

FINAL REPORT

An Assessment of Alternative Measures for Determining Economically Distressed Counties and Areas in the Appalachian Region

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EXECUTIVE SUMMARY

The Appalachian Regional Commission (ARC) has played a vital role since 1965 in advancing the well being of people, communities, and institutions in the region. Due to sustained investments undertaken by ARC and other public and private sector entities, substantial inroads have been made against the economic instability, poverty, weak human capital, poor transportation corridors, and limited physical infrastructure that characterized the region at the time of ARC's inception.

This report responds to a proactive effort by the ARC to explore new avenues for assessing well-being. Despite well-recognized advances, chronic socioeconomic distress persists in various pockets in the region while other areas face increasing instability stemming from population shifts and global economic changes. The ARC has sought to develop meaningful indicators to document distress, with the goal of improving the ability of the federal office of the ARC and its state partners to target resources effectively to counties facing a diversity of barriers to achieving economic progress.

The purpose of this report is to offer additional insights on the set of distress indicators and their respective measures that can prove comprehensive, practical, and valuable in guiding the future work of the ARC. Our report takes a fresh look at the current indicators employed by the ARC to classify counties as economically distressed. We outline the strengths and limitations associated with such indicators and evaluate a series of new indices and data sources that may promote greater accuracy in terms of monitoring the long-term socioeconomic complexion of counties in the region. These new indicators include "forward-looking" measures as well as indicators that tap a wider range of socioeconomic dimensions of distress, beyond the standard economic indices conventionally employed by the ARC.

Our *conclusion* is that the ARC should update its current distress indicators to better reflect twenty-first century socioeconomic conditions. Though improved in recent years, the currently-used distress index -- based on the poverty rate, unemployment rate, and per capita market income -- suffers from various shortcomings. Our analysis reveals that the poverty rate alone largely drives the variability in the current distress index. Therefore, the current index is not a valid and transparent measure that fully reflects all the dimensions of distress. Another problem is the use of the unemployment rate and per capita income. In particular, the unemployment rate does not capture contemporary labor market weaknesses to the degree that other indicators would. Finally, in sensitivity analysis, we find that the counties can shift in terms of their distress designation with only modest changes in how the distress index is calculated.

After a careful analysis of over 50 indicators, we **recommend** that the ARC reevaluate its distress indicators in the following ways. First, it should consider the following candidate indicators in this analysis: (1) population change; (2) educational attainment; (3) income and earnings; (4) housing market conditions; (5) entrepreneurship and self employment; (6) improved measures of labor market strength; and (7) the poverty rate. These indicators capture dimensions of both current and forward-looking distress. Second, the analysis of candidate indicators should be statistical in nature, relying on regression approaches to determine the factors that have more power in explaining shifts in distress over time. This analysis should

consider variable measurement issues and proper weights for each indicator. The outcome of the proposed approach would be a small list of three to five variables that would constitute a new indicator of distress. Finally, the ARC should consider monitoring a secondary grouping of indicators to provide a broader context for benchmarking. These **recommendations** are more fully described in Section 7 of the report.

PART I - BACKGROUND AND ISSUES IN CONSTRUCTING DISTRESS INDICATORS

1. Introduction

The purpose of this report is to assist in developing distress indicators and their respective measures that will be comprehensive, practical, and valuable in guiding the future work of the ARC. Our report takes a fresh look at the current indicators employed by the ARC to classify counties as economically distressed. We outline the strengths and limitations associated with such indicators and evaluate a series of new indices and data sources that may provide improved accuracy of the long-term socioeconomic viability of counties in the region. These new indicators include “forward-looking” measures as well as indicators that tap a wider range of socioeconomic dimensions of distress, beyond the standard economic indices conventionally employed by the ARC.

Our analysis is the product of a multi-disciplinary research team that carefully appraised the findings of past empirical studies, examined agency reports, conducted preliminary empirical analyses, and met with federal and state ARC representatives and staff to secure their input. The project team consists of economists and sociologists specializing in community/regional well-being and spatial analysis. Throughout the six month duration of the project, the team met in Washington D.C. and in Columbus, OH, conducted numerous conference call meetings, and worked individually to assemble the information presented here. The task of writing of the report was collectively shared by all members of the team.

This report is organized into three parts and seven sections.

Part I provides the research and policy-oriented background for the selection of distress indicators. Our primary intent is threefold. First, in Section 2, we present an overview of the history and background of the ARC’s efforts to document distress. Agency reports and empirical research studying distress in the region are used to inform this overview. Second, we examine the comparability between ACR indicators and measures of distress with those of other federal agencies in Section 3. We find that many, if not most, agencies employ the same indicators used by the ARC -- poverty, unemployment, and income -- but some add other indicators more tailored to the respective needs of these agencies. Finally, Section 4 discusses conceptual, theoretical and methodological issues involved in developing indicators of distress. We document the types of decisions that need to be made and the problems that arise in selecting appropriate indicators and measures.

Part II turns to an appraisal of indicators that can be employed to document distress. The overall strength and limitations of these indicators for covering “distress” as a concept are discussed in Section 5.1. Data issues involved in the measurement of these indicators -- such as timeliness, geographic coverage, and cost of data sources -- are documented. Our initial focus is on what we label “backward-looking” indicators, measures that benchmark contemporary conditions such as poverty rates, income, and unemployment. Some of these variables have been widely used as distress measures; others are alternative measures involving new income sources and population attributes such as aging and immigration, measures that have received limited attention with

regard to their possible inclusion in socioeconomic distress indexes. In both cases, however, these indicators appear to perform better at tracking past or current conditions than in determining future well-being.

In Section 5.2, we delineate a number of indicators that potentially offer a window into the future fortunes of the region. These include indicators of population change, housing starts, entrepreneurial and knowledge economy trends, local government capacity, and the social capital/civic health of local communities. Section 5.3 examines new data sources that can be tapped to construct some of the indicators above for different geographies and time periods. These include data available at the sub-county level and recently developed data sources, such as the American Community Survey (ACS) which will soon be available for the nation's smallest counties (although with some time lags and as of yet unknown limitations). Taken as a whole, this section provides a list of indicators and their respective measures that we believe offer a more comprehensive and multi-faceted picture of distress relative to those presently in use.

