

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

Prepared by

Mark Partridge
Linda Lobao
Ayesha Enver
Wilner Jeanty
Ohio State University

Bo Beaulieu
Roberto Gallardo
Mississippi State University

Stephan Goetz
Penn State University

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.

The Candidate Indicators: General Issues in Selection and Evaluation

The methodology for selecting the candidate indicators follows the principles delineated in the team's April 2008 report. These principles can be summarized as follows:

- Selection of indicator variables should be based on credibility, transparency, and acceptability to the ARC, Congress, and OMB. Moreover, we follow the current ARC practice of ranking the variables relative to the rest of the country when determining the particular category of distress, an approach is that likely to prove more defensible in the eyes of external observers.
- The component indicator variables selected for each index should be as up-to-date or produced with as little time lag as possible.
- The subsequent index constructed from the indicators variables should be accurate in terms of capturing economic distress in the ARC counties.

Based on the objectives outlined in the project proposal, our *first* priority is to consider forward-looking measures (such as population growth and educational attainment). Another priority is the inclusion of new labor market measures, such as the employment-to-population rate, as potential replacements for the unemployment rate. As a *secondary* priority, we consider other measures outlined in our April 2008 report as being potentially useful. For example, we examine how measures of building activity and expansion of bank branch offices can be tapped as potential forward-looking measures. Overall, as we explain below, we select and evaluate a total of 40 different indicators within seven specific groupings, as prospective variables that could be used to construct a new distress index.

Sources of Data and Issues in Constructing Indicators

One of the traditional critiques of the ARC distress indicators is that some of the data are typically drawn from the decennial Census, which means that these variables become rather dated as the end of a decade draws near. This major shortcoming is expected to be overcome with the planned full implementation of the American Community Survey (ACS). Officially, the Census Bureau still maintains that by late 2010, the ACS will produce *annual* data that will capture all of the elements of the decennial Census long-form at a disaggregated geographical level including county, census tract, five-digit zip code, and census block group (though there are some restrictions for small samples).¹ Because the ACS data are derived using sampling, the accuracy will be reduced for less-populated counties. Likewise, the data will not be perfectly up-to-date since a five-year moving average will be used for less-populated geographical locations—though that has the offsetting advantage of averaging out year-to-year fluctuations (as is currently the case in the housing market) that do not capture long-term distress. However, we

¹For more details of current Census plans for the ACS, see U.S. Census Bureau (2009) and Office of Management and Budget (2009).

believe that the ACS will produce reasonably accurate estimates based on its sampling procedures. Thus, despite the shortcomings of the ACS, we view the annual availability of data for less-populous counties to be a significant improvement for calculating future ARC distress indicators.

When deriving the candidate distress indices, we examine how candidate variables measured in circa 1996/1997 are associated with current distress measured in (or as close as possible to) 2006/2007. However, as described in more detail in a latter section of this report, some of our variables are estimated due to limitations in the availability of current data. For example, the 2007 employment/population ratio and the 2007 labor-force participation rate are estimated because the denominator—population 16 years and over—is not reported annually by the Census Bureau. Instead, the Census annually produces estimates of the county population 18 and over, as well as the estimated county population between 14 and 17 years of age. For 1996/1997, data to estimate the employment/population ratio or the labor force participation rate do not exist. Therefore, we substitute their respective rates from the 2000 Census. Fortunately, such interpolation will not be necessary with the ACS because it will directly report the necessary data. Thus, we believe that when ACS data is fully available, the employment/population and labor force participation variables will be even more strongly linked to distress than the numbers being used here.

Another issue in the choice of indicators involves the time-period required to capture distress. We use ten year measures of job and population growth because they capture the persistent nature of distress that we are seeking to measure. For example, short-term changes in job or population growth may reflect a temporary, cyclical event such as a plant opening or closing, or a transitory shock to the housing market. Whether such changes are indicative of a major change in the county's underlying prosperity would depend on whether the (say) newly laid off workers find work locally, or even outside of the county through commuting. Only after some period of time has elapsed would true economic distress reveal itself through these offsetting adjustments. Indeed, as the "New Economic Geography" literature, the economic impact literature, and the military-base closing literature indicate, communities that face adverse events such as a major military-base closing, natural disaster, or even an intensive military bombing exercise, generally return to their long-term growth paths within a period of about ten years (Edmiston, 2004; Poppert and Herzog, 2003; Kilkenny and Partridge, forthcoming).

It is important to note that five-year measures of job and population growth are likely to be inadequate measures of long-term distress. This conclusion is generally confirmed by Partridge et al. (2008, Chapter 6) when they found that replacing the unemployment rate by the five-year change in population would result in a relatively small number of changes in the number of counties that would be classified as being in distress compared to the current ARC distress index. Thus, we view ten-year changes in population and job growth as good measures of distress as they are long enough to balance out short-term events, but not so long as to capture trends that are not germane.

We do have specific concerns with regard to the use of poverty rate and educational attainment in any index. These variables are not currently available on annual basis for all counties. One of

the key measures that would likely be included in any distress index is the current poverty rate. Of course, a key shortcoming of using county poverty rates is that the most accurate poverty estimates are obtained through the decennial Census. Not only is this a problem for calculating annual measures of distress, but it presents problems for our study because we would prefer to have annual measures. Specifically, much of our analysis will use data from the circa 1996/1997 and the circa 2006/2007 periods. To avoid this data-availability shortcoming, we adopted the U.S. Census Bureau's Small Area Income and Poverty Estimates (SAIPE) as our annual estimate of poverty. One weakness is that the SAIPE does not produce direct estimates of county poverty, instead relying on estimates derived from personal income and tax data. To examine whether the SAIPE data are accurate enough for our purposes, we calculated the simple correlation coefficient between the 1999 county SAIPE poverty rate and the 1999 poverty rate derived from the 2000 Census (with the 2000 Census estimate viewed as being quite accurate). The correlation was equal to 0.94. The corresponding correlation using 1989 data equaled 0.95. We view this correlation as high enough to move forward with the SAIPE estimates in our study. Again, this would imply that using the ACS data would lead to even stronger predictors of future distress than the SAIPE poverty data used in this report—i.e., the ACS would present direct measures of poverty, not the estimates used to derive the SAIPE figures.

A final key variable is educational attainment. Unfortunately, accurate county-level annual data on educational attainment are not available between the Census decades. Thus, we are forced to rely on the 2000 decennial Census educational attainment data. Again, we expect that the annual ACS data will allow for more accurate future predictors of distress because the ACS will produce measures of educational attainment.

The Set of Indicator Variables Evaluated

We select and evaluate a total of 40 different indicators, within seven specific groupings that are described in our earlier report, as potential variables that could be used to construct a new distress index. These variable groupings and the specific variables within each group are described in the remainder of this section.

1. ***Population growth:*** This indicator, including its key component of net population migration, measures an important response for dealing with economic decline in a community; residents, in effect, vote with their feet by moving away if they believe that a place offers only a bleak economic future. As such, population growth needs to be considered carefully in any redesign of the distress index. Net population loss is a real measure of economic deterioration, whereas population growth may occur either in response to economic expansion or to features such as attractive natural amenities (as in retirement migration, for example). Over longer periods, population growth also serves as a close proxy for employment change, another key economic component that is essential to capture.

Adjustment assistance to counties experiencing significant population loss can be motivated with two key arguments: (1) those staying behind have to deal with the very real negative fiscal and other consequences of a smaller population base; and (2) assistance could stem or even reverse the net out-migration. A third, more indirect argument is that congested or

sprawling metro areas receive a public benefit when in-migration from declining areas is held in check.

We analyze the percent population growth between 1986-1996 and 1996-2006 using population estimates from the US Census Bureau (www.census.gov/popest/counties/). As elaborated above, we use the most current data available at the time of this study and we choose ten-year periods so as to even out short-term fluctuations and to focus on longer-term trends.

In addition to actual population counts, we consider the percent change in the population 20 years of age or younger (data were also obtained from the Census Bureau). The reason for singling out this age group is that it represents, in many ways, “the future” -- both metaphorically and as the concrete workforce of a community. Furthermore, research suggests that once these individuals leave, it is difficult to attract them back to the community.

2. **Educational Attainment:** Education is the prime measure of human capital and serves as an underlying determinant of an individual’s *current* and *future* earnings capacity. Returns to education (or spillovers) are enhanced when those with a college degree can locate near other workers who also hold college degrees. Moreover, education is highly correlated with poverty and it is associated with an individual’s ability to adjust to economic change, take advantage of new opportunities, and succeed more generally in the knowledge economy. For these reasons, education is connected to current distress and it is a forward-looking measure of future distress.

Indeed, adding high school educational attainment as an indicator may be more important than adding population growth in terms of affecting county exit/entry into/from distress (see Section 6 of our April 2008 report). We consider a full set of human capital measures, including the share of the adult population (25 + years old) in 2000 with: less than a high school diploma (nursery school through grade 12 but no diploma); only a high school degree (34.7% of the total); an associate’s degree or more, including BA, MA, professional, and Ph.D. degrees (22.2%); at least four years of college with degree completion (16.5%); at least one year of college (64.7%); and the percent with less than one year of college (35.3%). These data are drawn from the US Census Bureau (www.census.gov/population/www/socdemo/educ-attn.html), and they allow us to determine whether a community lacks sufficient human capital to compete in the knowledge economy.

3. **Income:** Per capita market income is another important measure of economic well-being or distress, and as such, we consider it carefully as a candidate in the new index (as it is currently also used in the ARC’s Distress Index). Yet, as noted in our April 2008 report, lower per-capita income can reflect a higher level of amenities, lower cost of living, and other factors that are not necessarily related to distress. For these reasons, we also evaluate other measures of income and earnings, such as *changes* in per capita income between

1986-1996 as well as 1996-2006. Income data are from the Bureau of Economic Analysis, Regional Economic Information System (www.bea.gov/regional/index.htm).

As the availability of natural amenities (including a favorable climate) tends not to change over time, we can conclude that any shifts in income observed over time are due to changes in factors other than natural amenities – such as deteriorating local economic conditions. In other words, a community with low or even negative income growth rates is truly experiencing economic difficulties, and not just attracting new residents who are willing to give up income for better amenities.

4. ***Housing or Housing Change:*** Housing construction activity, coupled with changes in property values, reflects the forward-looking economic outlook of each individual county. Housing is not only a fundamental human need but has been, until just recently, viewed as an important – if not the key -- vehicle for wealth creation. Homeownership may also be a key source of social stability and social cohesion in communities.

Changing property values denote local on-the-ground assessments of the future direction of the community by private businesses or entrepreneurs (the market). Also, changes in new home construction can provide good forecasts of future population shifts. In fact, the University of Michigan includes building permits issued as a key indicator in its national indicator of leading economic activity. Thus, innovative measures of housing conditions can be useful additions to a forward-looking index.

We examine building permits data (both permits issued and values of the permits) from the Census Bureau (www.census.gov/const/www/permitsindex.html). In addition, we identify an equally current data series from the same source on the number of housing units in each county, for the ten-year intervals corresponding to those used for population and employment changes. Since permits reflect intended rather than actual starts, and given the upheaval in the housing market associated with the present economic collapse and concerns about the completeness of the permitting process in some ARC states, we include only the actual number of housing units (from the Census Bureau) for the periods 1990-2000 and 2000-2007 in our analysis. In fact, the housing unit measure outperforms the building permits measure on virtually all counts. The data source is censtats.census.gov/cgi-bin/usac/usatable.pl.

In addition, we examined changes over time in the number of bank branch offices as supplemental predictors of subsequent economic growth. Banks are key sources of funds for homebuyers and other local businesses wishing to expand. Bank branch numbers are based on official counts and as such do not suffer from potential under-reporting problems (as may occur with residential building permits). However, our analysis shows that growth in bank branch offices tends to follow population expansion, rather than the other way around. Thus, it is more of a lagging indicator and thus, we choose to rely on population growth.

5. ***Entrepreneurship and Self-Employment:*** A forward-looking measure of the local community's ability to compete is the presence of strong entrepreneurial capacity. Though "entrepreneurial capacity" cannot be directly measured from any federal data source, a plausible proxy is self-employment in the form of small business ownership. Because new business formation is motivated by a host of favorable (e.g., a new idea or business opportunity) and unfavorable (e.g., a factory lays off workers) reasons, we attempt to sort out entrepreneurship of "necessity" from entrepreneurship of "opportunity" in the region. As described (section 5.2.5) of our April 2008 report, one clue about the extent to which self-employment growth in an ARC county is a response to opportunity as opposed to necessity may be found in the returns to self-employment, measured as average earnings per self-employed worker. This distinction between different forms of entrepreneurship may be an important measure of a county's ability to adjust to new employment realities.

We obtain data on both self-employment numbers and earnings from self-employment from the Regional Economic Information System of the U.S. Bureau of Economic Analysis, for 1996 and 2006 (www.bea.gov/regional/index.htm). In order to compare counties of various sizes, we express these numbers either as a percent of the total workforce (in the case of jobs) or as a percent of total earnings (in the case of incomes). We also examine the earnings per self-employed worker in order to sort out opportunity entrepreneurship (higher earnings) from entrepreneurship of necessity (indicated by lower earnings). After careful analysis, we conclude that self-employment, while correlated with local economic strength, does not provide sufficient additional information beyond that already contained in job changes over time to warrant inclusion of this measure in a distress index.

6. ***Labor Market Strength:*** We consider several measures of labor market conditions as candidate variables for the distress indexes. As noted in our April 2008 report, the unemployment rate fails, in general, to adequately capture labor market conditions. The *employment rate* (employment rate divided by the population that is sixteen years old and over), in conjunction with annual employment growth, are better indicators of overall labor market strength. The employment rate directly captures labor-force participation, unemployment and discouraged-worker effects. It proves more informative than the conventional unemployment rate measure. Specifically, an ARC county may have low employment rates due to a combination of high unemployment rates (i.e., those non-employed individuals who are *actively* seeking work) and low labor force participation because large numbers of non-employed individuals are not working or not actively seeking work.

In particular, we calculate the employment to population (16 years and older) ratio for 2000 and 2007 from Census Bureau data [see discussion above on data collection issues for intercensal years], the labor force participation rate in 2000 and 2007 (workers who are in the labor force relative to all those eligible) and the 1997 unemployment rate, for comparative purposes.

7. ***Poverty Rate:*** We maintain that the poverty rate should remain one of the core variables of the ARC distress index. Our investigation considers the overlap of poverty with the other

indicators included in the complete distress index, as is described in more detail further below in this report. Data are from www.census.gov/hhes/www/poverty/poverty.html.

To summarize, along with the current variables used by the ARC, our *first* priority is to consider forward-looking measures, such as population migration and educational attainment (e.g., college and high school graduates). Another priority includes the new labor market measures, such as the employment-to-population rate, as a potential replacement for the unemployment rate. In this construction, we also explore using the U.S. Census Bureau's Longitudinal Employer-Household Dynamics (LEHD) database to derive innovative measures of employment activity and job quality. However, as this data collection effort is still not complete for all of the ARC states, we are unable to conduct the same comprehensive analysis covering all geographies as we have done with the other variables. The major shortcoming of LEHD data is that it does not go back very far in time, making historical analysis impossible for our assessment. Thus, while the LEHD is a treasure trove of data, it is not useful for the historical analysis that is necessary to derive new distress indices.

As a *secondary* priority, we consider the other measures described above. In particular, for housing, we examine how measures of building activity and expansion of bank branch offices could be used in a potential forward-looking index. Here, we determine that population growth more effectively captures local conditions and that bank offices are more of a lagging than a leading indicator (in effect, population growth drives these other measures). Likewise, we consider measures of entrepreneurial activity as another forward-looking measure.

Geographical Patterns in the 2006/2007 County Patterns of Indicator Variables

Figures 2.1 to 2.8 display maps for eight indicator variables that we are evaluating. The first set of maps (labeled with an "a") is for the U.S. and the second set of maps (labeled with a "b") is specifically for the ARC region only. The maps display the variables in standardized or Z-score form. As we explain in more detail below in Section 3, the Z-score is a simple numeric transformation that makes it easier to directly compare the distributions of two different variables. For example, it is difficult to directly compare the poverty rate, which is measured as a percentage, with per capita market income, which is measured in dollars per person. With the Z-score transformation, variables that inherently vary a great deal (or statistically those with a large standard deviation), are scaled so as to make them more comparable with variables that do not vary as much from one county to the next. For example, we can directly compare unemployment rates, which may vary nationally from 4% to 18%, to poverty rates that may vary from 5% to 50%.

Figures 2.1a and 2.1b show Z-scores for the rate of population growth between 1996 and 2006. While the center of the nation experienced remarkable population loss, so did a core set of ARC counties that straddle the Kentucky, West Virginia and Virginia borders. A closer look at Figure 2.1b shows that four of these counties are in southwest West Virginia, and one each is located in Kentucky and Virginia. The important role of commuting and attendant urban sprawl is evident from the significant population expansion in eastern Pennsylvania and eastern West Virginia, as well as around the Atlanta metropolitan area. In the national map (Figure 2.1a), significant

population growth stands out in Texas in the Dallas-Ft. Worth mega-region (note the ring around the urban core), San Antonio, and Houston, as well as in selected counties of Colorado, Arizona and Nevada.

The Z-score map for the 2000 adult population share with at least one year of college (Figure 2.2a) shows considerable concentration, with high shares especially in Colorado and in a handful of counties in Wyoming, Montana and Idaho. In the eastern half of the nation, high concentrations of this variable tend to be found in or around major cities. In Figure 2.2b, for the ARC counties, higher shares of adults with at least one year of college are found in large cities or college towns (such as Centre County, PA, home to Pennsylvania State University).

