

Developing and Assessing Potential Forward-Looking Distress Indicators for the Appalachian Region

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Executive Summary

The Appalachian Regional Commission (ARC) has been a proactive leader in advancing the region's well-being for over four decades. Part of its success is rooted in efforts to develop sound benchmarks from which to monitor the region's progress. The ARC's index of distress (composed of poverty, unemployment, and per capita income) has been a valuable tool in years past. But new economic realities have accelerated the need to explore the development of a set of indicators that are better aligned with the important shifts taking place in the region, nation and world. Without doubt, Appalachian communities with sizable numbers of poorly educated workers and those experiencing a near-constant outflow of talented youth and skilled workers are facing intense struggles in today's global economy. As a result of these shifting economic circumstances, the ARC commissioned a systematic re-examination of its distress index. The intent of this project is to identify a new set of core variables that can provide a more meaningful and current benchmark of the critical factors needed for long-term socioeconomic progress in the region.

In this executive summary, we provide an overview of the results of our ARC-supported project titled, *Developing and Assessing Potential Forward-Looking Distress Indicators for the Appalachian Region*. Funded in December 2008, the project was intended to develop a series of new distress indexes and to evaluate their performance vis-à-vis the current ARC index. The project team consists of economists and sociologists whose research experience and present institutional affiliations encompass Northeastern, North Central, and Southern states that are part of the ARC's geographic boundaries.

The project has three goals:

- Provide an intensive evaluation of alternative forward-looking indicators along with other indicators;
- Develop a series of new distress indexes; and,
- Compare the performance of these new distress indexes along with the current distress index used by the ARC.

To accomplish these goals, the following research tasks were undertaken and results achieved:

1. *Gathering background information from ARC staff and state representatives to inform data analysis and evaluation.* Personal meetings and webinar sessions were conducted that provided useful information about the relevance of a variety of indicators and statistical procedures. These multiple insights were incorporated into subsequent research and into this final report.
2. *Data collection and estimation of select variables.* The project required intensive data-collection from key sources for the 1996 through 2007 time period, as well as estimation of select variables. Given the importance of employing the best possible data available and the need for timely new indicators, the research team collected data from a variety of secondary sources in addition to the decennial Census of Population.

3. *Select and evaluate a series of key indicators for use as candidate variables in new distress indexes.* We evaluated approximately 40 variables that represent a group of seven types of socioeconomic indicators: population growth; educational attainment; income; housing and housing change; entrepreneurship and self-employment; labor market strength; and poverty. The indicators assessed include a set of forward-looking variables, with particular attention given to population growth, education (including college graduates), new labor market measures (including use of the employment rate as a replacement for the unemployment rate), as well as variables currently employed by the ARC. To evaluate these 40 potential candidate variables, we identified five variables (the poverty rate for 2007, per capita market income for 2006, total job growth over 1996-2006, population growth over 1996-2006, and the employment/population ratio for 2007) for use as the economic outcomes to help in selecting the candidate variables best correlated with future distress.

Based on our evaluation (through statistical analysis) of the 40 potential candidate indicator variables, the following five were determined to be most viable for incorporating into a distress index:

- The employment/population ratio;
 - Poverty rate;
 - Per-capita market income;
 - Percent of the adult population (25 + years old) with at least one-year of college education, and/or percent with at least a four-year college degree; and,
 - Ten-year percent change in population.
4. *Use the candidate indicator variables to develop new, alternative distress indexes and evaluate their ability to predict current and future distress.* Using various combinations of the five candidate indicators above, we developed two dozen different distress indexes, assigning each indicator an equal weight in each index. We evaluated these new alternative distress indexes (measured in the 1996/1997 period) to see how they performed in predicting future distress (as indicated by our benchmark indicators, the poverty rate for 2007, per capita market income for 2006, total job growth over 1996-2006, population growth over 1996-2006, and the employment/population ratio for 2007, along with the ARC's current distress index). We then evaluated these new alternative distress indexes, measured in the most recent time period, to see how they performed in predicting current distress.

