimates

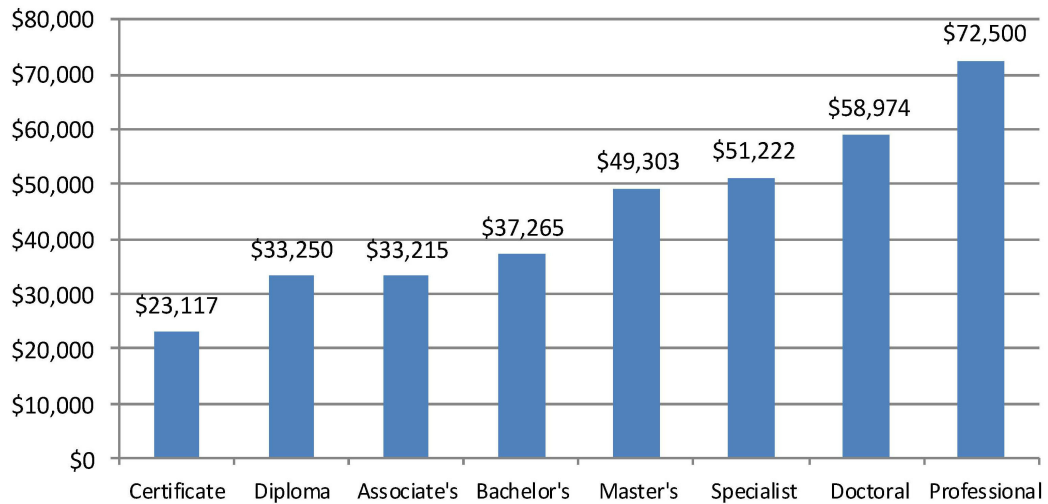
Note: Illustration from the Kentucky Center for Education and Workforce Statistics *Kentucky County Profiles 2012*

deciding factor in growth in communities has been the proportion of people with a college education. There is a direct relationship between the proportion of people with a college education and both higher incomes and faster growth rates. His research suggests that increasing education levels tends to beget success and not the other way around. In short, if an area's education levels increase so will its economy (2011).

Human capital theorists assert that investments in education and training must provide tangible returns at a personal level (Becker, 1964; Schultz, 1961). Higher levels of educational attainment on average provide higher wages both in Kentucky as identified in figure 1.3 (McGrew, 2013) as well as nationally (BLS, 2012). In addition to the direct return that these investments have for the individuals who pursue additional education and training in terms of their incomes and opportunities, communities also benefit. In addition to the increased tax base for those who now have higher wages there is also a *spill-over* effect of increased wages for other unskilled workers that results from having a cluster of more highly skilled or educated people in a region (Artz, 2003). The increase in per capita gross domestic product is greater than the sum of individual increases in income (Glaeser, 2011).

It is easy to conclude that if there were a higher proportion of people with higher levels of educational attainment in the region that there would be positive effects on income, poverty, and other social improvements. This concept is part of the rationale that has driven public policies in Kentucky and other states as well as many ARC programs.

**Figure 1.3: Median Annual Earnings for 2005-06 Kentucky College Graduates Five Years Later by Credential Level**



Source: Kentucky Center for Education and Workforce Statistics Special Report *Employment and Earnings of Kentucky's College Graduates: A Preliminary Report*

These efforts tend to focus on encouraging more people from an area to earn a postsecondary credential as the primary means of increasing the region's attainment level.

### **1.1 Policies to Increase Educational Attainment**

Efforts to improve economic development by enacting policies to improve educational outcomes in Central Appalachian states have been attempted since the 1980s. These represent a simplification of the problem of modernization in general (DeYoung, 1991).

Kentucky's House Bill 1 of 1997 which has become known as the Kentucky Postsecondary Education Improvement Act may be one of the best known efforts of this type. It was based on the premise that better postsecondary opportunities and higher levels of college and university completions would lead to higher incomes and a better quality of life. Some of the requirements of this landmark legislation required the creation of regional advisory groups to work with the colleges and universities to help ensure they were meeting the needs of the geographic areas they were to work with as well references to meeting the regional employer's needs suggesting the need for a partnership between the education and economic sectors (1997).

Kentucky's Council on Postsecondary Education (CPE) – the state's postsecondary education authority – enacted a strategic plan to meet the goals of House Bill 1. The measurable goals were in part based on increasing the number of degrees conferred at the state's postsecondary institutions (CPE, 2007). This assumes that graduates remain in the state in order to reach the educational attainment targets established.

The 54 Appalachian counties in Kentucky are home to two public universities, two community and technical colleges, and six independent not-for-profit four-year institutions including two federally subsidized work colleges. During the 2012 legislative session, former Governor Paul E. Patton – who was one of the architects of the state's House Bill 1 – supported legislation to convert one of those non-profit institutions, Pikeville University into the state's ninth public university. Patton argued that students in

Eastern Kentucky had fewer opportunities for affordable postsecondary education than people in other parts of the Commonwealth. He noted that students in part of Eastern Kentucky who attended college were more likely to attend a two-year institution than students in other parts of the state and these factors were partly responsible for the region's lower levels of educational attainment. Patton and House Speaker Greg Stumbo who sponsored the bill stated that students who wished to remain in the Appalachian region did not have affordable postsecondary choices (Kiley, 2012). The bill did not pass in its original form and Pikeville University was not transformed into a public institution. A modified version was submitted during the 2013 legislative session with the focus changed to providing additional financial aid to students from coal counties.

In an Op-Ed piece on December 10, 2012 Speaker Stumbo stated “The facts are clear and undisputed; the 12-county college-going rate is almost identical to that of the state, but bachelor's degree attainment is nearly 50 percent lower.” This suggests that producing more university level degrees in the region will increase its educational attainment level (Stumbo, 2012). Raising educational attainment levels in a region involves more than degree production. For a region to improve the proportion of skilled or educated people, the graduates have to either remain or return after completing their programs. This tends to be the opposite of what migration studies generally show as occurring. People with higher levels of education are more likely to emigrate from rural to metropolitan areas than people with lower levels of education (Brown, et al., 1962; Obermiller et al., 2000; Franklin, 2003; Gibbs, et al., 1994; Weber et al., 2007).



The anecdotal evidence indicates that people who complete higher levels of education in Appalachian Kentucky typically move to urban areas with greater economic opportunities (Caudill, 1973; Caudill, 1976; Eller, 2008). The statistical evidence suggests that people with higher levels of education have been leaving Appalachia while the majority of people who have been moving into the region have lower levels of education (Lichter, et al., 2005).

## **1.2 Appalachian Kentucky**

Appalachia is a geographic region that spans thirteen states from New York to Mississippi. As a whole, Appalachia is divided into three sub-regions: Northern, Central, and Southern Appalachia. Appalachian Kentucky along with West Virginia primarily make up the Central Appalachia sub-region (ARC, 2012). For the purposes of this study Appalachian Kentucky is defined as the eastern to south-central section of the Commonwealth that includes the 54 counties that are designated as part of the Appalachia region by the Appalachian Regional Commission (ARC) as illustrated in figure 1.3.

Appalachia attracted attention during the 1960s because of the high levels of poverty. The Appalachian Regional Commission was formed to coordinate funds from federal programs to make improvements in the region overall. Millions of dollars have been spent developing better roads and transportation infrastructures, medical facilities,



**Table 1.1: Demographic Characteristics of People who Reside in Appalachian and non-Appalachian Kentucky**

Demographics	Appalachian Kentucky		Non-Appalachian Kentucky		Overall	
	N	%	N	%	N	%
<b>Gender</b>						
Female	586,472	49.5%	1,548,480	49.1%	2,134,952	49.2%
Male	597,806	50.5%	1,606,609	50.9%	2,204,415	50.8%
<b>Race</b>						
Black, not Hispanic	20,988	1.8%	316,532	10.0%	337,520	7.8%
Other or Unknown	25,110	2.1%	167,200	5.3%	192,310	4.4%
White, not Hispanic	1,138,180	96.1%	2,671,357	84.7%	3,809,537	87.8%
<b>Ethnicity</b>						
Hispanic or Latino	15,824	1.3%	117,012	3.7%	132,836	3.1%
Not-Hispanic or Latino	1,168,454	98.7%	3,038,077	96.3%	4,206,531	96.9%

Source: U.S. Census American Community Survey, 2010

and educational opportunities in efforts to stimulate regional growth and development (Eller, 2008).

Despite significant improvements in the twelve other Appalachian states since 1960, Appalachian Kentucky has experienced slower growth. Three-quarters (77%) of the Kentucky counties classified as Appalachian are still categorized as *distressed* by ARC standards – the highest by far of any of the participating states (ARC, 2012). Appalachian Kentucky continues to lag behind the rest of the region and nation in terms of poverty and other social issues (Lichter, et al., 2005; Ziliak, 2012a). Appalachian Kentucky has consistently represented the largest contiguous block of low income counties and the largest concentration of distressed counties in the Appalachian region (Pollard, 2003;

Moore, 2005). Kentucky's Appalachian counties have the lowest employment rates and the lowest proportion of high school graduates and people with a baccalaureate or higher degrees out of the thirteen Appalachian states (Pollard, 2005).

Demographically as table 1.1 indicates Appalachian Kentucky is very homogeneous with little racial or ethnic diversity. Table 1.2 indicates that by most measures Appalachian Kentucky is economically disadvantaged compared to the rest of the state. Nearly one in four (24.4%) Appalachian Kentucky residents are living in poverty. One in five (19.5%) do not have health insurance. Two-thirds of the children in K-12 schools either receive or are eligible to receive free or reduced price lunches. High school graduates are less likely to go to college and more likely to be unprepared for college level coursework than their non-Appalachian counterparts. Only 12.8% of the adults in the region have a bachelor's degree or higher compared to nearly twice that rate (23.3%) in the non-Appalachian counties.

### **1.3 Migration**

Migration is defined as the movement of a person or group from any place to any other place (Lee, 1966). Much of the literature views migration as an international issue relative to the movement of people from one country to another and the terminology has been defined in terms of these international movements. The Population Reference Bureau defines migration as:

*The movement of people across a specified boundary for the purpose of establishing a new or semipermanent residence. Divided into international migration (migration between countries) and internal migration (migration within a country). (Haupt and Kane, 2004)*

For the purposes of this study, migration is viewed as a regional event. The terms and definitions used within the context of this study have been adapted to reflect moves across county or regional boundaries within Kentucky instead of national boundaries.

The terms migration, out-migration and emigration are used synonymously to refer to people who leave an area. The terms in-migration and immigration are used synonymously to refer to people who move into a specific geographical area or region. Internal migration refers to people who migrate from their initial location to another location within the same region.

Net migration is the combined effect that immigration and emigration have on an area's population. Net migration is either positive with more people moving in (immigrating) than moving out (emigrating) or negative with fewer people moving in than the number who leave. (Haupt and Kane, 2004).

Brain drain was initially coined as a term by the British Royal Society to describe the migration of scientists and other technology workers from Europe following World War II to the United State and Canada (Cervantes and Guellec, 2002). The more contemporary use of the term describes a pattern of out-migration of a geographic area's highly skilled or educated population which has a detrimental effect on their place of origin (Haupt and Kane, 2004; Lowell, 2003).

**Table 1.2: Differences Between Appalachian and non-Appalachian Kentucky**

Regional Characteristics	Appalachian Kentucky	Non-Appalachian Kentucky	Overall
<b>Economics</b>			
Per Capita Income	\$17,652.00	\$24,394.00	\$22,554.00
Percent of Residents in Poverty	24.40%	15.20%	17.70%
Percent of Residents Medicaid Eligible	27.40%	14.70%	18.20%
Percent Without Health Insurance	19.50%	15.40%	16.50%
<b>Educational Attainment</b>			
Less than a High School Diploma	28.20%	15.50%	19.00%
High School Diploma or Equivalent	37.20%	33.30%	34.40%
Some College	16.20%	20.90%	19.60%
Associate Degree	5.70%	7.00%	6.60%
Bachelor's Degree	7.00%	14.10%	12.10%
Graduate/Professional Degree	5.80%	9.20%	8.20%
<b>K-12*</b>			
Free and Reduced Lunch Eligible	65.60%	52.80%	56.50%
Classified as Special Education	14.90%	12.80%	13.40%
Graduates Ready for College Level Mathematics	30.40%	39.70%	36.90%
Graduates Ready for College Level English	43.40%	51.80%	49.30%
Graduates Ready for College Level Reading	36.50%	42.90%	41.00%
Average ACT Composite	19.9	21.1	20.7
<b>Postsecondary Education</b>			
In-State College Going Rate	56.00%	57.10%	56.70%
Out-of-State College Going Rate	4.90%	9.00%	7.90%
College Going Rate -- Overall	60.80%	66.10%	64.60%
<b>Social Capital</b>			
Percent of Eligible Voters who Voted in the Last Presidential Election	55.50%	67.50%	64.00%
Number of Non-Profit Organizations per 10,000 residents	33	45	41.8
Total Population	1,184,278	3,155,089	4,339,367

Note: Data sources include the U.S. Census 2010 Decennial Census, Kentucky County Profiles 2012, Kentucky High School Feedback Reports Class of 2010.

\*Data represented for public schools only except for free and reduced lunch eligibility which includes students in both public and private schools in the region.

Economists commonly view the educated or skilled workforce as a region's human capital and loss of it typically diminishes growth and could damage the earning of those left behind (Lowell, 2003). W. Arthur Lewis (1954) noted that the impact of the migration of skilled labor differs in part as a factor of scale. Even a small number of skilled workers moving from a rural community to an urban one may have a significant impact on the rural economy because it may represent a large proportion of skilled labor from that region (Lewis, 1954).

In addition to the economic advantages skilled human capital bring to a region they also represents civic and intellectual capital. The middle class is primarily composed of skilled or educated workers who generally helps to organize the community and demand better services and schools. People with higher levels of education inside a region also generally have ties to or more contact with the outside world and that they can serve as a conduit for bringing in new ideas and values (Plunkett, et. al., 1973). Over time, if an increasing number of people with higher levels of education leave an area and they aren't replaced by equally educated immigrants, it creates a state of declining educational attainment within the population.

Like some of the “chicken and egg” arguments that helped lead to the development of roads and adequate water and power utilities in Appalachian Kentucky to help attract more businesses, some believe an educated workforce is also required to attract modern industries that demand an educated supply of knowledge workers to the region (Jepsen et al, 2008).

There are several studies that illustrate the number of people who move into and out of rural regions like Appalachian Kentucky but there are conflicting ideas about the reasons people move. Much of the research in this area focuses upon human capital theory and the fact that metropolitan areas tend to both have a larger number of economic opportunities and higher wages for skilled labor (Weber, et al., 2007).

In addition to economic opportunities and higher wages, other factors are involved when people make migration decisions (Lee, 1966; Corbett, 2007, 2005; Carr, et al., 2009; Eller, 2008). Some of the others which have been discussed previously have included community composition and the availability of better health care and schools and even commercial or retail options (Corbett, 2007, 2005; Carr, et al., 2009; Eller, 2008). The idea of measuring social capital as Putnam did in *Bowling Alone* (1995) provides insight into the types of factors that can contribute to the members of a community's satisfaction which also provides insights into understanding why some areas are more desirable to live than others. We also know that people with higher levels of education many of whom are part of the *creative class* differ from the general population in terms of the things they value in a community which could affect the migration decisions of college graduates such as those in this study (Florida, 2012).

#### **1.4 Purpose of this Study**

The primary purpose of this study was to provide a method for evaluating the effectiveness of policies that focus on degree and credential production as a means of

increasing an area's human capital or education levels. Any discussion of migration for skilled and educated people at least hints at the concept of brain drain. This is not a research study about brain drain because it does not address the net-migration of people moving into the region. It does however provide definitive information about a population of 8,827 college graduates from the region and whether they remain in the region or migrate elsewhere. A side effect of researching the outcomes of these types of public policies will provide some insight into factors which could help to slow or reverse the out-migration of human capital.

The secondary purpose of the study was to serve as a proof of concept for using one of the recently developed statewide longitudinal data systems (SLDS) as the primary data source for complex statistical analyses. Much of the rural community migration research that has been conducted has relied on collecting data on small groups in a geographically confined area. These are not generalizable across a large region. It would be difficult to secure a sample size large enough to look at an area the size Appalachian Kentucky and provide reliable granular data about the various sub-populations without utilizing a system of this magnitude.

### **1.5 Statewide Longitudinal Data Systems**

Government agencies collect and maintain extensive amounts of data which can be useful for statistical analyses. Unfortunately these data have historically been scattered across many isolated information systems. SLDS initiatives in states like Kentucky link

data together from these operational systems to provide a larger, more complete longitudinal view that reaches across traditional state agency boundaries. These systems are designed to provide data to better inform state policy development. Research is an integral component of this work. The academic community can benefit by working with states to gain access to these systems much faster and for a fraction of the cost compared to the amount of work which would have been expended collecting, cleaning, and matching this volume of data in the past.

This study was conducted using data from the Kentucky Longitudinal Data System (KLDS). KLDS is a large statewide collection of education and workforce data which was initially developed to link data from K-12 and postsecondary education to provide information about academic alignment across the systems. It incorporates data from public K-12 students, educators, postsecondary education, early childhood, and workforce to cover a wider spectrum of public policy issues (P20, 2012).

## **1.6 Overview of the Study**

This study connects information about a cohort of 2005-06 graduates from Kentucky's public and independent colleges to their employment records from fiscal year 2010-11 to determine whether they remained within Appalachian Kentucky, moved to the non-Appalachian part of the state, or appeared to have left the state in general. It includes migration rates calculated for a number of sub-populations and three logistic regression models.



The logistic regression models provide an incremental perspective of how various types of factors may influence migration decisions. They provide a cumulative perspective to predict migration likelihood based initially on demographic and academic characteristics alone then including information about their county of origin to evaluate “push” factors, then adding characteristics about the communities where they had emigrated five years later to identify the strength of “pull” factors in predicting migration.

Based upon findings from previous studies and the anecdotal and qualitative information available about Appalachian Kentucky, this study attempts to answer the following questions to better understand the impact of public policies which focused on degree production as a means of increasing educational attainment levels in the region:

1. To what level are people from Appalachian Kentucky who complete college degrees remaining in or returning to the region to work?
2. Do people from Appalachian Kentucky who go to college at an institution in a non-Appalachian county have a higher chance of migrating away from the region to work than people who go to one of the local institutions?
3. What types of people are more likely to remain in or return to the region after college graduation and what types are more likely to leave in terms of demographics and academic choices?

4. Are people from counties with lower levels of social or cultural capital more likely to leave the region than people from communities with higher levels of social and cultural capital?
5. Do people who migrate out of the region have better economic returns on their educational investments than people who remain in Appalachia?

### **1.7 Contribution to the Field of Research**

Rural to urban migration and the impact of education on migration decisions are not new ideas. They have been studied for decades. Much of the previous research on these topics has either been too broad to understand the impact of education policies, or they have relied on small samples with limited self-reported data, or they have been small community based studies which include multiple factors which cannot be generalized to a larger region.

This study adds to the field of the body of research in two ways. It includes a study of a large population from a large region with a wider range of academic, demographic, and economic factors who are at the same point in time. They are experiencing the same economic and cultural situations because they have all graduated at the same time. This depth and breadth of subjects have not typically been available for research in the past. This provides a better base for statistical analysis testing the assumptions about migration decisions. It also leverages a relatively new source of data

that is becoming available in many states that includes a broad range of data that could be used to study a wide variety of issues if researchers were more aware of the opportunities and if they could see examples of successful use cases.

## **CHAPTER TWO**

### **Appalachia and Rural Migration**

Migration decisions are affected by a number of complex issues. This study draws upon a body of multidisciplinary research on migration, the factors which are unique to rural out-migration, the social and cultural capital of communities, and characteristics which may be unique to the people and communities of Appalachia.

#### **2.1 Migration Theories**

There are many stories of how nomadic people follow herds of animals as they migrated with the seasons and how people from all over the world have migrated to the United States for a *better life*. The simple version is that people go from places with less to places with more. Even today most migration theories are still based on the basic premise of opportunities and resources.

Ranis and Fei's theory of economic development (1961) is frequently cited in the economics migration literature. It draws from Lewis's two sector model of development,

which focused on the relationship between the Capitalist and Subsistence sectors and the shifting labor force between the two. Ranis and Fei operationalized these sectors as the industrial or urban and agricultural or rural (Ranis, et al., 1961).

The theory asserts that growth requires an interaction between the two sectors. Rural areas are a source of potential labor that can be shifted to the industrial urban areas as they are needed. The shift occurs in phases and requires either sufficient wages in the industrial areas to attract workers from the rural areas or changes in the methods of production in the agricultural sector which allows the same amount of products to be created with fewer workers thereby creating a labor surplus leaving people to move to the urban sector to find work. Changes in agricultural productivity cause a reduced need for workers which also drives down agricultural wages relative to urban wages (Ranis, et al., 1961). This theory generally assumes that agricultural and industrial workers are easily interchangeable so it would at best be seen as a way of explaining the migration of unskilled workers.

Migration of skilled or educated workers is often explained in terms of human capital theory. Gary S. Becker's *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education* is probably the most cited work in terms of explaining the reasons people pursue education. It is considered his most pivotal work for the Nobel prize he received in economics (Becker, 1964).

The basis of Becker's theory is the concept of investments in people that yield psychic or monetary gains in the future at the immediate opportunity cost to the

individuals. He called these activities investments in human capital. It can include anything from taking a class to completing an apprenticeship or a formal education program. People choose to sacrifice earnings they could be making at work or time they could use in other ways to pursue skills which in the long term will have a benefit to them. Becker noted that formal education yields a monetary return for people. He noted that in general earnings were higher for people with more education (Becker, 1964).

Earnings for people with college educations were calculated to be higher for white men and for people in urban settings compared to earnings for women, minorities, and rural people who had completed a college education (Becker, 1964). Schultz (1959 and 1961) noted that income differentials by race and different geographic regions can largely be explained by looking at the differences in investments in human capital – particularly in terms of education. He proposed that the primary reason there was growth in developing nations had more to do with increases in the qualifications and skills of their citizens than in their increasing population (1961).

Schultz believed young people have competitive advantages over older people in terms of employment. The younger population tends to be better educated than the older population. They also tend to be able to migrate more easily to take advantage of economic opportunities. Migrating is another form of human capital investment. Young people receive a higher return on a migration investment than older people because they will benefit from that increase in income longer because they have more years of work left in their career (Schultz, 1961).

Recent studies linking human capital with migration provide a clearer link between not just the creation of more people with college educations but also the importance of attracting migrants with credentials into a region with its economic growth and well-being. The existence of a land grant or research university and the research and development activities associated with it can help to raise human capital levels above the number of the degrees they generate (Glaeser, 2011; Deitz et al., 2011).

Everett S. Lee's *A Theory of Migration* (1966) addresses migration in a more general sense whether a person moves across the street, across counties, or across states. He developed his theory as a reaction of what he felt was a lack of theoretical basis in demography which at the time was reporting about analyses of data but without organization or direction. He asserts that every permanent or semi-permanent move that people make has three basic factors: a source, a destination, and an intervening set of obstacles. He identified four basic types of factors that influence every migration decision:

1. Factors associated with the area of origin.
2. Factors associated with the area of destination.
3. Intervening obstacles.
4. Personal factors.

Lee asserted that migration decisions are made on an individual basis based upon a multitude of factors that each person takes into consideration. The origin location has factors that may play into keeping a person from moving while others may push them to leave. The same would be true for the potential destination. Lee wrote that it is impossible to take every potential factor into consideration so he felt it would be best to focus on a small set of general factors. It is particularly important to look for ways the origin and destinations differ. These differences vary in terms of how people perceive them based on different stages of their lives. Lee noted that people are more likely to migrate at the point when they move from one stage of life to another like graduating from school, getting married (or divorced), or moving into the labor market (Lee, 1966). Lee also indicates that people who migrate begin to take on characteristics in common with people in the destination community before they actually migrate (Lee, 1966).