Figures 2.3a and 2.3b, showing z-score maps of the proportion of adults who have completed a four-year college degree, are similar to the immediately preceding maps, and yet there are subtle and important differences. In particular, Figures 2.3a and 2.3b appear to be lighter in color, suggesting that the *relative* concentrations of adults with four years of college in certain counties tends to be greater than is the case for adults with just one year of college. Especially in Figure 2.3b, the relatively small share of adults having completed four years of college in Central Appalachia (and especially southwest West Virginia) is noteworthy.

Relatively high levels of 2006 per capita market income are evident in Figure 2.3a along the Northeast Seaboard, southern Florida, coastal California and in Wyoming. In the latter states, the high income could reflect natural resource-based activities or the high incomes of transplants who earned their wealth elsewhere – such as on Wall Street or in Hollywood. In Figure 2.4b, per capita market income tends to be high around major cities (Pittsburgh, PA and Montgomery, AL). The contiguous counties in Kentucky with low incomes stand out, and relatively strong spillover effects from Lexington (Fayette County) into the adjoining ARC counties are also evident.

A more dispersed pattern of high and low Z-scores appears in the maps showing 2006 self-employment shares of total county employment (Figure 2.5a). It should be noted that this variable captures *non-farm* self-employment or proprietorships. A few counties stand out with high rates of self employment, particularly in the central part of the nation – this is also the region with large population losses shown earlier in Figure 2.1a. For the ACR region, Figure 2.5b reveals relatively low self-employment shares in southwest West Virginia.

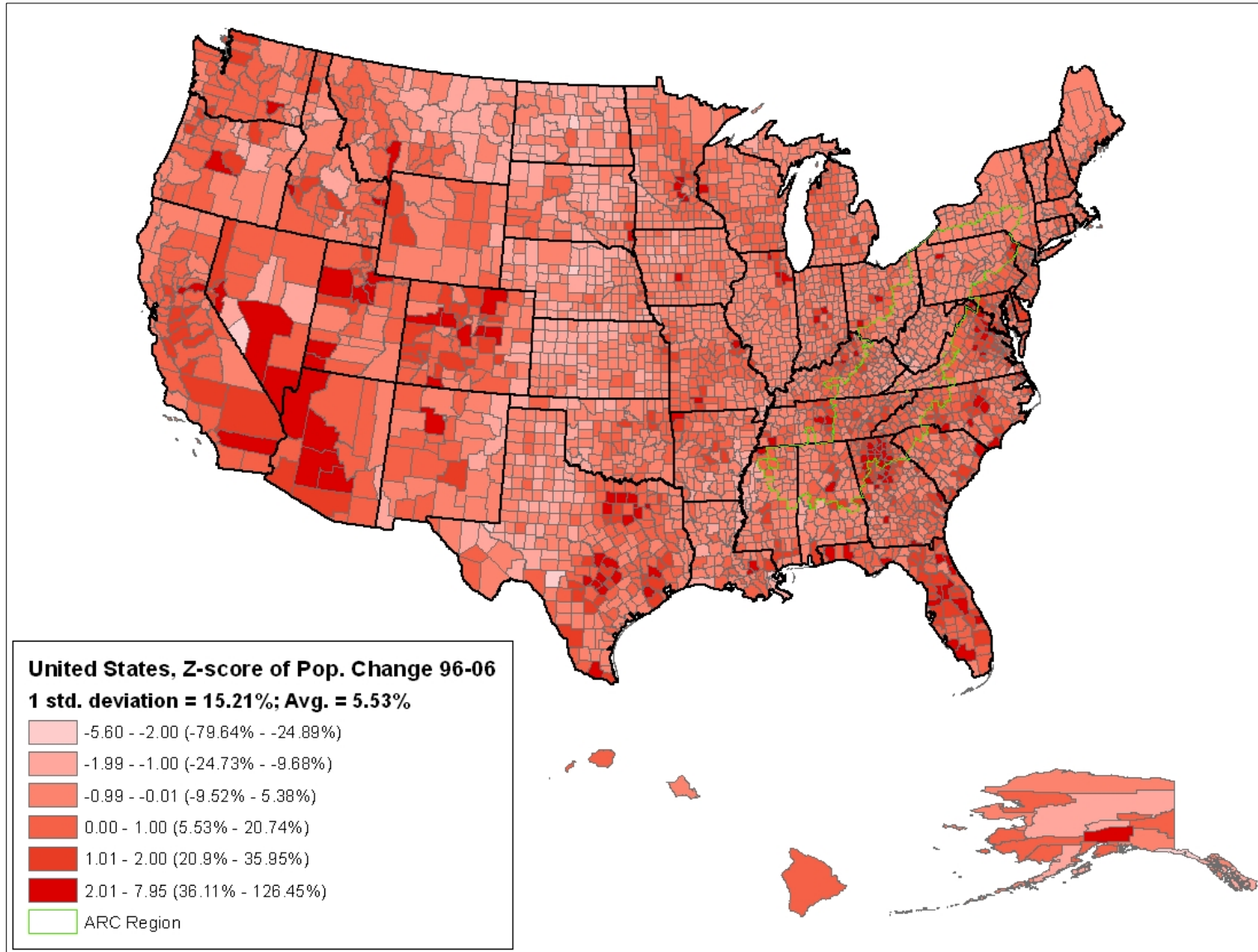
Another key variable, the 2007 employment-to-population ratio (Figure 2.6b), shows high rates in some of the Rocky Mountain states and relatively widespread occurrences of very low rates in the ARC region (as well as other southeast states). This ratio is a powerful predictor of economic well-being and, indeed, some overlap between Figures 2.6a and 2.4a (for per capita market income) is evident. In Figure 2.6b, the low employment/population ratios in some of the eastern Kentucky counties are quite noticeable.

For the unemployment rate (Figure 2.7a), a substantially different pattern emerges as compared to the employment-to-population ratio (shown previously in Figure 2.5a). This different pattern confirms the importance of evaluating the employment/population ratio as a potentially more

reliable alternative to the unemployment rate as a measure of underlying economic distress. Note especially the concentration of low unemployment rates in the northern Great Plains region and the Rocky Mountain states, and the high unemployment rates in California, which entered the current recession at a relatively early date. Michigan, South Carolina and the Mississippi Delta region also have high unemployment rates. In contrast, unemployment rates are very low in Virginia and parts of north central Alabama. In Figure 2.7b, a seemingly sharp divide along state lines appears between Kentucky and Virginia on the one hand, and between Alabama and Mississippi on the other. The counties surrounding metropolitan Atlanta also enjoy comparatively low unemployment rates.

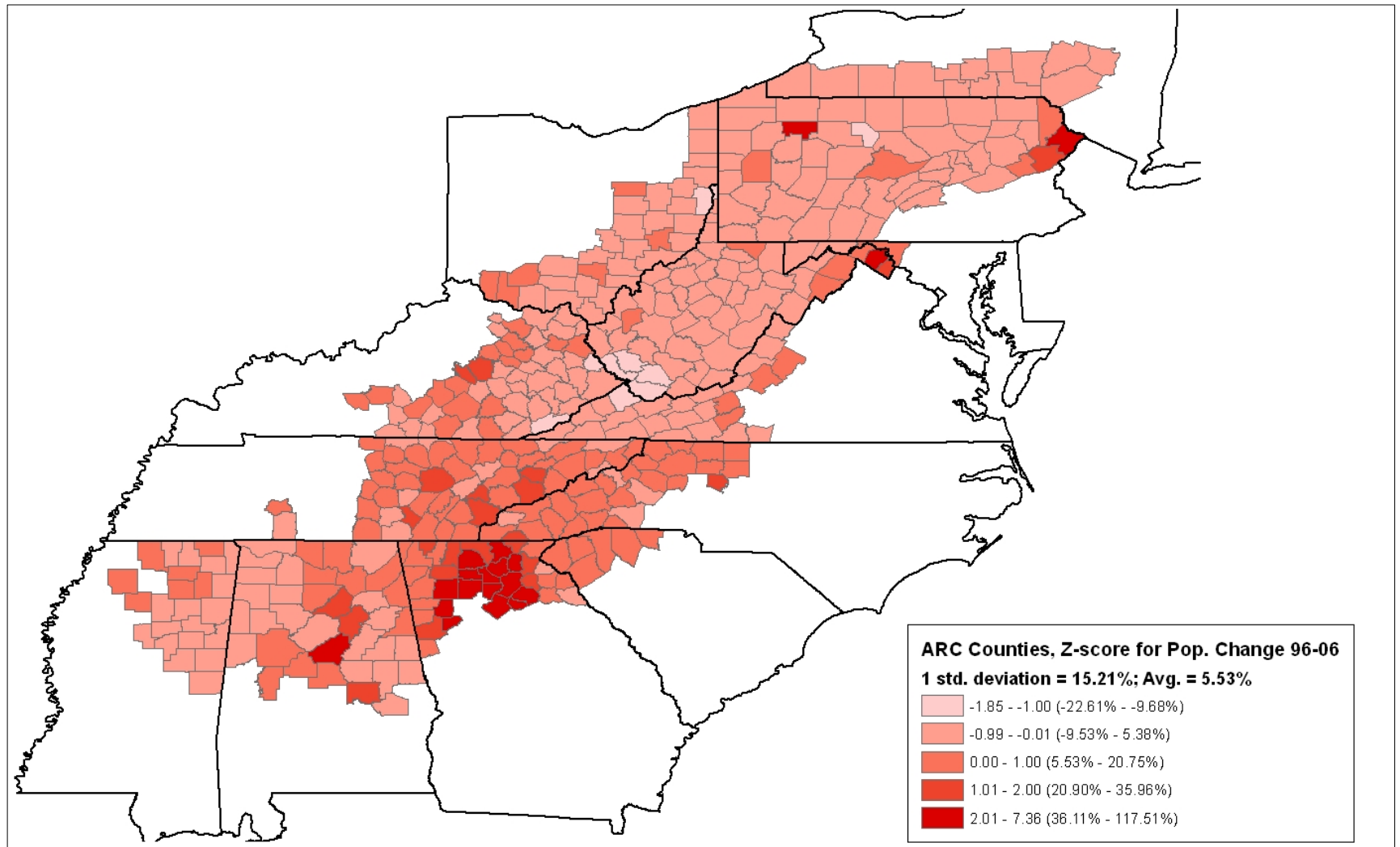
Turning to the last set of maps, Figure 2.8a shows Z-scores for poverty rates across the nation. Again, the central core of the ARC region stands out as does the Mississippi Delta region, southwest Texas and portions of South Dakota. Quite remarkably, there is also a band of very high poverty counties just outside the ARC boundary in Alabama. The map displayed in Figure 2.8b for the ARC region tends to confirm this pattern, but also shows a very high poverty county within the ARC border in Alabama. Also evident are counties with relatively high poverty rates in eastern Kentucky, southwest West Virginia, and Ohio.

Figure 2.1a: County Distribution of Z-scores for Population Growth, 1996-2006



United States, Z-score of Population Growth, 96-06

Figure 2.1b: County Distribution of Z-scores for Population Growth in ARC Counties, 1996-2006



ARC Counties, Z-score of Population Growth, 96-06

Figure 2.2a: County Distribution of Z-scores for 2000 Share of Adults with at least One Year of College Education

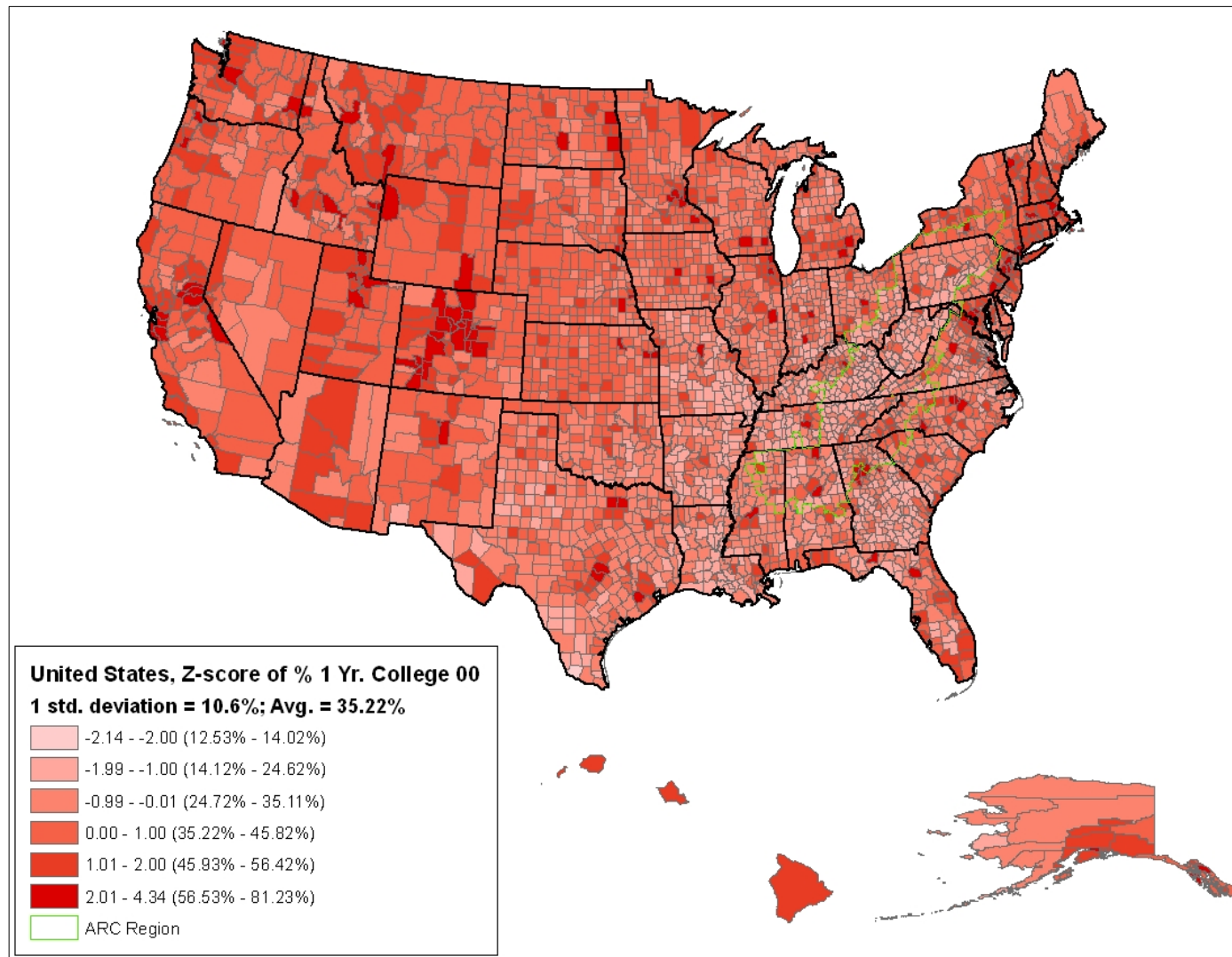


Figure 2.2b: County Distribution of Z-scores for 2000 Share of Adults with at least One Year of College Education, ARC Counties

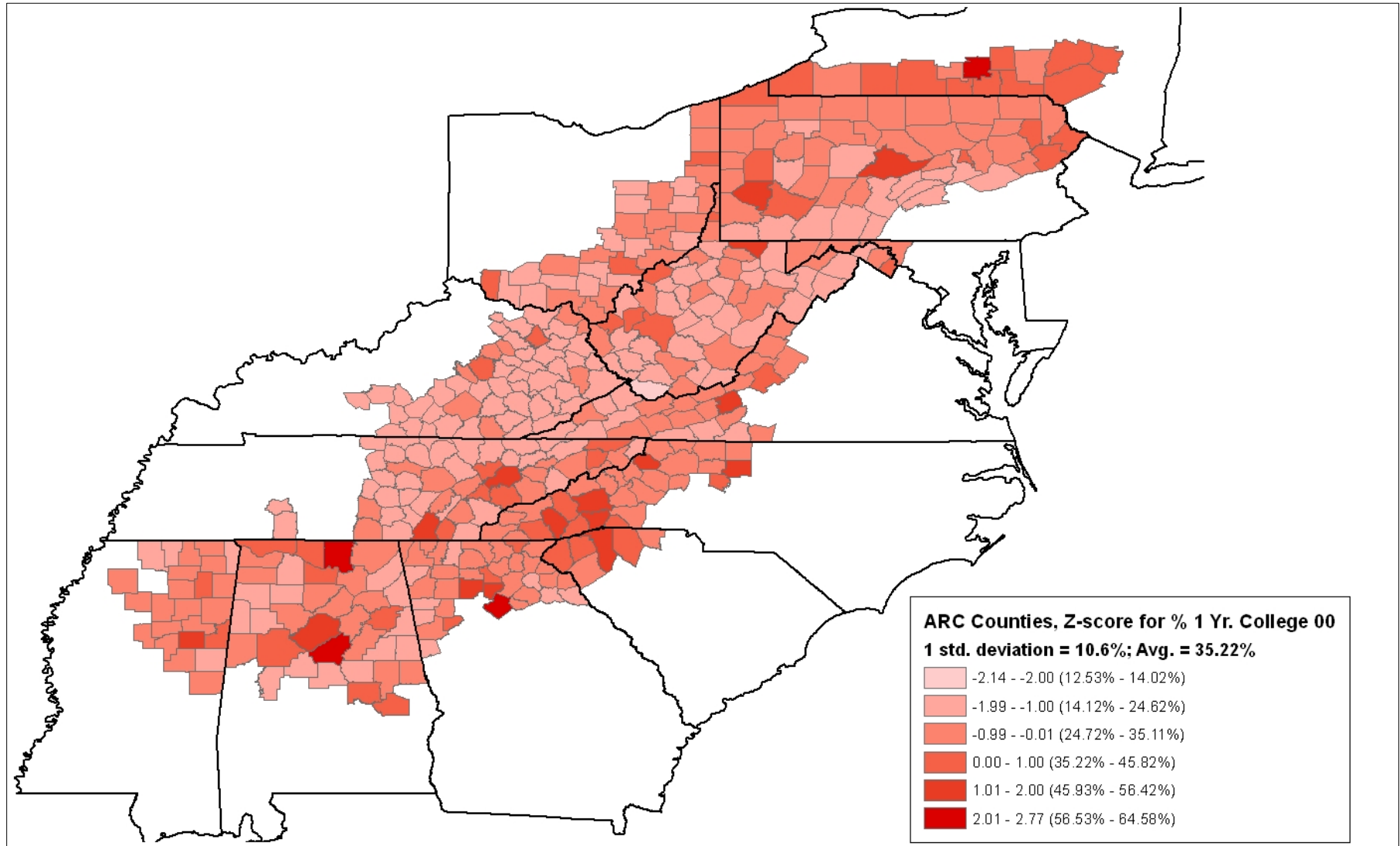


Figure 2.3a: County Distribution of Z-scores for 2000 Share of Adults with a Four-Year College Degree