Part III, contained in Section 6, provides an exploratory sensitivity analysis of distress indicators using empirical data. The purpose is to determine the consistency of the use of different variables in classifying counties as distressed. We begin by examining the performance of ARC's current distress indicators, namely, poverty, income, and unemployment. While all three have been perceived as key contributors to distress, our analysis reveals that the poverty rate alone largely drives the variability in the current distress index.

We then turn to a "what-if" analysis, changing the assumptions of the current distress index by adding two potential new variables, change in population and educational attainment. We find that while there is some stability in the classification of counties as distressed when either of the two variables is added, shifts in the designated distress classification of some counties also occur. Our conclusion is that categorizing distress is somewhat sensitive to the variables used in constructing the index.

Part IV, contained in Section 7, presents our conclusions and **recommendations**. We summarize the findings of our research review and exploratory empirical analysis. We document the range of scientifically sound indicators that are both contemporary and forward-looking measures of distress. These indicators should prove most useful to the ARC and other federal/state agencies) in its quest to develop a defensible system for determining levels of economic distress. Finally, we specify needed steps to refine the selection process of indicators and their accompanying measures, a process that can improve the benchmarking of both past progress and attainment of future goals.

2. History and Background of ARC

Created by an act of Congress in 1965, the Appalachian Regional Commission (ARC) is a regional economic development agency representing a unique partnership of federal, state, and local government. Local level participation in the Commission is assured through 72 local development districts with boards composed of elected officials, business people, and other local leaders. Similar to other agencies created to promote local planning and to address socioeconomic problems of lagging regions and communities in the U.S., ARC's primary role is to promote economic competitiveness and social development of the Appalachian Region.

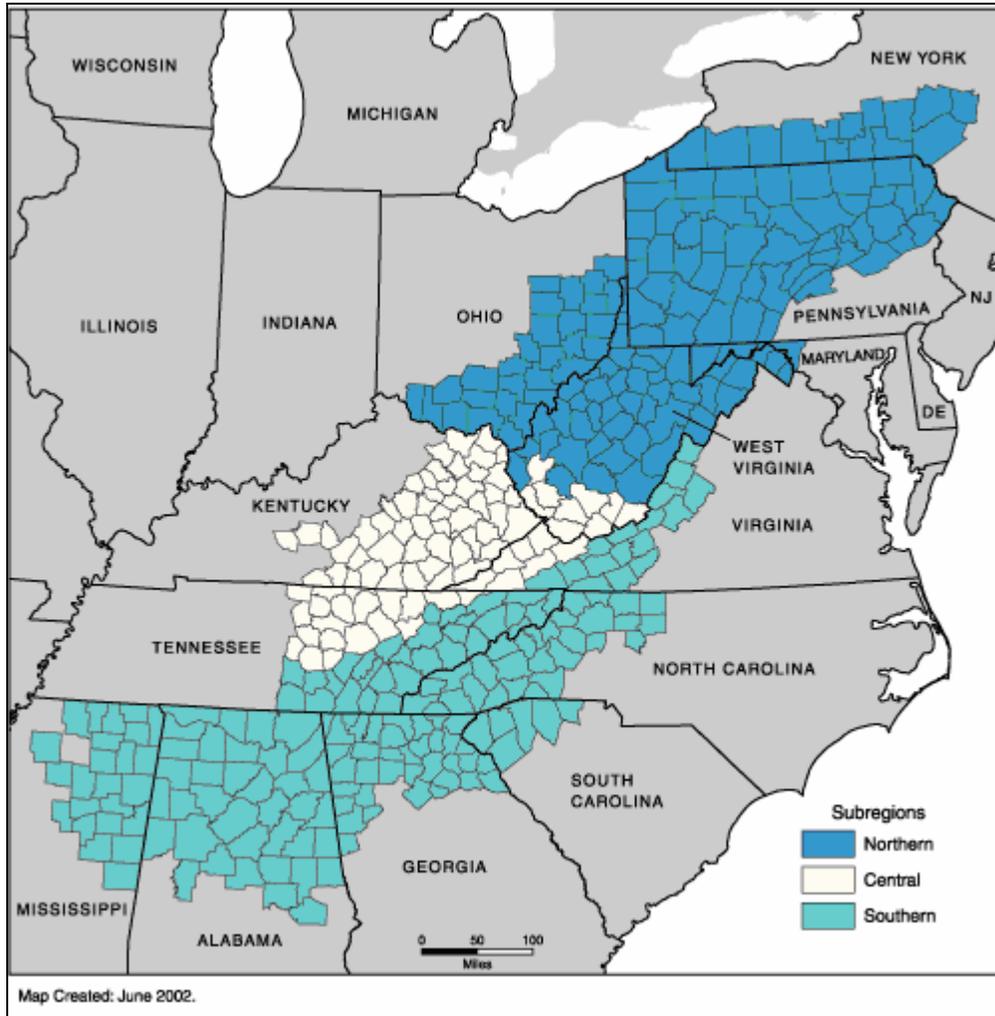
In the Appalachian Regional Development Act, the legislation from which ARC derives its authority, Appalachia was originally defined to include 300 counties in 10 states. As a result of several amendments to the Act, the last of which was in 2002, the region now incorporates an area of 200,000 square miles and about 22.9 million people. It follows the spine of the Appalachian Mountain from Southern New York to Northern Mississippi and includes 410 counties comprising all of West Virginia and parts of 13 states referred to as Appalachian states: Alabama, Georgia, Kentucky, Maryland, Mississippi, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, and Virginia. Governors of these 13 states, together with a federal co-chairman appointed by the President, make up the Commission. Figure 2.1 presents the Appalachian Region and its sub-regions.

To fulfill its mandate of reducing the socioeconomic gap between the Appalachian Region and the rest of the nation, the commission has put forth a wide range of activities and programs in the Region over the course of its history. In contrast to economic development agencies that are principally categorical grantmakers, ARC has implemented a multi-faceted approach which combines its special grant programs with advocacy, regional planning, and research activities. As a result, the commission has provided support for various projects since its inception, ranging from the Appalachian Development Highway System (ADHS); community water and sewer facilities for homes, businesses, and industries; health, education, and human resource development initiatives; to economic development programs and local capacity building and leadership development.