In addition to the private returns individuals receive, communities also benefit in terms of increased tax revenues as well as the potential expansion of industry that can be created by having more people in a region who have college credentials (Becker, 1964). Schultz makes the case for education and skills investments at a larger scale. People invest in themselves in terms of improving their individual capital, the sum of these investments yields an accumulated effect for society so societies should see expenditures in training and education as investments (Schultz, 1959).

Expenditures in education may not be enough to yield the benefits of having a better educated workforce. Poorer areas not only have lower levels of education and



wages but they also have a higher proportion of low paying jobs. Even if education were distributed evenly, if the majority of jobs that required a degree were lower paying then simply providing more education will not improve overall economic conditions. Education has to be coupled with economic opportunities that both demand higher levels of skills and provide higher wages (Sjaastad, 1962).

Migration is another type of investment in human capital (Schultz, 1961). When people move, they make sacrifices in terms of social ties and familiar locations to emigrate to areas with better occupational opportunities (Becker, 1964; Schultz, 1959). Urban areas have a higher monetary return on educational investments than rural areas so rural to urban migration for people with higher levels of education or skills is expected. Younger people are more likely to migrate for economic reasons than older people because their return on investment for education and training is greater due to the fact that they have more years of work ahead of them. For older workers, the return is lower because they have fewer years of work to make up for the investment so the growth curve is lower (Schultz, 1961).

## **2.2 Rural Out-Migration**

Incentives to migrate are lower for employed low skill individuals with lower levels of education because of the tangible and psychic costs of relocation. However, the income differentials and job opportunities for those with more human capital appears to

cause educated people to leave rural or non-metropolitan areas at a rate greater than those without college degrees (Baumann, 2006; Compton, et al., 2007; Kodrzycki, 2001).

Compton et. al. (2007) studied variation in migration rates based upon family relationships and education levels. In general, they found that couples were more likely to migrate to larger metropolitan areas if the male had an occupation that required a postsecondary degree and was considered “urban” (i.e. occupations which are found concentrated in urban areas). Couples where both the man and women have college degrees are more likely to migrate from small and medium sized Metropolitan Statistical Areas (MSAs) to large MSAs. Couples where only the female had a college degree were only slightly more likely to migrate than couples where neither spouse had a college education. Women have a greater chance of having a college degree in a field that is portable and found outside urban areas such as in education or healthcare. Educated men were more likely to migrate whether they were single or married than educated women. In general, highly skilled individuals were more likely to migrate than individuals with lower skill levels. In situations where a household had two individuals in highly skilled fields, it is more likely that they will migrate to a large MSA (Compton, et al. 2007).

Kodrzycki's (2001) study of migration patterns of recent college graduates found that people with higher levels of education are more likely to move to a different state than people with lower education levels. He analyzed data from the U.S. Bureau of Labor Statistics' National Longitudinal Survey of Youth (NLSY) about people with varying

levels of education among other characteristics. Kodrzycki found that universally whether it was across states, from one state to a contiguous state, or across census divisions people with at least some college were more likely to emigrate away from the place where they graduated or attended high school (Kodrzycki, 2001).

There was little difference in terms of the migration patterns for high school drop-outs and those with only a high school diploma. College graduates who completed a four-year degree were nearly twice as likely (35.1%) to be living in a state different from where they graduated high school than those with only a high school diploma (18.8%). The difference is even more pronounced for people who completed a higher level credential (43.7%). Kodrzycki found that migration rates escalated in the immediate years following graduation from either high school or college but that overall rates began to level out after five years (Kodrzycki, 2001).

Kodrzycki found a statistically significant relationship between college graduates' previous migration experience and their likelihood of migrating again. Students who attended college out-of-state were 54 percent more likely to migrate than those who attended college in-state. Caucasians were also more likely to migrate than other races. When community factors were introduced into the equation, the analyses indicated that people were less likely to emigrate from states with higher rates of employment growth and lower unemployment rates (Kodrzycki, 2001).

Gibbs and Cromartie analyzed the county-to-county migration matrix from the U.S. Census Bureau and found high non-metro out-migration rates (Gibbs, et al., 1994).

Between 1985 and 1990 roughly half of all rural cross-county migration occurred with people between ages 20 and 34. 20 to 24 year-olds had the highest migration rates. Overall, the likelihood of migration declined with peoples' ages. The rates for younger people was higher in part because many moved to attend a postsecondary institution. Rural counties are much less likely to have colleges or universities so when people go to college, many must leave home. As people progress through their twenties, they experience what Gibbs and Cromartie termed a “settling down” period where they may marry, have children, and make career choices. All of these are associated with a declining likelihood of migration (Gibbs, et al. 1994). Findings also indicated much higher rates of out-migration for people with at least some college. Out of the four million people who migrated during the time period they analyzed, nearly sixty percent had at least some college (Gibbs, et al. 1994).

Weber, Marre, Fisher, Gibbs, and Cromartie (2007) tested the likelihoods of migration and poverty using probit models. They developed a model to predict the likelihood of migrating using age, education, gender, race, family size, and marital status with a dummy variable that indicated whether the subject had grown up in a rural area as independent variables. They developed a poverty model which included the individual's predicted likelihood of migration from the first equation in addition to the other independent variables from the migration model. Using data from the 1993 and 1999 Panel Study of Income Dynamics (PSID) longitudinal survey they identified 708 household heads from 1993 who were living in rural locations. They found statistically

significant relationships between education (measured in years) and both migration and poverty. For every year of education, individual's chances of migrating increased by more than 10 percent. The relationship with poverty was even stronger. For each additional year of education an individual's chances of poverty decreased by almost 40% (Weber, et al., 2007).

Using data from the 1989 through 2004 U.S. Census Current Population Survey Domina (2006) developed a logistic regression models to predict non-metro migration. He defined migration as a dichotomy with race, gender, region of residence, age, and educational attainment as independent variables. In order to account for expected variations in migration differences for people in different points of their lives he used age as a continuous variable but he also created a number of dummy variables identifying specific age ranges: 18-24, 25-30, and over 60. He also created dummy variables for race, gender, and various levels of educational attainment. Each of the models only accounted for about 10 percent of the variation. Education levels and age were the strongest in terms of predicting the odds of migration. Younger respondents and people with college degrees were both more likely to emigrate (Domina, 2006).

Greenwood conducted a survey to identify not just whether people migrate but to provide more insight into variations in migration such as the distance people moved. He found an inverse relationships between distance and migration. Most migration events are relatively short distance moves which he attributed in part to the lower psychic costs of moving closer than further. Longer distance moves have real costs such as the actual cost

to move a household. Monetary costs may be modest compared to the psychic or intangible costs may vary to a much wider degree such as moving away from friends or family or leaving the familiar to go to a new or strange place (Greenwood, 1975).

In his synthesis of rural to urban migration literature, Faggian concluded that migration behaviors can be predicted in part by how far from home students go to attend college. He concluded this was in part due to a self-selection process. If students choose to go away away to college, it indicates an interest or at least the ability to move away. Using spatial analyses, Faggian found that students who went to school near their homes were more likely to take their first jobs after college nearer their homes. Essentially, the further from home a student went to school, the further he or she was likely to move to take a job afterward. Students choose where to attend college based on a number of factors including academic offerings, reputation, and location (Faggian et al 2007).

Migration is one of many issues addressed in community based ethnographic studies. Schwarzweller, Brown, and Mangalam's *Mountain Families in Transition: a Case Study of Appalachian Migration* (1971). It is an often cited ethnographic study compiled from interviews, document analyses, and U.S. Census data about the people who make up the Beech Creek area in Appalachian Kentucky. They collected histories of residents over decades with a focus on individual and community characteristics as well as the importance of kinship relationships (Schwarzweller, et al., 1971).

Like many rural places, a large number of young men left the region to serve in World War II and many others left to work in war plants. Between 1942 and 1947, the

area population of original residents dropped by 57 percent. Despite some in-migration, the overall population continued to decline through the 1950s. Their analyses primarily identified economic factors as the primary force behind much of the migration. Overall people who left improved their economic situations.

At the time of their study most people did not have many years of formal education. The researchers found that migrants who were “more educated” were less reliant upon the family relationships in the communities where they moved. They reported more relationships with people from the urban areas and were less likely to report feelings of anomie or helplessness than their less educated counterparts who had moved. They concluded that education may provide a mechanism that helps individuals become more integrated into the host communities (Schwarzweiler, et al., 1971).

Like many other economies built upon some type of harvesting or resource extraction like coal in Appalachian Kentucky, Canada’s rural fishing communities have experienced population shifts as larger companies purchased fishing rights and as technology reduced the need for a large workforce. Michael Corbett’s *Learning to Leave: The Irony of Schooling in a Coastal Community* is one of the best known studies of its kind. Corbett studied generations of individuals in a group of rural Canadian fishing communities. He analyzed people's migration decisions in light of dramatic changes to local economic opportunities. He paid particular attention to the area’s residents’ opinions about education and how it factored into their migration (Corbett, 2007).

Corbett identified three distinct cohorts of students who attended the consolidated

school between 1963 and 1974, 1975 and 1986, and 1987 and 1998. These periods were selected because they represented distinct economic periods. In the earlier periods the area depended heavily upon the fishing industry and experienced tremendous growth and prosperity with industrialization. Eventually the fishing industry began to downsize and jobs started going away. Over time, about 70 percent of the former students left the community. Three out of five who left stayed relatively nearby. Those who chose not to migrate or who moved to a neighboring community were generally less educated than those who left. Few students who attended a postsecondary institution remained in the area. Half of the men who stayed had less than a high school diploma while one third of the men (34.1 percent) and women (32.6 percent) who moved away had attended college (Corbett, 2007).

Despite being better educated overall, women who stayed in the area earned significantly less than the less educated men who remained. Women in these communities had few job opportunities and the better paying work on the boats was almost exclusively reserved for men. Based on interviews, Corbett surmised that higher education was largely unnecessary for people – especially men – who chose to stay in the region. Schools were seen as primarily for providing skills and ideas that were not very applicable locally. While people did value education, there was little practical application unless someone wanted to move away (Corbett, 2007).

Patrick J. Carr and Maria J. Kefalas had similar findings in their ethnographic study of a rural Iowa town they describe in *Hollowing Out the Middle: The Rural Brain*



*Drain and What it Means for Americans*. They studied the impact that education appears to have on young people's decisions to stay or leave a rural community which is undergoing a similar economic crisis to other rural areas like Corbett's Canadian fishing villages and Appalachian Kentucky (Carr, et al., 2009).

Carr and Kefalas described the impact out-migration had on the town at the center of their analyses. They analyzed the impact that the educational establishment and attitudes from the local community had on high school graduates' decisions to stay in, leave, or return to the region. They chose Iowa in part because it had the second highest out-migration rate for young people in the country but also because it also had consistently high standardized test scores which suggests it placed a strong value on education (Carr et. al., 2009).

Graduates were classified as as achievers, stayers, seekers, or returners. Achievers were very successful in most aspects of school including academics, sports, and organizations. Stayers performed adequately in school but were destined to remain in the area. Seekers did not excel well enough academically to leave for college but chose to find other ways of leaving such as the military. Returners left the area for a period of time either to go to college or join the military but later returned (Carr et. al., 2009).

The achievers received an enormous amount of attention and resources from the schools and local communities despite the fact that more than half would migrate out of the state much less the area after college. Through the interviews they found strong support for the idea that this was not just the children of the town's wealthier

professionals but the community in general and the school played a major role in encouraging and facilitating even poorer students who showed academic promise the opportunity to leave and go to college. The authors call the way that the local community supports these individuals and encourages them to go on to bigger and better things the equivalent of slowly committing suicide. In an interview, the counselor from the local high school described one of the issues related to brain drain by stating “The best kids go while the ones with the biggest problems stay, and then, we have to deal with their kids in the schools in the next generation” (Carr, et al., 2009).

Out of the 40-50 students who finished high school, fewer than half actually lived in and around the county after they graduated. With such a high majority of those who attended college choosing not to return, the community itself is facing a population problem as the education level of its working age population in general is declining with every class of high school graduates (Carr, et al., 2009).

### **2.3 Social and Cultural Capital and Economic Growth**

In *The Rise of the Creative Class: And How It's Transforming Work, Leisure, Community and Everyday Life* (2004) Richard Florida developed a new perspective about the changing dynamics of economic development largely driven by a social class which he identified by their level of education and the type of work they complete. Florida's creative class contains a number of individuals with higher levels of education and skills

whose work helps to stimulate change and growth that can spread to others within their regions. The majority of people with a postsecondary credential are categorized as members of the creative class (Florida, 2012). Florida concluded that the labor of this class is responsible for economic and other types of growth. His updated edition *The Rise of the Creative Class Revisited* (2012) in the wake of declines in manufacturing and the economic downturn still supports his premise that economic growth is inherently tied to and driven by a community's creative class.

Florida found that the majority of creative class members are concentrated in urban areas where they make up a growing proportion of the population. The more creative urban centers are becoming more educated in terms of the proportion of their workforce with advanced education and skills as their economies become less driven by factories and manual labor and more driven by fields that require independent thinking and levels of creativity such as medicine, research, and finance. Florida points out that it is the work which is accomplished by the creative class that tends to grow economies. Florida notes that the creative class has its own values including appreciation for diversity, openness, and individuality among other things. Communities with high levels of diversity and tolerance would be more attractive to this class (Florida, 2012).

Florida notes the importance of proximity to creative class members as role-models and mentors for adolescents and young adults. Lack of access to people like this makes it less likely that young people will foster these skills on their own. One of the potential hubs for creativity can be the University. Florida cautions against the simplistic

view of higher education institutions' roles in economic development because of the potential spin-offs of commercial businesses from research. Universities contribute both economically and culturally by helping communities become more creative by bringing in access to technology and research, through their ability to become a magnet for talent, and by fostering tolerance (Florida, 2012).

Lexington or Fayette County, Kentucky which is dominated by the University of Kentucky – the state's flagship land grant research institution – was the highest ranked metropolitan community in the state in terms of the concentration of creative class members (32.4%) in 2010. It was also the highest ranked in terms of his creativity index. Despite Louisville and Northern Kentucky having access to larger urban centers, they have lower concentrations of creative class members and lower scores on both the creativity and tolerance indexes (Florida, 2012).

Florida's work could have value to communities that wish to improve their levels of economic and social growth. Areas with a greater proportion of creative class members were more likely to have higher levels of economic growth. Communities with larger concentrations of the working class tended to have stagnating economies (Florida, 2012). In short, improving a region's long term economy is tied more to attracting innovation, which requires both human capital and creativity than to expanding manufacturing (Lee et al., 2010).

Robert Putnam notes in his pivotal discussion of social capital *Bowling Alone: The Collapse and Revival of American Community* (2001) that people with like social and

cultural values tend to live in proximity to one another. People want to be around people like them. He argues that crime and other social problems are not as much the root of basic poverty as they are of the social capital of the communities where they occur. Poor neighborhoods with higher levels of social cohesion and informal contact have lower rates of crime, child neglect and child abuse. Disadvantaged youth who live in areas with high numbers of educated, white collar workers are themselves more likely to graduate from school than similar youth who live in less educated neighborhoods. The culture and prevalence of people with educational credentials and degrees is a factor in influencing additional generations to complete higher levels of education. The power of social capital is largely derived from networks and connectedness of individuals to a community (Putnam, 2001).

If a community would like to increase its level of education and economic growth it would seem obvious that they need to foster connections for those who have the traits they wish to see expand within their area. If people are in a community that lacks these types of formal and informal connections, they are less likely to feel an affinity for the area and less likely to make efforts to be more civically engaged.

Putnam measured social capital in a number of ways including community factors such as civic participation represented by voter participation rates and associational density measured as the number of non-profit organizations in an area divided by its population in 10,000s to represent the likelihood of formal and informal networks and relationships between members of a community (Putnam, 2001).

## 2.4 Appalachian Kentucky and Appalachian Literature

The Appalachian Regional Commission formally defines the region as “The Appalachian Region includes all of West Virginia and parts of Alabama, Georgia, Kentucky, Maryland, Mississippi, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, and Virginia. The Region is home to more than 25 million people and covers 420 counties and almost 205,000 square miles.” (ARC, 2012). Appalachian Kentucky is currently defined as the 54 Appalachian counties and is considered part of the Central Appalachian sub-region (ARC, 2012).

Appalachia has captured the imagination of the country for more than one hundred years. Early travel guides recounted stories of a land that time had virtually forgotten where people still lived quaint, simple lives despite growing industrialization and urbanization in the other parts of the country. The Appalachian people were thought to be backwards, uneducated, and to a large degree violent with a history of feuds and clannish behavior (Billings, et al., 2000; Eller, 2008).

These stereotypes and caricatures of the people of the region are part of modern culture (Billings, et al., 1999). Mountain people have been assumed to be violent, lazy, and lack intelligence. Terms like *hillbillies* and *Appalachians* are part of modern slang. Billings, Norman, and Ledford offer a number of examples from magazines and quotes from legislators, and even presidents where these kinds of terms are still in use without reproach (1999).

Despite the stereotypes, Appalachia is and has been the focus of extensive academic work in rural sociology, history, demography, as well as economics and other fields. Appalachian studies has become its own field. In order to better understand something like migration that has cultural, educational, and economic underpinnings it is important to develop at least a basic understanding of the culture, history, and social dynamics that may impact people's migration decisions.

#### **2.4.1 History of the Region**

Appalachian Kentucky is divided into small communities that are physically isolated from one another due to the topography of the region. Poverty and inequality have been persistent traits in the region historically. Roots of these problems have been traced to early problems with land distribution. A large proportion of people in the region were not able to acquire land. Land speculators and companies coupled with an inadequate legal system to resolve land disputes created what early statesman Henry Clay called a “lawyer's paradise” (Billings, et al., 2000). At a point in time when agriculture would have been the main source of income, not having land greatly limited what people could do to not just subsist but create the kind of abundance that could provide a means of social mobility (Billings, et al., 2000; Caudill, 1963). This fostered the development of a social structure of *haves* and *have nots* from the beginning that continued over time and set a precedent for absentee ownership with land and other resources were owned by

companies outside of the region (Duncan, 1999). Jobs and wealth are still primarily controlled by a small number of people or families and outside interests in most parts of the region (Eller, 1982, 2008; Caudill, 1962).

The isolation helped to foster the development of clusters of tightly knit family or kin groups scattered throughout the region. These groups were in competition for resources and there have been many documented cases of feuds and violence during the 1800s. The importance of family and kinship ties is still considered to be very strong (Billings, et al., 2000).

Between 1880 and 1930 the average farm shrank in size from 187 to 76 acres and non-farm income exceeded farm income for most households. Outside corporations purchased the better available lands and mineral rights. Timber and coal helped create several towns – many of which were temporary and went away as resources were depleted. People gravitated to these towns where they could find work as well as shops, medical care, and even schools – albeit typically company controlled ones. Life shifted from people living in tight family units on relatively self-sufficient farms to people working for wages. Ron Eller asserts that modernization came to the mountains and it impacted virtually everyone there as it did other parts of the country but it was a different type of modernization (Eller, 1982).

Company towns outnumbered regular incorporated towns in some parts of Appalachia like the coal fields by a margin of five to one. People worked in the mines, lived in company housing, bought their groceries and commodities at company stores,



sent their children to company ran schools, and received medical care from company doctors and clinics (Eller, 1982). They even attended company owned churches. The mine owners controlled most aspects of life for the miners and their families. Over a period of a few decades people moved from a life of self sufficiency and absolute freedom to what Goffman would have called a total institution (1961). They were basically under the control of the mine owners with no real hope of going back to the way things had been (Eller, 1982).

The economy of the region changed dramatically between the early 1900s and World War II. The timber industry moved out west . Coal wages dropped dramatically between the late 1920s and '30s. Entire towns vanished. People were left without work and without land or homes or farms they owned. The region had been part of industrialization but largely as a provider of fuel and raw materials. There was not a strong industrial sector to take over. By 1936 nearly half of all mountain families were receiving federal relief (Eller, 1982).

The building economy that followed the war with factories and industrial developments created a very prosperous time for most of the country but not in Appalachian Kentucky because in part they lacked the infrastructure to support the movement of goods and materials. The coal driven economy with it's fluctuating employment did not create a middle class the way that industrialization had elsewhere (Eller, 2008).

The remainder of the country increased its standard of living, unemployment was relatively low, and primary services such as health care and consumer opportunities continued to improve outside of Appalachia. People from Appalachia who desired better schools, healthcare and wages left the region because there were now growing urban areas closer to the area where they could emigrate such as Cincinnati, Birmingham, and Knoxville (Eller, 2008; Brown, et al., 1962). Between 1950 and 1960, the Southern Appalachian Region lost more than one million people—one fifth of its total population, the majority who migrated were young adults who had higher levels of education than the people they left behind (Brown, et al., 1962).

Harry M. Caudill, an attorney who became a state legislator and later a history professor at the University of Kentucky was one of the more prolific authors of the region. *Night Comes to the Cumberlands* (1963) is considered to be one of the pivotal works about the region that helped bring the attention of national leaders and the press in the mid-twentieth century to the problems in Appalachia. (Whisnant, 1994; Billings, et al., 1999; Eller, 2008; Eller, 1982)

John F. Kennedy visited Appalachia during his 1960 campaign tour. With television cameras following him, he and the rest of America were appalled to see the quality of life of the people living in rural Appalachia (Eller, 2008). Kennedy formed the President's Appalachian Regional Commission (PARC) to study the area and craft an economic development plan for the region (ARC, 2012). *Appalachia: A Report by the President's Appalachian Regional Commission* was completed after Kennedy's death and

was presented to Lyndon B. Johnson in 1964 (Eller, 2008; ARC, 2012). The report described the region where one in three lived in poverty compared to one in five nationally with a per capita income that was significantly below the rest of the country with Kentucky listed as the poorest of the Appalachian states. It was reported that high unemployment and poor living conditions had caused a massive out-migration with two million people leaving the region (ARC, 2012; PARC, 1964). According to PARC, Kentucky's per capita income was less than half of the national average (PARC, 1964). The PARC report helped gain support to pass the Appalachian Regional Development Act in 1965 which formally created the Appalachian Regional Commission (ARC, 2012).

The Appalachian Regional Commission (ARC) was formed to administer and distribute funds to programs to improve the region (Eller, 2008). Many of the initial funding policies of the 1960s and early 1970s were based on the idea that Appalachia needed to be better integrated into the rest of the country. Funding primarily went to large scale infrastructure projects like developing roads and highways, sanitation systems, and health care facilities (Eller, 2008; Bradshaw, 1992). Critics would argue that that these also went to serve the interests of the existing industries such as the coal mines and their absentee owners (Bradshaw, 1992).

ARC funding was reduced during the Reagan administration and it was tasked with develop a plan to complete some of the major initiatives like the highway project. The focus of much of ARC's non-highway work has been targeted at developing economic programs to attract or foster the creation of industries and to improve the work

readiness of the local people to make the area more attractive to employers. Between 1983 and 1985 the ARC spent over \$11 million on their education programs and reports serving over 100,000 individuals (Bradshaw, 1992).

During the 1990s the focus of ARC education programs was primarily divided between those that serve all elementary and secondary school students (38 percent of education programs) and those targeting adult populations (33 percent). A small number were directed at preschool services (7%), targeted types of elementary and secondary students (10 percent), and community wide programs such as the creation of distance learning centers and other types of services (12%). Providing basic skills training in literacy and improving college readiness were also common themes (ARC, 2001).