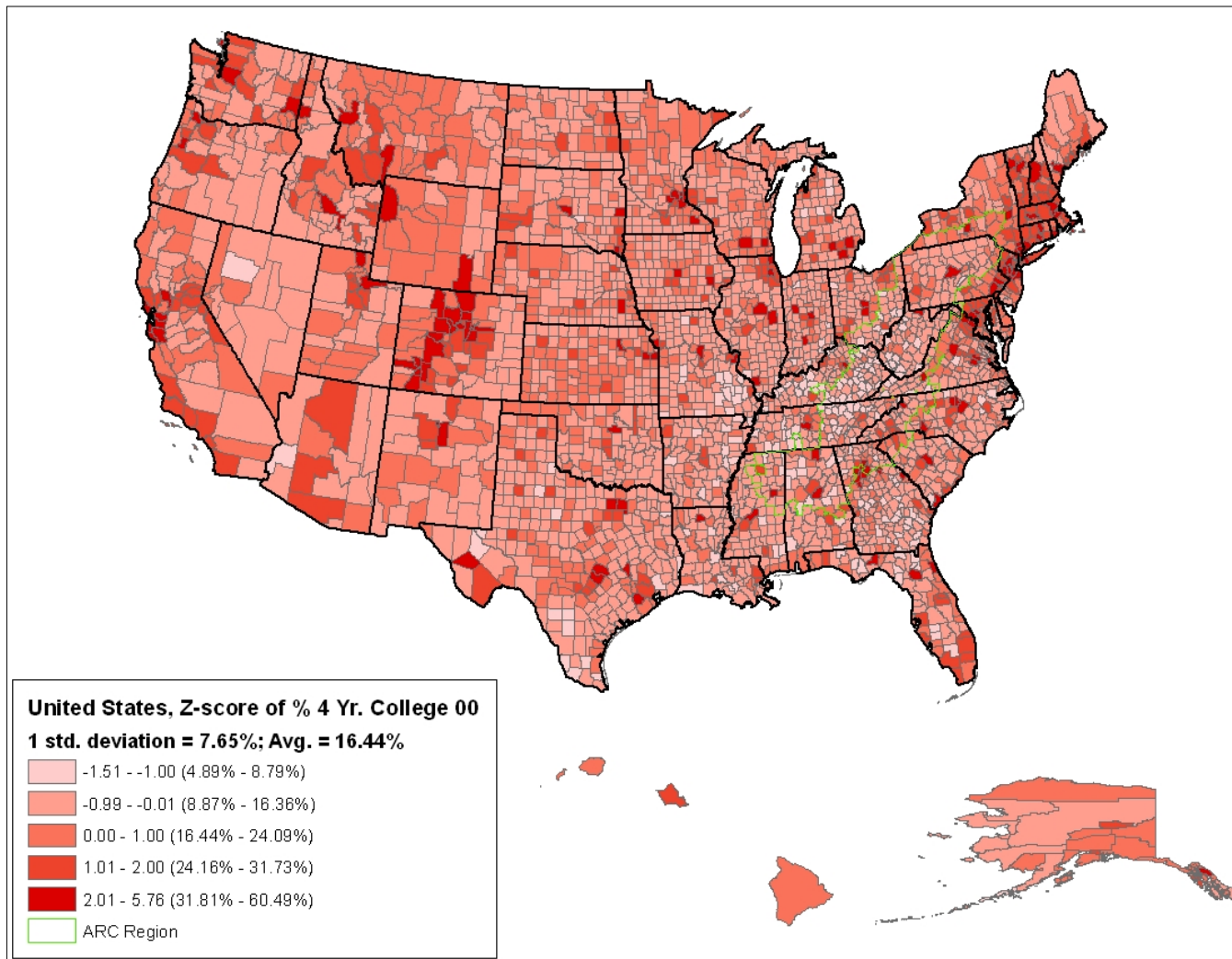


Figure 2.3b: County Distribution of Z-scores for 2000 Share of Adults with a Four-Year College Degree, ARC Counties

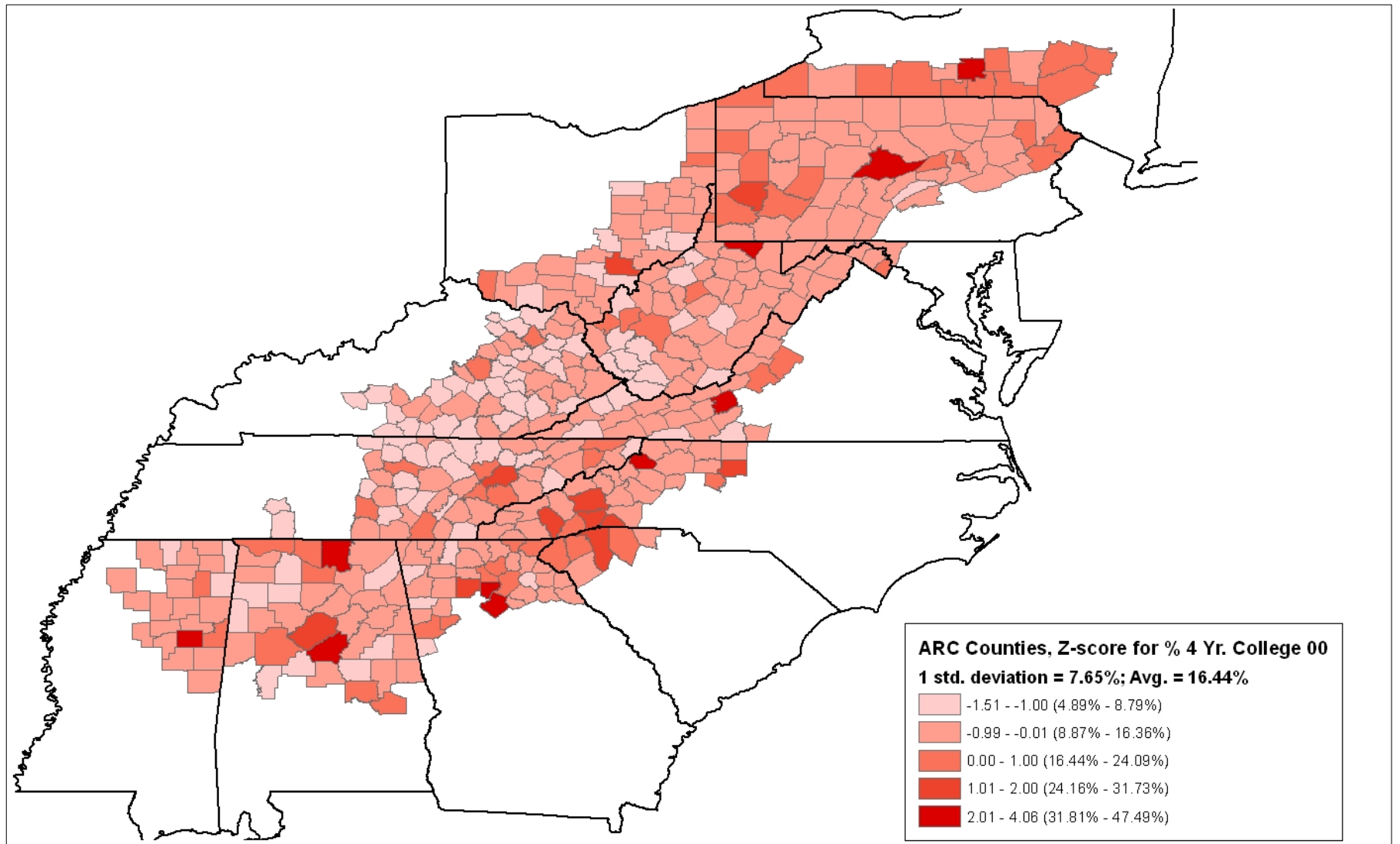


Figure 2.4a: County Distribution of Z-scores for 2006 Per-Capita Market Income

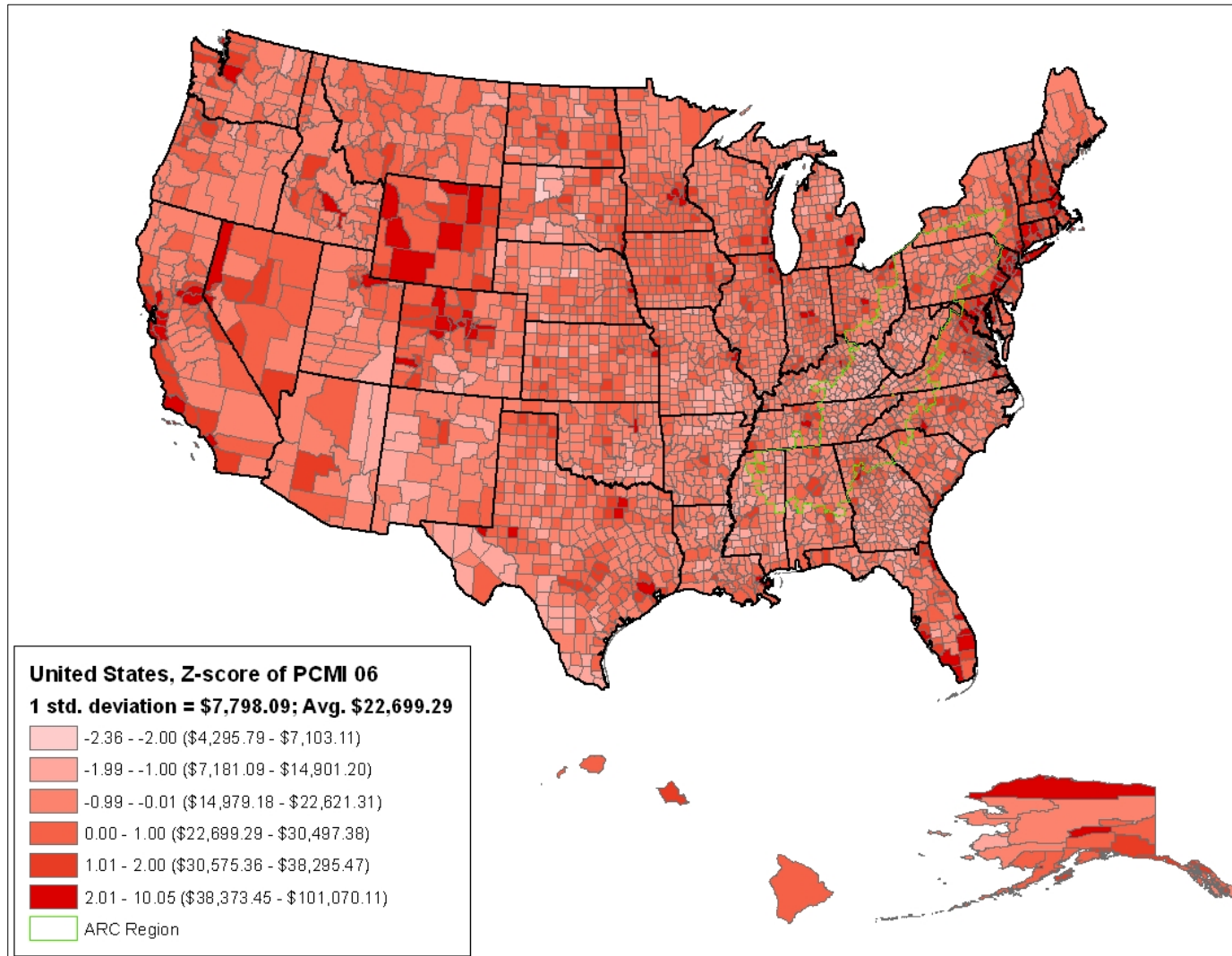


Figure 2.4b: County Distribution of Z-scores for 2006 Per-Capita Market Income, ARC Counties

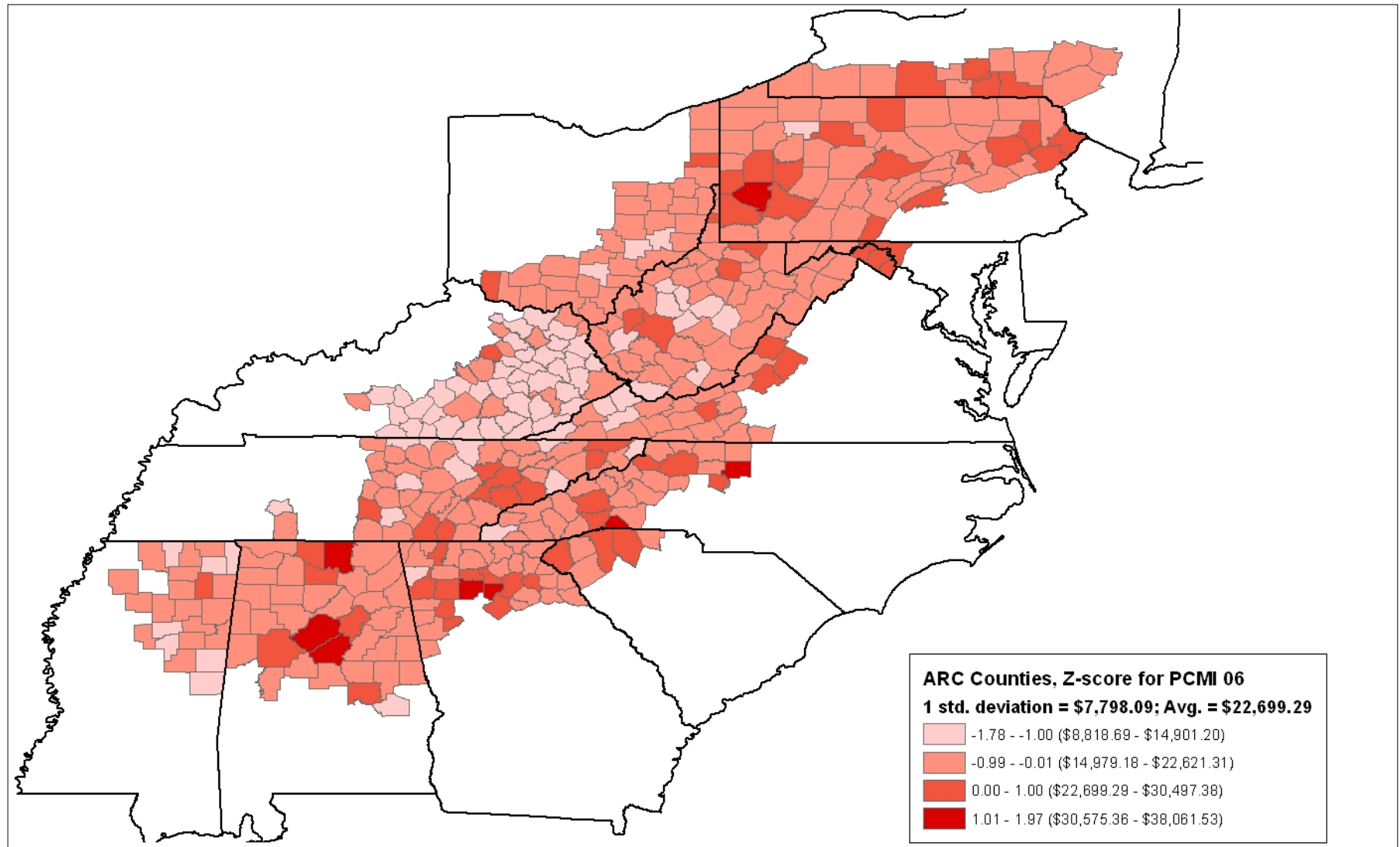


Figure 2.5a: County Distribution of Z-scores for 2006 Nonfarm Self-Employment Share of Total Employment