In the spirit of its congressional mandate, ARC originally mobilized its efforts to employ a growth center policy aiming at promoting economic development in Appalachia's urban areas with the assumption that development, once taken place in these localities, would spread to rural areas. Such policies, prominent among many world leaders and other development agencies such as EDA, were in line with the prevailing regional development theory in the 1960s and early 1970s. The growth center approach was harshly criticized for not supporting the areas in greatest need. The ARC shifted its focus in the mid-1980s towards the more remote rural areas, allocating its resources primarily to these more economically disadvantaged counties.

As a result of the Commission's multi-pronged efforts, great strides have been made in reducing the economic imbalances between the Region and the rest of the U.S. In fact, Widner (1990) forcefully argues that the ARC's endeavor to develop Appalachia (mostly through the Distressed Counties Program) has been the most comprehensive regional development effort ever undertaken in the country. However, a large number of communities in the region are still not

up to par with the rest of the country in terms of economic vitality and living conditions. Appalachia continues to battle economic anguish, concentrated areas of high poverty, high unemployment rates, educational disparities, high rates of diseases, and population out-migration (ARC, 2004).



Source: ARC

Figure 2.1: Map of the Appalachian Region and Sub-regions

2.1. The ARC Distressed Counties Program and Distress Indicators

The ARC Distressed Counties Program is well documented in the academic literature (Glasmeier and Fuellhart, 1999; Wood and Bischak, 2000). The Distressed Counties Program (DCP) was proposed by ARC in a report to Congress in the early 1980s as a response to the threat of the Commission's imminent demise. Congress had requested that ARC outline a plan for completing its programs in a timely manner. Not only was ARC not dissolved, but the Distressed Counties Program was formally adopted as ARC's policy and took effect at the beginning of the fiscal year 1983. Implementing the program required that a reasonable share of the Commission's

funds be devoted to counties in the most dire economic need. From the inception of the DCP, 20 percent of Area Development funds were allocated to the distressed counties. In fiscal year 1997, Area Development allocation to distressed counties increased to 30 percent. But, this annual set-aside does not preclude these counties from benefiting from the rest of ARC's funded programs. The Distressed Counties Program has been the ARC's principal vehicle and predominant framework for providing adequate help to the most economically disadvantaged counties in the region.

Putting to work the Distressed Counties Program involves identifying distressed counties using economic indicators. ARC elected to employ variables that not only would vary little over very short time periods, but also would identify counties having the structurally weakest economies. In the 1980s, ARC began its distressed county designation using four distress indicators selected from a larger list of 12: a three-year average unemployment rate, poverty rate, per capita market income (which is income excluding transfer payments), and a three-year average infant mortality. These indicators were used to rank all ARC counties. To qualify as distressed, counties had to be in the lowest quartiles in at least three of the four categories. However, the ARC continues to struggle with how to define distress and how the definition should evolve with the changing economy. For example, between December 1999 and July 2006, there were 33 ARC meetings to discuss the distress indicators (Witte and Bischak, 2006).

To date, ARC has made several revisions to the original distress measures in order to improve their consistency and relevancy over time. The first adjustment to the distress indicators occurred in fiscal year 1988. Specifically, ARC discontinued the use of infant mortality since the region's mortality rate had improved to the point where it was consistent with the average rate for the nation. The ARC also indexed the remaining indicators to national averages. Rather than using a single county status designation, ARC defined two more categories, middle and competitive counties. Competitive counties were those with poverty rates at or below national averages, three-year unemployment rates at or below national averages, and per capita market income (PCMI) no less than 80 percent of the national average. In the same fiscal year, the Commission began tracking the counties located within its region using a five-category system: severely distressed, distressed, middle, strong, and very strong.

A second revision, which occurred in fiscal year 1995, resulted in a change in the distress designation. No longer did a county need to meet all three criteria to qualify as distressed. Counties with poverty rates of at least 200 percent of the national average needed to meet one of the two remaining criteria to be considered distressed. The two remaining criteria were 150 percent unemployment or two-thirds per capita market income.

A fourth designation, attainment counties, was introduced in FY1997 to categorize the counties performing at or above national averages in all three criteria. The four categories were then as follows: distressed, transitional or middle, competitive, and attainment. In that year, Area Development funds increased to 30 percent and attainment counties were disqualified from receiving such funds.

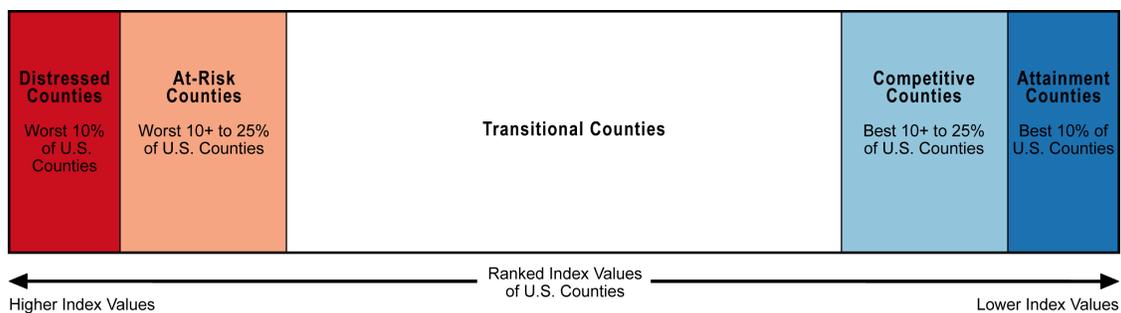
In fiscal year 1998, a fourth adjustment in the ARC distress measure was created. Congress charged ARC with the task of addressing the needs of severely and persistently distressed areas

of the Region and focusing attention on the areas of greatest need to provide a fairer opportunity for the people of the Region to achieve a quality of life on par with that generally enjoyed by citizens across the United States.