Much of the emphasis since the 1990s has been placed upon vocational education and workforce development skills over preparation for transition to four year colleges and universities, which seems to work against their plan to emphasize competitiveness in the 21st century economy as stated in their evaluation of their own education programs:

*The current evaluation addresses two of these areas: developing a knowledgeable and skilled population and creating a dynamic economic base. The stated objectives for the first goal in the strategic plan are (1) increasing the percentage of workers receiving basic education and skills training, skills upgrading, and customized training, which will lead to development of a workforce that is competitive in the 21st century world economy, and (2) increasing the percentage of students participating in school readiness, dropout prevention, school-to-work transition, and GED programs, thereby raising the college-going rate and preparing students for the world of work in the 21st century. (ARC, 2002)*

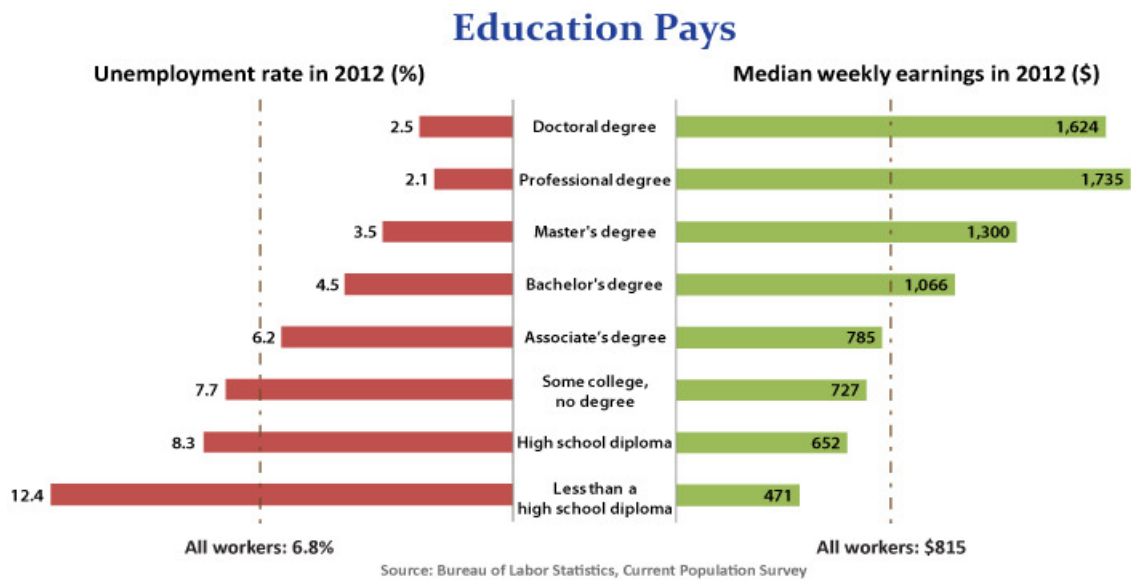
According to the ARC, Appalachia has improved in educational attainment, poverty, and urbanization. Northern and Southern Appalachia has closed many of the gaps with the remainder of the country, Central Appalachia still lags behind (Isserman, 1996). Unemployment rates may be misleading in rural areas because they fail to take into account underemployment – in addition to those who are seeking employment there may also be a large portion of people who are not employed and are not seeking employment because the jobs simply do not exist (Isserman, 1996; Fesser, et al., 1999).

The ARC's 2011-2016 strategic plan included a number of education related goals. Many of these references discuss similar themes such as reducing drop-out rates, increasing college going, and in particular providing workforce development and training needs. Education is also discussed from a more general perspective such as the impact it could have on health and the use of training programs at the high school, vocational, and college levels to teach entrepreneurial skills as a means of enhancing the diversity of the local economy (ARC, 2011).

#### **2.4.2 Educational Attainment in Appalachian Kentucky**

Since the 1960s economists and sociologists have identified educational attainment as one of the critical elements that factor into economic development as a means to reduce poverty and inequality (Shaw, et al., 2004). Data from the Bureau of Labor Statistics (BLS) in figure 2.1 illustrates how higher levels of educational

**Figure 2.1: Unemployment and Weekly Earnings by Credential Level 2012**



Source: U.S. Bureau of Labor Statistics 2012

attainment results on average with both higher wages and lower unemployment rates (BLS, 2012). The Kentucky Center for Education and Workforce Statistics found a similar relationship between credential levels and earnings for 2005-06 graduates back in figure 1.3 (McGrew, 2013).

The history of educational participation in Appalachia and other rural places differs from the rest of the country. Rural America faces issues relating to the value of and purpose of education as well as practical issues including the remoteness of some communities. In a remote area which has been separated from other parts of society,

family and religion play influential roles in people's values but education can provide a conduit to the outside world and modern ideas (Schwartzweiler et al. 1970).

The common school movement focused on the importance of schooling in the lower grades to teach morals to poor and immigrant children. It helped increase educational participation in other parts of the country. Some believe cultural differences caused Appalachia to lag behind support of the movement because it was commonly believed that morality was the purview of the institutions of family and religion (Shaw, et al., 2004).

The secondary education movement was driven by occupational skill development. Caudill and others have suggested that Appalachians resisted adopting these ideas because so much of their economy was based on low-wage manual labor such as coal mining they did not see the value (Caudill, 1967; Shaw, et al., 2004).

In the 1960s the emphasis in education shifted to preparing people for postsecondary education which they felt would be required to provide the specialization of labor needed for the changing economy it was met with similar resistance in Appalachia (Shaw, et al., 2004).

### **2.4.3 Education as an Industry in Appalachian Kentucky**

Schools in Appalachia have received subsidies to help equalize the quality of education. Caudill thought funds which were intended to improve the quality of

education and attainment in the region were more likely to find their way into the hands of local education leaders and their friends and families. Education had become one of the better paying enterprises in the region and had effectively become another political mechanism for people in positions of influence (Shaw, et al., 2004; Caudill, 1976).

When conducting interviews in Appalachian Kentucky, Duncan also found strong beliefs that school board elections were heavily influenced by political connections more than educational qualifications. Jobs – especially jobs which pay well for the region like in education – are thought of as being primarily awarded to people because of who they knew and not their qualifications. There are clearly some pockets in the region where the better educated and more affluent families live where the qualifications matter but she did not believe it was the norm (Duncan, 1999).

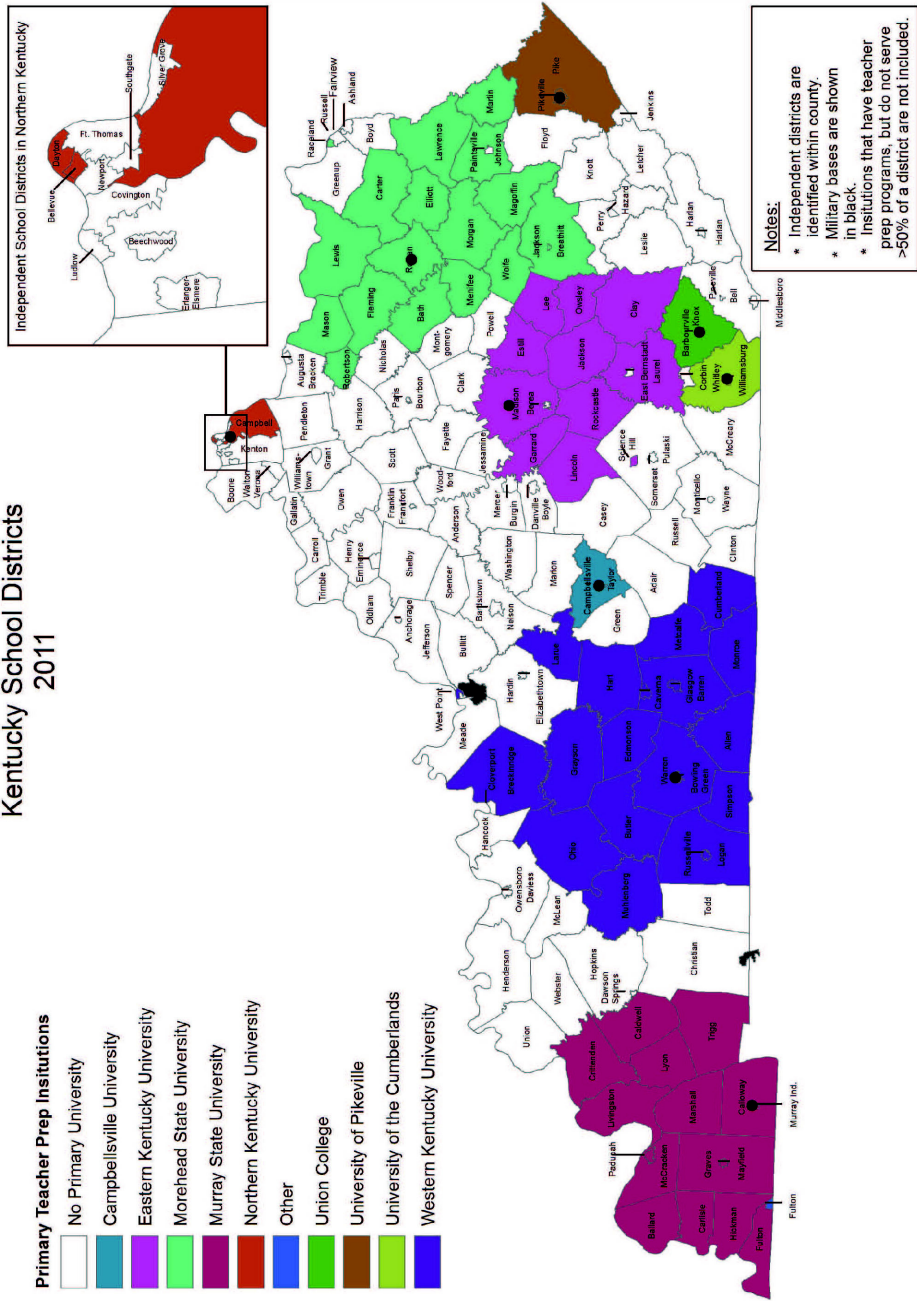
Caudill believed that the low levels of educational attainment in Appalachian Kentucky were the result of poorly trained teachers who were basically from the region (1967). More recent empirical studies suggest that teachers in the region are both from the area and that the more poorly qualified ones are the ones who are most likely to return there to teach (Fowles et al., 2011)

Teacher labor markets are thought to be relatively small with most teachers preferring to teach near where they grew-up or in a place which is very similar to it. Boyd et al. found that in New York 85% of teachers started their first job within 40 miles of their hometowns. They also found that teachers who moved away for college were still more likely to return and work near their hometowns (Boyd et al. 2005). Similarly, a



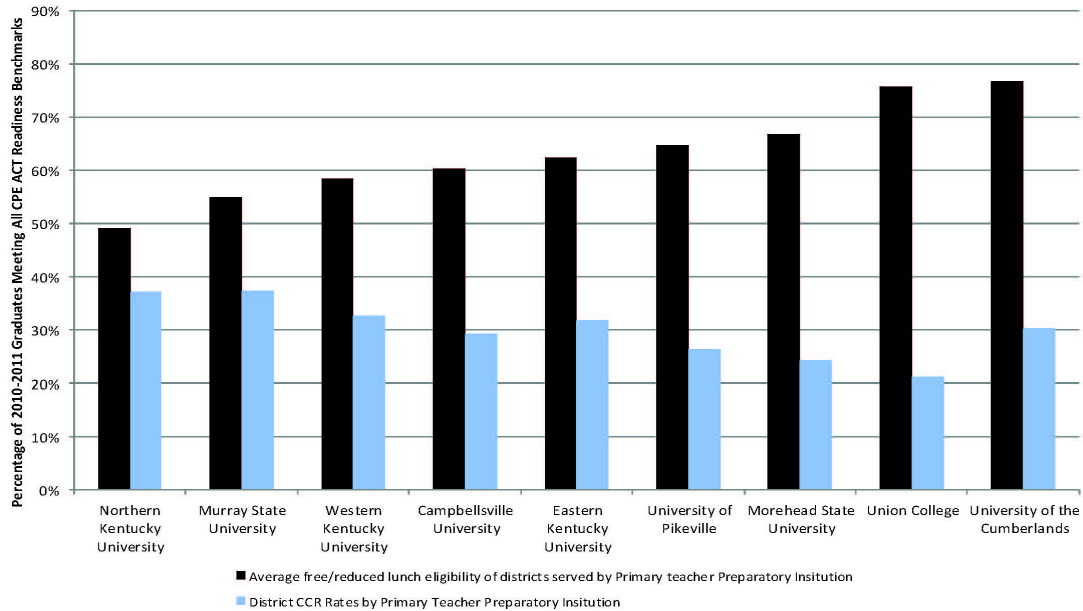
**Figure 2.2 Teacher Placement by Primary Institution**

**Primary Teacher Preparatory Institutions of Employed Teachers in Kentucky School Districts 2011**



Source: Kentucky P-20 Data Collaborative Research Brief *School Performance and Teacher Preparation Programs*

**Figure 2.3: District Percentage of Graduates College Ready in all Three Subjects by Primary Teacher Preparation Program**



Source: Kentucky P-20 Data Collaborative Research Brief *School Performance and Teacher Preparation Programs*

recent study of teacher placement in Kentucky found that people from Appalachia who go to college to become teachers were three times more likely to teach in Appalachia than their non-Appalachian peers (Fowles et al., 2011). Mid-career switches into and out of the Appalachian region had been noted as very unlikely to occur. At least in terms of assessment scores, recent research suggests that teachers from Appalachia with lower ability levels are more likely to remain in the region while those with higher levels are more likely to teach elsewhere (Fowles et al., 2011).

The Kentucky P-20 Data Collaborative found that teachers were likely to work near the college or university where they graduated. The five institutions identified in the report which are located in an Appalachian county served school districts in the same

region. These districts had a higher proportion of economically disadvantaged students and some of the lowest levels of college and career readiness (Akers, 2012).

Kentucky pays teachers on a salary schedule so wages are somewhat normalized across the various geographical and economic areas of the state. Following the Kentucky Education Reform Act (KERA) salaries in the region matched those outside. Over time the gap was widened and overall Appalachian teachers again make less. When one controls for lower costs of living, teachers in Appalachia may be earning more than their non-Appalachian counterparts (Fowles et al., 2011). In a region with limited professional opportunities, teacher salaries compare favorably to other professional occupations including nursing and physical therapists and above others such as accountants and auditors (Streams et al., 2013).

#### **2.4.4 Contemporary Appalachian Kentucky**

While much has changed over the decades as the ARC has attempted to modernize Appalachia, the problems in Appalachian Kentucky continue to persist. The ARC defines low-income counties as counties with per capita incomes that are less than two thirds of the national average. In 1965, 233 of the counties in Appalachia were considered low income. By 1980, the figure declined to 142 and dropped off again to 104 by 2000. The decline in the number of low income counties has primarily taken place in Southern Appalachia where there has been significant growth in manufacturing. Central

Appalachia has not experienced the economic growth of the other regions. Between 1990 and 2000 when the rest of Appalachia was improving, the number of low-income counties in Central Appalachia increased by 14% from 51 to 58 (Moore, 2005).

Through 1990 Northern and Central Appalachia experienced a negative net migration of individuals with a high school diploma or above. Central Appalachia experienced population declines in all areas except the number of people with fewer than nine years of education. Southern Appalachia experienced increases in all levels of educational attainment. With a larger population, this skews the overall Appalachian figures which masks the educational attainment declines in Appalachian Kentucky. Obermiller and Howe also identified changes in migration patterns in Appalachia with a shift from long-range migration to shorter range moves to cities in and near the region. (Obermiller et al., 2000).

Between 1990 and 2000, Central Appalachia experienced a negative net-migration of young adults and people with a college education. More educated people left than moved into the region. It also attracted more immigrants with less than a high school diploma than they exported. Between 1995 and 2000, Appalachia lost more than 19,000 people with a bachelor's degree and more than 6,000 people with graduate or professional degrees than they attracted due to out-migration (Lichter, et al., 2005).

Appalachian Kentucky has consistently represented the largest contiguous block of low income counties and the largest concentration of distressed counties in the region (Pollard, 2003; Moore, 2005). According to the 2000 Census, Appalachian Kentucky had

the lowest employment rates and the lowest proportion of high school graduates and bachelor's degree completers out of the thirteen Appalachian states (Pollard, 2005). As of 2013 it still has the highest three-year average poverty rate (24.4%) and unemployment rate (10.2%) of any of the Appalachian states (ARC, 2013).

In an interview in the PBS series *Frontline*, Cynthia Duncan noted that Appalachia faces many of the same systemic problems of other parts of the country with chronic poverty. It generally reflects a lack of investment in communities and in individuals. Duncan suggests that in the rural areas she has studied, the lack of investment has been deliberate because the individuals in power have wanted to ensure that there was an adequate, vulnerable workforce from which to draw (Duncan, 2005).

Duncan noted that investments such as those from the ARC in roads and other infrastructures have helped those areas where they occurred but also notes that there are political forces at work that essentially allow the power establishment to continue to support their friends and family without the scrutiny that would keep it in check in a community with an established middle class. She did not believe there had been sufficient investments in education and training or the development of an economic base that would attract and retain a middle class in the region (Duncan, 2005).

Pockets of prosperity have developed within Appalachian Kentucky. Within the sea of poverty, unemployment, and low levels of education are what W.A. Lewis would have called islands of industrial activities (1954). Eller and Duncan both note that the ARC and other infrastructure projects did to some degree improve development in the

area which is at least partially responsible for the expansion of health care, shopping, and growth of service industry work that grew in pockets through the region (Eller, 2008; Duncan, 2005).

The development of small prosperous cities amid widespread poverty and subsistence is what W.A. Lewis predicted as likely to occur in his essay *Unlimited Supplies of Labor*. Lewis notes that industries like mining tend to be highly capitalized so there are dramatic juxtapositions between life in the centers where mine business is transacted and the areas around it (Lewis, 1954).

*But we find the same contrasts also outside their economic life. There are one or two modern towns, with the finest architecture, water supplies, communications and the like, into which people drift from other towns and villages which might almost belong to another planet. There is the same contrast even between people ; between the few highly westernised, trousered, natives, educated in western universities, speaking western languages, and glorying in Beethoven, Mill, Marx or Einstein, and the great mass of their countrymen who live in quite other worlds Capital and new ideas are not thinly diffused throughout the economy; they are highly concentrated at a number of points, from which they spread outwards.*(Lewis, 1954)

Baumann found the wage-gap between Appalachia and the rest of the country to be virtually unchanged between 1970 and 2000 suggesting that at least economically, little progress had been made (2005). According to the ARC as recently as 2009 the per-capita income in Appalachian Kentucky was still the lowest of all the Appalachian states and barely over half (51.3%) the national average (2013).

### **2.4.5 Underdevelopment in Appalachia**

Appalachian Kentucky has a history of underdevelopment. For more than the past century its economy has been driven by resource extraction industries. First it was the timber industry which cut down much of the lumber from the forest lands then the mining industry through a number of boom cycles depleted much of the coal resources (Eller 2008; Billings et. al. 1999; Black et. al. 2012).

Coal and timber are both resource extraction industries because they basically revolve around removing something from nature as opposed to manufacturing or farming which essentially creates or processes something and is renewable. Extraction industries have a limited life span because eventually the resource is depleted or becomes harder to extract to the point that it is no longer cost effective. Resource-extraction industries like these require a large unskilled workforce. At their height they can provide well-paying jobs for people without educational credentials or higher levels of skills or training. The easy availability of well-paying unskilled employment can slow the need for other employment and diversified industries which slows the creation of opportunities or a demand for skilled or educated labor.

Many Appalachian scholars believe the absentee ownership of the industries contributed to a lack of investment in the region which could have improved the area or diversified economic opportunities. The lack of a diversified economy or investment in the human capital of the people of the region has created a situation that may discourage

people from pursuing education and encourage those who do to leave the region because of a lack of employment opportunities (Duncan, 1999; Caudill, 1967).

## **2.5 Overview**

There are considerable bodies of work in the areas of migration, education, and Appalachian studies. Previous studies have indicated high rural out-migration rates for people with higher levels of education. Human capital theory would indicate this is caused by a higher return on investment for people who move to urban areas. Teachers may be a possible exception to this because they tend to have a small labor market and generally teach near the places where they came from.

Out-migration research finds that people who have fewer ties or restrictions may be more likely to migrate away from a region. This could include younger people who may be less likely to be married, have children, or be in an established career. These would all be factors in a migration decision according to Lee as well as other issues such as types of cultural opportunities and other traits that a person desires in a community. Florida would argue that people who members of the creative class, which includes most of the people who complete a college degree will be more likely to be drawn to places with greater diversity of people and ideas.



## **CHAPTER THREE**

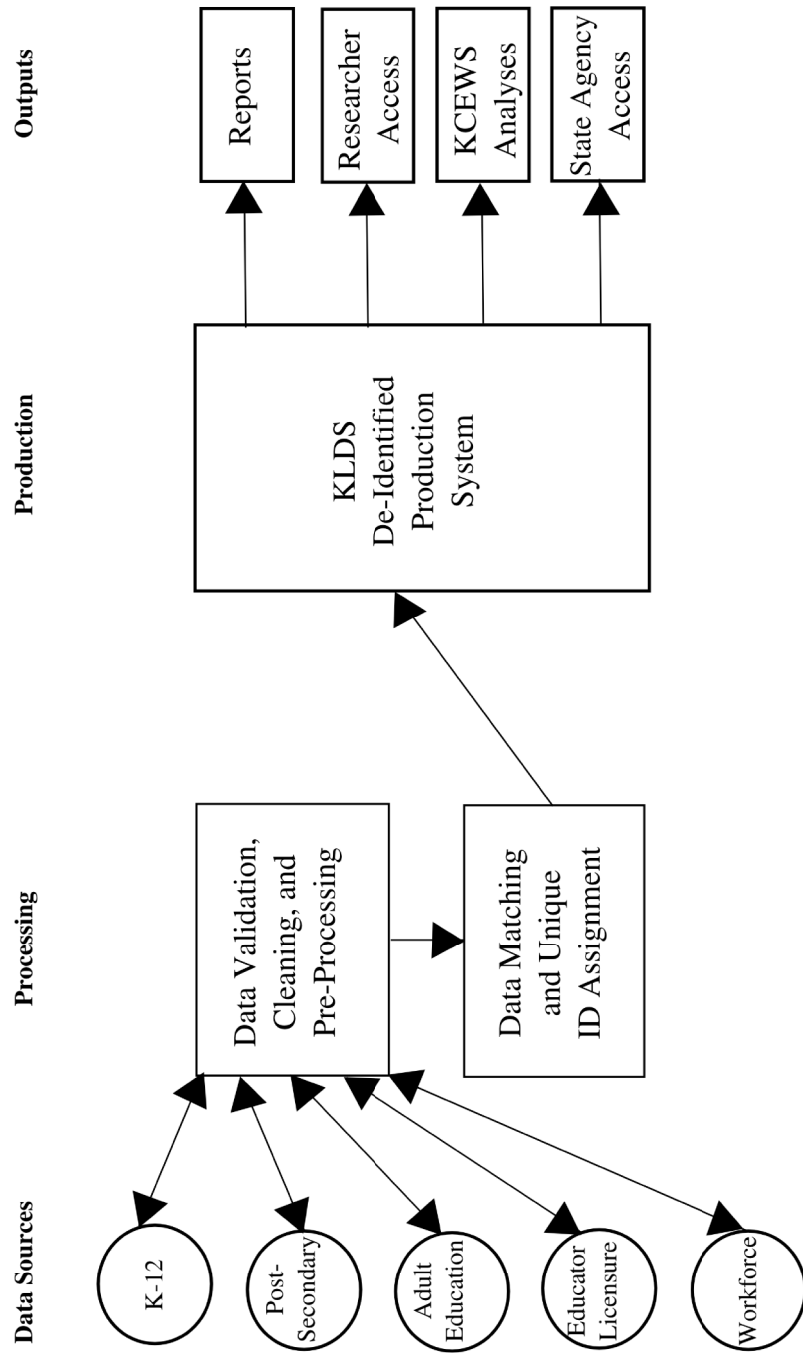
### **Statewide Longitudinal Data Systems**

Governments amass stores of data through their regular operations including information about services which are provided to people, expenditures, and data collected for compliance purposes among other things. The U.S. Department of Education's Institute for Education Sciences administers the Statewide Longitudinal Data Systems grant program. The purpose of this program has been to stimulate the development of statewide data systems particularly in the areas of education and workforce which allow for these various types of data to be collected and maintained over time so they can be linked together and utilized to better inform public policy development and educational practice and operations (IES, 2012).