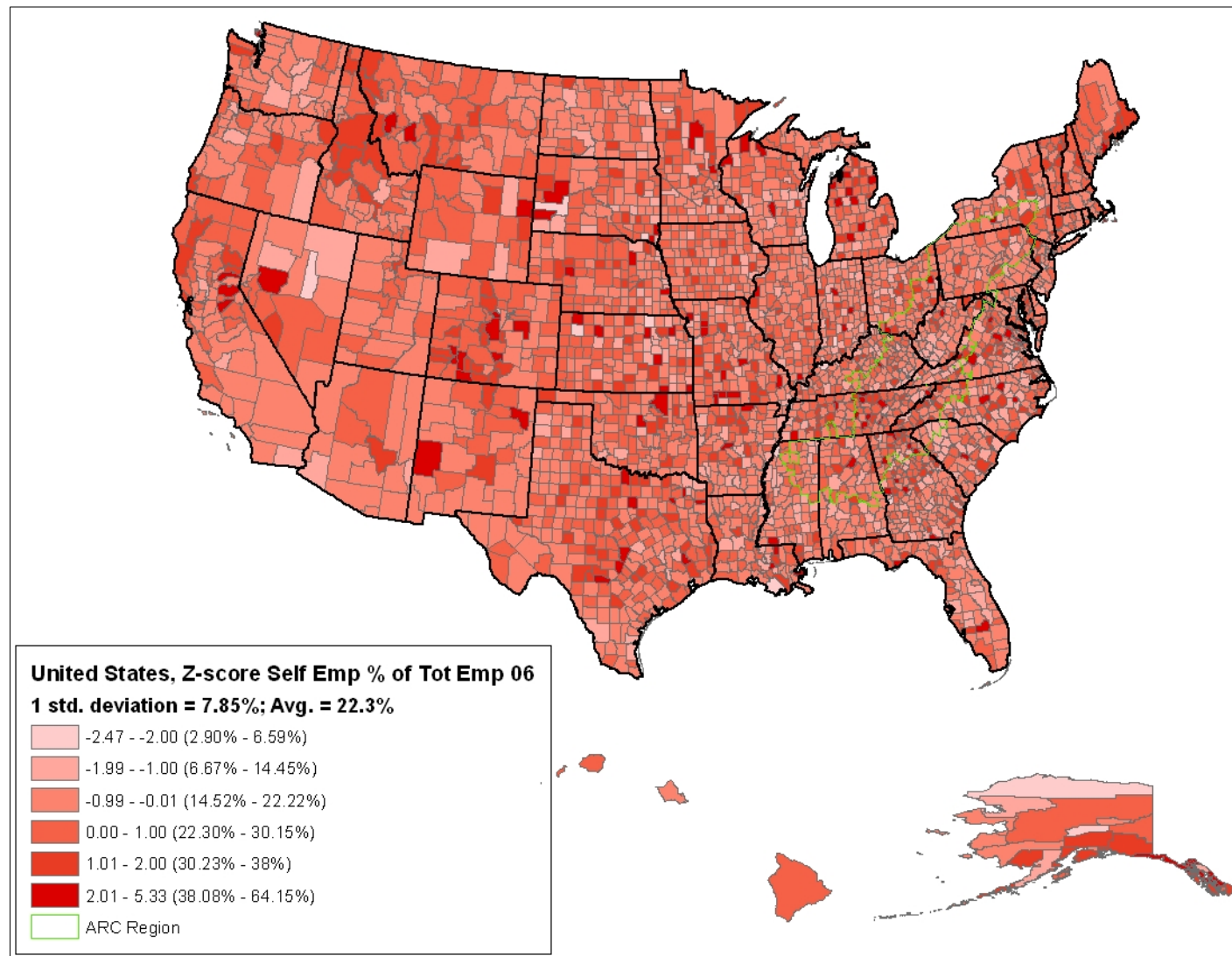


Figure 2.5b: County Distribution of Z-scores for 2006 Nonfarm Self-Employment Share of Total Employment, ARC Counties

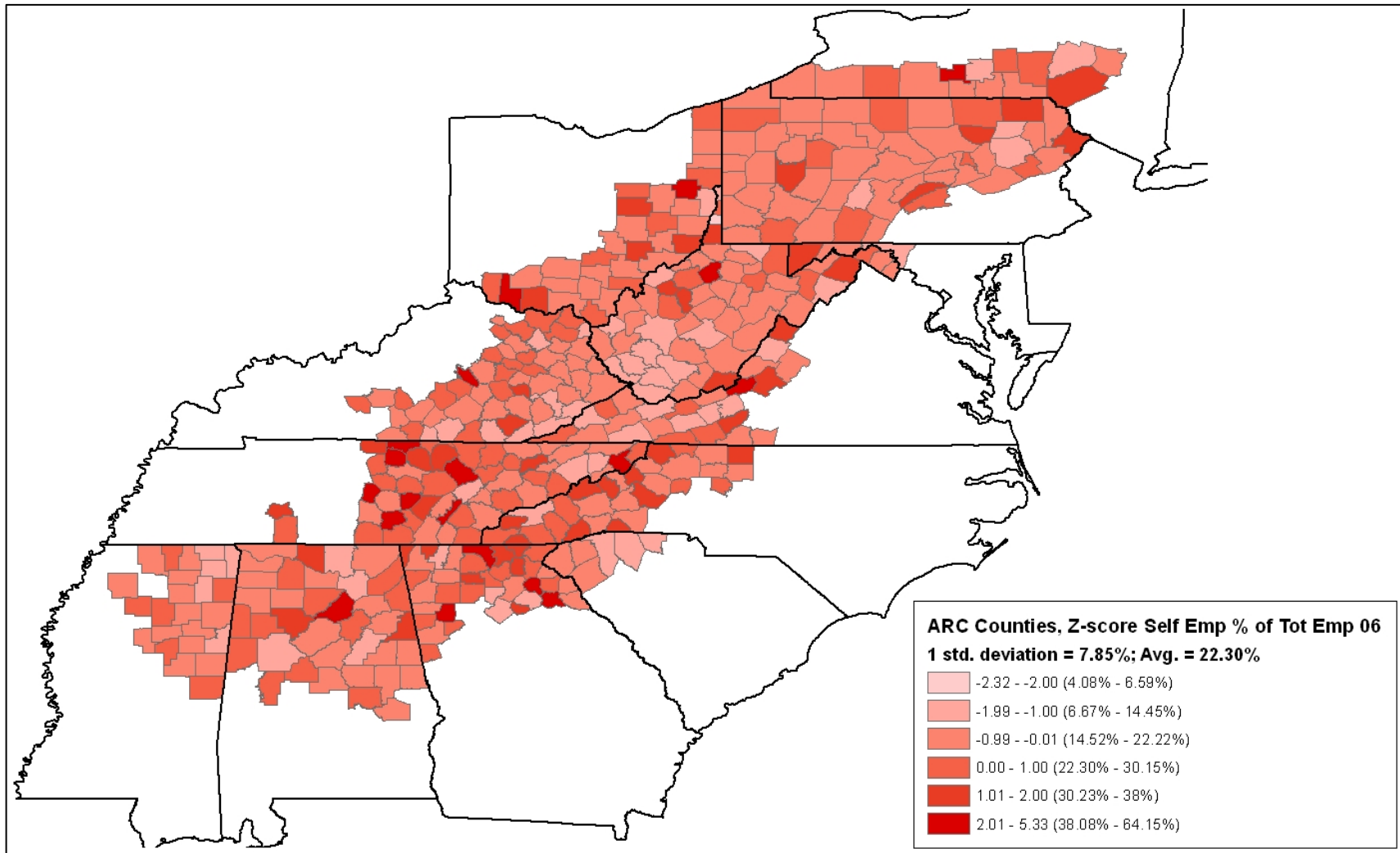


Figure 2.6a: County Distribution of Z-scores for 2007 Employment/Population Ratio

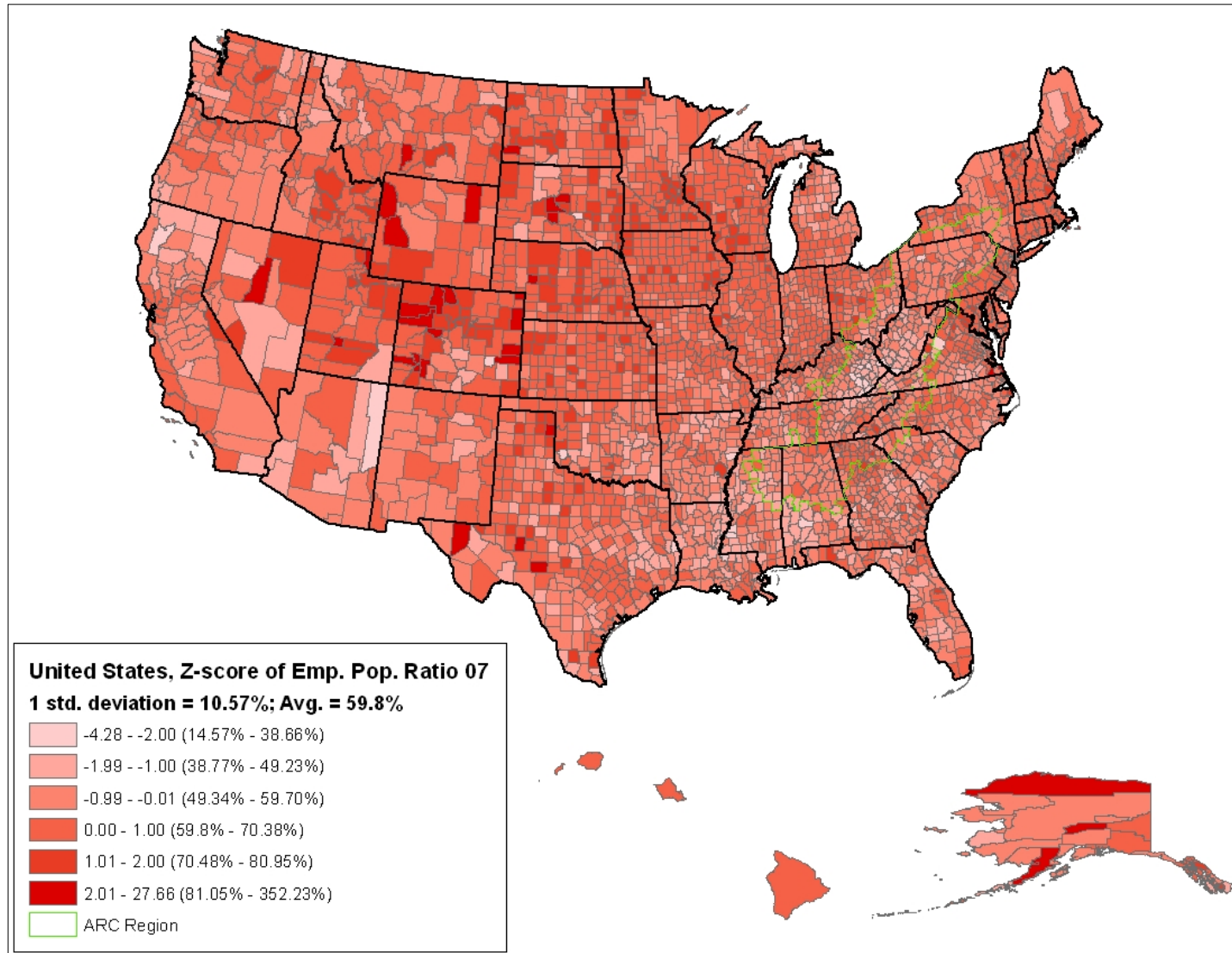


Figure 2.6b: County Distribution of Z-scores for 2007 Employment/Population Ratio, ARC Counties

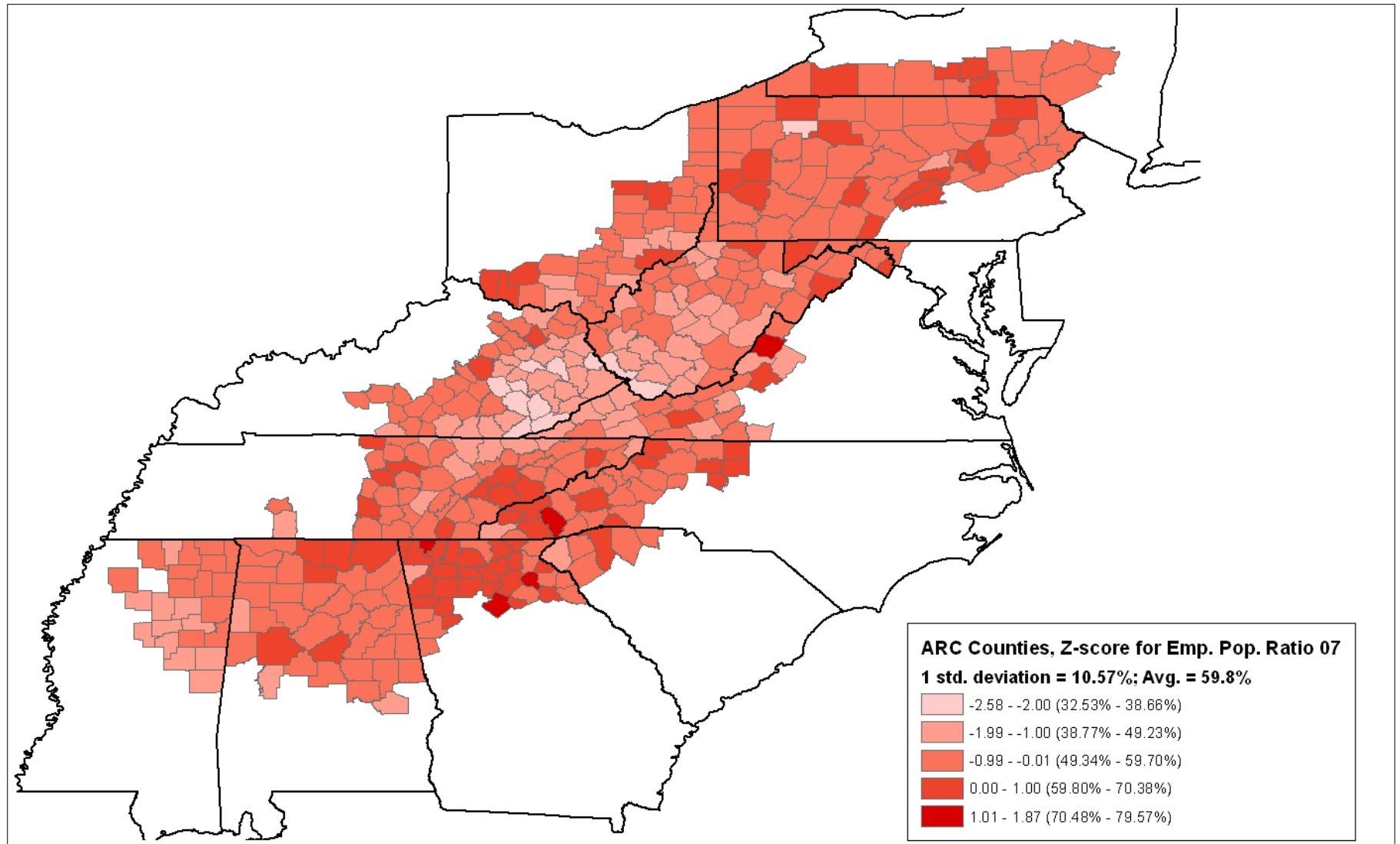


Figure 2.7a: County Distribution of Z-scores for 2007 Unemployment Rate

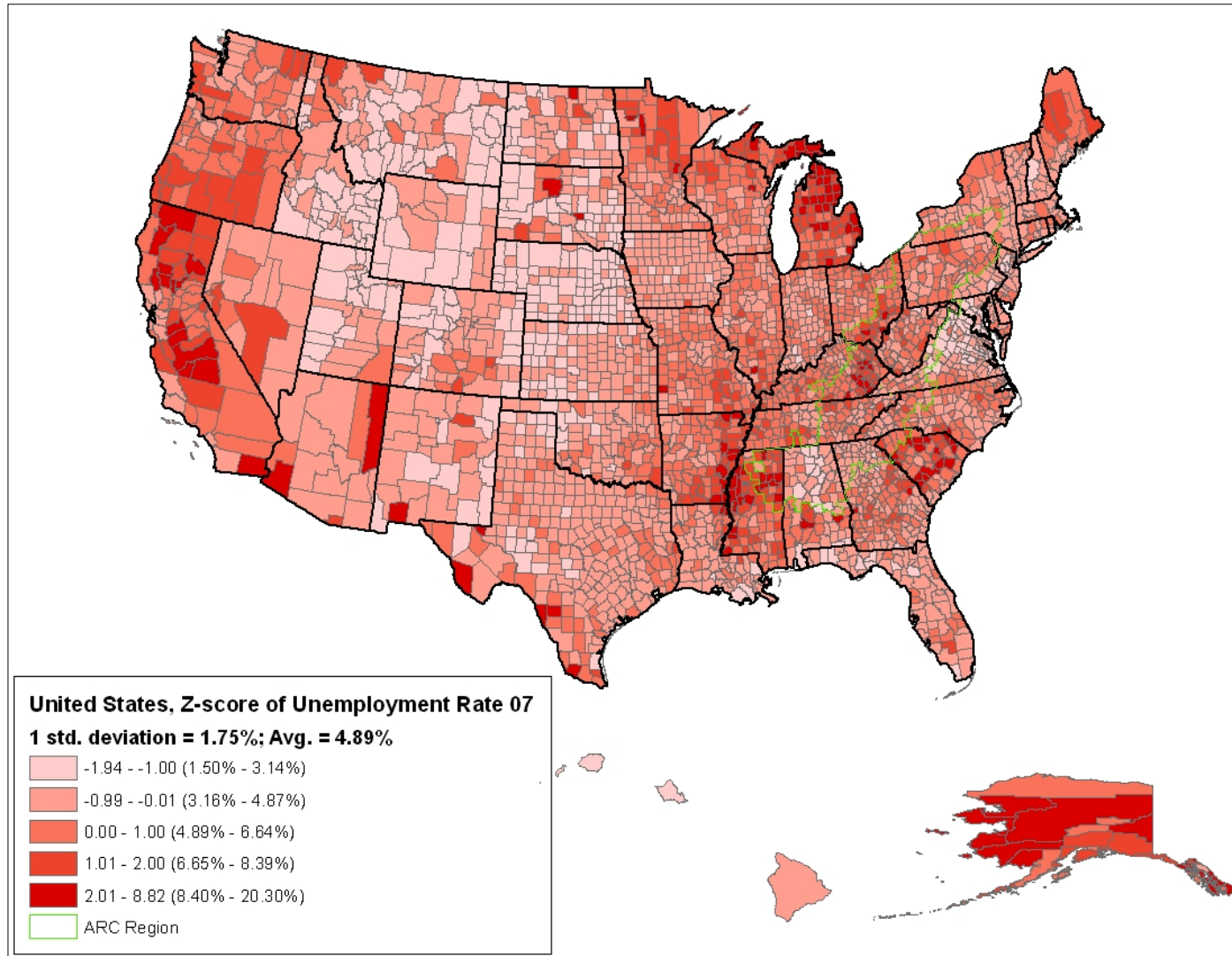


Figure 2.7b: County Distribution of Z-scores for 2007 Unemployment Rate, ARC Counties