In fiscal year 2006, ARC introduced an “at risk” designation to include non-distressed counties which were nearly distressed. However, this designation (which was only for planning purposes) did not entitle counties to any additional funding. The at-risk category was viewed as useful in identifying the transitional counties with characteristics touching on the distress threshold. Criteria used to identify the at-risk category included a per capita market income that is two-thirds of the national average or less, a three-year average unemployment rate that is at least 125 percent of the national average, and a poverty rate that is at least 125 percent of the national average. ARC’s county designations now were expanded to five: distressed, at risk, transitional or middle, competitive and attainment.

Finally in fiscal year 2007, ARC elected to transform its three traditional distress indicators into a national index. Under this new model, county designation and classification involves a three-step procedure. First, a county’s averages on three economic indicators -- three-year average unemployment rate, per capita market income, and poverty rate -- are compared with national averages. Second, the resulting values are summed and averaged to create a composite index value for each county. Each county in the nation is then ranked based on its composite index value. The higher the index values, the higher the levels of distress. Thirdly, each Appalachian county is classified into one of the five economic status designations based on its position in the national ranking. Figure 2.2 shows the ARC’s current economic status designation criteria.

ARC assigns the status “distressed” to counties ranking in the worst 10 percent of the nation’s counties. Distressed counties are the most economically depressed. Counties ranking between the worst 10 percent and 25 percent of the nation’s counties receive the “at-risk” status, meaning that counties are at risk of becoming economically depressed. Such counties ranking between the worst 25 percent and the best 25 percent of the nation’s counties are assigned the “transitional” status. Counties ranking between the best 10 percent and 25 percent of the nation’s counties fall in the “competitive” category. Those that rank in the best 10 percent of the nation’s counties are classified as “attainment” counties, areas that are the most economically strong.



Source: County Economic Status Fiscal Year 2007, ARC

Figure 2.2: ARC County Economic Status Designation by National Index Value Rank

2.2. Past Research on Alternative Distress Indicators for Appalachia and Other Regions

ARC distress measures have been criticized as being imperfect. For example, conventional unemployment rates do not fully capture local market conditions, especially in rural regions. That is, unemployment rates fail to measure underemployment, labor force participation, or job creation differences. Furthermore, unemployment does not encompass involuntary part-time workers and discouraged job seekers who exit the job markets. To obtain a better understanding of the local labor markets and the need for job creation, ARC commissioned two studies assessing underemployment (e.g., involuntary part-time employment) and labor force participation which are broader measures of labor market surplus than unemployment.

A study by Bradley et al. (2001) focused on generating county-level measures of labor force participation and underemployment rates. Results from this study indicate that, more so than unemployment, both labor force participation and underemployment portray a higher degree of labor market surplus in Appalachia as compared to the U.S. Additionally, between 1993 and 1998, underemployment and labor force participation apparently grew more slowly in Appalachia than in the U.S. as a whole. This study also revealed that job growth was slower and wage growth slightly less than for the entire U.S. over this time period.

Following Bradley et al. (2001), Price and Wial (2005) analyzed underemployment by state and demographic group for each Appalachian state and the entire country for each year from 1996 to 2004. They concluded that tremendous progress had been realized by 2004 in bridging the underemployment gap between nonmetro and metropolitan Appalachia relative to nonmetro and metropolitan areas outside of Appalachia. Most Appalachian states experienced statistically significant declines in underemployment.

Another downside of the ARC distress measures is that data on poverty rates are decennial and as such become outdated over the course of a decade. Research conducted by Hammer (2000) and commissioned by ARC analyzed recent trends in poverty in the Appalachian region and examined the Census Bureau's Small Area Income and Poverty Estimates (SAIPE) effects on the ARC distress county designation. The SAIPE program was an attempt to remedy the deficiencies in economic distress measures such as the ten-year interval poverty rate and per capita income. The reason is that national levels and spatial distributions of income and poverty for small areas are not stable over time. The study focused on changes in total poverty in Appalachia between 1979 and the mid-1990s, with particular emphasis paid to the post-1990 period. Hammer discussed the geographic distribution of poverty, especially child poverty. He contended that while SAIPE would provide overall better estimates of distress than the poverty estimates derived from a decade-old census, a simple substitution of the SAIPE point estimates for census poverty estimates might unjustifiably deny some counties distressed-status recognition. The author concluded that the availability of new sources of income and poverty data such as the American Community Survey should significantly improve the accuracy of the SAIPE, making them an even more viable option for the determination of distressed-status by the Appalachian Regional Commission.

Another study by Wood and Bischak (2000) focused on progress and challenges in reducing economic distress in Appalachia from 1960 to 1990. They used data from several sources including the U.S. Census Bureau, the Bureau of Economic Analysis, and the Office of Economic Opportunity to identify time trends in the number of distressed counties in Appalachia, prior to the inception of ARC, as well as throughout much of the ARC's existence. The study also extended its scope to include all the remaining U.S. counties. To identify distressed counties, ARC's current distress criteria at the time of the study were applied to all U.S. counties for the decennial years 1960, 1970, 1980, and 1990. Illustrating the progress in the ARC region, their findings indicated that the number distressed counties had decreased by more than a half during the time period under scrutiny and only about one-quarter of the 1960 distressed counties in Appalachia remained distressed. Measures used to identify distressed counties included the following:

- A poverty rate that is 150 percent or more of the U.S. average
- PCMI that is no more than 2/3 of the U.S. average
- An unemployment rate that is 150 percent or more of the U.S. average
- A county also qualifies as being distressed if it has a poverty rate that is at least 200 percent of the national average and matches only one of the two remaining criteria (150 percent unemployment or two-thirds PCMI).

In addition to identifying counties moving out of or remaining in distress, Wood and Bischak pointed to several factors affecting the distress status of counties using two logistic regression models, a socioeconomic model and an economic structure model. The dependent variable in both models took on the value of "1" if a county moved out of distress and "0" if the county remained distressed between 1960 and 1990. Based on the socioeconomic model, factors contributing to a county moving out of distress between 1960 and 1990 included rates of employment in manufacturing, high educational attainment rates, high percentage of the population living in urban areas, a low percentage of minorities, and a county's location in the southern Appalachian sub-region. The results from their economic structure model point to factors such a county's ability to attract retirees, high levels of manufacturing, and close location to a metropolitan area as being key factors in determining whether a county moved out of the distress category.