There have been four rounds of SLDS grant funding. Forty-seven states, the District of Columbia, and Puerto Rico have received funds to develop the SLDS infrastructures (IES, 2012). Kentucky has received three separate grants to develop their system. It is one of the first systems to expand beyond the collection of K-12 student and postsecondary data to also incorporate workforce and employment data.

**Figure 3.1: KLDS Systems Overview**

### **Kentucky Longitudinal Data System General Technical Overview**



Source: Kentucky Center for Education and Workforce Statistics

### **3.1 Research use of SLDS Data**

While these systems include an extensive amount of data, these data were collected for administrative purposes initially and not in the same way data would typically be collected by a researcher looking into a particular topic. The IES cautions that data may not necessarily be representative in the same way that a sample data collection would be designed. Not all data may be available for all people or necessarily for the same longitudinal periods of time (SLDS, 2012a).

States are encouraged to work with the research community and with Local Education Authorities (LEAs) to leverage these data to provide better insight into policy and program evaluations and support improved decision making. Cautions are also indicated in terms of ensuring that potential data users must ensure that they have a thorough understanding of the data in the system, how it is collected, who it represents, and any manipulation that may be required for the data to be usable for research purposes. Much of the data is collected at a granular level for specific operational purposes and it will have to be manipulated before it can be used for research (SLDS, 2012b).

### **3.2 Kentucky's Longitudinal Data System**

Kentucky has received three of the four rounds of SLDS funding and used the first one for collecting K-12 data statewide; the second one to develop a P-20 data system

which draws data from the state's K-12, postsecondary, and educator licensure data systems together; and the third one to expand the P-20 system into what is called a P-20W system including employment and workforce data with the various education data sources.

Figure 3.1 provides a simplified overview of the KLDS system. Kentucky has developed what they call a de-identified third-party model. While identifiable data enter the system from various administrative data systems, after the data are processed and matched to existing data within the system to align records for the same individuals with each other, all personally identifiable information (PII) is removed from the records before they are moved into the production system for reporting purposes.

This is what they refer to as *de-identified* in that the production system has no PII within it so the users of the system do not have access to identifiable data such as names, Social Security Numbers, addresses, or other directly identifiable data. Kentucky views all person level data – even these de-identified records without PII – as confidential because small cell sizes could make some of the data statistically identifiable for very small groups or sub-groups of people therefore the data system itself can only be accessed by authorized users including KCEWS staff and staff from the participating agencies. Even then, the agencies which have primary responsibility over each of the original data sources must approve reports and any other disclosure of summary data before they can be published to ensure that the data represent statistical facts and is not personally or statistically identifiable (P-20 Data Collaborative, 2010).

### **3.3 Data Scope**

SLDS data all generally flow from administrative data systems which were designed to capture data about services provided or about people who have received a service of some type in order to produce state and/or federal compliance reports. The data are collected using unique definitions which were created specifically for that purpose and all of the data within the systems have limitations and caveats. This makes it important to understand the scope of people or services included because depending upon the research topic, the data may or may not be statistically representative (SLDS, 2012b).

The KLDS system includes information about students who attended public K-12 schools, public two- and four-year colleges and universities, independent not-for-profit four-year colleges, people who are certified to teach in Kentucky, and people who are employed in jobs which are reported through the state unemployment insurance system to determine employment and wages. It is not an appropriate source of data about students who attend private K-12 schools or the people who teach there, people who go to college out-of-state or who attend a proprietary college in- or out-of-state, or people who work in another state or who are independently employed or in the military. For a number of policy topics though the issues surrounding individuals who are receiving some form of service or intervention from a public source such as one of the public education or workforce development programs and it does contain the universe of subjects who are most likely to be of interest in those cases.

In addition to the types of people who have data included in the system, the breadth of data could be an issue for researchers. While survey research may allow for very in-depth questions to be asked including opinions, feelings, and various types of descriptive matter to get to specific issues, the types of data collected in SLDS systems like KLDS is more from an observational, dosage, or completion process. KLDS includes information such as assessment scores, earnings, college enrollment, credential completion, and even grades but there is no information available about the reasons people chose particular programs or services and very little information about these subjects' lives outside of their involvement in an education or workforce program which may require researchers to examine many topics using indicators or proxy variables.

The depth or number of years of data which are available in these longitudinal systems is also an issue. The relatively slow pace at which government has operated in terms of collecting and maintaining data causes these systems to be most relative to issues that have occurred within the past few years. In Kentucky, the majority of data within the system only go back to the 2008-09 fiscal year due to changes in the K-12 statewide student information platform. Postsecondary and employment data are available in limited supplies for a few years before this.

### **3.4 Data Quality and Manipulation**

The data in systems like KLDS are originally collected through separate, disconnected processes. For examples colleges and universities may have a transcript from a student's high school but they may not know anything about whether the student's family finances or self-described ethnicity or the social security their parents provided to their K-12 schools. They collect versions of these data for their own reporting purposes and they do not always match up.

Data which are not used to fulfill a compliance or accounting related business process may not be scrutinized as closely as it would be by a researcher and there is no process for going back to the individuals to attempt to resolve data discrepancies. Researchers must spend significant time reviewing the data to ensure that it appears to be accurate in terms of how they are attempting to utilize it.

The Unemployment Insurance (UI) system provides a good example of this issue. For the purpose of this study, it is the primary source of information about where the cohort members are five years after college. It is the only source of data on this issue within the system at this time. In general, location of an employee is not a primary issue for the unemployment insurance process. It does not matter where a person works or where they live in terms of the amount paid into the system for these individuals and if they apply for benefits there is a separate process that collects their mailing address and banking information to ensure that the checks go out correctly. This means that the location information is not monitored as closely as it could be when it is collected on

employment and earnings records. During the data review process for this study an unusual trend was identified that indicated the majority of graduates with a credential in the education field were all working in Franklin County – which is where the Kentucky Department of Education is located. Their employers appeared to be located all over the state including many in Appalachian Kentucky but the counties were all miscoded as Franklin. This required creating a cross-reference table with county location for every school district in Kentucky and processing the employment location data through it so that the counties would be correctly identified. This affected more than 900 subjects in the cohort and if it had not been corrected would have provided an almost opposite view of migration for people in that field.

In addition to reviewing the data for accuracy, it is important to understand the other inherent limitations from how they were collected. Again with the employment location data it is important to understand that there are inherent assumptions that have to be made from a research perspective about what these data represent. Location of a person's employer may be different than the location of a person's home or the places where they may spend their money, raise their children, or vote however this is the only post-college data that exists within the system for evaluating geography or migration at this time.



### **3.5 Advantages of Using an SLDS**

While there are a number of issues and assumptions that must be made when using these systems as the foundation for research, there are many advantages too. Much like other existing data sources, one of the biggest advantages of working with an SLDS system is that the data already exist. Someone else has taken on the painstaking, difficult, and expensive task of collecting, validating, and cleansing the data. In addition, these systems are developed specifically for the purpose of linking data together from multiple sources which generally means that the matching process is going to be superior to the simple SSN or name matches that many researchers employ for individual projects.

Since the data are collected for specific purposes, some of the ancillary types of data may not have as high of a level of quality as one would prefer. For the purpose of this study I did not have to rely on asking subjects if they completed a college degree or not or ask about a sensitive subject like their earnings. Those data were already certified as accurate by the institutions which conferred their degrees and credentials and by their employers who paid unemployment insurance taxes on each of them. Obviously there are methods of collecting accurate data from people, however using these systems has the benefits of the authentication and validation methods which have already been employed without relying on every researcher being considered an expert in developing data collection processes or instruments to achieve these goals. If the purpose is to raise awareness of policy issues, the lay community may be less likely to suspect the accuracy

of data collected from official government sources and the findings may receive more attention.

Sample sizes and response rates are not obstacles to research that utilizes an SLDS type of system. If the cohort is defined within the system they typically have all records of all events for all members of the group. For the purposes of this study, I identified a cohort of people at a very specific point in their lives and then attached a snapshot of data from a later period. This would have been possible with a panel type of survey but it would have to include a very large sample in order to find enough people who were at the same point in their academic to work lives to provide any disaggregated data by degree and credential levels or demographics.

## **CHAPTER FOUR**

### **A Research Methodology for Analyzing Appalachian College Graduate Migration**

This study incorporates multiple analyses of migration of the college and university graduates from the cohort to provide extensive information about them and how different groups within the cohort exhibit different migration behaviors. The analyses include extensive descriptive statistics about the population and how they compare to their non-Appalachian counterparts, migration rates for various sub-populations, and a set of three logistic regression models which build upon each other to provide a perspective for evaluating the strength of individual and community characteristics in migration decisions.

#### **4.1 Data Sources**

The study utilizes data from the Kentucky Center for Education and Workforce Statistic's KLDS. The data include demographic, academic, and economic data elements for individuals in the cohort. The analyses also includes linking these data with county level data collected by the researcher from a variety of public data sources. These data

were merged together to provide individual level data with characteristics about the communities where they came from before they entered college and the communities where they were working five years later.

The data utilized about the demographic and academic characteristics of the graduates in the cohort were originally collected by the Kentucky Council on Postsecondary Education (CPE) as part of their accountability data system from all of the public community and technical colleges and the state's eight public four year universities as well as the twenty not-for-profit four-year institutions.

These data were evaluated and validated by the CPE before they were provided to the KCEWS for incorporation into the KLDS where they have been linked with K-12, employment, and other data to provide a more comprehensive view for public policy making. This system also includes data from the Kentucky Office of Employment and Training's (OET) Division of Unemployment Insurance (UI) program about individual earnings and employment which were used to identify employment status, earnings, industry, and employer location which serves as a proxy for residence during the 2010-11 fiscal year.

The UI system collects data quarterly from for-profit and not-for-profit employers in Kentucky. Their system requires participation from the vast majority of employers in the state and includes the majority of wage earners in the state with the exception of federal, military, and people who are independently employed. The full list of criteria can

**Table 4.1: Characteristics of 2005-06 Graduates from Kentucky's Public and Independent Colleges by Region of Origin**

	Appalachian Kentucky		Non-Appalachian Kentucky		Out-of-state	
	N	%	N	%	N	%
<b>Gender</b>						
Female	5782	65.5%	14211	61.5%	4075	56.2%
Male	3045	34.5%	8912	38.5%	3179	43.8%
<b>Race</b>						
Black, not Hispanic	150	1.7%	1867	8.1%	526	7.3%
Other or Unknown	428	4.8%	1636	7.1%	1612	22.2%
White, not Hispanic	8249	93.5%	19620	84.9%	5116	70.5%
<b>Age at Graduation</b>						
Unknown	620	7.0%	1893	8.2%	749	10.3%
24 and Under	3460	39.2%	9402	40.7%	3073	42.4%
25 - 29	1949	22.1%	5200	22.5%	1833	25.3%
30 - 39	1774	20.1%	3875	16.8%	1073	14.8%
40 - 49	733	8.3%	1846	8.0%	371	5.1%
50 and Over	291	3.3%	907	3.9%	155	2.1%
<b>Type of Institution Attended</b>						
2-year Public Community /Technical College	3548	40.2%	7456	32.2%	546	7.5%
4-Year Public University	3994	45.2%	12901	55.8%	5332	73.5%
4-Year Non-Profit Independent Institution	1285	14.6%	2766	12.0%	1376	19.0%
<b>Institution Location</b>						
Non-Appalachian Kentucky	2450	27.8%	21520	93.1%	5950	82.0%
Appalachian Kentucky	6377	72.2%	1603	6.9%	1304	18.0%
<b>Degree or Credential Level Completed</b>						
Sub-Associate	1505	17.0%	3451	14.9%	295	4.1%
Associate	2424	27.5%	4808	20.8%	470	6.5%
Bachelors	3381	38.3%	10719	46.4%	3969	54.7%
Graduate or Professional	1517	17.2%	4145	17.9%	2520	34.7%
<b>Academic Major Area</b>						
Business	816	9.2%	3239	14.0%	1101	15.2%
Education	1479	16.8%	3051	13.2%	893	12.3%
Health	2104	23.8%	4470	19.3%	973	13.4%
Liberal Arts	2325	26.3%	6130	26.5%	1773	24.4%
Other	786	8.9%	2703	11.7%	1267	17.5%
Science Technology Engineering and Mathematics (STEM) – Except Health	700	7.9%	2138	9.2%	1128	15.6%
Skilled Trades and Vocational	617	7.0%	1392	6.0%	119	1.6%

be found in the Kentucky Unemployment Insurance Employer's Guide 2012 (OET, 2012). It is estimated to include approximately 90% of all wage earners in the state (McGrew, 2013). Employers register with OET and then provide quarterly reports of earnings for all of the full- and part-time employees. When they register they provide information about their physical location and the industry in which they operate.

The individual level data analyzed in this study were from a file of data extracted from KCEWS which had already linked the records of college graduates from the CPE with employment and income data from UI. The data are linked through a complex set of algorithms that utilizes a variety of personal characteristics to identify records from various systems such as those from the CPE and UI which actually belong to the same person. This provides the benefits over using self-reported data such as the U.S. Census or one of the longitudinal panel surveys because the data have been validated by an external source.

#### **4.2 Cohort Definition**

The cohort includes all of the students who were identified as graduates of either a public or AIKCU independent college or university in Kentucky who completed a postsecondary credential of any level during the 2005 – 2006 academic year whose origin before they entered college was in one of the 54 Kentucky counties which are designated as Appalachian by the Appalachian Regional Commission. This includes 8,827 of the 39,204 Kentucky postsecondary graduates during the 2005-06 academic year.

Demographic, academic, and other individual characteristics including county of origin were collected from the cohort's postsecondary education records. County of destination which is used to determine migration was identified from the location of their employers along with other employment characteristics.

### **4.3 Characteristics of the Cohort**

Overall 39,204 people completed a postsecondary credential at one of Kentucky's public or independent institutions during the 2005-2006 academic year. Nearly one-fifth (18.5 percent) had originally come from out-of-state or another country. Slightly over one-fifth (22.5 percent) came from one of Kentucky's Appalachian counties and the remaining three-fifths (59.0 percent) came from one of the 66 other non-Appalachian Kentucky counties. If you remove the non-residents, roughly one out of four (27.6 percent) of the college graduates for that year came from an Appalachian county.

The Appalachian cohort which is the focus of this study differs in some important ways from their counterparts who graduated in the same year. They were more likely to be female (65.5 percent compared to 61.5 percent), white (93.5% compared to 84.9%), and older (31.7% compared to 28.7% age 30 or older). The dataset does not have information about their socio-economic backgrounds or academic preparation however if they were representative of the population in the regions where they came from, table 1.2 would suggest the students from Appalachian Kentucky were more likely to be less

prepared for college level work and more likely to be poor than their non-Appalachian counterparts.

Their academic decisions also differed. Appalachian graduates were about 20% more likely to attend a public two-year institution and about 20% less likely to have attended a public four-year institution. The level of institution that they attended had a notable impact on the level of credential they completed with 44.5% of the Appalachian students completing Associate degrees or lower level credentials compared to only 35.7% for the non-Appalachian Kentucky graduates. Appalachian graduates are more likely to complete an associate degree or lower than they are a baccalaureate degree (44.5% compared to 38.3 percent) while non-Appalachian graduates are more likely to complete a baccalaureate than a lower level credential (46.4% compared to 35.7%).

Liberal arts types of major were the most popular for both Appalachians and non-Appalachians graduates and made up one out of every four of all credentials awarded to Kentuckians in this year. Appalachians were more likely to complete credentials in a health or education field (40.6% compared to 32.5%) and less likely to complete a business program (9.2% compared to 14.0%) than non-Appalachian graduate.

#### **4.4 Data Elements and Definitions**

The combined analyses including the descriptive statics and the logistic regressions utilize a large number of data elements from a combination of postsecondary,



employment, U.S. Census files, and other public data sources as well as derived elements created for analysis purposes defined as follows:

#### **4.4.1 Individual Level Data**

Demographic characteristics are provided from the graduates' colleges and universities based on the data within their student information systems. These are typically identified or self-reported by students when they enter an institution. Academic characteristics are provided as they were at the point when the student completed his or her credential. In the event that a student completed multiple credentials during the 2005 – 2006 academic year, the highest level credential was utilized for analysis purposes.

<b>Variable</b>	<b>Definition</b>	<b>Source</b>
Gender	Coded as “Male” or “Female.” A small number fewer than 10 cases did not provide Gender codes and were recoded as “Female” because the majority of members of this cohort are female.	CPE
Race	Race or ethnicity recoded due to small numbers into Black, not Hispanic; Other or Unknown; and White, not Hispanic.	CPE
Age at Graduation	Derived by subtracting the graduates' birth year from 2006.	CPE
County of Origin	Graduate's county of residence at their point of entry into the college or university.	CPE
Institution	The college or university from which the graduates received their degree or credentials.	CPE

Institution Type	The type of institution where the student completed his or her credential was coded as 2-year Public College, 4-year Public University, or Independent Institution.	CPE
Institution Location	The institution's location was identified as either in Appalachian Kentucky if they were physically located in one of the 54 counties identified as Appalachia or it was coded as non-Appalachian Kentucky if it was in one of the state's 66 other counties.	CPE
Credential Level	The level of the degree or credential was coded as: <i>Sub-Associate's</i> – Diplomas and certificates of less-than two years in length <i>Associate's</i> – Any Associate degree <i>Bachelor's</i> – Any bachelor's degree or post-bachelor's certificate <i>Master's</i> – Any type of master's degree or educational specialist degree <i>Doctoral Research</i> – PhDs and EdDs in research practice areas <i>Professional</i> – Terminal graduate professional credentials including practicing medical doctors and lawyers	CPE
Academic Major	Academic major in which the credential was earned identified by the initial two-digits of the program's Classification of Instructional Program (CIP) code.	CPE
Credit Hours	The number of credit hours the student had successfully completed when they received the credential.	CPE
Employment County	Employer location as provided through the UI registration process. In the event that the subject had multiple employers, a primary employer is identified based on the employer from which the subject received the largest proportion of his or her wages during the year.	UI
Industry of Employment	The graduate's industry of employment as reported by the first two digits in his or her primary employer's North American Industrial Classification (NAICS) code.	UI
Earnings	Sum of all reported wages from all employment during the four quarters in the 2010 – 2011 fiscal year.	UI

#### 4.4.2 County Level Data

County level data were collected from the Kentucky County Profile 2012 which includes data from a variety of sources including the U.S. Census Bureau's American Community Survey (ACS), the Kentucky Department of Education (KDE), the Kentucky Council on Postsecondary Education, and the Kentucky State Police,

County level data elements are included both for the subjects' counties of origin as well as for the counties where their employers are located. These are designated with the prefix Origin or Destination before the variable name in the analyses.

<b>Variable</b>	<b>Definition</b>	<b>Source</b>
Total Population	County level population figure from the 2010 U.S. Census.	U.S. Census
Urban	Derived variable that designates a county as urban if it has a population of 50,000 or higher or not-urban (rural) if the population is below 50,000.	U.S. Census
Median Family Income	Median Family income as calculated through the 2010 Decennial Census.	U.S. Census
Per Capita Income	Per Capita income as calculated through the 2010 Decennial Census.	U.S. Census
Educational Attainment	The percentage of a county's population age 25 and older who have a bachelor's degree or higher from the American Community Survey 3-year average for 2010.	U.S. Census
ACT Composite	Composite score for the American College Test administered to all eleventh graders in public high schools in 2009 2010.	Kentucky Department of Education

College Going Rate	The proportion of public high school graduates from the class of 2010 who went on to attend a public or private university either in Kentucky or out-of-state.	Kentucky Center for Education and Workforce Statistics
Non-Profit Organizations	The number of registered non-profit organizations in the county.	U.S. Census
Voter Participation	The percentage of registered voters who voted in the 2008 general election.	Kentucky County Profiles 2012
Unemployment Rate	The unemployment rate calculated from 2010	Kentucky Office of Employment and Training
Crime Rate	The part 1 crime rates by county as reported by the Kentucky State Police for the calendar year in the report 2009 Crime in Kentucky.	Kentucky State Police

#### **4.5 Definition of Migration**

Migration is the dependent variable for the three logistic regression models and is also represented in the descriptive statistics to illustrate the differing types and levels of migration for groups within the cohort. The primary definition of migration is based on the cohort of subjects whose County of Origin is one of the 54 Appalachian Kentucky Counties as of the time they graduated from college and then estimating their destination County five years later by their County of Employment. Depending upon the County of Employment migration was coded as follows:

<b>County of Employment</b>	<b>Migration</b>
One of the 54 Appalachian Kentucky Counties	Did not migrate
One of the 66 non-Appalachian Kentucky Counties	Migrated to non-Appalachian Kentucky
No employment record	Left Kentucky

#### **4.6 Data Limitations**

The college and university data are collected from the data provided to the CPE by public two- and four-year institutions and independent not-for-profit four-year institutions in the state. Students who completed credentials at other private or out-of-state institutions are not included in the analyses and we are unable to ascertain anything about that group of students or anything about whether they return to the region or not. Information about demographics are self-reported by the students during their application process at the colleges and universities they attended.

Employment data are collected from the data employers provide the state Unemployment Insurance program for individual employees on a quarterly basis. The location data that will be provided will be for the employer itself and not the physical residence of the employees. Information is not collected on individual titles or occupations through this process so it is not possible to easily cross-reference academic degrees or programs with working in or out of their field. Limited information can be assumed based on industries that hire specific credentialed or even certified staff such as hospitals hiring nurses and medical doctors or school districts that employ people with

degrees from teacher preparation programs. Information is not available in this system for people in the military or who work for the federal government or who are independently employed in a capacity that does not require them to participate in the state unemployment insurance program. It may be possible to collect information about people in the military and federal employment and it may be possible to collect data about the people who leave the state but these processes have not been finalized.

#### **4.7 Statistical Analyses**

The analyses includes two basic levels: 1) initial descriptive statistics about the cohort and measures of association for selected demographic and academic characteristics with migration decisions, and 2) three binomial logistic regression models with migration as the dependent variable and independent variables including demographics, academic characteristics with some re-coding, employment data elements in terms of earnings, and two sets of community characteristics data elements including elements from the county of origin and their county of employment five years later.

##### **4.7.1 Descriptive Statistics**

The study includes descriptive statistics about the cohort of students who are from Appalachian Kentucky and how they compared to other students in the same graduating

class in terms of general demographics, types of degrees completed, institutions attended and their employment outcomes compared to the other graduates. Demographic characteristics and information about the communities where students came from and the academic programs in which they participated are also provided cross referenced with migration behaviors. As many of these types of variables are categorical by nature, while migration distributions are presented so are nominal measures of association to identify if the differences were strong enough to be considered statistically significant.

#### **4.7.2 Regression Models**

A set of three logistic regressions were ran against the data from the individuals from Appalachia who remained in Kentucky in either Appalachian or non-Appalachian counties as the dichotomous dependent variable. The data set was limited to these 5,776 individuals in order to ensure that the same cohort would be used in all three models. The first model only included academic and demographic variables. The second also added characteristics about their counties of origin. The third model added information about the destination county where people were employed in 2020-11 – which were only available for people who had employment records from Kentucky.