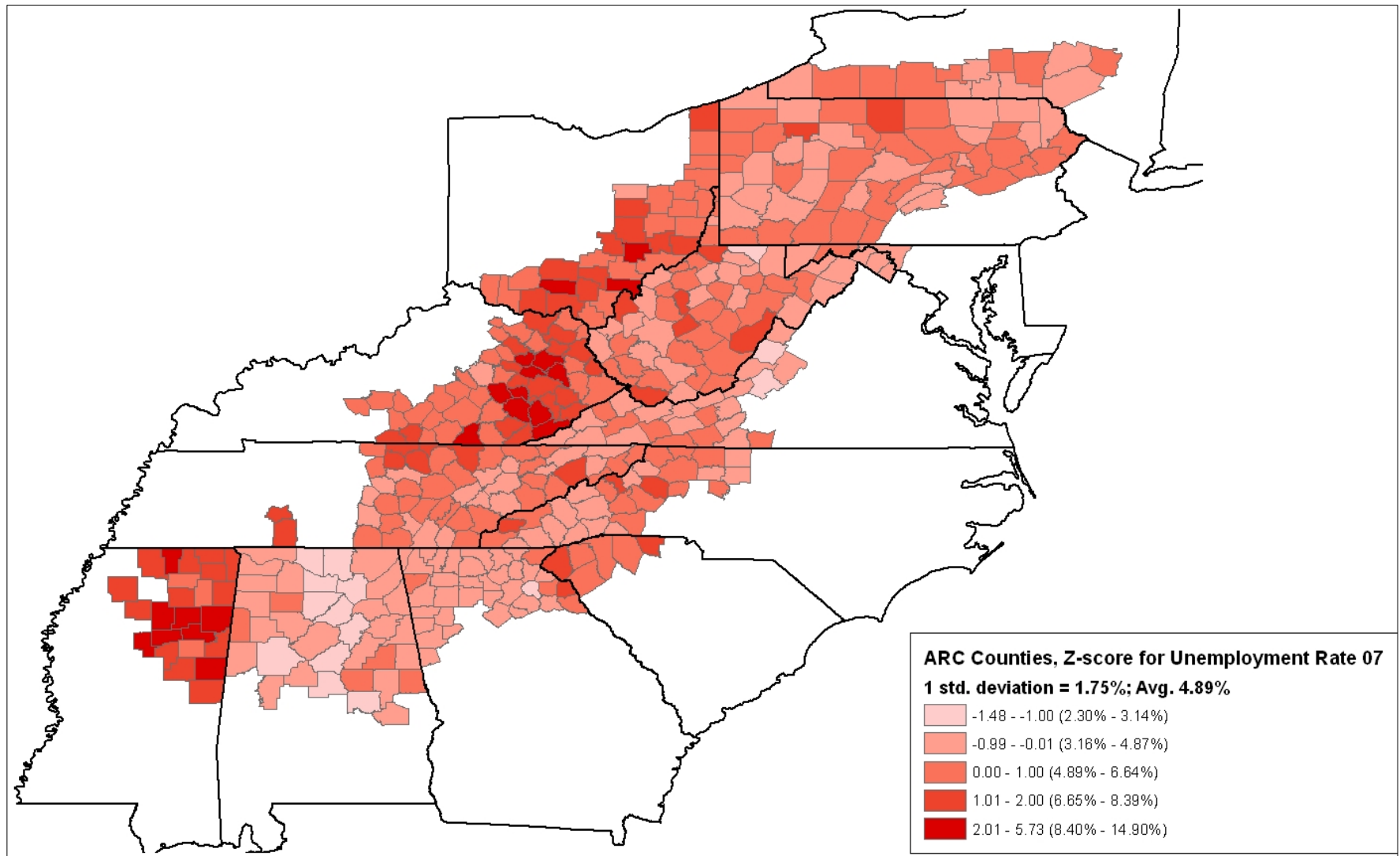


Figure 2.8a: County Distribution of Z-scores for 2007 Poverty Rate

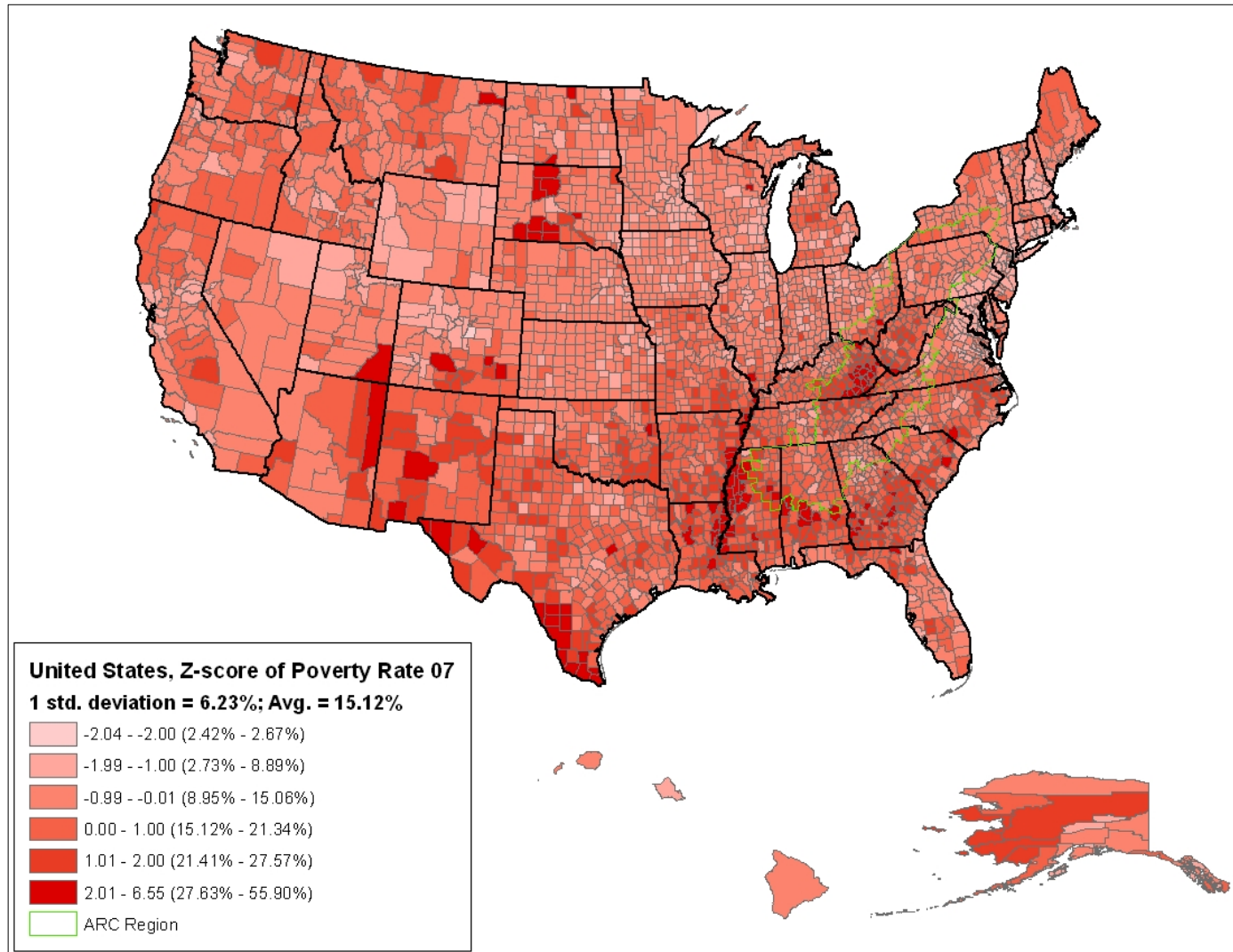
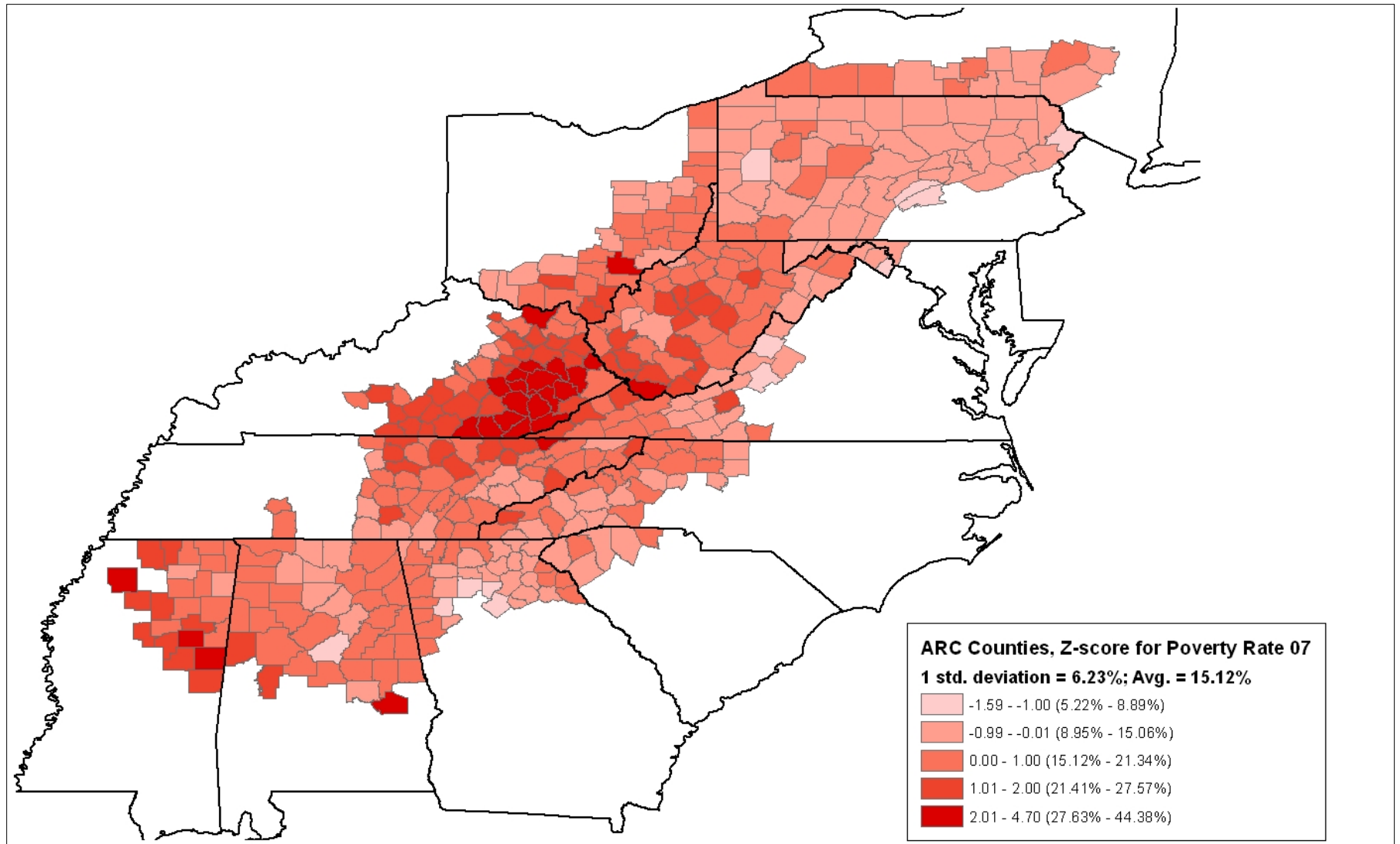


Figure 2.8b: County Distribution of Z-scores for 2007 Poverty Rate, ARC Counties



Methodology: Identifying Specific Candidate Variables and Building Distress Indexes

In this technical section, we describe the methodology used to select the candidate distress indicator variables and to build the distress indices presented in Section 4. To improve readability, the longer statistical tables can be accessed in the Appendix. For those with less interest in the technical details of our work, we invite you to skip directly to Section 4 where we present our results.

In deriving our candidate distress indexes, we generally follow the process described during the February and June 2009 webinars organized at the ARC headquarters and in the April 2008 report we submitted to the ARC. Our methodology involves (1) identifying individual “Candidate Variables” that are associated with contemporaneous and future distress as described in Section 2 above, and (2) using the Candidate Variables to construct six top “Candidate Distress Indexes” presented to ARC for further examination. The six top Candidate Distress Indexes are constructed using a variety of combinations of the Candidate Variables.

As described in Section 2, we consider 40 Candidate Variables that are linked to future distress and local economic growth. These measures are associated with labor market conditions, income, poverty, housing and self employment, among other factors. *A priori*, these 40 Candidate Variables are perceived as good measures of contemporaneous distress. To assess whether they are also suitable forward-looking variables for determining future distress, we collect data on the same variables dating back to the mid-1990s.

Selecting Specific Candidate Distress Indicator Variables

We considered a variety of methodologies to select our distress indicators. Sophisticated regression strategies were initially considered which have the advantage of being considerably less data intensive than the approach we eventually selected. Yet, we decided to forego this methodology for two reasons. First, there is no clear, single dependent variable for distress—so pursuing statistical analysis without a clear dependent variable is problematic. Second, ARC stakeholders desire an end-product that is transparent to non-statisticians. As a result, we employ a multiple-step approach that selects the variables associated with both current and future distress in a clear and straightforward manner. The desired outcome is to develop Candidate Distress Indexes that could help target funding to counties that are *currently* in distress and at the greatest risk of experiencing *future* distress. Because ARC policy intervention is usually aimed at reducing future distress, our empirical goals seem particularly appealing.

Our methodology for selecting Candidate Variables is explained in the following steps. The first step is to consider whether our Candidate Variables are strongly associated with future distress. As noted previously, our interest is to address future distress in a manner that is consistent with the ARC tradition of addressing long periods of persistent distress—rather than short-term cyclical downturns such as a plant closing. As such, we consider whether the Candidate Variables are associated with future distress (or economic outcomes) about ten years in the

future. Thus, we take the Candidate Variables measured in circa 1996/1997 (or as close as possible due to data availability) and examine their correlation with key economic outcomes around the current or 2006/2007 time period.

While numerous economic outcomes in 2006/2007 are considered in this analysis, we focus on key recognizable outcomes. Specifically, Table 3.1 outlines the five measures of “contemporaneous” distress that we believe are the most important and most easily defensible to ARC stakeholders and external observers. These five key indicators provide a general picture of overall economic prosperity and help capture the broad dimensions of community distress, without examining so many outcomes as to become too unwieldy. We view high correlations with these five contemporaneous economic measures as a good reflection that a Candidate Variable measured in the mid 1990s would be closely associated with future distress.

Table 3.1: Five Key Indicators of Current Distress

1	2007 poverty rate
2	2006 per-capita market income
3	1996-2006 total job growth (including proprietors)
4	1996-2006 population growth
5	2007 employment/population ratio

As noted in the previous section, the ten-year measures of employment and population growth reflect the persistent nature of the distress that we are trying to capture here. This persistence would not be well-represented in measures calculated over shorter periods of time, such as two or five years.

The predictive performance of these Candidate Variables for the ARC counties is demonstrated in Appendix Table A.1. This table shows the correlations for Candidate Variables measured in the mid-1990s (down the rows) with outcomes measured around 2006/2007 (columns across the top). For comparison, the very top row shows the 1997 ARC distress index measured on a 1 to 5 scale with one being categorized as in attainment and five being classified as distressed. The correlation of the percent change in population between 1986 and 1996 with the 2007 poverty rate is -0.41, which is of moderate predictive power.

The predictive performance of the same Candidate Variables for all U.S. counties is demonstrated by the correlations shown in Appendix Table A.2. U.S. aggregate correlations are used as a way to appraise the reliability of the ARC county results. For example, for all U.S. counties, the correlation of the 1986-1996 percent change in population with the 2007 poverty rate is only -0.22. In other words, population growth is related to a much lesser degree to poverty in the overall U.S. than in the ARC region.

We provide many of the correlations for the 2006/2007 variables shown in Tables A.1 and A.2 for comparison purposes. Evaluating the size of all these correlations, the five variables identified in Table 3.1 are the most informative variables in terms of whether a Candidate Variable measured in 1996/1997 also is associated with distress in 2006/2007.

Based on discussions with ARC stakeholders, and after reviewing the distress indicator literature, we view the correlations with the 2007 poverty rate as particularly important in indicating distress. Thus, we require some Candidate Variables (measured in the 1996/1997 period) to be highly correlated with the 2007 poverty rate. Not surprising, the 1997 poverty rate is highly correlated with the 2007 rate (0.92), while the 2000 employment/population ratio and the 1996 per-capita income also have correlations in the -0.74 or -0.77 range. Given the persistence of the poverty rate, we include the poverty rate as a good Candidate Variable in further assessment. For illustration purposes, Figures 3.1 to 3.3 report scatter plots of the 1996 poverty rate with the 2007 poverty rate, 2006 per capita market income, and the 2007 employment/population rate. These figures show the strong association between the 1997 poverty rate and future economic outcomes.