Based on these analyses, six indexes were closely grouped in terms of best-performance. Of these, we determined the two best performing indexes to include: (a) the ten-year percent change in population, the employment/population ratio, the poverty rate, and the percent of the adult population with a college degree; and (b) all five candidate indicator variables. As we explain in Section 3 of this report, our recommendation is to adopt the candidate distress indexes that include the four-year college degree attainment (Bachelors degree) share rather than one-year college attainment.

5. *Compare the performance of the six new distress indexes with the current index used by the ARC.* We focused on the six best-performing indexes and compared them to the current ARC Distress Index. A series of maps and tables were generated to help identify specific counties that entered or exited the distress category when each of these six new alternative indexes were compared with the current ARC indicator.

Overall, the results of our analysis show that with the use of the new candidate indexes, a greater number of ARC counties would be classified as either distressed or at-risk when contrasted with the current ARC Index. This pattern is relative to the nation in that we employ the same classification scheme used by the ARC. In particular, the lowest 10% of U.S. counties are defined as “distressed” and the lowest 10- 25% of counties as “at-risk.” Compared to the 74 distressed and 88 at-risk that are delineated using the ARC’s current FY 2007 index, between 82-95 counties are classified as distressed and 87-112 are defined as at-risk using the six new candidate indices that we developed.

In conclusion, the new candidate distress indexes should provide a useful benchmark for charting the progress of the Appalachian Region. The indexes are composed of indicator variables that should be credible, transparent, and acceptable to the ARC, Congress, and OMB. The indexes can be constructed in relatively up-to-date manner. Finally, the indexes perform well in identifying the counties that are currently in a distress, as well as in predicting the counties that are at greatest risk for falling into future distress. Because ARC policy interventions are particularly aimed at reducing future distress, these new candidate indexes should be useful in guiding the critical investments needed to sustain the region’s progress in the years ahead.

Introduction and Overview

The Appalachian Regional Commission (ARC) has been a proactive leader in advancing the region's well-being for over four decades. Part of its success is rooted in efforts to develop sound benchmarks from which to monitor the progress achieved both in the region as a whole and in the smaller core of counties designated as economically distressed. The ARC's current index of distress (composed of poverty, unemployment, and per capita income) has been a valuable tool in years past. But the region's new economic realities have accelerated the need to identify a more meaningful set of measures for monitoring the region's long-term social and economic progress and vitality. Knowledge-based jobs, for example, are core drivers of prosperity in today's economy and entrepreneurial-friendly communities are a vital part of spurring local innovation and creativity. As such, these types of economic shifts should be accommodated in any new measure of distress.

No doubt, these changed economic realities are proving burdensome to many Appalachian communities, particularly those with sizable numbers of poorly educated workers, those that have faced a near-constant outflow of talented youth and skilled workers, and/or those with a limited history of support or commitment for entrepreneurial and knowledge-based development. As a result of these shifting economic circumstances, the ARC has launched a systematic re-examination of its economic distress index, the matter that is at the very heart of our project. The intent of this project is to explore a new set of core variables that can offer a more contemporary examination of the critical elements needed to promote long-term socioeconomic progress in the region.

In this report, we document the results of our ARC-supported project titled, *Developing and Assessing Potential Forward-Looking Distress Indicators for the Appalachian Region*. Funded in December 2008, this initiative is intended to develop new alternative distress indices and to evaluate their performance vis-à-vis the current ARC measures. The project team consists of economists and sociologists specializing in community and regional well-being and spatial analysis. The team's research experience and present institutional affiliations encompass the three regions (Northeast, North Central, and Southern) having states that are part of the ARC's geographic boundaries. The project builds on the research team's past work for the ARC, as documented in the report *An Assessment of Alternative Measures for Determining Economically Distressed Counties and Areas in the Appalachian Region* (April 2008). In this earlier report, we outlined the strengths and limitations associated with ARC's current indicators. Moreover, we delineated new indicators, including "forward-looking" measures -- such as educational attainment, housing change, and entrepreneurship -- that we believed would perform better than current measures in guiding the type of critical investments that will be needed by the ARC in the region.

The project has three goals:

- Provide an intensive evaluation of alternative forward-looking indicators along with other indicators;
- Develop a series of new distress indexes; and,
- Compare the performance of these new distress indexes along with the current distress index used by the ARC.