In order to be utilized in the regression model a number of categorical and interval ratio variables had to be recoded or converted into dummy variables including the following transformations:

<b>Variable Name</b>	<b>Definition</b>
FEMALE	Gender recoded as “1” for females and “0” for males.
BLACK	Race recoded as “1” for “Black, not Hispanic” and “0” for all others.
AGE30	Age recoded as “1” for people who were 30 years old or older when they graduated and “0” for people who were under 30 years old.
COLLEGE_IN_APP	Institution Location recoded as “1” for people who graduated from institutions located in Appalachian Kentucky and “0” for those who graduated from an institution in non-Appalachian Kentucky.
IND_INSTITUTION	Institution Type recoded as “1” for people who graduated from an Independent institution and as “0” for people who graduated from 2-Year Public or 4-Year Public institution.
2YR_COLLEGE	Institution Type recoded as “1” for people who graduated from a 2-Year Public institution and as “0” for people who graduated from 4-Year Public institution or Independent institutions.
4YR_COLLEGE	Institution Type recoded as “1” for people who graduated from a 4-Year Public institution and as “0” for people who graduated from 2-Year Public or Independent institutions.
BACHELORS	Credential Level recoded as “1” for people who completed a Baccalaureate level credential and “0” for everyone else.
ASSOCIATE	Credential Level recoded as “1” for people who completed an Associate degree and “0” for everyone else.



SUBASSOCIATE	Credential Level recoded as “1” for people who completed a postsecondary certificate or diploma and “0” for everyone else.
MASTERS	Credential Level recoded as “1” for people who completed a Master's or Specialist's degree and “0” for everyone else.
DOCTORAL	Credential Level recoded as “1” for people who completed a Doctoral degree and “0” for everyone else.
MAJOR_BUSINESS	Academic Major recoded as “1” for individuals completing a credential in Business and “0” for all other programs.
MAJOR_EDUCATION	Academic Major recoded as “1” for individuals completing a credential in Education and “0” for all other programs.
MAJOR_HEALTH	Academic Major recoded as “1” for individuals completing a credential in Health and “0” for all other programs.
MAJOR_LIBERALARTS	Academic Major recoded as “1” for individuals completing a credential in a Liberal Arts program and “0” for all other programs.
MAJOR_STEM	Academic Major recoded as “1” for individuals completing a credential in Science Technology Engineering and Mathematics field other than Health and “0” for all other programs.
MAJOR_SKILLED	Academic Major recoded as “1” for individuals completing a credential in a Skilled Trade and “0” for all other programs.
OR_URBAN	County of Origin's Total Population recoded as a “1” if the population was 50,000 or greater and a “0” if the population was less than 50,000.
OR_HOUSEHOLDINC	County of Origin's Median Household Income.

OR_UNEMP	County of Origin's Unemployment Rate.
OR_BACHELORS	County of Origin's percent of the population 25 and older with a bachelor's degree or higher.
OR_ORG10K	The number of non-profit organizations in the County of Origin divided by its population divided by 10,000.
OR_VOTERTURNOUT	County of Origin's Voter Participation Rate
DE_URBAN	County of Destination's Total Population recoded as a “1” if the population was 50,000 or greater and a “0” if the population was less than 50,000.
DE_HOUSEHOLDINC	County of Destination's Median Household Income.
DE_UNEMP	County of Destination's Unemployment Rate.
DE_BACHELORS	County of Destination's percent of the population 25 and older with a bachelor's degree or higher.
DE_ORG10K	The number of non-profit organizations in the County of Destination divided by its population divided by 10,000.
DE_VOTERTURNOUT	County of Destination's Voter Participation Rate

Much of the migration literature discusses decisions to remain in or leave an area in terms of ideas related to human capital concepts suggesting that people who invest in education are most likely to emigrate to a place where they can receive the greatest return on these investments (Becker, 1964; Schultz, 1959) or from the perspective of factors that either push people from an area or that pull them towards another. The three regression models have been developed to provide a cumulative perspective of the influence of

initially individual demographic and academic characteristics, then adding in characteristics about the individuals' home communities to estimate factors that may push people away from some communities, and then adding in the impact of external factors in the communities where they decide to move either inside or outside of the region to estimate the strength of factors that may pull or attract people.

The equations for the three models are essentially the same however the number of dependent variables taken into account increases through the models so the number of factors represented changes.

$$\rho = \frac{\exp(\beta_0 + \beta_1 X)}{1 + \exp(\beta_0 + \beta_1 X)}$$

### **Model 1**

The dependent variable is the dichotomous variable of Migration. Independent variables include: FEMALE, BLACK, AGE30, COLLEGE\_IN\_APP, 2YR\_COLLEGE, 4YR\_COLLEGE, BACHELORS, ASSOCIATE, SUBASSOCIATE, MASTERS, DOCTORAL, MAJOR\_BUSINESS, MAJOR\_EDUCATION, MAJOR\_HEALTH, MAJOR\_LIBERALARTS, MAJOR\_STEM, and MAJOR\_SKILLED.

### **Model 2**

Includes the same dependent and independent variables as Model 1 but adds the following community characteristics for the subjects County of Origin: LR\_OR\_URBAN, OR\_HOUSEHOLDINC, OR\_UNEMP, OR\_BACHELORS, OR\_ORG10K, and OR\_VOTERTURNOUT.

### **Model 3**

Includes the same dependent and independent variables as Models 1 and 2 and adds the following community characteristics for the subjects' County of Destination: DE\_URBAN, DE\_HOUSEHOLDINC, DE\_UNEMP, DE\_BACHELORS, DE\_ORG10K, and LR\_DE\_VOTERTURNOUT.

Information about family relationships and marital status are not available, however the model includes AGE30 as a proxy making assumptions that older graduates will be more likely to have community or familiar ties. Previous research (Schultz, 1961; Gibbs et. al., 1994) has found age to be related to migration with the same assumptions with results indicating that younger people are more prone to migration.

Faggian (2007) found that previous evidence of migration such as attending school away was associated with the likelihood that people would emigrate or at least not return to the place where they came from for various reasons. Proximity of the institution attended will be defined in terms of whether the college or university the graduates attended was in one of the Appalachian counties or not.

Field of study is mentioned in much of the literature in terms of whether the individual has left to seek additional education in a field for which there are employment opportunities in the home region or not. In terms of rural areas, this has been described qualitatively as jobs in education and health care which are often held by women. As purely categorical data, these will have to be represented as indexes or dummy variables in the equation. Multiple ways of representing these will be attempted including whether the field of study is classified as a STEM field or not as well as some groupings into a series of dummy variables including blocks of CIP codes into a small number of academic fields.

While level of education is likely to explain much of the difference between students who complete two-year, four-year, and other credentials, there may also be differences in terms of the type of institution the student attends. This will be represented by a series of dummy variables to identify if the student attended a community and/or technical college, a four-year institution, or a research university. There is an expected amount of interaction between many of the academic variables that will have to be considered as the data are analyzed.

Individual economic opportunity is difficult to measure; however, for the purposes of this analysis, the economic opportunity of the community where the individual came from will be represented in terms of mean unemployment rates, percentage of the population with a bachelor's degree or above, and the ratio of jobs to people in the county.

## **CHAPTER FIVE**

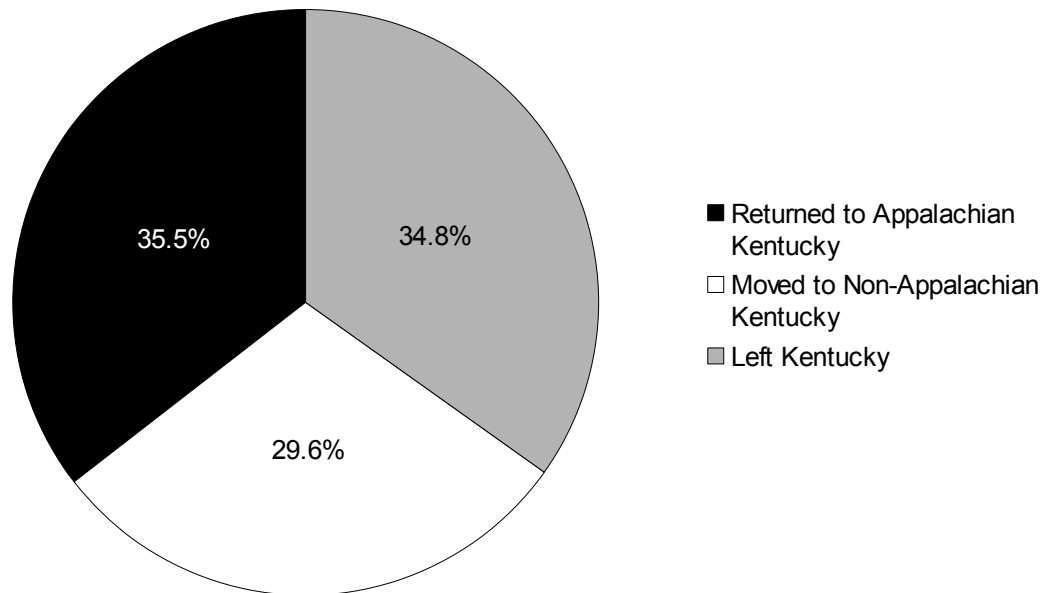
### **Factors that Influence Appalachian College Graduate Migration**

As expected given the previous research findings on the issue, the majority of the people from Appalachian Kentucky in the cohort appeared to have left the region within five years after college. Slightly more than one-third (35.5%) chose to remain in the Appalachian Kentucky. More stayed in Appalachian Kentucky than moved to non-Appalachian Kentucky despite its urban areas like Louisville and Lexington. More than one-third (34.8%) did not appear to be working in Kentucky at all and most likely emigrated to another state.

#### **5.1 Migration Rates for Different Demographic Groups**

There was some heteroscedasticity within the cohort. Emigration rates varied among some groups. As Corbett and others have found in other rural areas, women appeared to be less mobile than men with 39.3% remaining in Appalachian Kentucky compared to 28.2% of men. When they did move, they did not appear to move as far with

**Figure 5.1: Cohort Migration Rates by Fiscal Year 2010-2011**



only 32.1% appearing to leave the state compared to 40.0% of males. Blacks were much less likely to remain in Appalachia than whites and others (10.8% compared to 35.9% and 36.4% respectively) and they appeared to leave the state at a much higher rate with nearly half (45.3%) not appearing to stay in Kentucky at all compared to only about a third of white not-Hispanic (34.6%) and other races (36.7%). The relatively small number of members of the cohort identified as black most likely masks some of the relationship which appears to exist for this group and overall race is not related to migration to a statistically significant level.

**Table 5.1: Migration of Appalachian Graduates by 2010-2011**

		Migration Based Upon 2010-11 Employment Location					
		Returned to Appalachian Kentucky		Moved to Non- Appalachian Kentucky		Left Kentucky	
		Count	Row N %	Count	Row N %	Count	Row N %
Gender	Female	2274	39.3%	1651	28.6%	1857	32.1%
	Male	860	28.2%	966	31.7%	1219	40.0%
Race	Black, not Hispanic	16	10.7%	66	44.0%	68	45.3%
	Other or Unknown	156	36.4%	115	26.9%	157	36.7%
	White, not Hispanic	2962	35.9%	2436	29.5%	2851	34.6%
Age at Graduation	Unknown	191	30.8%	150	24.2%	279	45.0%
	24 and Under	1105	31.9%	1110	32.1%	1245	36.0%
	25 - 29	660	33.9%	612	31.4%	677	34.7%
	30 - 39	772	43.5%	491	27.7%	511	28.8%
	40 - 49	306	41.7%	188	25.6%	239	32.6%
	50 and Over	100	34.4%	66	22.7%	125	43.0%
Overall		3134	35.5%	2617	29.6%	3076	34.8%

Age was also a factor, which was expected because of its significance in previous research (Schultz, 1961; Gibbs et al., 1994). Graduates who were more traditional aged 24 and younger at graduation would most likely be under 30 five years later. They were less likely to remain in Appalachia (31.9%) than their counterparts age 25 and over who would have been at least 30 in 2010-11 (38.7%). Generally age would be a proxy for



social ties and connections with people being more likely to have children and families as they get older which normally makes them less likely to be mobile and it is statistically significant in terms of it's relationship with migration however as the distribution suggests, the relationship is not particularly strong overall.

## **5.2 Academic Characteristics and Migration**

Migration rates varied for the graduates from different types of institutions, academic programs, and credential levels. One unexpected finding was that people who had graduated from one of the state's public community and technical colleges were slightly less likely likely (32.7%) to remain in the region compared to students who graduated from a public 4-year institution (34.5%). Students who attended one of the not-for-profit independent colleges in the region were the most likely to remain in Appalachia with nearly half (46.2%) employed in one of the 54 Appalachian counties.

The level of credential completed by the members of the cohort was statistically significant in terms of the association with migration decisions, albeit a weak relationship. From a distribution perspective, associate degree earners were less likely to migrate than those who earned baccalaureate degrees (34.7% compared to 30.9%) however the higher level credentials and sub-associates had unexpected results. More than half (53.5%) of graduate and professional degree holders remained in Appalachia to work; however, this is largely the result of educators who had completed Master's degrees. Nearly two-thirds of the individuals completing a degree in education remained

in Appalachia. More than a third of all the graduate and professional degree recipients (606 out of 1,517) were people who earned a master's degree in education.

Sub-associate credentials are certificates and diplomas. These tend to have a strong emphasis upon work readiness and vocational skills. The vast majority (86.7%) of people who completed a credential in a skilled trade or vocational major completed a sub-associate level diploma or certificate. Skilled workers' results may be skewed because of the potential effect of independent employment which would not be reflected in the UI employment records so the percentages of both sub-associate credential completers and people who who completed a Skilled Trades and Vocational program may be under-represented. This is a limitation of the data source. Even though it was a moderate level of relationship (Lambda .115), the association between academic major and migration was the strongest of the categorical variables tested.

Institutional location was also a factor in terms of predicting migration decisions. As previous research has indicated (Faggian, 2007), students who went away to college were more were likely to go away to work. In this case those who attended college in Appalachian Kentucky were twice as likely to stay in the area (41.3%) as those who attended a college or university in non-Appalachian Kentucky (20.4%). This study only included those who graduated from a Kentucky college so it was not possible to gauge the impact on students who attended college out-of-state. There is a statistically significant relationship between college or university location and migration.

**Table 5.2: Academic Factors Relative to Migration Rates**

		Returned to Appalachian Kentucky		Moved to Non- Appalachian Kentucky		Left Kentucky	
		Count	Row N %	Count	Row N %	Count	Row N %
Type of Institution Attended	2-year Public College	1161	32.7%	994	28.0%	1393	39.3%
	4-Year Public University	1379	34.5%	1345	33.7%	1270	31.8%
	4-Year Non- Profit Independent Institution	594	46.2%	278	21.6%	413	32.1%
College or University Location	Non-Appalachian Kentucky	500	20.4%	967	39.5%	983	40.1%
	Appalachian Kentucky	2634	41.3%	1650	25.9%	2093	32.8%
Degree or Credential Level	Associate	840	34.7%	724	29.9%	860	35.5%
	Bachelors	1046	30.9%	1090	32.2%	1245	36.8%
	Graduate or Professional	812	53.5%	386	25.4%	319	21.0%
	Sub-Associate	436	29.0%	417	27.7%	652	43.3%
Academic Major	Business	228	27.9%	245	30.0%	343	42.0%
	Education	949	64.2%	267	18.1%	263	17.8%
	Health	665	31.6%	711	33.8%	728	34.6%
	Liberal Arts	819	35.2%	669	28.8%	837	36.0%
	Other	177	22.5%	318	40.5%	291	37.0%
	STEM - Not Health	139	19.9%	254	36.3%	307	43.9%
	Skilled Trades and Vocational	157	25.4%	153	24.8%	307	49.8%

**Table 5.3: Measure of Association Lambda Scores for Categorical Variables with Migration**

Categorical Variables	$\lambda$	Asymp. Std. Error <sup>a</sup>	Approx. T <sup>b</sup>	Approx. Sig.
Gender	.063	.008	7.901	.000
Race	.009	.003	2.661	.008
Age at Graduation	.047	.011	4.083	.000
Type of Institution Attended	.041	.009	4.596	.000
College or University Location	.085	.006	12.656	.000
Degree or Credential Level	.076	.012	6.117	.000
Academic Major	.115	.012	9.285	.000

\*Migration is defined dichotomously with the cohort either being found in Appalachian Kentucky or Not in 2010-11 based on employment records from the state UI system.

### 5.3 Logistic Regression Models

Most of the expected results in terms of migration behaviors being influenced by people's age, gender, and academic decisions appear to exist for the cohort; however, the relationships are not very strong statistically and we have to assume that there would be any number of variations and combinations of these characteristics which may have unique effects in terms of migration options or decisions. In order to attempt to provide a better understanding of how these factors are related three logistic regressions each of which builds upon the previous model by adding additional characteristics or variables into the equation were also performed.

**Table 5.4: Predicted and Observed Migration Rates for the Null Model**

Observed	Did Not Migrate	Predicted Migrated	% Correct
Did Not Migrate	3134	0	100.0
Migrated	2617	0	0.0
Overall Percentage			54.5

Since the dependent variable is defined the same and the same exact cohort is used in each of the three models, the three regression models have the same null model or equation. Since 54% out of the cohort members who remain in Kentucky to work stay in Appalachian Kentucky, the null model accurately predicts migration decisions 54% of the time by estimating that everybody chooses to remain in the region without migrating.

The first model was composed of individual characteristics including demographic as well as academic variables representing both ascribed and achieved characteristics about the subjects including gender, ethnicity, and age in addition to variables representing college choice in terms of the location and type of institution as well as the level of degree or credential completed and the academic program or major. The second model adds factors about the subjects' home communities or counties to provide the perspective on differences which may help to predict migration choices as a result of factors that push people to leave a region. The third model keeps all of the previous variables and adds in factors about the communities where the graduates were living five years later to identify potential pull factors such as what one might expect

educated or skilled workers to migrate to either for social capital purposes or because of economic opportunities.

In order to ensure the same cohort was used in all three models, the cohort for the regressions was limited to the 5,571 Appalachian graduates who were found to be in Kentucky five years later because they are the only ones for which we had data about the communities where they were employed in fiscal year 2010 – 2011.

### 5.3.1 Model One – Demographic and Academic Characteristics

The first model evaluated the impact of using gender, race, and age as well as academic characteristics about academic program or major and credential levels as predictors of migration.

**Table 5.5: Predicted and Actual Migration Rates for Model One with Demographic and Academic Variables**

Observed	Did Not Migrate	Predicted Migrated	% Correct
Did Not Migrate	0	2367	34.9
Migrated	1	1185	65.1
Overall Percentage			66.1

The inclusion of the demographic and academic characteristics and decisions produces a model that accurately predict migration behaviors 66.1%, which is better than the null model which predicted migration 54.5% of the time. Using these factors alone we

are able to accurately predict whether someone will remain in the region or migrate to the non-Appalachian part of the state two-thirds of the time.

A number of independent variables were identified as significant in terms of their ability to add to the model's calculations of the odds-ratios of predicting migration choices. Being female or being categorized as black not-Hispanic were significant predictors of migration at the .000 level. The negative Beta indicates that being female reduces the chances of migration while the higher positive Beta for blacks indicates that as a predictor, regardless of all other circumstances and characteristics people coded as black are much more likely to leave the region. Age was borderline significant at the .05 level with people age 30 and over only being slightly more likely (Beta -.119). This supports the idea that women may be more prone to remain nearer to their families or possibly have stronger family ties which may influence their decisions keeping them in the region regardless of economic opportunities outside of Appalachia.

The decision to attend college at a school in Appalachia or to complete a program in education were the two strongest academic predictors of migration. Majoring in education was nearly as strong of a factor in being able to accurately predict if a subject would stay (Beta 1.493) in the region as being black was in predicting that they would leave. Completing a program in business, a liberal arts program, or in a skilled trade or vocational type of program were also significant in terms of their ability to predict if

**Table 5.6: Logistic Regression Results Predicting Migration with Demographic and Academic Characteristics**

Independent Variable	B	S.E.	Wald	df	Sig.	Exp(B)
FEMALE	-.380	.068	31.226	1	.000	.684
BLACK	1.500	.293	26.127	1	.000	4.481
AGE30	-.119	.061	3.759	1	.053	.888
COLLEGE_IN_APP	-1.082	.070	240.313	1	.000	.339
LR_2YR_COLLEGE	.058	.162	.128	1	.720	1.060
4YR_COLLEGE	.575	.091	40.017	1	.000	1.778
BACHELORS	.218	.260	.702	1	.402	1.244
LR_ASSOCIATE	.333	.284	1.370	1	.242	1.395
SUBASSOCIATE	.325	.301	1.163	1	.281	1.384
MASTERS	-.198	.268	.545	1	.460	.821
DOCTORAL	-.384	.558	.474	1	.491	.681
LR_MAJOR_BUSINESS	-.400	.139	8.317	1	.004	.671
MAJOR_EDUCATION	-1.493	.129	133.656	1	.000	.225
MAJOR_HEALTH	-.202	.121	2.791	1	.095	.817
LR_MAJOR_LIBERALARTS	-.518	.115	20.353	1	.000	.596
MAJOR_STEM	-.031	.151	.042	1	.837	.970
MAJOR_SKILLED	-.620	.181	11.671	1	.001	.538
Constant	.992	.276	12.906	1	.000	2.697

people with program completers from those area being more likely to remain in the region. Choosing to attend a four-year institution was the second strongest predictor (Beta .575) that a person would leave the region regardless of the degree or credential level the subject completed.



### **5.3.2 Model Two – Demographic, Academic, and Community of Origin**

#### **Characteristics**

By adding in factors about the subjects' home communities as identified through their counties of origin when they entered postsecondary education, it was hoped that factors relative to social capital would help to identify reasons people chose to leave a region. In general it did not. This could be a factor of the fact that so much of Appalachia shares strong levels of poverty and lower levels of education compared to other places that there was not enough variance in these factors impact on migration decisions to be statistically significant. It may also be the result of an inherent weakness in the model which does not account for within-region migration. People are moving within Appalachia and may very well be moving to places with higher levels of cultural capital but they are not leaving the region.

Adding in characteristics about the subjects' counties of origin does not increase the predictive power of the model over the previous version with simply demographic and academic characteristics. It still accurately predicts the migration behavior for the cohort nearly two-thirds of the time (65.8%). This reflects an improvement over the null model but it is not an improvement over the first model which only utilized demographic and academic characteristics.

The same basic results were present with the second model in terms of the significance of gender, race, age, college choice, and academic programs with some minor variations. Academic program selection continued to be significant for the same

liberal arts, education, business, and skilled work or vocational programs. A number of community factors though related to the county of origin were also significantly associated with migration choices though the results varied from what may be expected.