Next, we examine several groupings of variables to select additional Candidate Variables to be used in constructing Candidate Distress Indexes. First, the 1986-1996 population growth variable consistently dominates the 1986-1996 job growth variable across the board—even being more highly associated with 1996-2006 job growth. Second, 1996 per-capita market income is also highly associated with most of the key variables, though it is only moderately associated with 1996-2006 population and job growth. Third, the 2000 employment/population rate is more strongly correlated with the five key 2006/2007 measures than the labor-force participation rate. Conversely, the 1996 unemployment rate is much less strongly related to 2006/2007 outcomes than either the employment population ratio or the labor force participation rate. The weak performance of the unemployment rate is consistent with the general limitations of the unemployment rate recognized by ARC stakeholders and within the academic literature (Partridge et al., 2008).

Among the education variables, we focus on measures that reflect at least some college attainment. This follows from the February 2009 ARC webinar in which stakeholders strongly voiced this preference. College-educated workers better reflect the shift to the knowledge economy. (We report the correlations for high school dropouts and high school graduates for comparison.) The percent of the adult population with at least one year of college education generally outperforms the percent of the adult population with at least an associate degree and the percent of the adult population with at least a bachelor’s degree. Yet, given the focus on the knowledge economy in the literature and among ARC stakeholders, we retain the bachelors degree for subsequent analysis because the differences in correlations among the educational attainment groups are not that sizable. Overall, the five (six including the bachelor’s degree variable) Candidate Variables selected for further analysis are shown in Table 3.2.

Table 3.2: Candidate Indicator Variables Selected for Further Analysis for Inclusion into Distress Indexes

1	Employment/population ratio
2	Poverty rate
3	Per-capita market income
4	Percent of the adult population with at least one year of college education (also at least a four-year Bachelors degree)
5	10 -year percent change in population

It should be noted that other variables are not as highly associated with the five key 2006/2007 economic outcomes. For example, the 1986-1996 percent change in per-capita income, the 1996 self employment share of total employment, and 1996 building permits per capita are not as highly correlated with these five key outcomes.

The results of our selection of the candidate indicator variables are also supported by the correlation analysis for all U.S. counties. As noted previously, Table A.2 shows the corresponding correlations with 2006/2007 outcomes for all U.S. counties. Comparisons to the entire U.S. represent a valuable way to examine the validity of the results. One of the key patterns is that the ARC regional correlations for the key economic outcome variables are greater than the corresponding correlations for all U.S. counties. However, our basic conclusions remain unchanged in that the best Candidate Distress Variables shown in Table 3.2 for the ARC region appear to be the same for the U.S. as a whole. This correspondence with the U.S. adds credibility to our findings, which would help make a compelling argument when proposing a new economic distress index to OMB and Congress.

The five Candidate Variables displayed in Table 3.2 appear to be solid forward-looking indicators associated with economic outcomes 10 years in the future (six when including the four-year college graduate share). Of course, these Candidates are selected on the basis of their characteristics in 1996/1997. Thus, one outstanding question is whether the Candidate Variables listed in Table 3.2 are linked to contemporaneous outcomes measured in 2006/2007. In this fashion, Table 3.3 presents the correlations of the six Candidate Variables (including the four-year college graduate share) measured in (or as close as possible to) 2006/2007 with the five key economic outcomes measured in 2006/2007. We also show the respective correlations for the 2007 unemployment rate because it is currently being used by ARC in its distress index.

Table 3.3: Correlations between 2006/2007 Candidate Variables, the Unemployment Rate and 2006/2007 Economic Outcomes, ARC Counties

	Poverty Rate 2007	Per-capita Market Income 2006	% Job Growth 1996-06	% Population Growth 1996-06	Employment-Population Ratio 2007
Employment-population ratio 2007	-0.72	0.71	0.45	0.42	1.00
Unemployment rate 2007	0.61	-0.61	-0.37	-0.29	-0.62
Poverty Rate 2007	1.00	-0.74	-0.32	-0.33	-0.72
Per-capita market income 2006	-0.74	1.00	0.36	0.32	0.71
Percent share of adult population with a 4-yr college degree or more (BA+MA+professional+PhD), 2000	-0.37	0.72	0.26	0.26	0.47
Percent share of adult population with more than one year of college (more than one year at some college+associates+BA+MA+professional +PhD), 2000	-0.47	0.77	0.26	0.28	0.53
Population percent change 1996-06	-0.33	0.32	0.73	1.00	0.42

The unemployment rate consistently underperforms relative to the employment-population ratio as shown by the size of correlations for both variables. The results clearly demonstrate that not only are the six Candidate Variables (including the four-year bachelors degree share) strong forward-looking indicators of future distress, but they also capture contemporaneous distress as well.

Methodology to Construct the Distress Indexes Using the Candidate Variables

The first step in the process of building actual Candidate Distress Indexes is to create Z-scores for each of the five Candidate Variables described above. Z-scores are commonly used by social scientists to compare variables that are measured using different metrics (such as income in dollar figures and poverty in percentages) and having different distributions. In effect, Z-scores allow for comparisons between variables and without it, one would be attempting to compare “apples” and “oranges.” For example, by using Z-scores, we can directly compare unemployment rates, which may nationally vary from 4% to 18%, to poverty rates that may vary from 5% to 50%.

A Z-score is created through a statistical transformation of a variable that sets its mean equal to zero and its standard deviation equal to 1. Thus, for each of the 5 Candidate Variables, we create a transformed variable that reflects whether a county’s value for the variable is (say) 0.5 standard deviations above the mean. For example, if the mean 1986-1996 population growth rate for all counties is 12% and the standard deviation is 10%, then a county that experienced a 17% population growth rate would be 0.5 standard deviations above the mean and be given a population-change Z-score of 0.5. Likewise, a county that experienced a population growth rate of only 2% over the period would be given a Z-score of -1.0 to correspond to its falling 1.0 standard deviation below the mean population growth rate of 12%.

For every Candidate Variable except the poverty rate, a *positive* Z-score is associated with a more favorable outcome. In order to convert the poverty rate Z-score into the same basis, we take the negative of the poverty rate Z-score-- i.e., $-Z\text{-score}_{\text{povrt}}$. Thus, if the mean poverty rate is 15% with a standard deviation of 10%, a county with a poverty rate of 20% would be assigned a Z-score of -0.5 -- i.e., negative Z-scores would then reflect outcomes *below* the national mean for all of the Candidate Variables.

As we noted above, converting the variables into Z-scores is important in constructing a distress index because it places all of the Candidate Variables on an even basis regardless of their variability. For example, the

Side Box 3.1:

The sensitivity of changing to an index based on Z-scores can be examined using the current ARC Distress Index. Using the process described in this section, we calculated the FY2007 ARC Distress Index based on Z-scores rather than the current procedure.

Figures 3.1a and 3.1b show how the ARC distress categorization would change if it were based on Z-scores.

Red indicates counties that would be categorized as distressed under both indexes—or there would be no change.

Blue indicates counties that would be categorized as distressed with the ARC Index, but would not be categorized as distressed using the Z-score index.

Green indicates counties that would be categorized as distressed using the Z-score index, but not under the current ARC Index.

White indicates counties that would not be categorized as distressed using either index.

The results show that 33 counties would change position, mostly in Central and Southern Appalachia. Sixteen counties not categorized by the current ARC method as distress would now fall into the distressed category when using the Z-score method (mostly in Ohio and Mississippi). On the other hand, 17 counties classified as distressed using the current method would no longer fall into the distress category with the Z-score method, with a large number of these being located in West Virginia. Thus, there is very little net change in the number of distressed counties using z-scores.

current ARC Distress Index gives a greater weight to the poverty rate by default--simply because the poverty rate has greater variability than the unemployment rate or the per-capita market income, as we demonstrated in our 2008 report (Partridge et al., 2008). Giving the poverty rate a higher weight may be appropriate, but this characteristic is an artifact of the poverty rate having a larger standard deviation, not because of a formal process of selecting weights by the ARC staff and stakeholders. With the Z-score transformation, this problem of different weighting among the variables comprising a distress index is avoided.

The current ARC Distress Index is composed of three variables. One potential shortcoming of this index is that three variables may be inadequate to capture all the dimensions of distress. Another shortcoming is that a distress index composed of only three variables may be prone to large year-to-year fluctuations when one variable changes, which may create transitional funding issues. Thus, considering up to five Candidate Variables mitigates these concerns without creating an index that is too unwieldy because it contains too many variables.

Using the five Candidate Distress Variables, we create 24 different permutations (combinations of different Candidate Variables) that are used to identify potential Candidate Distress Indexes. The basic strategy is to construct several permutations composed of 3 of the 5 Candidate variables, then several permutations composed of 4 of the 5 Candidate Variables, and finally one composed of all five Candidate Variables. Based on these permutations, once we identify the top potential Candidate Distress Indexes, we create additional Candidate Distress Indexes by substituting the percent of the population with at least one-year of college education with the percent with at least a bachelor's degree. We substituted different variables for education because the ARC States and staff suggested that differing measures of years of college completion might have varying effects in the region. Thus, our substitution considers whether using fewer years of college attainment (one year) has different effects than using a four-year college degree.

Then, for each of the two dozen permutations of Candidate Distress Indexes, the respective Z-scores for the corresponding Candidate Variables (including the negative of the poverty rate Z-score) are summed to obtain an overall measure of relative distress. For a given year, equation 3.1 illustrates a Candidate Distress Index (D) based on using population growth, the percent of the adult population with at least one-year of college education, and the poverty rate:

$$(3.1) D_{\text{pop_col_pov}} = Z_{\text{pop}} + Z_{\text{col}} + Z_{\text{pov}}.$$

Given our construction of the Z-scores, more *positive* values of the Candidate Distress Index indicate a more vibrant environment, while a more negative value indicates a county that is falling more into distress. We repeat this calculation for each of the 25 permutations and combinations to obtain the various Z-score based Candidate Distress Indexes.

The current ARC ranking procedure is then used to categorize each county into the five classifications running from distressed to attainment. Specifically, for each of the two dozen Candidate Distress Indexes measured in 1996/1997, we rank all of the approximately 3,100 U.S. counties into the five ARC attainment categories: the lowest 10% Z-scores are considered

Distressed; 10%-25% Z-scores are categorized as *At-Risk*; 25%-75% of Z-scores are classified as *Transitional*; 75%-90% of Z-scores are denoted as *Competitive*; 90%-100% of Z-scores are considered in *Attainment*. Each ARC region county is then assigned to the category into which they fall for the entire nation.

Ranking the Candidate Distress Indexes

To assess whether the two dozen 1996/1997 Candidate Distress Indexes are forward-looking measures of distress, we calculate their correlation with the five key contemporaneous (2006/2007) measures of economic outcomes shown in Table 3.1, as well as the other ancillary measures used in Tables A.1 and A.2.² The resulting correlations for the ARC region are shown in Appendix Table A.3 and the corresponding correlations across all U.S. counties are reported in Appendix Table A.4. The last column of these two tables shows the average correlations for the five key economic outcome variables. We rank the top Candidate Distress Indexes based on this average, which implicitly gives each of the five key outcomes an equal weight in appraising the overall economic outcomes. In cases in which there are ties in the average correlation, Candidate Distress Indexes that use more Candidate Variables are ranked higher because that would better reflect broader dimensions of economic distress. Indexes based on more indicators would also have the advantage of experiencing less-year-to-year fluctuation. We also rank more highly the Candidate Distress Indexes that include the poverty rate due to poverty's long-standing significance as an economic benchmark in the ARC region.

Based on the criteria above, we report the top six-ranked indexes in upper six rows of Table A.3. The highest-ranked Candidate Distress Index has an average correlation of 0.71. It is composed of the ten-year population growth, employment/population rate, percent of the population with at least one-year of college education, and the poverty rate. The second ranked index—also with an average correlation of 0.71—includes the same set of Candidate Variables but does not include the percentage of the population with at least one-year of college education. Finally, the sixth highest ranked Candidate Distress Index includes the percent of the population with at least one-year of college education, per-capita market income, ten-year population growth, and the poverty rate (with an average correlation of 0.70).

For the top-six ranked (circa) 1996/1997 indexes, there is relatively little difference in terms of their average correlation with 2006/2007 economic outcomes. As one moves further down the list, the forward-looking correlations tend to decline more rapidly. Thus, at the very top, there is less to differentiate the indexes from one another, which would suggest that the Commission would not be making a major mistake were it to choose one index over another—at least on an *a priori* basis. However, different sets of counties would be affected by the choice of a specific index.

As explained earlier, the percent of the population with a four-year college degree will be given further attention since it is perceived as more strongly linked to a county's potential to participate

²The values assigned to the Distress Indexes are a value of 5 for a distressed county, a value of 4 for a county classified as at-risk, and so forth, to a value of 1 when the county is classified as in attainment.

in the emerging knowledge economy. Of the top-six Candidate Distress Indexes presented in the top tier of Table A.3, four include the percent of the population with at least one year of college education. For these four Candidate Distress Indexes, we replace the percent of the adult population with at least one year of college education with the percent with at least a bachelor's degree. We then create four additional Candidate Distress Indexes. These four alternative distress indexes are reported in the bottom rows of Table A.3 (see rows 1b-4b).

The average correlations in the final column of Table A.3 illustrates that using the college graduate share results in no measurable change in the predictive capacity of the indexes. Moreover, the highest-ranked Candidate Distress Index using four-year college graduate includes the same variables as the highest-rated Candidate using the percent with at least one-year of college education (with the only difference being the college attainment variable). Likewise, the second-highest Candidate Distress Index using the bachelor's degree is the one that includes all 5 Candidate Variables—which is also the second-highest Candidate Distress Index when using the one-year college attainment share. The overall conclusion is that replacing the one-year college attainment share with the bachelor's attainment share does not make a perceptible difference as a forward-looking indicator of economic distress. Given that having at least a bachelor's degree is more closely linked to the emerging knowledge economy, we have a slight preference for Candidate Distress Indexes that include the bachelor's degree share, which is in line with the preferences of ARC stakeholders.

Table A.4 reports the corresponding Candidate Distress Index correlations using all 3,100 U.S. counties rather than the group of ARC counties. The table is ordered in the same manner as Table A.3 with the top indicators using the one-year college attainment share in the upper portion of the table and four corresponding measures using bachelor's degree attainment in the bottom tier. Among the ones using bachelor's degree attainment, the Candidate Index with the highest correlation (0.63) is the one that uses ten-year population growth, employment/population rate, percent of the adult population with at least a bachelor's degree, and the poverty rate. The second highest-ranked index includes all five Candidate Variables, while the one ranking third-highest includes all the variables with the exception of the poverty rate.

For the Candidate Distress Indexes using at least one-year college attainment, the top-three ranked indexes use the same variables as the top-three ranked Candidate Distress Indexes using bachelor's degree attainment. The only difference is that a modest change occurs in the ordering of the indexes. In addition, the rankings using all U.S. counties tend to be aligned with the results of the rankings of the ARC counties.

A general finding is that the top-ranked choices in terms of average correlation are very closely clustered—with a more rapid decline when moving further down the list. But, in order to winnow the list to a more manageable size, we decide to move forward with Candidate Distress Indexes that include at least four Candidate Variables. We do so for at least three reasons: (1) indexes that include at least four Candidate Variables represent the largest change from past ARC practice; (2) there is less year-to-year variability when including a greater number of variables; and (3) they capture more dimensions of distress. Thus, we no longer consider the Candidate Distress Index composed only of ten-year population growth, employment/population

ratio, and per-capita income, nor the Candidate Distress Index composed of ten-year population growth, the employment/population ratio, and the poverty rate.

This leaves six Candidate Distress Indexes for further consideration, three that include at least one-year college attainment variable and the other substituting this measure with the bachelor’s degree attainment share. In Table 3.4, we report the six indexes we recommend for further consideration by the ARC: section 3.4a lists the variables and section 3.4b presents them in chart form. Appendix Table A5 presents descriptive statistics for each of the six Candidate Distress Indexes for (1) the ARC region and (2) for the remaining U.S. counties. Appendix Table A6 presents the underlying Z-score values for the six Candidates for each ARC county, as well as comparisons to the FY2007 ARC Distress Index.

Our recommendation is to rank more highly the Candidate Distress Indexes that include the bachelor’s attainment share rather than one-year college attainment. Among those, our two highest-ranked Candidate Distress Indexes use all five Candidate Variables (with bachelor’s degree attainment) or uses population growth, employment/population rate, bachelor’s degree share; and poverty rate. Though we are not strongly recommending Candidate Distress Indexes that use the one-year college attainment share, they do provide an excellent comparison to examine the sensitivity of the precise counties that fall into the distress category (see Section 4).

The correlations of these Candidate Distress Indexes with 2006/2007 outcomes are reported in Table 3.5. In addition, the last two columns of Table 3.5 include the ARC Distress Index measured in 2007 and 2009.