Expanding and updating the work by Wood and Bischak (2000), Wood (2005) recently analyzed trends in national and regional economic distress from 1960 to 2000. Wood capitalized on the release of the 2000 census data to re-examine distress conditions in Appalachia. He found that distress was not random over time, but rather quite persistent. Counties that were distressed in 2000 were distressed for the most part in 1960. Wood's results were similar to those he obtained in the previous study with Bischak. Factors affecting the distressed county status include high minority populations, low educational attainment, low employment in manufacturing, high employment in mining, low employment in professional services, and location in a metropolitan area.

Given the weaknesses of the ARC's distress measure, Glasmeier and Fuellhart (1999) developed a surrogate additive index they labeled the *economic health index* (EHI). The EHI was composed of four individual indices: an unemployment rate index comparing county-level civilian

unemployment rate to the national civilian unemployment rate; a per-capita market income index comparing a county's income level, less transfer payments, to the national level; a labor force participation index; and a per-capita transfer payments to per-capita market income ratio index. The summation of the four individual indices yields the health economic index. The lower the health economic index scores, the better counties performed economically.

To predict economic distress, a linear regression model was used with the 1994 county-level index values as the dependent variable. Socioeconomic variables, such as percent of population with four-year college degrees, percentage of income from manufacturing, and percentage of income from residential adjustment were significantly and positively associated with county economic health. On the other hand, variables such as single mothers with children under 18, females in the labor force, and those over 65 years of age, were negatively associated with the EHI. Location variables, such as adjacency to a metro area, were significantly and positively related to a better EHI, while location in the central Appalachia region was significantly and negatively associated with county economic health. Glasmeier and Wood (2005) later used the EHI to determine the economic characteristics of the counties that had received funds from the U.S. Economic Development Administration from 1965 to 1997.

Feser and Sweeney (2003), in a study not commissioned by ARC, used data from the 1969 to 1999 period to examine the spatial extent and temporal persistence of U.S. economic distress based on three different indicators: unemployment, low income, and out-migration-induced population decline. They utilized commuter zone as their unit of analysis. The study was an attempt to assist the U.S. Economic Development Administration (EDA) in a review of criteria used to assess target development assistance and to evaluate the incidence and geography of out-migration and population decline as compared with two of the most common distress measures: low income and unemployment. The authors excluded poverty rate due to the unavailability of yearly poverty data. A mixture of absolute and relative distress measures was used. While unemployment was expressed as a rate, the ratio of income maintenance transfer payments (for family assistance, food stamps, and other income maintenance programs) to total personal income was used instead of per capita income.

To distinguish high-growth/high-out-migration places from places experiencing high out-migration/depopulation, Feser and Sweeney employed the following measure of out-migration/population loss (OPL):

$$OPL_{it} = \left(\frac{O_{it}}{P_{it}^*} \right) \left(\frac{P_{i,t+1} - P_{it}}{P_{it}} \right)$$

where t and i index regions and year respectively; O is the number of out-migrants as reported by the Statistics of Income Division of the IRS; P^* is estimated population from the IRS; and P is population from the Bureau of Economic Analysis. Unemployment and income data were from the BLS and the BEA's Regional Economic Information System respectively. Distress thresholds were 8.4 percent for unemployment rate (75th percentile), 75th percentile for ratio of income maintenance payments to personal income, and 25th percentile for OPL respectively.

Other studies have collected primary data to identify socio-economic problems characterizing distressed individuals, families, and communities. Fox and Chancey (1998), for example, analyzed the sources of economic distress, examining the relationship between six measures of economic stress and seven measures of individual and family well-being. Distress measures included income, perceived economic well-being, individual and spouse job instability, and individual and spouse job insecurity. Measures of individual and family well-being included psychological distress, self-affirmation, health, family accord, family conflict, and split-up. Results indicate that job and financial uncertainties negatively affected individual and family well-being for both men and women. For both employed men and all men, family conflict increased when a spouse experienced job instability and job insecurity.

The Florida Legislative Committee on Interregional Relations (LCIR) surveyed the county and municipal governments in the state regarding problems facing distressed communities and the extent to which federal and state revitalization programs used by local governments were successful in addressing the needs of these communities. Results from the survey revealed that the set of socioeconomic problems that characterized most distressed communities included (LCIR, 2003):

- Vacant and abandoned buildings
- Loss of jobs and corresponding high unemployment rates
- High dropout rates
- Inferior public infrastructure: streets in need of repair, crumbling sidewalks, lack of adequate street lighting, antiquated sewer/water systems, among others
- Low income households,
- Concerns for public safety and high crime.

Summary Evaluation: Past research has repeatedly identified key conditions related to whether a county is categorized as in distress or as having exited the distress category. These key conditions include poverty, labor market conditions, educational attainment, and net population loss.

3. Distressed Counties Programs of Other Federal Agencies

In addition to ARC, a wide range of federal and state agencies strive to counteract economic challenges in places of distress. Among these agencies are the Economic Development Administration (EDA), which under numerous program titles provides funding to projects in economically distressed places; the U.S. Department of Agriculture's (USDA) rural development programs that addresses housing electricity, water and sewage, empowerment zones, and enterprise communities; the Department of Housing and Urban Development (HUD), focusing specially on areas with persistent economic distress; and the Federal Emergency Management Agency (FEMA) which assists areas in need of disaster assistance. The Bureau of Indian Affairs; and the Tennessee Valley Authority (TVA) also plays key development roles as well.

Newly created entities established by Congress to address economic distress issues include the Delta Regional Authority (DRA), the Denali Commission, and the Northern Great Plains Regional Authority. Members of Congress have also proposed bills to establish regional development commissions in the Southwest Border Region and the Southeast Crescent region.

Each of these established agencies has targeted specific areas with a variety of special programs if they meet the distress threshold that has been established by the relevant agency. However, the geographical distressed areas served by ARC overlap, at times, with those designated by these agencies. Because many of these agencies are modeled after ARC, it is not surprising that they rely on similar indicators for determining a county's distress status.