The size of the county of origin represented as whether it was considered an urban area or not measured in terms of populations of 50,000 and over was significant at the .015 level with people from larger communities in Appalachian Kentucky being more likely to remain in the region – which represent the availability of greater opportunities. Other measures related to poverty and economic prosperity including household income, and the percentage of the home county with a bachelor's degree or above similarly illustrated that people from the parts of Appalachian Kentucky that were less poor and more highly educated were also more likely to remain in the region. Putnam's ideas about community engagement though did not appear to hold true in the way that the number of non-profit organizations and the voter turnout rates worked within these equations. Due to the amount of poverty in Appalachian Kentucky it may be an issue that there are

**Table 5.7: Predicted Migration Rates for Model Two with Demographic, Academic, and Community of Origin Variables**

Observed	Did Not Migrate	Predicted Migrated	% Correct
Did Not Migrate	2367	767	75.5
Migrated	1200	1417	54.1
Overall Percentage			65.8

**Table 5.8: Logistic Regression Results Predicting Migration with Demographic, Academic, and Community of Origin Characteristics**

Independent Variable	B	S.E.	Wald	df	Sig.	Exp(B)
FEMALE	-.388	.068	32.240	1	.000	.678
BLACK	1.453	.294	24.386	1	.000	4.275
AGE30	-.118	.061	3.705	1	.054	.888
COLLEGE_IN_APP	-1.034	.074	196.100	1	.000	.355
2YR_COLLEGE	.115	.164	.493	1	.482	1.122
4YR_COLLEGE	.531	.093	32.903	1	.000	1.701
BACHELORS	.159	.262	.370	1	.543	1.173
ASSOCIATE	.245	.287	.731	1	.393	1.278
LR_SUBASSOCIATE	.236	.304	.602	1	.438	1.266
MASTERS	-.254	.269	.885	1	.347	.776
DOCTORAL	-.494	.559	.781	1	.377	.610
MAJOR_BUSINESS	-.446	.139	10.211	1	.001	.640
MAJOR_EDUCATION	-1.504	.130	134.424	1	.000	.222
MAJOR_HEALTH	-.209	.122	2.955	1	.086	.811
MAJOR_LIBERALARTS	-.523	.115	20.599	1	.000	.593
MAJOR_STEM	-.052	.151	.117	1	.733	.950
MAJOR_SKILLED	-.657	.182	13.000	1	.000	.518
OR_URBAN	-.224	.092	5.870	1	.015	.800
OR_HOUSEHOLDINC	.015	.008	2.997	1	.083	1.015
OR_UNEMP	.028	.022	1.631	1	.202	1.029
OR_BACHELORS	.026	.011	5.992	1	.014	1.026
OR_ORG10K	-.010	.004	7.243	1	.007	.990
OR_VOTERTURNOUT	.003	.009	.150	1	.698	1.003
ACTComp	.094	.053	3.102	1	.078	1.098
OR_Crime_pt1_off_rate	-.001	.004	.045	1	.832	.999
Constant	-1.550	1.051	2.174	1	.140	.212

simply a large number of not-for-profit organizations in general there to administer programs so it actually had the inverse relationship with migration. A higher number of non-profit organizations per 10,000 people was associated with increasing the likelihood that someone would stay in the region as opposed to leave. Voter turnout was not significantly related to migration nor were crime rates or unemployment rates. The strongest predictive influence was still attached to college location, majoring in education and race.

### **5.3.3 Model Three – Demographic, Academic, and Community of Origin and Destination Characteristics**

While the county of origin characteristics did include a number of factors about home counties which suggest that people from the more affluent or larger communities within Appalachia may be the ones who are more likely to remain in or return to the area, their inclusion did not contribute to the predictive power of the model compared to the first model which only focused on the demographic and academic factors. The addition of community factors from the destinations where the graduates went after college to identify characteristics that may pull graduates to leave Appalachia had the unexpected result of producing a model which accurately predicts placement in Appalachian or non-Appalachian Kentucky too well.

**Table 5.9: Predicted Migration Rates for Model Three with Demographic, Academic, Community of Origin, and Community of Destination Variables**

Observed	Did Not Migrate	Predicted Migrated	% Correct
Did Not Migrate	3054	80	97.4
Migrated	93	2524	96.4
Overall Percentage			97.0

Inclusion of the same community factors about the subjects' destinations including population size, household income, percentage with a bachelor's degree or above and social capital measures among other things produces a model which accurately predicts migration 97% of the time. Unfortunately, these results may actually be predicting if the the county of destination is in Appalachian or non-Appalachian Kentucky instead of migration. The stark differences between counties from these two different parts of the Commonwealth is complicating efforts to predict migration using destination characteristics. by infusing data which allows the prediction of the region based on the destination county's social and cultural characteristics.

Though it is impossible to separate migration from the other issue of identifying the region of the destination, the fact that this model still shows the individual demographic factors to be significant in terms of how they relate to migration including that women are more likely to remain in the region while people classified as blacks are more likely to leave but it completely eliminates the significance of academic program.

**Table 5.10: Logistic Regression Results Predicting Migration with Demographic, Academic, Community of Origin, and Community of Destination Variables**

Independent Variable	B	S.E.	Wald	df	Sig.	Exp(B)
FEMALE	-.369	.221	2.790	1	.095	.692
BLACK	2.112	.836	6.385	1	.012	8.261
AGE30	.375	.199	3.548	1	.060	1.455
COLLEGE_IN_APP	-1.223	.208	34.481	1	.000	.294
2YR_COLLEGE	-.508	.509	.997	1	.318	.602
4YR_COLLEGE	-.243	.284	.731	1	.393	.784
BACHELORS	1.155	.742	2.427	1	.119	3.175
ASSOCIATE	.653	.805	.658	1	.417	1.921
SUBASSOCIATE	1.425	.878	2.632	1	.105	4.157
LR_MASTERS	.004	.755	.000	1	.996	1.004
DOCTORAL	.563	1.145	.242	1	.623	1.757
MAJOR_BUSINESS	.016	.486	.001	1	.973	1.017
MAJOR_EDUCATION	.499	.416	1.438	1	.230	1.647
MAJOR_HEALTH	.649	.430	2.283	1	.131	1.915
MAJOR_LIBERALARTS	.246	.408	.363	1	.547	1.279
MAJOR_STEM	.491	.487	1.020	1	.313	1.634
MAJOR_SKILLED	-.094	.590	.025	1	.874	.911
OR_URBAN	.739	.338	4.787	1	.029	2.094
OR_HOUSEHOLDINC	-.070	.026	7.039	1	.008	.933
OR_UNEMP	-.353	.080	19.640	1	.000	.703
OR_BACHELORS	-.080	.033	5.704	1	.017	.924
OR_ORG10K	-.027	.010	6.887	1	.009	.974
OR_VOTERTURNOUT	.009	.032	.069	1	.793	1.009
OR_ACTComp	-.120	.178	.452	1	.502	.887
OR_crime_pt1_off_rate	-.021	.012	2.990	1	.084	.980
DE_URBAN	-.955	.306	9.746	1	.002	.385
DE_HOUSEHOLDINC	.279	.028	98.353	1	.000	1.322
LR_DE_UNEMP	.683	.123	30.740	1	.000	1.979
DE_BACHELORS	-.068	.032	4.509	1	.034	.934
DE_ORG10K	.092	.011	75.269	1	.000	1.096
DE_VOTERTURNOUT	.810	.054	227.632	1	.000	2.248

Considering how strong the academic major or program variables were in the previous model suggests that those relationships previously identified may in actuality be a reflection of the market demands in the regions where the graduates settled than an actual deciding factor. Simply producing more education graduates may not produce more people who stay in the region unless the demand for educators increases. Destination characteristics are important in determining migration decisions but it was impossible to measure the degree to which it was a factor with this model.

#### **5.4 Employment and Economic Factors**

The differences between Appalachian and non-Appalachian Kentucky necessitates a review of the economic factors which the subjects in the cohort would have experienced to identify the economic factors which influence migration decisions. As illustrated in table 5.11, there are noticeable differences in migration rates for different academic majors. Comparing the results from figure 5.2 and table 5.11 illustrates how people who completed a credential in Education are very likely to remain in the region compared to most of the other programs. Educators primarily represent people who are teaching in public schools and they are paid on a scale so there is less competitive advantage from a salary perspective of teaching in non-Appalachian Kentucky over remaining to work in Appalachia. In fact, the educators in the cohort who did not migrate earned more than

those who did. This could be a factor of the ratio of bachelor degree earners to graduate degree completers in the regions.

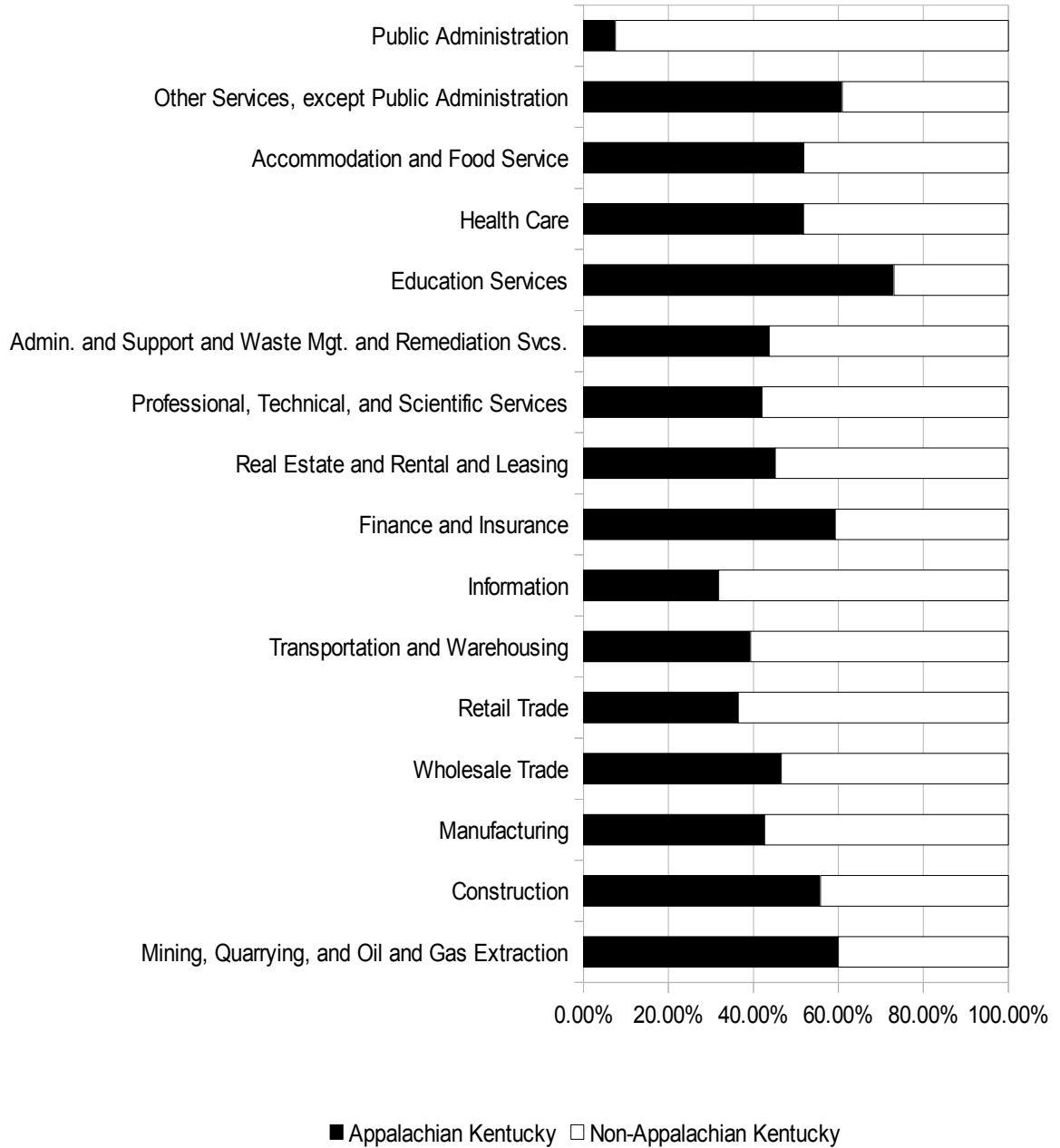
**Table 5.11: Migration Status by Primary Industry of Employment**

Primary Industry	Appalachian Kentucky		Non-Appalachian Kentucky	
	N	%	N	%
Mining, Quarrying, and Oil and Gas Extraction	39	60.0%	26	40.0%
Utilities	**	**	**	**
Construction	53	55.8%	42	44.2%
Manufacturing	93	42.7%	125	57.3%
Wholesale Trade	41	46.6%	47	53.4%
Retail Trade	109	36.5%	190	63.5%
Transportation and Warehousing	24	39.3%	37	60.7%
Information	28	31.8%	60	68.2%
Finance and Insurance	83	59.3%	57	40.7%
Real Estate and Rental and Leasing	14	45.2%	17	54.8%
Professional, Technical, and Scientific Services	97	42.0%	134	58.0%
Administration and Support and Waste Management and Remediation Services	66	43.7%	85	56.3%
Education Services	1408	73.1%	518	26.9%
Health Care	923	51.8%	858	48.2%
Arts, Entertainment, and Recreation	**	**	**	**
Accommodation and Food Service	55	51.9%	51	48.1%
Other Services, except Public Administration	53	60.9%	34	39.1%
Public Administration	24	7.5%	296	92.5%
Other	**	**	12	>90%

\*\*Groups with cell sizes of less than 10 are suppressed as are their derivative percentages.



**Figure 5.2: Migration Rates by Primary Industry of Employment**



**Table 5.12: Mean Wages Earned by Migration Status in 2010-2011**

Major Group	2-Digit CIP Major Area	Returned to Appalachian Kentucky	Migrated to Non-Appalachian Kentucky	Difference		
		Mean Wages	Mean Wages	Dollars	%	
Business	Business, Management, Marketing, and Related Programs	\$29,131	\$38,836	\$9,705	33.3%	
Education	Education	\$45,162	\$43,691	-\$1,471	-3.3%	
	Library Science	**	\$43,791	**	**	
Health	Health Professions and Related Programs	\$39,017	\$46,404	\$7,387	18.9%	
Liberal Arts	Area, Ethnic, Cultural, and Gender Studies	**	**	**	**	
	English Language and Literature	\$33,117	\$25,085	-\$8,031	-24.3%	
	Family and Consumer Sciences/Human Sciences	\$19,447	\$29,681	\$10,234	52.6%	
	Foreign Languages, Literatures, and Linguistics	**	**	**	**	
	History	\$26,534	\$27,747	\$1,213	4.6%	
	Liberal Arts and Sciences, General Studies	\$26,374	\$30,430	\$4,056	15.4%	
	Multi/Interdisciplinary Studies	\$25,629	\$34,184	\$8,556	33.4%	
	Philosophy and Religious Studies	**	**	**	**	
	Psychology	\$33,446	\$34,849	\$1,403	4.2%	
	Social Sciences	\$26,194	\$32,281	\$6,087	23.2%	
	Theology and Religious Vocations	**	**	**	**	
	Visual and Performing Arts	\$31,320	\$22,278	-\$9,042	-28.9%	
	Other	Agriculture and Agricultural Operations	\$25,890	\$33,819	\$7,930	30.6%
		Communication, Journalism, and Related Programs	\$27,188	\$28,048	\$861	3.2%
Homeland Security, Law Enforcement, and Fire		\$24,391	\$37,604	\$13,213	54.2%	
Legal Professions and Studies		\$43,401	\$47,493	\$4,093	9.4%	
Natural Resources and Conservation		**	**	**	**	
Parks, Recreation, Leisure and Fitness Studies		\$36,524	\$27,143	-\$9,381	-25.7%	
Public Administration and Social Service		\$25,935	\$31,056	\$5,120	19.7%	
STEM - Not Health		Biological and Biomedical Sciences	\$46,453	\$45,034	-\$1,419	-3.1%
STEM - Not Health	Communication Technologies/ Technicians	**	**	**	**	
	Computer and Information Sciences	\$33,314	\$40,436	\$7,122	21.4%	
	Engineering	**	\$60,243	**	**	
	Engineering Technologies and Engineering	\$31,163	\$39,915	\$8,752	28.1%	
	Mathematics and Statistics	\$39,395	\$49,156	\$9,761	24.8%	
	Physical Sciences	\$42,440	\$55,680	\$13,241	31.2%	
	Science Technologies/Technicians	**	**	**	**	
	Skilled Trades and Vocational	Architecture and Related Services	**	**	**	**
Construction Trades		\$32,539	\$26,152	-\$6,386	-19.6%	
Mechanic and Repair Technologies/Technicians		\$22,684	\$33,476	\$10,793	47.6%	
Personal and Culinary Services		**	**	**	**	
Precision Production		\$34,967	\$42,047	\$7,081	20.2%	
Transportation and Materials Moving	**	**	**	**		

\*Individuals were identified as Remaining in Appalachia or Moving to Non-Appalachian Kentucky based upon the location of their employers from the employment records in 2010-11 in the Kentucky Unemployment Insurance system.

\*\*Groups with cell sizes of less than 10 are suppressed as are their derivative percentages.

Subjects who completed a degree or other credential in a STEM field were the least likely to remain in Appalachia compared to their counterparts who completed degrees in other majors with only one out of every five (19.9%) choosing to remain in the region. They also had some of the strongest financial incentives comparing wages for those who remained in Appalachia to those who migrated to non-Appalachian Kentucky.

The assumed alignment between industries and academic programs provides additional insight into migration behaviors. Some of the differences in migration for different academic majors is aligned to differences in migration rates for people who work in different industries. Like education, other industries which are at least partially funded through public investments such as health care also have lower migration rates which suggests that in addition to wages, economic opportunities may also be a factor in terms of where people work. Consequently, people who work in the mining industry are more likely to be in Appalachia than to migrate to non-Appalachia but people in the information industry are more likely to leave. Industries which have markets in the region or a funding mechanism such as tax dollars for education or insurance or public insurance like health care have lower migration rates than other industries.

## **5.5 Overall Findings**

In general, the basic results indicate that the majority of people from Appalachian Kentucky who complete a postsecondary credential do leave the region at least to work.

*Research Question 1*

*To what level are people from Appalachian Kentucky who complete college degrees remaining in or returning to the region to work?*

Overall, across all degree levels and academic programs only slightly more than one out of every three (35.5%) graduates from the cohort returned to Appalachian Kentucky. A little less than a third (29.6%) remained in Kentucky but were employed in one of the non-Appalachian counties. The remaining third (34.8%) did not appear to be employed in Kentucky at all and are assumed to be living elsewhere.

*Research Question 2*

*Do people from Appalachian Kentucky who go to college at an institution in a non-Appalachian county have a higher chance of migrating away from the region to work than people who go to one of the local institutions?*

More than two-thirds of the graduates from Appalachian Kentucky (72.2%) attended a college or university in the region. Out of those who did, more than forty percent (41.3%) returned to the region which is basically twice the rate of those who attended a college or university in non-Appalachian Kentucky (20.4%). The remaining

subjects who attended non-Appalachian institutions in Kentucky were evenly divided between working in one of the non-Appalachian counties (39.5%) or not working in Kentucky at all (40.1%). There was a statistically significant relationship between institution location and migration though the level of association was low (Lambda .085) it was one of the strongest measures of migration decisions and also retained significance as a factor in the regression models.

College location was also one of the strongest variables in terms of predicting migration in the logistic regression models as well. This is likely a factor of two things in that people who are open to the idea of leaving the area even just for college are at least willing or able due to family situations and other factors that may influence decisions for others. It may also be a factor of employment opportunities associated with the program or connections and opportunities that probably exist in proximity to the institution where they attended. We know that most education majors work in closer proximity to the institutions where they earn their degrees.

### *Research Question 3*

*What kinds of people are more likely to remain in or return to the region after college graduation to help contribute to the educational attainment levels of the region compared to the characteristics associated with predicting which people leave after college in terms of demographics and academic choices?*

As Corbett (2007) and others discovered in other rural areas, women were also much more likely to return to Appalachian Kentucky following college graduation than men (39.3% compared to 28.2%) suggesting that there may be differences in terms of income opportunities between the genders as well as the possible interaction of family responsibilities which may be different. Blacks were very unlikely to return to the region following graduation with only one in ten (10.7%) choosing to remain in or return to the Appalachian region.

Age was also a factor with more of the adult students who were between 30 and 50 years old at graduation choosing to remain in the region (43.5% of the 30-39 year olds and 41.7% for those 40-49 years of age) at a considerably higher rate than those who were under 30 at graduation. In this situation, age is probably serving as a proxy for other things like family responsibilities such as marriage and children and possibly even for existing employment.

#### *Research Question 4*

*Are people from counties with lower levels of social or cultural capital more likely to leave than people from communities with higher levels of social and cultural capital?*

Graduates from larger counties with populations over 50,000 were less likely to leave the region when other factors were taken into account in the second logistic regression model and the same was true albeit a fairly low level of explanatory power in terms of people from counties with a greater proportion of non-profit organizations using Putnam's example using it as a measure of social capital in a community. Both were significant in the model at the .015 and .007 levels respectively. The percentage of people in the subjects' home counties with a bachelor's degree or above was also significant in terms of being able to contribute towards a model for predicting migration behavior but in the opposite direction. While it was still significant at the .015 the impact on the equation was in the opposite direction indicating that people who came from communities with higher levels of bachelor's degree holders were slightly (.026) more likely to leave the region. The size of the county of origin is a statistically significant factor in determining out-migration. People from larger urban areas in the region were more likely to remain in the area which is indicative of the idea that larger communities provide greater opportunities and potentially a greater return on educational investments and residents may have less incentive to leave.

*Research Question 5*

*Do people who migrate out of the region have better economic returns on their educational investments than people who remain in Appalachia?*

In general, individuals in non-Appalachian Kentucky had higher wages in 2010-11 than those who returned to Appalachia. Other studies (Baumann, 2005) have found similar results and the census data shows steep differences in per capita and family incomes between Appalachian and non-Appalachian Kentucky. The largest area in terms of the number of people who returned to Appalachia was in education where people who remain in the region have slightly higher wages than their counterparts working in education elsewhere in the state. In the majority of areas where more people left the region than remained, those who were working in non-Appalachian counties earned higher wages suggesting that there are higher returns on educational investments for those who leave which is one of the basic premises of the human capital theory perspective on migration.



## **CHAPTER SIX**

### **Appalachian Migration and Policy Development**

The disparity in terms of income and educational attainment between Appalachian and non-Appalachian Kentucky are represented in the migration trends of recent college and university graduates. About two out of every three people from the Appalachian region who complete a college degree or credential from the cohort left the region to work in the other part of the state which seems to provide greater economic opportunities and counties with higher levels of social capital measured in terms of educational attainment, school quality reflected in assessments and college going rates, poverty, and civic engagement or they appeared to have left the state in general.

Simply focusing on policies either at the state or regional level to produce more college credentials in a general sense is not likely to improve the levels of educational attainment in the Appalachian region. Providing greater financial aid opportunities to encourage more people to go to college and finish in general is most likely going to encourage more people to leave the region. Completing college and completing college and choosing to remain in Appalachia are two very different things. Even if there were

financial opportunities for them, which appears to be questionable for a number of fields, at the current return rate the state would have to fund and produce three college graduates from the area for every one that remains behind to contribute to the area's educational attainment levels assuming that there would be jobs for them. At least for those completing degrees in education, it is unlikely that the number of vacant teaching positions in the region is going to increase dramatically in the near future.

Some of the predictive factors from the analyses and the logistic regression models do shed some light into the types of people who leave, who stays behind, and some critical differences between the two. Understanding what types of people choose to stay and for what reasons could help inform a less generic policy around educational degree production to focus on encouraging the types of people and programs which not only produce graduates but produce graduates who are more likely to remain in the region – which is what is really intended.

## **6.1 Understanding Who Chooses to Stay**

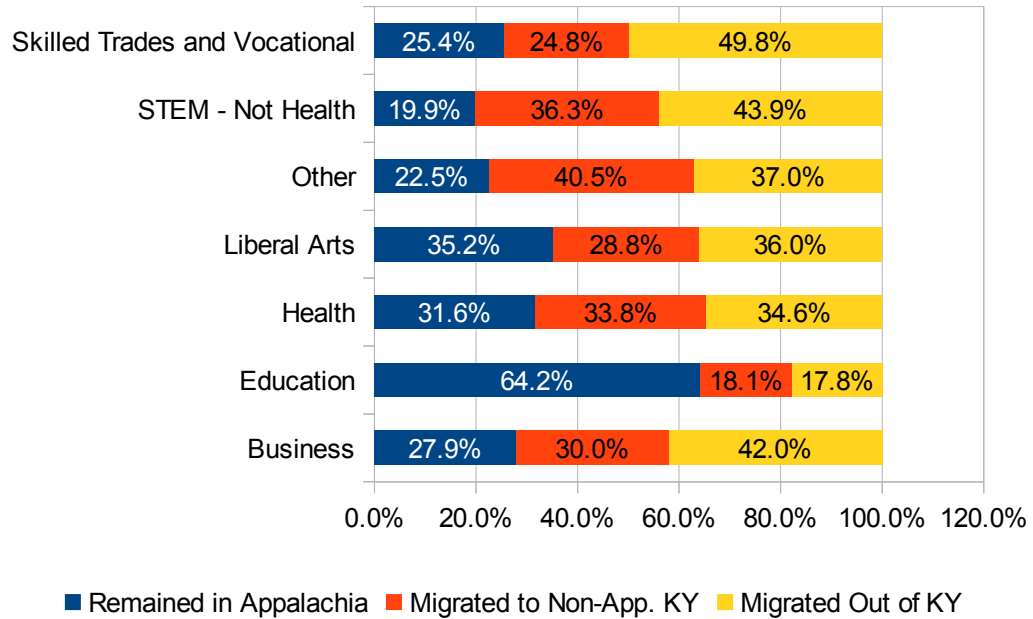
Much of the findings of this study suggests that in general there is strong support for human capital theory concepts in terms of mobility, educational investments, and the economics of earnings. People from the cohort who completed a postsecondary credential were more likely to move from places with lower levels of social or cultural capital to places with higher levels. However, much as Lee suggested in his demography based

theory of migration (1966), it does not appear to simply be an economic decision. There are other factors which influenced the subjects of this study to remain in Appalachia.