Table 3.4: The Six Indexes Recommended for Further Consideration to the ARC

Panel a. The Six Indexes

1	Population growth, Employment/population ratio, Percent of adults with a four-year college degree, Poverty Rate
2	Population growth, Employment/population ratio, Percent of adults with a four-year college degree, Per-capita market income, Poverty Rate
3	Population growth, Employment/population ratio, Percent of adults with a four-year college degree, Per-capita market income
4	Population growth, Employment/population ratio, Percent of adults with at least one year of college education, Poverty Rate
5	Population growth, Employment/population ratio, Percent of adults with at least one year of college education, Per-capita market income, Poverty Rate
6	Population growth, employment/population ratio, Percent of adults with at least one year of college education, Per-capita market income

Panel b. Specific Candidate Variables Comprising Each Index

	Poverty Rate 2007	Population growth 1996-2006	Employment/ population ratio 2007	% of adults with a four-year college degree 2000	% of adults with at least one year of college education 2000	Per-capita market income 2006
Index 1	X	X	X	X		
Index 2	X	X	X	X		X
Index 3		X	X	X		X
Index 4	X	X	X		X	X
Index 5	X	X	X		X	
Index 6		X	X		X	X

Table 3.5: Correlations between the Lagged Candidate Distress Indexes and 2006/2007 Key Economic Outcomes, ARC Counties

Lagged Candidate Distress Indexes	%Pop. Growth 1996-06	Poverty Rate 2007	Per-capita Market Income 2006	%Job Growth 1996-06	Employment/ Population ratio 2007	ARC Distress Index 2007	ARC Distress Index 2009
Population growth 86-96, Employment /population ratio 00, Percent of adults with a four-year college degree 00, Poverty Rate 97	0.65	-0.78	0.80	0.52	0.80	-0.83	-0.79
Population growth 86-96, Employment /population ratio 00, Percent of adults with a four-year college degree 00, Poverty Rate 97, Per-capita market income 96	0.62	-0.79	0.85	0.49	0.80	-0.85	-0.82
Population growth 86-96, Employment /population ratio 00, Percent of adults with a four-year college degree 00, Per-capita market income 96	0.67	-0.70	0.83	0.53	0.78	-0.80	-0.77
Population growth 86-96, Employment /population ratio 00, Percent of adults with at least one year of college 00, Poverty Rate 97, Per-capita market income 96	0.55	-0.86	0.85	0.45	0.80	-0.87	-0.84
Population growth 86-96, Employment /population ratio 00, Percent of adults with at least one year of college 00, Poverty Rate 97	0.64	-0.79	0.81	0.51	0.80	-0.83	-0.80
Population growth 86-96, Employment /population ratio 00, Percent of adults with at least one year of college 00, Per-capita market income 96	0.67	-0.72	0.83	0.52	0.78	-0.81	-0.78

Evaluating How the Top Candidate Distress Indexes Correlate with Contemporaneous Distress

The top-six Candidate Distress Indexes reported in Table 3.4 appear to do an admirable job as forward-looking indicators of future distress. Next, we briefly confirm that they are also highly linked to contemporaneous measures of economic outcomes. To do this, for the top-six Candidate Distress Indexes shown in Table 3.4, we now derive their values based on circa 2006/2007 data (rather than circa 1996/1997 data used in the previous sub-section). The correlations of these circa 2006/2007 Candidate Distress Indexes with the five key 2006/2007 economic outcomes (listed in Table 3.1) are reported in Table 3.6. The results indicate that there is a very high correlation with contemporaneous measures of economic distress, often in the 0.8 range. Thus, we conclude that the top-six Candidate Distress Indexes are strong indicators of both current and future economic distress.

The last two columns of Table 3.6 show that the correlations of the top-six 2006/2007 Candidate Distress Indexes with the current 2007/2009 ARC Distress Index are also in the range of 0.77~0.84. Thus, because the correlations are not near 1.0, the Candidate Indexes do not merely represent incremental change from the current ARC Index. Yet, the relatively high correlation also means that they would not constitute a radical change. The question of which particular counties are affected when using these Candidate Distress Indexes versus the current ARC Index is discussed next in Section 4.

Table 3.6: Correlations between the Candidate Distress Indexes and 2006/2007 Key Economic Outcomes

Candidate Distress Indexes	Population growth 96-06	Poverty Rate 07	Per-capita market income 2006	Job growth 1996-06	Employment /population ratio 2007	ARC Distress Index 2007	ARC Distress Index 2009
1) Population growth 96-06, Employment/population ratio 07, Percent of adults with a four-year college degree 00, Poverty Rate 07	0.70	-0.81	0.81	0.60	0.84	-0.83	-0.81
2) Population growth 96-06, Employment/population ratio 07, Percent of adults with a four-year college degree 00, Per-capita market income 06, Poverty Rate 07	0.64	-0.82	0.87	0.57	0.83	-0.86	-0.84
3) Population growth 96-06, Employment/population ratio 07, Percent of adults with a four-year college degree 00, Per-capita market income 06	0.70	-0.66	0.84	0.62	0.80	-0.78	-0.76
4) Population growth 96-06, Employment/population ratio 07, Percent of adults with at least one year of college education 00, Per-capita market income 06, Poverty Rate 07	0.64	-0.83	0.87	0.56	0.83	-0.86	-0.84
5) Population growth 96-06, Employment/population ratio 07, Percent of adults with at least one year of college education 00, Poverty Rate 07	0.69	-0.82	0.81	0.59	0.84	-0.84	-0.81
6) Population growth 96-06, employment/population ratio 07, Percent of adults with at least one year of college education 00, Per-capita market income 06	0.70	-0.68	0.84	0.61	0.81	-0.80	-0.77

Figure 3.1a: Index constructed using proposed equal-weight Z-score method--using current ARC variables (Unemployment Rate, Poverty Rate, Per-Capita Market Income)

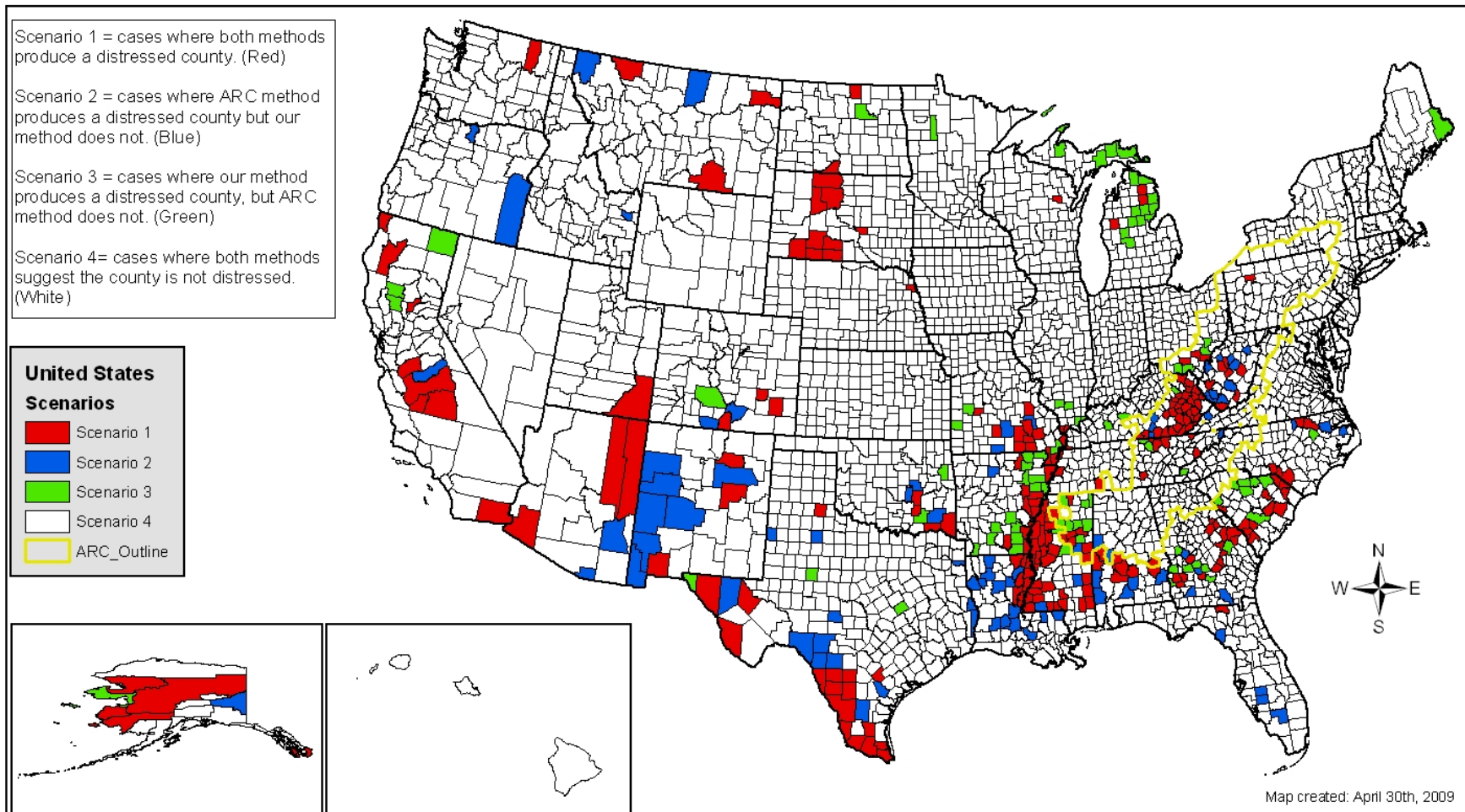


Figure 3.1b: Index constructed using proposed equal-weight Z-score method--using current ARC variables (Unemployment Rate, Poverty Rate, Per-Capita Market Income), ARC Counties

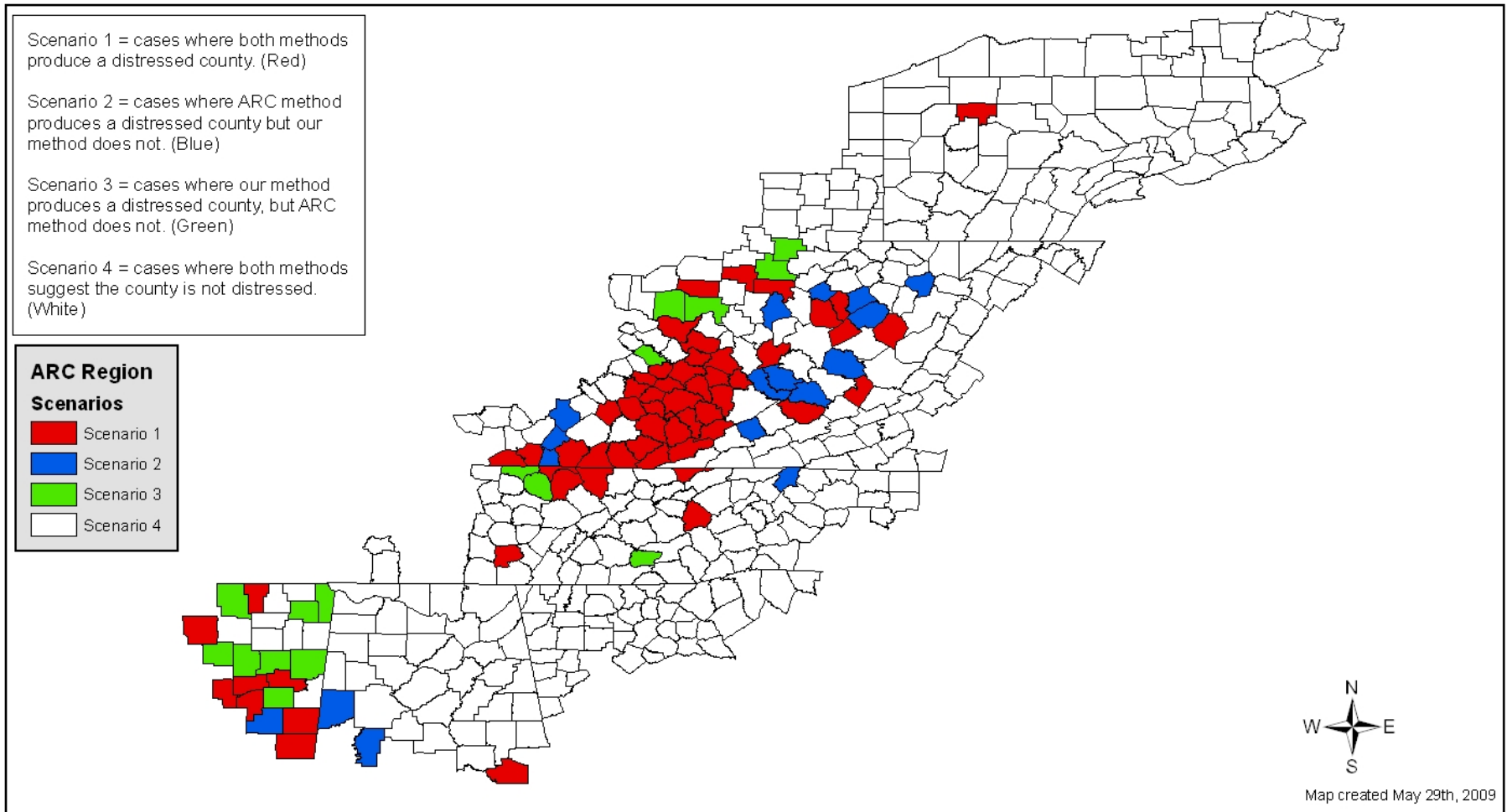


Figure 3.2: Correlation between 2007 Poverty Rate and 1997 Poverty Rate, ARC Counties

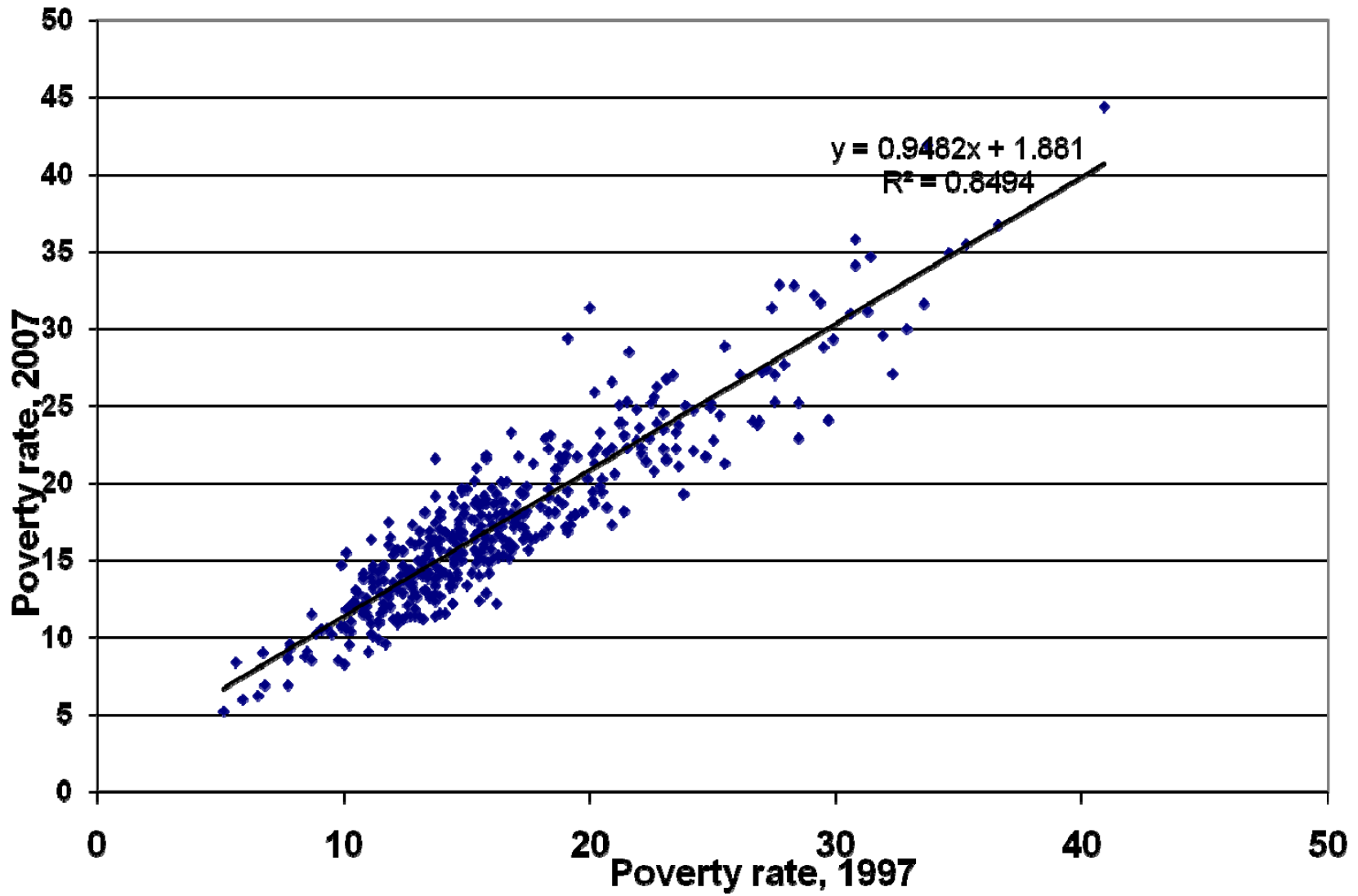


Figure 3.3: Correlation between 2006 Per-Capita Market Income and 1997 Poverty Rate, ARC Counties