In terms of indicator usage across the established distressed programs, in a review of 16 federal and 18 state programs, Fullenbaum and McNeil (1995) noted that three distress indicators are the most commonly used: poverty, unemployment, and income. Most agencies employ at least one or all of the indicators used by ARC. Only rarely would an agency consider a single indicator at the county level. Six of the sixteen federal programs combine population change or out-migration with such measures as poverty rate and unemployment.

Some federal programs, rather than relying on a set of criteria, have recently adopted an open-ended approach to determining distress eligibility. The EDA rests upon two primary measures of distress to determine a community's eligibility to receive funding: per capita income and unemployment rate. To qualify as distressed, a community must have an average per capita income which is 80 percent or less of the national per capita income average and an unemployment rate, for the most recent 24-month period, at least one percentage point higher than the national average. Also qualifying as distressed are communities facing actual or threatened severe unemployment or economic adjustment problems resulting from short-term and long-term economic shocks, including the following (EDA, 2002):

- Closure or restructuring of industrial firms essential to area economies;
- Military base closures or realignments, defense contractor reductions-in-force, and Department of Energy defense-related funding reductions; federally declared natural or other major disasters or emergencies; extraordinary depletion of natural resources, such as fisheries, coal, and timber;
- Substantial out-migration or population loss;
- Underemployment;
- Destructive impacts of foreign trade.

Although DRA is patterned after ARC in terms of structure, it uses EDA's criteria to identify distressed counties (Reeder and Calhoun, 2002). The Department of Housing and Urban Development (HUD) has recently proposed a change in the Community Development Block Grant (CDBG)'s formula which favors towns with large college student populations by including the incomes of these full-time dependent students in the calculation of poverty rate (HUD, 2006). To allocate funds, the proposed formula would be based on five variables including:

- The number of households living in poverty excluding full-time students;
- The number of overcrowded housing units;
- The number of female headed households with minor children;
- The number of homes 50 years or older occupied by a low-income family;
- The per capita income of the community relative to the per capita income of its metropolitan area.

Most programs consider absolute measures to determine distress eligibility, meaning that counties must reach a threshold to be considered distressed. Agencies such as HUD, USDA, and TVA adopt a relative standard on given indicators. Counties qualify for funds based on their ranks on selected distress measures.

Geographic units utilized by federal programs can range from entire counties to small communities. While a county may not qualify as distressed, it may have distressed ‘communities’ ranging from cities, towns, Indian tribes, census tracts, to subdivisions. Recognizing such a possibility, ARC designates as distressed areas census tracts within “at-risk” and “transitional” counties with a median family income no greater than two-thirds of the national average and a poverty rate at least 1.5 times the national average (ARC, 2006). Similarly, communities in non-distressed counties can qualify for EDA’s assistance if they meet the EDA’s eligibility definition. Sub-county distress measures based on census tract data are also used by the SBA and USDA’s empowerment zone and enterprise communities programs. Table 3.1 provides examples of distress indicators used across programs.

Programs	Distress Indicators					
	Poverty	Income	Employment	Population	Housing	Social/Economic
ARC	Poverty rate	Per capita market income	3-year Unemployment rate			
USDA1	High level of poverty rate greater than 30%					
USDA2		Median family income	Unemployment rate	Population change		
DRA		80% or less of national per capita income average	Unemployment rate at least one point higher than the national average	Substantial out-migration and population loss		
Ed Title1	Poverty rate					Number of children eligible for free school lunch
EDA		80% or less of national per capita income average	Unemployment rate at least one point higher than the national average	Substantial out-migration and population loss		- Destructive impact of foreign trade - Closure or restructuring of local industries
NGPA	- % of pop below 150% poverty level - % of pop below poverty level		Unemployment rate as of 2003	- %of pop ≤ 24 yrs - % of ≥ 65 yrs - Pop change		- % pop over 25 with bachelor's and higher - % of pop over 25 with high school and higher
HUD	Number of households living in poverty, excluding full-time college students	Per capita income of the community relative to the per capita income of its metropolitan area		Population size	-Overcrowded housing - Substandard housing - Cost of housing production - Housing built prior to 1940 - Housing with incomplete plumbing	Number of female headed households
SBA	Poverty rate 20% or more	- Median household income in non-metropolitan census tracts < 80% of the statewide median household income - 50% or more of households in metropolitan census tracts with income below 60 % the area median income				

Source: Bischak, 2002; Reeder and Calhoun, 2002; and HUD, 2006

Table 3.1: Distress Indicators Used across Distressed Counties Programs

4. Conceptual, Theoretical, and Empirical Issues

Academic and policy-oriented literature on the use and construction of socioeconomic indicators is vast. Indicators are summary tools used to delineate current status, problems, and trends. These tools enable policymakers and other decision-makers to assess important attributes of local and regional conditions, to evaluate specific programs, and determine the impacts of programs and policies (Miller, 1993). Academic researchers also use socioeconomic indicators to address a wide array of scholarly and policy-oriented questions. Socioeconomic indicators are innumerable in scope, but Sections 2 and 3 (Part I) explain that the most common measures of distress include poverty, unemployment, educational attainment, and income.

It should be kept in mind that a variety of measures constructed from data sources that can be used to operationalize any indicator. For example, poverty can be operationalized by using the official U.S. poverty rate, which is considered an indicator of “absolute deprivation” or by other measures, such as the proportion of a population whose income falls below 50% (or some other proportion) of the national median family income, which is a measure of “relative deprivation” (Schiller, 2008).

4.1. Conceptual and Theoretical Issues in Producing Robust Indicators: A Framework to Guide Selection

Drawing from the academic and policy-oriented literature on socioeconomic indicators, we offer brief points relevant to analyzing distress in the Appalachian region. Most broadly, the selection of appropriate indicators needs to be based on a sound conceptual and theoretical framework. Such a framework helps avoid *ad hoc* data collection and analysis and allows for the selection of indicators that best target distress. We briefly describe such a framework.