As would be expected, people who may have reasons other than pure economic opportunity such as potential family ties or responsibilities appear to be more likely to remain in Appalachia. We have no direct data about this cohort and their marital or parental status but using age as a proxy for any number of social ties people may have to an area, people who are between the ages of 30 and 50 are statistically more likely to remain in the region. It is likely that the same factors that encouraged them to attend an institution which was within the area and nearer to their Counties of Origin may very well be strong forces in encouraging them to remain in the region.

Academic programs which would lead to industries that exist and hire graduates in the Appalachian region appears to also be related to whether people stay or migrate elsewhere. Given the substantially lower levels of household income in the region it is apparent that there are not large numbers of people earning the types of wages typically associated with positions which require academic credentials. The largest numbers and percentages within industries of people who remain in Appalachia are either associated with industries which are more dependent upon public funds like education or health care which exist regardless because they typically do not depend on a consumer base of any type or industries like mining which we know exists in an albeit diminished capacity from where it once was. This suggests further analyses should be conducted in terms of job availability in the region.

**Figure 6.1: Migration by Academic Program Groupings**



## 6.2 Understanding Who Chooses to Leave

Younger graduates who tend to have fewer ties like family responsibilities have fewer impediments to moving. It is less complicated for them to leave the area. From an anecdotal perspective there are a number of assumptions about young people and their being more likely to be interested in cultural and consumer types of opportunities that are simply more prevalent in the non-Appalachian portion of the state. Florida's concept that the creative class which these people most likely belong to are more likely to be drawn to communities that share their culture, values, and education and economic levels can help to explain why the younger people who finish college would be more likely to leave.

African Americans identified as blacks within the research are very unlikely to stay in the region. They represent a small group within the overall population of the region however as an individual group, they are the least likely to return and are much more likely to also migrate to non-Appalachian Kentucky or out of state both of which are almost guaranteed to be more diverse than Appalachia.

While academic programs which lead to specific careers in education and health care which we know do exist in the region provide their graduates with options for employment within the region, other programs such as non health related STEM and public administration are much more likely to leave than to stay. While more than half of the people who work in a health industry stay in Appalachia, more than half who complete a credential in a health field migrate away indicating that people from other areas such as liberal arts, business, etc. are working in supporting roles within the health care industry but people with specific health credentials are more mobile.

### **6.3 Migration Destinations**

With a destination being determined based on the county of employment, the places where most of the graduates are living are heavily influenced by the location of work and economic opportunities.

**Table 6.1: County of Employment for Appalachian Graduates in 2010-2011**

Appalachian Kentucky Destinations		Non-Appalachian Kentucky Destinations	
County	Number	County	Number
MADISON	273	FRANKLIN	1079
PIKE	233	FA YETTE	641
BOYD	219	JEFFERSON	305
PULASKI	198	WOODFORD	108
LAUREL	151	WARREN	83
PERRY	150	BARREN	36
WHITLEY	146	BOONE	33
FLOYD	123	JESSAMINE	31
ROWAN	114	TAYLOR	23
KNOX	95	BOURBON	22
BELL	82	SCOTT	22
JOHNSON	82	WASHINGTON	22
RUSSELL	75	KENTON	21
HARLAN	67	HARDIN	18
BREATHITT	66	MASON	16
MONTGOMERY	62	HARRISON	13
CLARK	61	BUTLER	11
LETCHER	60	FULTON	10
CARTER	55	BULLITT	<10
WAYNE	50	NELSON	<10
KNOTT	46	SHELBY	<10
ADAIR	40	MERCER	<10
CLAY	40	CAMPBELL	<10
CLINTON	38	DAVISS	<10
ROCKCASTLE	37	OLDHAM	<10
CASEY	36	ALLEN	<10
GREENUP	34	CHRISTIAN	<10
FLEMING	33	GRAYSON	<10
LAWRENCE	31	LARUE	<10
LESLIE	31	ANDERSON	<10
MCCREARY	31	MCCRACKEN	<10
MONROE	30	BRACKEN	<10
MAGOFFIN	29	HOPKINS	<10
MORGAN	27	MARION	<10
LINCOLN	24	MUHLENBERG	<10
MARTIN	24	SIMPSON	<10
BATH	23	CALLOWAY	<10
CUMBERLAND	21	HENDERSON	<10
GARRARD	20	LOGAN	<10
ESTILL	19	UNION	<10
LEWIS	19	WEBSTER	<10
JACKSON	16	BRECKINRIDGE	<10
POWELL	15	GALLATIN	<10
NICHOLAS	14	HANCOCK	<10
HART	13	LIVINGSTON	<10
LEE	13	LYON	<10
WOLFE	13	MARSHALL	<10
METCALFE	11	MEADE	<10
ELLIOTT	10	OHIO	<10
MENIFEE	<10	PENDLETON	<10
OWSLEY	<10	SPENCER	<10
EDMONSON	<10	TRIMBLE	<10
GREEN	<10		

**Figure 6.2: County of Employment for Appalachian Graduates in 2010-2011**

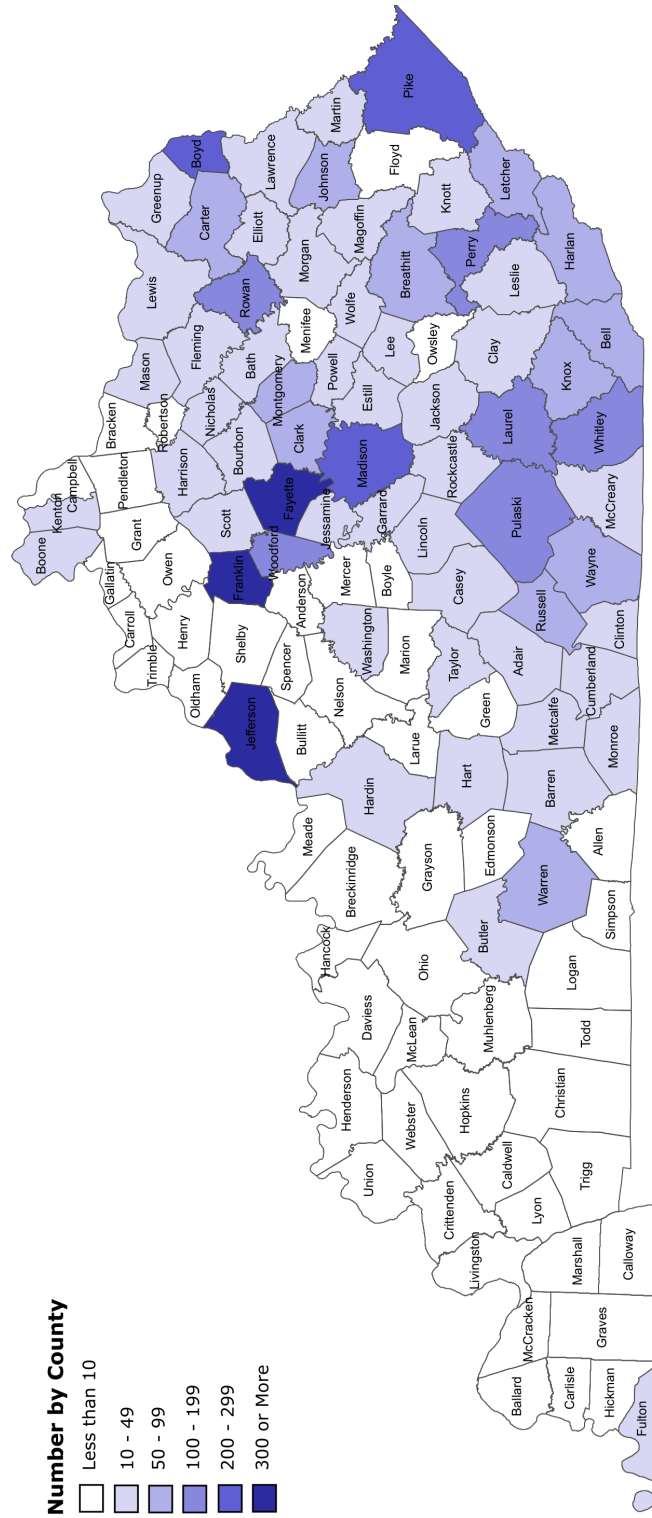


Table 6.1 and figure 6.2 provides the destination counties for both those graduates who remain in the region and those who have migrated to non-Appalachian Kentucky. Internal migration within Appalachian Kentucky appears to be to the counties which have seen development of cities and industries such as Richmond and Pikeville.

Migration to non-Appalachian Kentucky though suggests that they have not moved particularly far. The two largest destinations represent the counties where Lexington and Frankfort are located. Though considerably smaller than Jefferson County where Louisville is located, these largest destination locations represent places where there are employment opportunities which are also nearer to Appalachian Kentucky.

#### **6.4 Potential Policy Developments**

The policies enacted through Kentucky's House Bill 1 were never designed to improve educational attainment levels in specific parts of the Commonwealth. The fact that people who go to college are more likely to migrate away from Appalachian Kentucky is not simply a factor of this policy or Kentucky's efforts to increase the number of people attending and graduating from college. As Carr and Kefalas noted from their work in Iowa (2009) that choosing not to educate young people is not an option but that there are ways to reduce out-migration by developing thriving communities and economies which allow people to remain in Appalachia. By enacting policies that stimulate education without providing policies that also stimulate growth and the need for



a better educated workforce, it does have the unintended consequence of causing people to emigrate to the growing areas with greater economic opportunities and social capital.

If incentive programs were developed to target the types of people who may have additional ties to the region such as older people or non-traditional students who may have families or other community ties it may help to encourage more people from the region to complete college and stay behind whether they are working in occupations that require a credential or not because of external factors. While this option may not produce the economic gain that would be desirable by having people employed in higher paying occupations it can still have a positive impact in other ways.

Simply producing more people with degrees in education will not guarantee that they remain in the region. Like education, health care is a portable industry where there are job opportunities everywhere however the majority of people who complete specific health care programs still left which may be a reflection of the fact that those who worked in non-Appalachian Kentucky earned higher wages unlike education where wages were more competitive.

Some of the issues which would help influence graduates to choose to stay in the region and possibly attract others with higher levels of education to move into the region is to stimulate growth, create economic opportunities, and make the areas more attractive for people like the creative class. Educators will work in area schools only to the degree that there are openings and to a lesser extent equitable pay. Fields like business or manufacturing or especially STEM where the people who work in non-Appalachian

Kentucky are making considerably higher wages have higher migration rates. While opportunities have to exist, they also need to be similar in terms of wages to what exists elsewhere or people are still likely to leave.

Wages and opportunities can be more easily controlled in publicly funded industries. In general if more people with more education are going to stay in the region, industries need to be stimulated within the private sector that could employ large numbers of people with college credentials. More than 100,000 credentialed people would need to be employed in the region to bring the region up to the average for the rest of the state. In addition, simply having more people retained may increase the human capital of the region but alone it may not stimulate growth (Lee et al., 2010; Florida, 2012).

Eller (2008) suggests that the creation of a research university in the region could have a significant impact on modernization and improve economic development and growth beyond the number of degrees generated. A public research university would provide the region with an immediate magnet to attract talented faculty, researchers, and students (Florida, 2012). There would be an immediate impact of adding hundreds of professional level positions into the workforce for the region. While it would not directly employ enough professional staff to bring the region up to the state or national average the spill-over effects of a research institution can create community partnerships that could attract many more educated or creative people to the region and stimulate the need for human capital (Florida, 2012; Abel et al., 2011). This however would not likely be

accomplished by simply creating another public institution in the region or by converting one of the private institutions into a public institution. It would have to be a new endeavor which did not compete with the existing higher education institutions. A research university would do that and is what Florida suggests when he writes about the University as an agent of growth. As noted, it is about much more than simply generating degrees – it is more about how the institution can serve as a catalyst for modernization as well as a force to attract innovative and creative people to the area by employing them or by stimulating other industries. The institutions which are already located in the region have already had the impact they are going to on it.

## **6.5 Future Research Opportunities**

While this study provides specific numbers to apply to phenomena that have been suspected for decades, it only represents a single snapshot for a single cohort. These migration events occurred during a particular economic period. When more years of data are available in the KLDS, it would be advisable to analyze multiple cohorts together over a longer period of time to provide better data about the overall trends. In addition, data sources including either voter registration or state tax revenue could provide a more reliable source of data about where people live to determine migration instead of the location of their employer as well as people who are not in the employment records system.

Students from Appalachian Kentucky who go on to complete a postsecondary credential only represent a small proportion of the area's population. This is a self-selecting group who elected to initially attend college for a reason. That act implies a desire to do something different than their peers and in some ways may suggest an interest in leaving with education providing the conduit. A larger scale study that starts with a population of high school students and follows them through completion or drop-out and then into college, employment, neither or both inside and outside of the region would provide a broader perspective on migration and a better indicator of brain drain.

The Kentucky Center for Education and Workforce Statistics and other state P-20 efforts are continuing to develop and expand the depth and breadth of data which are available for studying state policy issues. The capacity to conduct studies of these types should exist in the future as long as states continue to support these efforts.

## APPENDIX A

### Kentucky County Level Data

County	Appalachian (1=App, 0=Non)	Population	Median Household Income	Percent Living in Poverty	Voter Turnout	Percent Unemployment	Percent Bachelor Degree or Above	Part 1 Crime Rate	Number of Non-Profits
Adair	1	18656	29834	21.3	59.9	10.5	14.4	6.6	34
Allen	0	19956	35247	20.3	60.3	12.5	10.6	7.5	62
Anderson	0	21421	55506	11.4	69.5	10.5	17.3	12.6	70
Ballard	0	8249	41228	13	68.3	10.2	10.7	16.9	24
Barren	0	42173	38374	18.7	63.6	12	15	21.8	114
Bath	1	11591	30458	29.6	55	14.2	13.2	14.3	37
Bell	1	28691	24724	29.4	48.4	13.7	11.3	17.6	99
Boone	0	118811	66549	7.5	66.5	9.5	28.1	20.5	327
Bourbon	0	19985	40849	16.1	63.4	9.9	17.5	21.5	100
Boyd	1	49542	38802	18.1	58.6	8.9	15.8	45.7	283
Boyle	0	28432	40720	18.6	65.9	12.3	23.2	27.2	216
Bracken	0	8488	38481	19.7	58.6	11.3	11.6	10.6	27
Breathitt	1	13878	19906	33.2	42	11.7	10.4	11.5	56
Breckinridge	0	20059	37395	19.2	61.8	11.3	7.8	4.5	65
Bullitt	0	74319	51526	9.5	64.2	10.8	11.1	21.8	150
Butler	0	12690	33703	19.1	61.8	12.3	7.8	5.9	35
Caldwell	0	12984	35289	18.6	66.2	9.3	14	27	71
Calloway	0	37191	39194	17	63.7	8.7	28.2	35.9	184
Campbell	0	90336	51482	11.3	67.9	10.7	26.3	26.5	346
Carlisle	0	5104	33909	15.7	68.6	8.8	10.6	3.5	19
Carroll	0	10811	43440	21.8	55.1	13.7	9.3	18.5	45
Carter	1	27720	32424	20.6	53.7	12.4	10.1	23.1	82
Casey	1	15955	26592	28.2	57.3	11.1	9.5	14.7	44
Christian	0	73955	37061	20	58.6	11.5	13.7	33.8	256
Clark	1	35613	46575	16	65.3	10.8	17.7	28.2	130
Clay	1	21730	20175	34.4	49.7	13.9	7.5	9.7	49
Clinton	1	10272	23788	29.1	59.3	9.6	3.6	3.2	24
Crittenden	0	9315	34623	17	64.1	10.3	9.3	11.6	39
Cumberland	1	6856	28135	26.6	53.4	12.3	7.9	2.5	21
Daviess	0	96656	42821	14.6	68.1	9.2	18.2	22.9	423
Edmonson	1	12161	35808	18.8	62	13.2	7.2	6.5	17
Elliott	1	7852	22097	36.5	51.3	13.1	7.2	12.1	10
Estill	1	14672	28324	25.1	54	12.3	6.6	29.2	54
Fayette	0	295803	47469	17.4	72.7	8.1	39.1	43.4	1865
Fleming	1	14348	31236	20.1	59	12.1	12.7	12.1	97
Floyd	1	39451	27907	28.1	52.3	12.6	11.6	17	150
Franklin	0	49285	47976	13.9	73.2	8.9	27.2	30.3	469
Fulton	0	6813	31965	27.6	55.2	13.2	10.8	30.5	41
Gallatin	0	8589	41310	23.5	57	11.6	9	9	22
Garrard	1	16912	37095	17.5	63.5	11.8	13.9	16.7	38

## Kentucky County Level Data (Continued)

County	Appalachian (1=App, 0=Non)	Population	Median Household Income	Percent Living in Poverty	Voter Turnout	Percent Unemployment	Percent Bachelor Degree or Above	Part 1 Crime Rate	Number of Non-Profits
Grant	0	24662	42475	17.4	59.5	11.6	10.8	18.2	75
Graves	0	37121	35277	19.9	68.9	10.2	14.4	17.4	164
Grayson	0	25746	33965	19.5	53.8	14.5	7.6	13.6	93
Green	1	11258	36575	18	63.2	12	11.4	1.1	27
Greenup	1	36910	42377	15	60	9.9	14.9	13.9	117
Hancock	0	8565	44892	15.5	69.2	9.7	10.9	2.7	31
Hardin	0	105543	47540	13	63.6	9.5	18.5	26.3	380
Harlan	1	29278	26582	30.7	49.7	11.6	11.2	18	81
Harrison	0	18846	40582	20.4	63.4	10.9	13.8	36.1	67
Hart	1	18199	30969	23.5	56.2	10.4	9.2	7.5	53
Henderson	0	46250	40438	14.4	65.4	10.2	16.1	22.4	179
Henry	0	15416	43612	18.5	64.8	10.1	14.1	10	55
Hickman	0	4902	31836	16.1	64.2	9.1	16.5	5.5	20
Hopkins	0	46920	39312	18.2	63.3	9.4	13.2	20.1	230
Jackson	1	13494	21928	33.1	54.8	17.1	6.2	12.2	28
Jefferson	0	741096	45352	15.5	71.1	10.6	28.5	52.2	3908
Jessamine	0	48586	47494	14.8	65	9.3	27.5	33.8	164
Johnson	1	23356	30820	22.1	52	11.6	10.5	7	75
Kenton	0	159720	53213	11.4	64.7	10.5	27.5	34.5	673
Knott	1	16346	29451	24.1	50.9	13.4	12.4	17.1	31
Knox	1	31883	21493	36.5	52.4	11.8	8.6	15.3	60
LaRue	0	14193	38891	15.5	63.4	9.6	12.2	7.3	41
Laurel	1	58849	36787	20.1	57	11.1	13.6	20.5	170
Lawrence	1	15860	28865	24.4	51.3	12.8	8.2	7.8	35
Lee	1	7887	25129	31.6	54	12.6	7.8	7.3	38
Leslie	1	11310	26857	24.6	49.6	13	8.2	7.3	26
Letcher	1	24519	31283	26.8	50.6	11.4	11.7	26.1	97
Lewis	1	13870	28376	27.5	50.6	15	11.6	8	29
Lincoln	1	24742	32314	21.9	55.3	13.4	10.4	8.5	65
Livingston	0	9519	39075	11.2	65.6	10.8	10.7	16	39
Logan	0	26835	34647	18.3	64.9	10.1	10.4	25.2	105
Lyon	0	8314	42079	14	68.3	11.3	10.8	15.2	30
Madison	1	82916	41894	18.9	63.8	8.8	27.4	38.3	402
Magoffin	1	13333	22779	29.8	48.2	19.7	10.6	10.1	41
Marion	0	19820	37488	17.8	64.1	11.7	11.4	22.2	56
Marshall	0	31448	43326	11.6	69.3	11.1	14.8	20.7	138
Martin	1	12929	25173	33	42.1	11.8	8.9	12.1	25
Mason	0	17490	40523	21.1	60.5	10.5	14.3	46	127
McCracken	0	65565	41630	15.3	66.6	9.1	21	30.3	365
McCreary	1	18306	22643	35.2	49.7	14.4	8	18	35

## Kentucky County Level Data (Continued)

County	Appalachian (1=App, 0=Non)	Population	Median Household Income	Percent Living in Poverty	Voter Turnout	Percent Unemployment	Percent Bachelor Degree or Above	Part 1 Crime Rate	Number of Non-Profits
McLean	0	9531	39115	16	67.3	10.3	9.7	3.2	36
Meade	0	28602	43800	13.4	65.1	13.2	11.5	10.8	65
Menifee	1	6306	29740	20.4	49.6	17.5	10.4	9	18
Mercer	0	21331	47955	12.4	64.3	11.6	17	12.1	88
Metcalfe	1	10099	34732	18.7	58.5	14.1	7.2	10.2	26
Monroe	1	10963	28439	27.1	57.9	11.5	11.6	8.2	44
Montgomery	1	26499	36034	21.1	60.3	11.9	15.1	40.6	93
Morgan	1	13923	30229	23.6	50.6	14	11.8	10.2	42
Muhlenberg	0	31499	36750	20.6	58.2	11	10.2	6.9	85
Nelson	0	43437	44783	14.2	65.2	11.7	15.4	17.7	153
Nicholas	1	7135	40259	18.3	57.4	11.6	9.4	4.8	25
Ohio	0	23842	36050	19	61.6	9.2	9.4	8.9	69
Oldham	0	60316	79417	7.4	75.1	8.5	37.1	12.7	209
Owen	0	10841	46238	12	63.2	9.6	18.6	10.1	35
Owsley	1	4755	19351	41.5	47.6	11.4	5.9	11	28
Pendleton	0	14877	44670	18.6	59.7	12.8	10.6	18.3	54
Perry	1	28712	29547	27.9	50.7	11.3	11.9	20.8	107
Pike	1	65024	32563	22.1	50.9	10.1	12	20.3	166
Powell	1	12613	31815	26.3	53.3	15	10.4	14.9	40
Pulaski	1	63063	32771	21.1	61.7	10.7	14.6	31.7	215
Robertson	1	2282	27254	25.1	61.7	9.5	7.4	8.2	5
Rockcastle	1	17056	26946	28.1	54.1	11.3	11.6	9.4	28
Rowan	1	23333	31604	29.8	60.9	9.2	24.7	33.5	117
Russell	1	17565	29980	24.2	59.9	11.1	12.6	25.8	56
Scott	0	47173	58028	13.4	68.4	9.5	26.3	24.2	182
Shelby	0	42074	55296	11.4	71.3	9.1	23.2	22.9	164
Simpson	0	17327	41323	14.5	63.4	12.6	15.6	35.9	70
Spencer	0	17061	59326	7	72.2	10.4	16.7	6.7	44
Taylor	0	24512	35378	22.8	64.4	10.8	14.9	23.7	79
Todd	0	12460	36989	21.4	63.1	10.7	10	11.4	46
Trigg	0	14339	41825	13	66.2	12.2	15.8	18.1	57
Trimble	0	8809	47798	16.9	60.1	12.9	13.1	8.5	21
Union	0	15007	39515	18.5	62	9.3	12.4	13	70
Warren	0	113792	43954	18.5	68.3	9	27.5	39.3	528
Washington	0	11717	43090	13.2	67.4	11.4	12.8	14	41
Wayne	1	20813	25993	26.7	53.2	13.1	9	19	52
Webster	0	13621	39635	16	60.2	9.3	8.5	7.3	54
Whitley	1	35637	28122	28.9	54	11.7	12	14.6	161
Wolfe	1	7355	20910	42.2	52.6	14.4	7.6	19.2	21
Woodford	0	24939	56537	11.3	69.3	8.1	33.1	35.5	153

## APPENDIX B

### Logistic Regression Output

#### Logistic Regression Model One

Case Processing Summary			
Unweighted Cases <sup>a</sup>		N	Percent
Selected Cases	Included in Analysis	5751	100.0
	Missing Cases	0	0.0
	Total	5751	100.0
Unselected Cases		0	0.0
Total		5751	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding		
Original Value		Internal Value
.00		0
1.00		1

#### Block 0: Beginning Block

Classification Table <sup>a,b</sup>					
Observed	LR_MIGRATION		Predicted		Percentage Correct
			LR_MIGRATION .00	1.00	
Step 0	LR_MIGRATION	.00	3134	0	100.0
		1.00	2617	0	0.0
		Overall Percentage			54.5

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation							
		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-.180	.026	46.351	1	.000	.835

Variables not in the Equation <sup>a</sup>							
Step 0	Variables		Score	df	Sig.		
		LR_FEMALE	59.500	1	.000		
		LR_BLACK	41.053	1	.000		
		LR_AGE30	30.155	1	.000		
		LR_COLLEGE_IN_APP	330.877	1	.000		
		LR_2YR_COLLEGE	.535	1	.465		
		LR_4YR_COLLEGE	31.269	1	.000		
		LR_IND_COLLEGE	76.939	1	.000		
		LR_BACHELORS	41.827	1	.000		
		LR_ASSOCIATE	.536	1	.464		
		LR_SUBASSOCIATE	4.617	1	.032		
		LR_MASTERS	156.240	1	.000		
		LR_DOCTORAL	.736	1	.391		
		LR_PROFESSIONAL	26.318	1	.000		
		LR_MAJOR_BUSINESS	8.228	1	.004		
		LR_MAJOR_EDUCATION	344.816	1	.000		
		LR_MAJOR_HEALTH	27.735	1	.000		
		LR_MAJOR_LIBERALARTS	.241	1	.624		
		LR_MAJOR_STEM	62.225	1	.000		
		LR_MAJOR_SKILLED	1.958	1	.162		

a. Residual Chi-Squares are not computed because of redundancies.