This report describes our project's accomplishments in meeting these three goals. In this introductory section, we provide a brief overview of tasks completed and the results of our research. The subsequent sections of this report provide a more detailed discussion of the research results associated with each of the project three goals.

Overview of Project Accomplishments:

We first offer a snapshot of the important activities that we have accomplished over the course of this project. In sum, we completed the following:

Gather information from ARC to inform data analysis. Since the start of the project, the research team has held conference calls, undertaken email discussions, and met on a face-to-face basis with ARC staff/representatives to gather information about specific needs and to solicit comments about the usefulness of particular indicators and statistical procedures. On February 4, 2009, the team conducted a webinar from the ARC headquarters in Washington to describe our research plans and procedures to the ARC State Representatives and ARC staff. On June 8, 2009, the team provided a preliminary report and conducted a webinar from the ARC headquarters to explain the results to the ARC State Representative and ARC staff. These inputs provided useful information about the relevance of different indicators and statistical procedures. These multiple insights have been incorporated into our subsequent research endeavors and into this final report.

Collect data and undertake estimation of select variables. This project required intensive data-collection, data-base management, and estimation of variables. In order to evaluate the future performance of indicators, it is important that data for each specific indicator be available for a span of at least one decade. As such, our team retrieved data from key sources for the 1996 through 2007 time period. Given the importance of employing the best possible data available, coupled with our desire to examine a variety of new indicators, the research team had to collect data from a variety of secondary sources in addition to the decennial Census of Population, factors that added complexity to the programming and data-base management components. Finally, as we explain below, some variables were not available for all counties for the years required and as such, they had to be estimated statistically.

Select and evaluate a series of indicators that can be used as candidates for a new distress index. We evaluated approximately 40 variables that represent a group of seven types of indicators: population growth; educational attainment; income; housing and housing change; entrepreneurship and self-employment; labor market strength; and poverty. The indicators we

assessed include variables currently being used by the ARC and a set of forward-looking measures, with particular attention given to population growth, education (including college graduates), and new labor market measures (including use of the employment rate as a replacement for the unemployment rate). To evaluate these 40 potential candidate indicators, we identified five indicators (the poverty rate for 2007, per capita market income for 2006, total job growth over 1996-2006, population growth over 1996-2006, and the employment/population ratio for 2007) for use as benchmark indicators in selecting the candidate variables that best correlated with future distress. Based on our evaluation (through statistical analysis) of the 40 potential candidate indicators, the following five were determined to be most viable for incorporating into a distress index:

- The employment/population ratio;
- Poverty rate;
- Per-capita market income;
- Percent of the adult population (25 + years old) with at least one-year of college education, and/or percent with at least a four-year college degree; and,
- Ten-year percent change in population.

Use selected indicators to develop new alternative distress indexes. Using the five candidate indicators above, we developed approximately 25 different indices (by combining various indicators and assigning each indicator an equal weight in each index). We evaluated these new alternative distress indexes (measured in the 1996/1997 period) to see how they performed in predicting future distress (as indicated by our benchmark indicators, the poverty rate for 2007, per capita market income for 2006, total job growth over 1996-2006, population growth over 1996-2006, and the employment/population ratio for 2007). As we explain below, based on this analysis, six indexes were closely clustered in terms of best-performance. Of these, the two top performing indexes were composed of: (a) all five candidate indicator variables; and (b) the employment/population ratio; the poverty rate; college educational attainment levels; and the ten-year percent change in population.

Compare the performance of the new distress indexes with the current index used by the ARC. We used the six best-performing indexes and compared them to the current ARC distress indicator. Maps identify specific counties that enter or exit the distress category when each of these six new alternative indexes is compared with the current ARC indicator. In particular, in comparison to the 74 distressed and 88 at-risk counties identified using the current ARC FY 2007 index, between 82-95 counties are classified as distressed and 87-112 are noted as at-risk using our six new candidate indexes.

In the following sections of this report, we provide more detailed documentation of the results for each of the three goals of the project: (1) Evaluate and select candidate indicators; (2) Develop a series of new distress indexes; and (3) Compare the performance of these new distress indexes along with the current distress index used by the ARC.