Defining the Meaning of “Distress”: To select appropriate indicators, the general concept being assessed needs to be defined. Glasmeier et al. (2003) note that there is no universally accepted measure of distress among federal agencies. A clear definition is particularly needed because government agencies’ use of “distress” tends to become blurred and imprecise as they respond to changing mandates. This in turn, affects the ability to meet big-picture goals. Distress, for example, can be conceptualized in terms of poverty alone, sufficiency or insufficiency along various other resource-related criteria (e.g., education, population increase, employment, income, health), and social exclusion or inclusion (e.g., isolation from nonpoor groups, social life, and services) (Garner and Short, 2002; Nelson et al., 1998; Schiller, 2008).

The ARC originally characterized “distress” as “underdevelopment,” essentially focusing on economic development in the entire region (ARC, 1999). In 1983, with the introduction of the Distressed Counties Program, poverty and other insufficiency indicators assumed a more prominent role in defining distress. Our observation in reviewing materials from ARC is that current interest centers on distress as an indicator of persistent structural problems that reduce residents’ well-being, with a focus on economic insufficiencies.

Using Government or Local Citizens’ Definitions of Distress: A related point is the question whose definition of distress should prevail? Social indicators can be conceptualized through

“subjective indicators,” that is, indicators that local citizens or community residents themselves evaluate, such as their perceptions of personal and local economic conditions. These types of indicators are associated with a “bottom-up” approach to community development because residents themselves decide the indicators that matter to them (Pike et al., 2008). Alternatively, distress can be defined through “objective indicators” such as official statistics collected in censuses. These types of indicators are usually associated with top-down approaches to community development, whereby external evaluators such as government agencies or other policymakers, decide the standards that are to prevail. Each of these ways of conceptualizing distress provides a different, equally important view of local conditions—but the views do not necessarily coincide (Garner and Short, 2002). That is, residents may not perceive distressed conditions even in communities where the poverty rate is high. As is customary in governmental agencies, ARC’s measure of distress is based on objective indicators and our report centers on these indicators.

Using Theory to Define Distress: In order to ideally define distress, analysts need to draw from theory or “a systematic explanation for the observed facts” (Babbie, 1989). Theory provides guidelines for selecting the indicators that best represent distress, assessing the causes of distress, and designing policies that are intended to alleviate it. Social scientists have developed a number of theories addressing the determinants of poverty and related forms of distress. A succinct review is provided by Schiller (2008). He notes that theories depend upon the degree to which individual attributes (such as individual decisions and responsibility), structural attributes (such as the local economy), and government (such as a weak or strong social safety net) are emphasized as determinants of poverty and other distress. There are also different theories addressing the contrasting question of regional well-being or development—its determinants, definition, and policies that can promote it. Pike et al. (2008) provide a recent review of these theories. The conceptualization and measurement of distress (and its obverse, regional development) should fit with the underlying theory that specifies its attributes and causal determinants.

Specifying the Time Horizon: In conceptualizing distress, it is important to define the time horizon. Common distress indicators are often oriented at providing a backward view of distress; they are limited at identifying the risk of future distress. Thus, policies may be put in places that fail to address emerging problems if they rely on current distress indicators. For example, recent downturns in local housing markets could not be anticipated using conventional income-based measures. Glasmeier et al. (2003) note the ability to track both long-term and short-term distress conditions needs to be part of the mix.

Validating Indicators of Distress: Once distress is defined, indicators should reflect its intended meaning—they should have validity. By validity, social scientists mean indicators should have several important properties that allow them to capture the underlying concept(s) (Babbie, 1989:124). One of these qualities is face-validity -- essentially transparency; indicators should reflect common agreement and shared understanding (such as among researchers, practitioners, and policy-makers) that the indicator is indeed tapping distress. As we show below, analysts debate whether some indicators such as a high elderly population should be treated as markers of distress. A second quality is predictive validity, the degree to which the indicator is predictive of the situation in the future. For example, past poverty rates tend to be

very good predictors of those in the future, but past unemployment rates may not perform as well. A third quality is content validity-- the degree to which an indicator covers “the range of meanings included within the concept” (Babbie, 1989).

Poverty, for example, tends to have a great deal of content validity in that it covers innumerable forms of distress caused by lack of income in a modern society. The U.S. poverty threshold itself was formulated to implicitly capture major forms of distress, extrapolating from food to housing and other consumption expenses. Poverty is thus a good umbrella indicator that depicts other forms of distress. As a fourth quality, indicators should have construct validity, which refers to how an indicator relates to other indicators. If the indicator is supposed to tap distress, it should correlate with other like-indicators. Again, poverty is an excellent example of an indicator that correlates with common “distress” indicators -- such as unemployment, educational attainment, and adult and child health. At the same time, it should be kept in mind that indicators can be selected to tap different dimensions of distress, so the degree of correlation can vary among indicators.

4.2. Socioeconomic Indicators and Selection of Specific Variables for Distress Indexes

Once the precise conceptual indicators of distress are defined, measures or variables can be constructed. Variables have strengths and limitations along several lines that affect their usefulness for inclusion in distress indexes like the one currently employed by ARC.

First, measures raise the same issues of validity discussed above. Ideally, measures should be transparent and usefully predictive of present as well as future distress. Umbrella variables such as the “general poverty rate” allow indexes that can be constructed with greater parsimony. They minimize the number of variables that need to be included and the time, effort, and data steps required to create them. Such variables also simplify interpretation. On other hand, in an effort to create parsimonious indexes, important variables that provide new or independent information about distress may be left out. Thus, index construction needs to balance the trade-offs between inclusion and exclusion of pertinent variables. Typically, if variables are measuring the same indicator, they correlate with one another. However, if distress is defined as a multi-faceted concept—which we believe it should be—then variables measuring different indicators of this concept may not correlate highly.¹

Second, since ARC employs “objective” or secondary-data indicators, selection of measures is dependent on available federal and other data sources, which vary in quality, geographic