## Logistic Regression Output (Continued)

### Block 1: Method = Enter

#### Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	884.900	17	.000
	Block	884.900	17	.000
	Model	884.900	17	.000

#### Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	7041.139 <sup>a</sup>	.143	.191

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

#### Classification Table<sup>a</sup>

Observed	LR_MIGRATION		Predicted		Percentage Correct
			LR_MIGRATION .00	1.00	
Step 1	LR_MIGRATION	.00	2367	767	75.5
		1.00	1185	1432	54.7
Overall Percentage					66.1

a. The cut value is .500

#### Variables in the Equation

Step 1 <sup>a</sup>		B	S.E.	Wald	df	Sig.	Exp(B)
	LR_FEMALE	-.380	.068	31.226	1	.000	.684
	LR_BLACK	1.500	.293	26.127	1	.000	4.481
	LR_AGE30	-.119	.061	3.759	1	.053	.888
	LR_COLLEGE_IN_APP	-1.082	.070	240.313	1	.000	.339
	LR_2YR_COLLEGE	.058	.162	.128	1	.720	1.060
	LR_4YR_COLLEGE	.575	.091	40.017	1	.000	1.778
	LR_BACHELORS	.218	.260	.702	1	.402	1.244
	LR_ASSOCIATE	.333	.284	1.370	1	.242	1.395
	LR_SUBASSOCIATE	.325	.301	1.163	1	.281	1.384
	LR_MASTERS	-.198	.268	.545	1	.460	.821
	LR_DOCTORAL	-.384	.558	.474	1	.491	.681
	LR_MAJOR_BUSINESS	-.400	.139	8.317	1	.004	.671
	LR_MAJOR_EDUCATION	-1.493	.129	133.656	1	.000	.225
	LR_MAJOR_HEALTH	-.202	.121	2.791	1	.095	.817
	LR_MAJOR_LIBERALARTS	-.518	.115	20.353	1	.000	.596
	LR_MAJOR_STEM	-.031	.151	.042	1	.837	.970
	LR_MAJOR_SKILLED	-.620	.181	11.671	1	.001	.538
	Constant	.992	.276	12.906	1	.000	2.697

a. Variable(s) entered on step 1: LR\_FEMALE, LR\_BLACK, LR\_AGE30, LR\_COLLEGE\_IN\_APP, LR\_2YR\_COLLEGE, LR\_4YR\_COLLEGE, LR\_BACHELORS, LR\_ASSOCIATE, LR\_SUBASSOCIATE, LR\_MASTERS, LR\_DOCTORAL, LR\_MAJOR\_BUSINESS, LR\_MAJOR\_EDUCATION, LR\_MAJOR\_HEALTH, LR\_MAJOR\_LIBERALARTS, LR\_MAJOR\_STEM, LR\_MAJOR\_SKILLED.

# Logistic Regression Output (Continued)

## Logistic Regression Model Two

Case Processing Summary				
Unweighted Cases <sup>a</sup>		N	Percent	
Selected Cases	Included in Analysis	5751	100.0	
	Missing Cases	0	0.0	
	Total	5751	100.0	
Unselected Cases		0	0.0	
Total		5751	100.0	

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding		
Original Value	Internal Value	
.00	0	
1.00	1	

## Block 0: Beginning Block

Classification Table <sup>a,b</sup>					
Observed	LR_MIGRATION		Predicted		Percentage Correct
			LR_MIGRATION	1.00	
Step 0	LR_MIGRATION	.00	3134	0	100.0
		1.00	2617	0	0.0
Overall Percentage					54.5

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation								
Step 0		B	S.E.	Wald	df	Sig.	Exp(B)	
Step 0	Constant	-.180	.026	46.351	1	.000	.835	

Variables not in the Equation <sup>a</sup>						
Step 0	Variables	Score	df	Sig.		
	LR_FEMALE	59.500	1	.000		
	LR_BLACK	41.053	1	.000		
	LR_AGE30	30.155	1	.000		
	LR_COLLEGE_IN_APP	330.877	1	.000		
	LR_2YR_COLLEGE	.535	1	.465		
	LR_4YR_COLLEGE	31.269	1	.000		
	LR_IND_COLLEGE	76.939	1	.000		
	LR_BACHELORS	41.827	1	.000		
	LR_ASSOCIATE	.536	1	.464		
	LR_SUBASSOCIATE	4.617	1	.032		
	LR_MASTERS	156.240	1	.000		
	LR_DOCTORAL	.736	1	.391		
	LR_PROFESSIONAL	26.318	1	.000		
	LR_MAJOR_BUSINESS	8.228	1	.004		
	LR_MAJOR_EDUCATION	344.816	1	.000		
	LR_MAJOR_HEALTH	27.735	1	.000		
	LR_MAJOR_LIBERALARTS	.241	1	.624		
	LR_MAJOR_STEM	62.225	1	.000		
	LR_MAJOR_SKILLED	1.958	1	.162		
	LR_OR_URBAN	.312	1	.577		
	LR_OR_HOUSEHOLDINC	67.617	1	.000		
	LR_OR_UNEMP	7.590	1	.006		
	LR_OR_BACHELORS	23.610	1	.000		
	LR_OR_ORG10K	1.572	1	.210		
	LR_OR_VOTERTURNOUT	61.380	1	.000		
	OR_ACTComp	35.639	1	.000		
	OR_crime_pt1_off_rate	1.426	1	.232		

a. Residual Chi-Squares are not computed because of redundancies.

## Logistic Regression Output (Continued)

Block 1: Method = Enter

### Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	922.037	25	.000
	Block	922.037	25	.000
	Model	922.037	25	.000

### Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	7004.002 <sup>a</sup>	.148	.198

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

### Classification Table<sup>a</sup>

Observed			Predicted		Percentage Correct
			LR_MIGRATION .00	1.00	
Step 1	LR_MIGRATION	.00	2367	767	75.5
		1.00	1200	1417	54.1
Overall Percentage					65.8

a. The cut value is .500

### Variables in the Equation

Step 1 <sup>a</sup>		B	S.E.	Wald	df	Sig.	Exp(B)
	LR_FEMALE	-.388	.068	32.240	1	.000	.678
	LR_BLACK	1.453	.294	24.386	1	.000	4.275
	LR_AGE30	-.118	.061	3.705	1	.054	.888
	LR_COLLEGE_IN_APP	-1.034	.074	196.100	1	.000	.355
	LR_2YR_COLLEGE	.115	.164	.493	1	.482	1.122
	LR_4YR_COLLEGE	.531	.093	32.903	1	.000	1.701
	LR_BACHELORS	.159	.262	.370	1	.543	1.173
	LR_ASSOCIATE	.245	.287	.731	1	.393	1.278
	LR_SUBASSOCIATE	.236	.304	.602	1	.438	1.266
	LR_MASTERS	-.254	.269	.885	1	.347	.776
	LR_DOCTORAL	-.494	.559	.781	1	.377	.610
	LR_MAJOR_BUSINESS	-.446	.139	10.211	1	.001	.640
	LR_MAJOR_EDUCATION	-1.504	.130	134.424	1	.000	.222
	LR_MAJOR_HEALTH	-.209	.122	2.955	1	.086	.811
	LR_MAJOR_LIBERALARTS	-.523	.115	20.599	1	.000	.593
	LR_MAJOR_STEM	-.052	.151	.117	1	.733	.950
	LR_MAJOR_SKILLED	-.657	.182	13.000	1	.000	.518
	LR_OR_URBAN	-.224	.092	5.870	1	.015	.800
	LR_OR_HOUSEHOLDINC	.000	.000	2.997	1	.083	1.000
	LR_OR_UNEMP	.028	.022	1.631	1	.202	1.029
	LR_OR_BACHELORS	.026	.011	5.992	1	.014	1.026
	LR_OR_ORG10K	-.010	.004	7.243	1	.007	.990
	LR_OR_VOTERTURNOUT	.003	.009	.150	1	.698	1.003
	OR_ACTComp	.094	.053	3.102	1	.078	1.098
	OR_crime_pt1_off_rate	-.001	.004	.045	1	.832	.999
	Constant	-1.550	1.051	2.174	1	.140	.212

a. Variable(s) entered on step 1: LR\_FEMALE, LR\_BLACK, LR\_AGE30, LR\_COLLEGE\_IN\_APP, LR\_2YR\_COLLEGE, LR\_4YR\_COLLEGE, LR\_BACHELORS, LR\_ASSOCIATE, LR\_SUBASSOCIATE, LR\_MASTERS, LR\_DOCTORAL, LR\_MAJOR\_BUSINESS, LR\_MAJOR\_EDUCATION, LR\_MAJOR\_HEALTH, LR\_MAJOR\_LIBERALARTS, LR\_MAJOR\_STEM, LR\_MAJOR\_SKILLED, LR\_OR\_URBAN, LR\_OR\_HOUSEHOLDINC, LR\_OR\_UNEMP, LR\_OR\_BACHELORS, LR\_OR\_ORG10K, LR\_OR\_VOTERTURNOUT, OR\_ACTComp, OR\_crime\_pt1\_off\_rate.

# Logistic Regression Output (Continued)

## Logistic Regression Model Three

Case Processing Summary			
Unweighted Cases <sup>a</sup>		N	Percent
Selected Cases	Included in Analysis	5751	65.2
	Missing Cases	3076	34.8
	Total	8827	100.0
Unselected Cases		0	0.0
Total		8827	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding		
Original Value	Internal Value	
.00		0
1.00		1

## Block 0: Beginning Block

Classification Table <sup>a,b</sup>					
Observed	LR_MIGRATION		Predicted		Percentage Correct
			.00	1.00	
Step 0		.00	3134	0	100.0
		1.00	2617	0	0.0
	Overall Percentage				54.5

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation							
		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-.180	.026	46.351	1	.000	.835

Variables not in the Equation <sup>a</sup>							
Step 0	Variables		Score	df	Sig.		
		LR_FEMALE	59.500	1	.000		
		LR_BLACK	41.053	1	.000		
		LR_AGE30	30.155	1	.000		
		LR_COLLEGE_IN_APP	330.877	1	.000		
		LR_2YR_COLLEGE	.535	1	.465		
		LR_4YR_COLLEGE	31.269	1	.000		
		LR_IND_COLLEGE	76.939	1	.000		
		LR_BACHELORS	41.827	1	.000		
		LR_ASSOCIATE	.536	1	.464		
		LR_SUBASSOCIATE	4.617	1	.032		
		LR_MASTERS	156.240	1	.000		
		LR_DOCTORAL	.736	1	.391		
		LR_PROFESSIONAL	26.318	1	.000		
		LR_MAJOR_BUSINESS	8.228	1	.004		
		LR_MAJOR_EDUCATION	344.816	1	.000		
		LR_MAJOR_HEALTH	27.735	1	.000		
		LR_MAJOR_LIBERALARTS	.241	1	.624		
		LR_MAJOR_STEM	62.225	1	.000		
		LR_MAJOR_SKILLED	1.958	1	.162		
		LR_OR_URBAN	.312	1	.577		
		LR_OR_HOUSEHOLDINC	67.617	1	.000		
		LR_OR_UNEMP	7.590	1	.006		
		LR_OR_BACHELORS	23.610	1	.000		
		LR_OR_ORG10K	1.572	1	.210		
		LR_OR_VOTERTURNOUT	61.380	1	.000		
		OR_ACTComp	35.639	1	.000		
		OR_crime_pt1_off_rate	1.426	1	.232		
		LR_DE_URBAN	167.577	1	.000		
		LR_DE_HOUSEHOLDINC	3876.189	1	0.000		
		LR_DE_UNEMP	1916.539	1	0.000		
		LR_DE_BACHELORS	3459.581	1	0.000		
		LR_DE_ORG10K	2892.973	1	0.000		
		LR_DE_VOTERTURNOUT	4277.592	1	0.000		
		DE_ACTComp	2226.935	1	0.000		
		DE_crime_pt1_off_rate	1584.667	1	0.000		

a. Residual Chi-Squares are not computed because of redundancies.

## Logistic Regression Output (Continued)

### Block 1: Method = Enter

Omnibus Tests of Model Coefficients				
		Chi-square	df	Sig.
Step 1	Step	7045.375	33	0.000
	Block	7045.375	33	0.000
	Model	7045.375	33	0.000

Model Summary				
Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	
1	880.664 <sup>a</sup>	.706	.944	

a. Estimation terminated at iteration number 9 because parameter estimates changed by less than .001.

Classification Table <sup>a</sup>					
Observed	LR_MIGRATION		Predicted		Percentage Correct
			LR_MIGRATION	1.00	
Step 1	LR_MIGRATION	.00	3054	80	97.4
		1.00	93	2524	96.4
Overall Percentage					97.0

a. The cut value is .500

Variables in the Equation							
Step 1 <sup>a</sup>		B	S.E.	Wald	df	Sig.	Exp(B)
	LR_FEMALE	-.369	.221	2.790	1	.095	.692
	LR_BLACK	2.112	.836	6.385	1	.012	8.261
	LR_AGE30	.375	.199	3.548	1	.060	1.455
	LR_COLLEGE_IN_APP	-1.223	.208	34.481	1	.000	.294
	LR_2YR_COLLEGE	-.508	.509	.997	1	.318	.602
	LR_4YR_COLLEGE	-.243	.284	.731	1	.393	.784
	LR_BACHELORS	1.155	.742	2.427	1	.119	3.175
	LR_ASSOCIATE	.653	.805	.658	1	.417	1.921
	LR_SUBASSOCIATE	1.425	.878	2.632	1	.105	4.157
	LR_MASTERS	.004	.755	.000	1	.996	1.004
	LR_DOCTORAL	.563	1.145	.242	1	.623	1.757
	LR_MAJOR_BUSINESS	.016	.486	.001	1	.973	1.017
	LR_MAJOR_EDUCATION	.499	.416	1.438	1	.230	1.647
	LR_MAJOR_HEALTH	.649	.430	2.283	1	.131	1.915
	LR_MAJOR_LIBERALARTS	.246	.408	.363	1	.547	1.279
	LR_MAJOR_STEM	.491	.487	1.020	1	.313	1.634
	LR_MAJOR_SKILLED	-.094	.590	.025	1	.874	.911
	LR_OR_URBAN	.739	.338	4.787	1	.029	2.094
	LR_OR_HOUSEHOLDINC	.000	.000	7.039	1	.008	1.000
	LR_OR_UNEMP	-.353	.080	19.640	1	.000	.703
	LR_OR_BACHELORS	-.080	.033	5.704	1	.017	.924
	LR_OR_ORG10K	-.027	.010	6.887	1	.009	.974
	LR_OR_VOTERTURNOUT	.009	.032	.069	1	.793	1.009
	OR_ACTComp	-.120	.178	.452	1	.502	.887
	OR_crime_pt1_off_rate	-.021	.012	2.990	1	.084	.980
	LR_DE_URBAN	-.955	.306	9.746	1	.002	.385
	LR_DE_HOUSEHOLDINC	.000	.000	98.353	1	.000	1.000
	LR_DE_UNEMP	.683	.123	30.740	1	.000	1.979
	LR_DE_BACHELORS	-.068	.032	4.509	1	.034	.934
	LR_DE_ORG10K	.092	.011	75.269	1	.000	1.096
	LR_DE_VOTERTURNOUT	.810	.054	227.632	1	.000	2.248
	DE_ACTComp	-1.515	.269	31.768	1	.000	.220
	DE_crime_pt1_off_rate	-.011	.012	.825	1	.364	.989
	Constant	-33.326	4.716	49.927	1	.000	.000

a. Variable(s) entered on step 1: LR\_FEMALE, LR\_BLACK, LR\_AGE30, LR\_COLLEGE\_IN\_APP, LR\_2YR\_COLLEGE, LR\_4YR\_COLLEGE, LR\_BACHELORS, LR\_ASSOCIATE, LR\_SUBASSOCIATE, LR\_MASTERS, LR\_DOCTORAL, LR\_MAJOR\_BUSINESS, LR\_MAJOR\_EDUCATION, LR\_MAJOR\_HEALTH, LR\_MAJOR\_LIBERALARTS, LR\_MAJOR\_STEM, LR\_MAJOR\_SKILLED, LR\_OR\_URBAN, LR\_OR\_HOUSEHOLDINC, LR\_OR\_UNEMP, LR\_OR\_BACHELORS, LR\_OR\_ORG10K, LR\_OR\_VOTERTURNOUT, OR\_ACTComp, OR\_crime\_pt1\_off\_rate, LR\_DE\_URBAN, LR\_DE\_HOUSEHOLDINC, LR\_DE\_UNEMP, LR\_DE\_BACHELORS, LR\_DE\_ORG10K, LR\_DE\_VOTERTURNOUT, DE\_ACTComp, DE\_crime\_pt1\_off\_rate.

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Master of Arts in Sociology Western Kentucky University, Bowling Green, KY.	1993
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### **Professional Experience**

Kentucky Center for Education and Workforce Statistics Executive Director	2012-2013
Postsecondary Consultants, LLC Senior Consultant	2010-2013
Kentucky P-20 Data Collaborative Executive Director	2010-2012
Data Quality Campaign Director of P-20	2009-2010
Kentucky Council on Postsecondary Education Assistant Vice-President for Information and Research	2005-2009
Kentucky Community and Technical College System Director of Institutional Research	2004-2005
University of Kentucky Adjunct Faculty	2004-2005
University of Kentucky – Lexington Community College Adjunct Faculty	2000-2003

University of Kentucky – Lexington Community College Director of Institutional Research and Effectiveness	1999-2004
Del Mar College Director of Institutional Research	1998-1999
Roane State Community College Adjunct Faculty	1996-1998
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Mississippi State University Assessment Coordinator	1993-1996
University of Massachusetts Institutional Research Assistant	1992-1993
East Tennessee State University Adjunct Faculty	1991-1992
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### **Professional Publications**

**McGrew, C.** (2007). *Brain Gain: Retaining Kentucky Graduates. A special information and research report.* Kentucky Council on Postsecondary Education. Frankfort, Kentucky.

Copa, N., Holdren, D., Danforth, D., Wheeler, T., **McGrew, C.**, Garrison, M., Klein, J., Kosty, D., Rebar, M., Taylor, R. (2011). *SLDS Best Practices Brief: Stakeholder Communications: Tips from the States.* National Center for Education Statistics, Institute for Education Sciences. Washington, D.C.

**McGrew, C.** (2012). *Kentucky County Profiles 2012.* Kentucky P-20 Data Collaborative. Frankfort, Kentucky.

**McGrew, C.** (2013). *Employment and Earnings of Kentucky's College Graduates: A Preliminary Report.* Kentucky Center for Education and Workforce Statistics. Frankfort, Kentucky.

**McGrew, C., Jenner, C., Sellers, J. (2013).** *SLDS Issue Brief: Building a Centralized P-20W Data Warehouse.* National Center for Education Statistics, Institute for Education Sciences. Washington, D.C.

### **Professional Presentations**

Jenner, C., **McGrew, C.**, Gibson, N. (2012) *Developing and Using P-20W Longitudinal Reports.* 2012 SLDS P-20W Best Practice Conference Presentation. National Center for Education Statistics, Institute for Education Sciences.

**McGrew, C.**, Parisi, M., Gibson, N., Schroeder, A. (2012) *Federated and Centralized Models.* 2012 SLDS P-20W Best Practice Conference Panel. National Center for Education Statistics, Institute for Education Sciences.

**McGrew, C., Jenner, C. (2012).** *Building a Centralized P-20 Data Warehouse. SLDS State Support Team Webinar.* National Center for Education Statistics, Institute for Education Sciences.

**McGrew, C. (2012).** *Diving into Data Workshop Panel.* National Education Writer's Association.

**McGrew, C., Vuong, B. (2009).** *Education and Workforce Data Systems.* Data Quality Campaign.

Smith, N. J., **McGrew, C. (2009).** *Essential Elements of State Longitudinal Data Systems.* 15<sup>th</sup> Annual Data Quality Meeting. U.S. Department of Education, Office of Vocational and Adult Education Division of Academic and Technical Education.

**McGrew, C. (2009).** *P20 Data Systems.* U.S. Department of Education, Office of Vocational and Adult Education Division of Academic and Technical Education.

**McGrew, C., Jonas, D. (2011).** *Research and Data Access. SLDS P-20W Best Practice Conference.* U.S. Department of Education, Office of Vocational and Adult Education Division of Academic and Technical Education.

**McGrew, C., Hackworth, R. (2008).** *Data Exchange in Kentucky.* Southern Regional Education Board and Data Quality Campaign Invitational One-Day Conference.

Kiehne, J., Klein, J., **McGrew, C.** (2011). *P-20-W Program Governance*. State Support Team Presentation. National Center for Education Statistics, Institute for Education Sciences.

**McGrew, C.** (2009) *P20 Updates*. Fall 2009 Data Summit. Postsecondary Education Standards Council annual meeting.

Seabaugh, J., **McGrew, C.** (2010). *High School Feedback Reports*. State Higher Education Executive Officers Network Meeting.

**McGrew, C.**, Parisi, D., Glenn, D. (2010). *High School & Community College Feedback Reports*. SLDS P-20 Best Practice Conference Panel. National Center for Education Statistics, Institute for Education Sciences.

### **Service and Associations**

Kentucky Education Research Roundtable Board Member	2011-2012
Kentucky Labor Market Information Advisory Group Board Member	2013
Association for Institutional Research Member	1991-2011
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