¹A mix of indicators is important to identify distress among the ARC counties. Roback (1982) demonstrated why employing only a few, select indicators can be inadequate. She shows that locations profitable for firms have higher wages and higher land or property values, but locations attractive to households have lower wages due to greater labor supply and higher land prices. Her analysis shows that vibrant communities can have high or low wages – and high or low per capita incomes. Similarly, depending on whether a region’s strengths are dominated by firm or household preferences, a vibrant region can have very low or high unemployment rates (Partridge and Rickman, 1997). It hinges on whether residents are willing to remain in a region if they are unemployed. This analysis illustrates why certain indicators such as average wages, income, and unemployment rates can be imperfect measures of distress when used in isolation. The rationale also underlies Partridge and Rickman’s (2003) call for multiple measures to indicate whether a region is experiencing broad-based prosperity or distress.

coverage, cost, and timeliness (Feeney et al., 1995). One quality that social scientists expect measures to have is reliability—the idea that repeated measures applied to the same observations will yield the same, consistent results (Babbie, 1989). Some measures are more reliable than others due to their data source. For example, where data are reported in a different manner by state, such is the case with the Census of Governments, reliability is more problematic (e.g. measurement error is introduced due to different methods of data collection procedures in each state). Another issue is geographic coverage. While numerous potentially useful measures exist, many are not available across counties, particularly small ones. Cost considerations are also important. The frequency of data collection affects the degree to which data are timely enough to assess distress conditions. To fully capture distress, measures should enable the assessment of both long and short-term distress.

Finally, once variables are selected, decisions need to be made about the manner by which counties are then classified as “distressed.” One method of classification is to use an absolute cut-off point, or threshold under which counties fall, to designate the county as distressed. For example, a county could be classified as distressed when its unemployment rate exceeds a certain threshold unemployment rate. A contrasting method of classification is to use a relative cut-off point in which some proportion of counties (e.g., the top 10%) is designated as distressed. Measures using absolute cut-off points are problematic because they tend to assume an unchanging threshold when this threshold may vary in relevance over time. Moreover, for most variables, no widely agreed upon standard threshold points have been set by researchers. For these reasons, absolute thresholds may produce unsatisfactory or unreliable results whereby distress is not consistently captured. Related discussions of this issue are found in Feser and Sweeney (2003) and Schiller (2008). By contrast, “relative” measures of distress have the advantage of changing over time as national conditions and norms change. Indeed, it may be more defensible to argue that a county is “distressed” if it falls in the bottom 10% of U.S. counties than try to defend that, for example, a 25% poverty rate indicates distress but a 20% poverty rate does not.

Other problematic issues arise when the classification system is an index that combines different measures of distress. Variation in types of distress can become masked (Glasmeier et al., 2003). A county that fares markedly worse on one measure may be ranked as not distressed if other measures are favorable because summary indexes can wash-out the effects of any one individual measure. Classifying counties based on index scores into an “either/or” situation also adds arbitrariness. For example, the 78th county that just made the “distressed” category in FY 2008 is likely little worse off than the 79th county that was ranked at the top of the “at risk” category. Yet, they could be treated very differently in funding priorities. Our point is that distress is not likely to be captured with a threshold, but is more accurately reflected by a continuum (ARC, 1999).

One possible solution to the “either/or” question is to adopt an additive index with carefully selected weights for each indicator. A community is designated as being distressed if a particular threshold number is reached after taking into account a large number of distress measures. Yet, this still suggests that the ARC (or anyone else) can design the perfect weights and can identify

the perfect indicators of distress, which may be too complex to reasonably expect.² In FY 2007, the ARC adopted a more flexible meaning of distress (ARC, 2007). Rather than meeting some set threshold for each of the three distress indicators, the ARC now uses an additive measure across its three measures of distress. Specifically, if the *additive* sum of the three distress indicator measures fall in the lowest 10% of all U.S. counties, the county is deemed as falling into distress (ARC, 2007). While additive indexes still can mask distress among any one of their component variables, this is a more flexible and useful approach vis-à-vis past classification systems. Ranking distress relative to the universe of U.S. counties also gives the ARC a more transparent and defensible benchmark when describing “distress” to Congress and other stakeholders.

4.3. ARC Variables Measuring Distress

As noted in section 3 above, government agencies tend to use a common set of indicators for distress—e.g., unemployment rate, net population change/out migration, poverty rate, per-capita income, employment growth, etc. The ARC’s historic reliance on the unemployment rate, per-capita market income (PCMI), and the poverty rate, places the Commission in the mainstream. Yet, there are shortcomings with any set of measures, including those used by the ARC. Moreover, structural changes in the economy since the early 1980s (when the ARC first initiated the distress indicators) suggest an ongoing need to appraise alternative measures to assess whether they are still meeting current priorities.

Our reading of the historic ARC usage of the term ‘distress’ is that it reflects persistent structural problems that reduce the well-being of most residents of a given county. In practice, its common distress indicators have been backward looking, examining “past distress.” They are not necessarily indicative of future structural problems that may cause distress. This raises the question as to whether the ARC should be more strategic and consider future trends in determining distress? Is it that current ARC programs are more aimed at solving past problems and not proactive in mitigating emerging pockets of distress?

The ARC’s usage of distress does not generally measure cyclical or short-term deprivation—e.g., a closing of a rural community’s pulp mill is painful but does not necessarily portend to structural problems. This would stand in contrast to the Economic Development Administration (EDA) which places considerably more weight on short-term cyclical measures (Feser and Sweeney, 2003; Glasmeier and Wood, 2005). A justification for the ARC’s targeting towards long-term distress is that its mission is to alleviate structural problems, leaving short-term problems to other agencies.

In the following section, we summarize a series of potential ‘distress’ indicators, assessing strengths and weaknesses, their geography of coverage, cost, frequency, and timeliness. We begin with primarily “backward” measures of distress that are indicative of past structural

² Another issue with weighting the relative contribution of measures is that weights would probably need to vary over time. So for example, unemployment typically would be given a stronger weight in eras where distress was more dependent upon this indicator (i.e., such as was the case in the 1970s) but lesser weight today where unemployment has become more uniform across regions. It becomes difficult to benchmark indicators over time when different weighting systems are used for each time period.

problems. We then consider more “forward” looking measures that reflect emerging or continued evidence of distress. We give special attention to the current distress measures employed by the ARC, namely, PCMI, unemployment rate, and poverty rate.