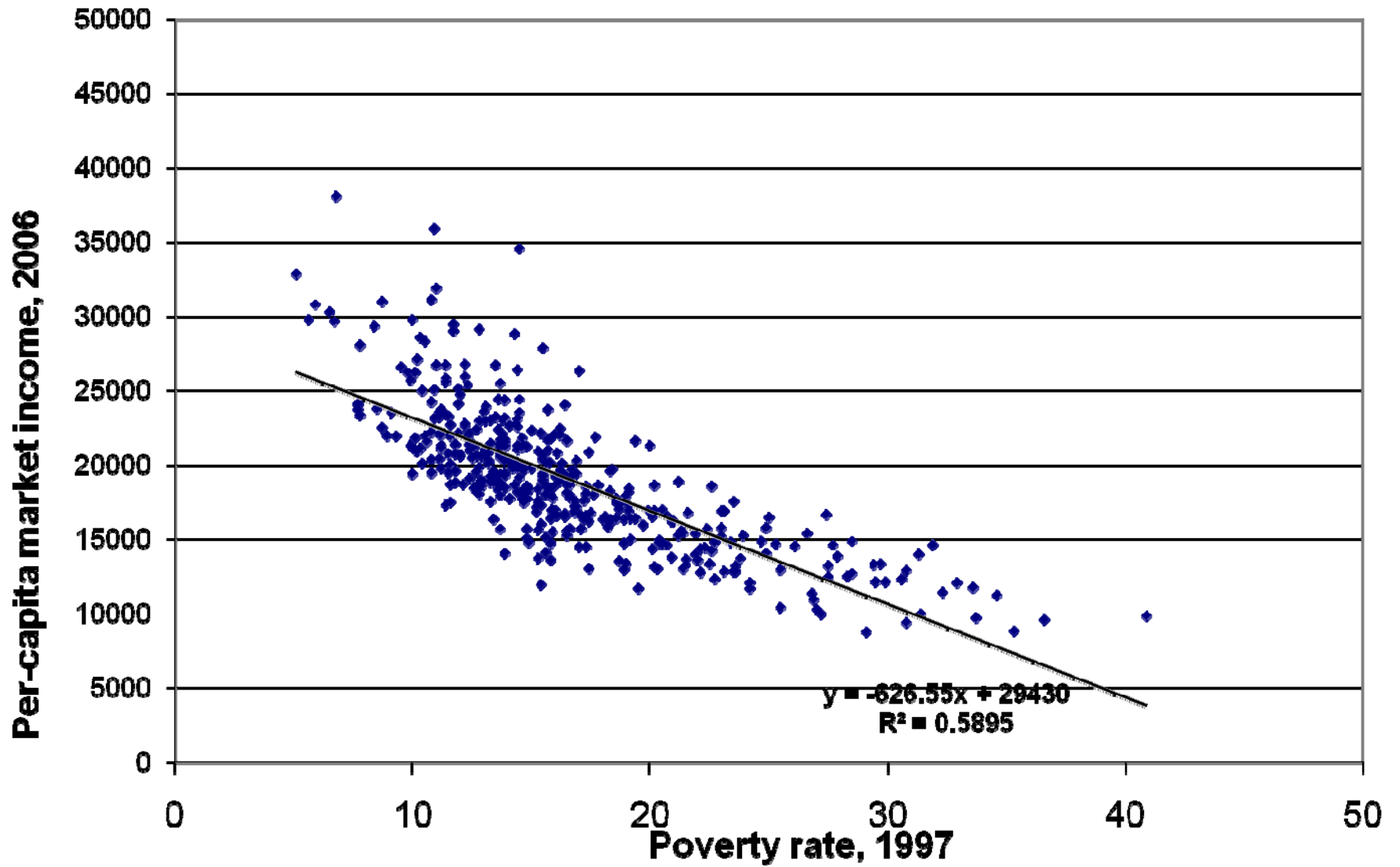
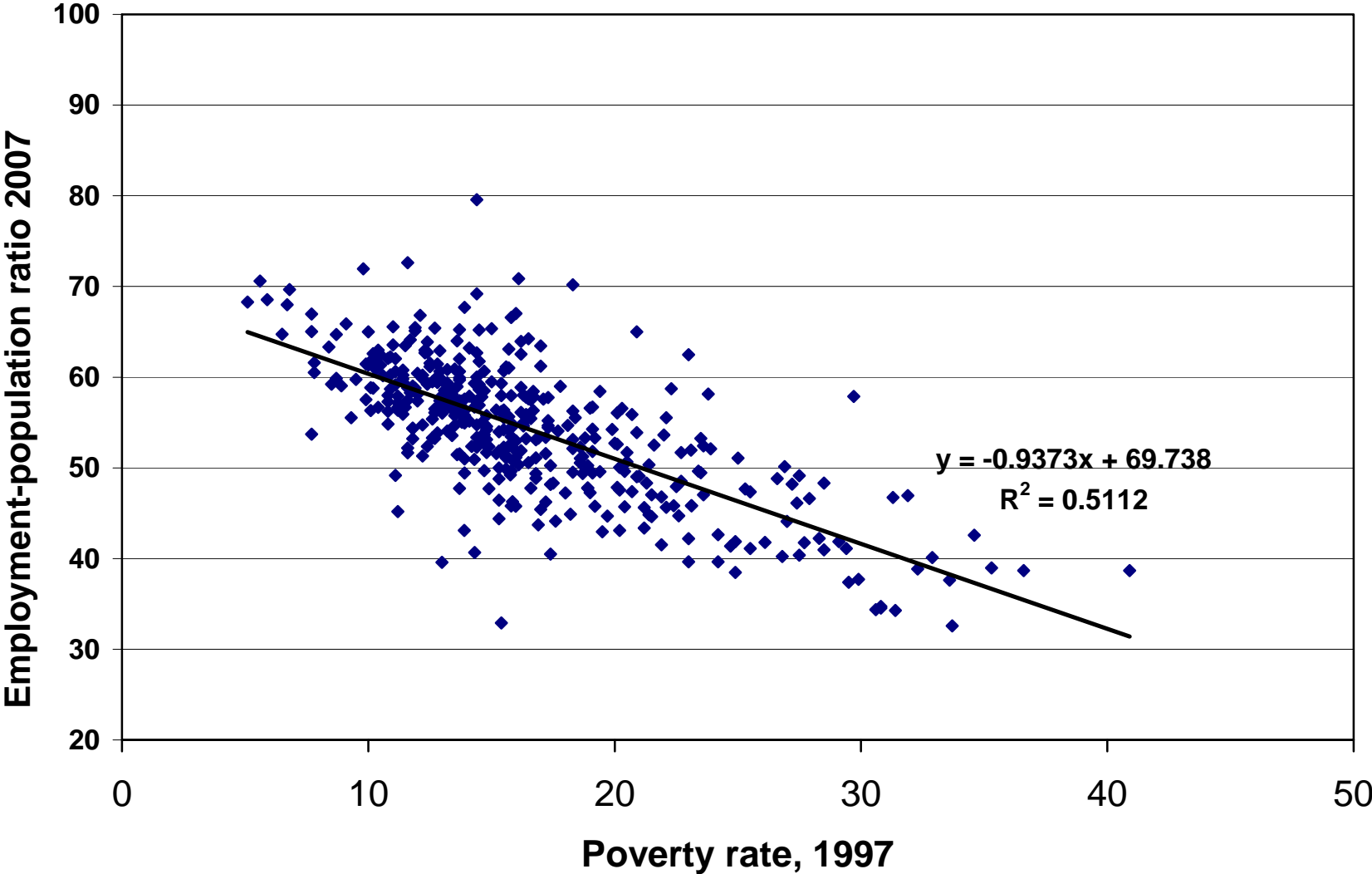


Figure 3.4: Correlation between 2007 Employment/Population Ratio and 1997 Poverty Rate, ARC Counties



Comparing the Candidate Distress Indexes to the ARC Distress Index

In the previous section, we identified our six preferred Candidate Distress Indexes for further analysis (see Table 3.4). This section demonstrates how each of the six Candidate Distress Indexes would affect the distress categorization of each ARC county. Because the “weakest” 10% of U.S. counties are categorized as being in distress, the total number of distressed counties in the U.S. does not change using our Candidate Distress Indexes compared to the ARC index. However, the geographical distribution of the counties inside and outside of the ARC region categorized as being in distress can change due to the differing implicit weighting in the current ARC Distress Index and the different variables used in the construction of each Candidate Index. In other words, our more refined analysis may find that a greater number of ARC counties are in fact distressed relative to the nation when contrasted with ARC’s current distress indicator.

To show the categorization of each of the Candidate Distress Indexes, we follow the approach outlined in our April 2008 ARC report (Partridge et al., 2008). Specifically, we report four sets of results for the Candidate Distress Indexes using 2007 data.

- First, we present a map for the entire U.S. that shows how the distress categorization would change if the respective 2006/2007 Candidate Distress Index replaced the FY2007 ARC Distress Index. The U.S. comparison is primarily used to show how the Candidate Distress Index benchmarks to the entire nation.
- Second, we present the corresponding map of how the distress categorization changes for the ARC region, which represents the most important result of our analysis. This is the same comparison to the FY2007 ARC Distress Index as the U.S. map, but we “zoom in” to the ARC region only.
- Third, we report a table that summarizes the changes across each of the five ARC economic categories by state that would occur if the alternative candidate variables were used compared to the FY2007 ARC Index. Appendix Table A7 presents a brief summary solely of the number of distressed counties for each Candidate Index by state (as well as for the ARC Indexes for FY2007 and FY2010).
- Fourth, for each of the six Candidate Distress Indexes, we show a map that illustrates how the Candidate Indexes would classify the ARC counties into the five ARC economic categories ranging from distress, at-risk, all the way to attainment. The general order of our discussion of the six Candidate Distress Indexes follows our minor preference in ranking each Candidate Index.

To preview the results, the general pattern is that the Candidate Indexes suggest that a greater number of ARC counties would be classified as either distressed or at-risk compared to the current ARC Distress Index. Specifically, compared to the 74 distressed and 88 at-risk ARC counties delineated using the current index (in FY2007), there would be between 82-95 counties classified as distressed and 87-112 classified as at-risk using the 6 Candidate Indexes. Note that

this is relative to the nation in that the Candidate Indexes also use the lowest 10% of U.S. counties to be classified as distressed and the lowest 10 to 25% to be classified as at-risk.

Candidate Index 1: Population Growth, Employment/Population Rate, Four-year College Attainment, and Poverty Rate

The four sets of results are presented graphically in Figures 4.1a-4.1c and summarized in Table 4.0 (which outlines changes taking place in the distress status of ARC counties when various indexes are employed). Figure 4.1a shows how the distress categorization would change nationally if the Candidate Index replaced the current ARC Index. We use the following colors to represent the changes. *Red* indicates counties that would be categorized as distressed under both indexes – in other words, both measures produce the same result. *Blue* represents counties that are categorized as distressed with the ARC index, but that would not be categorized as distressed using the Candidate Index. *Green* refers to counties that would be categorized as distressed using the Candidate Index, but not under the current ARC index. *White* indicates counties that are not categorized as distressed using either index.

Many counties in Central Appalachia turn green when this Candidate Index (containing population growth, employment-to-population ratio, percent of adults with four years of college, and the poverty rate) is used. Outside of the ARC region, the Candidate Index indicates more distressed (green) counties in the fringes of the Mississippi Delta and the Historic Cotton Belt, as well as in several counties in Georgia and Alabama and fewer distressed (blue) counties along the Rio Grande and in the Great Plains Reservations.

Figure 4.1b shows the same distress categorization specifically for the ARC region. The new Candidate Index reveals a scattering of green (newly distressed) counties throughout the Central Appalachian area, and an arc of blue (no longer distressed) counties stretching from Kentucky into Tennessee. The regions of Mississippi and Alabama that are close to the southern ARC border also have a total of five newly distressed counties (i.e., the southwest part of the ARC region near the Delta and the Cotton Belt) according to this Candidate Index, offsetting some of the blue counties that would fall out of the distress category (including one county in Pennsylvania).

Table 4.0 indicates that overall, 34 counties change distress status (for comparison, 74 ARC counties were classified as distressed in FY2007 using the ARC Distress Index). Specifically 21 counties move into the distress category and 13 counties move out of the distress category, for a net addition of 8 more counties categorized as being in distress using this Candidate Index. Table 4.1 confirms using this Candidate Index that 8 more counties are in distress using this Candidate Index (82 total in distress) compared to the current ARC Index measured in FY2007 (74 in distress). In particular, 11 more counties are classified as being in distress with the new Candidate Index, and 3 counties drop out of distress status (for a net change of 8). In terms of details, the changes break out as follows: Five states have additional distressed counties (AL, +2; MS, +2; OH, +2; VA, +4; and WV, +1) and two states have fewer distressed counties (KY, -2; and PA, -1). Furthermore, there is a net decrease of 1 county considered at-risk with this Candidate Index (with 12 becoming at-risk and 13 falling out of at-risk status), and the number

of transitional counties falls by 18 (from 225 to 207 counties). The number of competitive counties increases by 6, and the number of in attainment counties rises by 5 with this Candidate Index. Details as to where these counties are found, specifically by state, are reported in Table 4.1. For example, most of the counties (4) that are in attainment under this Candidate Index are located in Georgia.

Finally, Figure 4.1c shows the full range of ARC economic categories using the Candidate Index. Clearly, the largest concentration of red counties is observed across Central Appalachia (Kentucky and West Virginia especially) but the very southern reaches of the region in Mississippi and Alabama are also shaded in dark red. Light blue counties (competitive) are scattered throughout the region, with a notable concentration of dark blue (attainment) counties around the Atlanta, GA metropolitan area, and a single dark blue county in New York.

Candidate Index 2: Population Growth, Employment/Population Rate, Four-year College Attainment, Poverty Rate, and Per-capita Market Income

Figures 4.2a and 4.2b show a heavy concentration of red counties in Kentucky and West Virginia (indicating that both the current ARC Index and this Candidate Index classify the counties in the same manner, i.e., as distressed). In addition, blue counties that are no longer classified as being distressed (using Candidate 2) and green counties (that Candidate 2 now classifies as being distressed) are interspersed with the red ones. Further, while the counties in the southwestern ARC are mostly red, a few green counties and one blue county can be found in this region. Figure 4.2c shows how the counties compare with one another when we apply the ARC Region County Economic Levels.

With this indicator the number of distressed counties (also) rises to 82, while the number of counties at-risk increases to 94 (see Table 4.2). Virginia adds 4 distressed counties compared to the current ARC distress index, while Mississippi, Ohio and Tennessee each add two distressed counties, and Alabama adds one. In contrast, Kentucky and West Virginia each have one less distressed county. In terms of the at-risk category, Kentucky (1 added county), Tennessee (2) and West Virginia (6) all have more at-risk counties as compared to the current ARC index. There also are fewer transitional counties (199 compared to 225), eleven additional competitive counties and one more county overall that is in attainment. In fact, Georgia and Alabama each add one county in attainment while Virginia loses its one county that is in attainment under the current ARC index.

Candidate Index 3: Population Growth, Employment/Population Rate, Four-year College Attainment, and Per-capita Market Income

Figures 4.3a and 4.3b show a concentrated, if not sustained, cluster of red counties in the border area between Kentucky and West Virginia but there are also a handful of green counties (i.e., our method suggests distress whereas ARC's current index does not). The southwestern portion of the ARC region shows a somewhat balanced mosaic of blue, green and red counties. Figure 4.3c shows the distribution of ARC Region Economic Levels when our indicator is applied. Clearly, a distinct core of dark red counties in the central Appalachian Region remains, and the darker blue (in attainment) counties around the Atlanta metro area are noteworthy.

With this third candidate index, the number of distressed counties rises yet further (Table 4.3), when compared to the FY2007 ARC Index (to 90 from 74). Many of these added distressed counties (8) are found in Virginia, perhaps surprisingly, where the number in distress skyrockets from 1 to 9. However, West Virginia (plus 6 counties) and Ohio (plus 3) also see increases while Kentucky (minus 3, from 34 to 31) experiences a reduction in the number of distressed counties, as do Georgia and Pennsylvania. The number of at-risk counties rises from 88 using the ARC Index to 100 with this third candidate index. Pennsylvania experiences the greatest increase, from 1 to 13 counties, while the largest drop occurs in North Carolina (from 7 to only 3 counties).

Next, we turn to the same analysis *with the only exception that we use at least one year of college attainment rather than a bachelor's degree*. The first measure includes both the poverty rate and per capita market income (note that this does not perfectly match index 4.1 as that one did not include per capita market income).

Candidate Index 4: Population Growth, Employment/Population Rate, At Least One Year College Attainment; Poverty Rate, and Per-capita Market Income

Figures 4.4a and 4.4b compare county distress status for our fourth candidate index with the status obtained using the ARC Index. As noted, the major modification here is in terms of the number of years of college attended by the adult population. Again a cluster of red counties appears in the central ARC region, along with a smattering of mostly green counties – indicating that our measure picks up distress where the current ARC measure does not. Figure 4.4c demonstrates the shifts in the ARC Region County Economic Levels under this alternative index.

With Candidate Index 4, there are 87 distressed counties or 13 more than is the case with the current ARC Index. Here most of the increases (4) are observed in Tennessee, where the number of counties in distress rises from 7 to 11, and in Virginia (where the increase is from 1 to 5 counties, also for a net addition of 4). The number of at risk counties is 99 and there are 193 transitional counties with this fourth Candidate Measure. There are more competitive counties with this indicator (33 vs. 26) and one more county is in attainment when compared to the current ARC measure. The number of competitive counties in Georgia doubles, from six to twelve when we switch from the ARC Index to the Candidate Index constructed here.

Candidate Index 5: Population Growth, Employment/Population Rate, At Least One Year College Attainment, and Poverty Rate

In Figures 4.5a and 4.5b, the now familiar pattern of red counties in the core ARC region again emerges, along with a notable number of green counties and a few blue counties. In the southwestern portion of the region, more counties are red, and three each are blue and green. Figure 4.5c shows the ARC County Economic Levels based on this index.

With this candidate index, 88 counties are in distress with Tennessee, Virginia and West Virginia showing the largest increases, respectively adding 6, 4, and 4 more counties. Alabama, Kentucky, and Mississippi retain the same total number of distressed counties (34) under either scenario. In terms of the at-risk classification, we see an increase from 88 to 104 for the total count (or a net addition of 16 counties at-risk). The number of transitional counties is 187,

compared with 225 using the ARC index, with the biggest differences occurring in Georgia (a drop of ten counties, from 26 to 16), West Virginia (a drop from 21 to 12) and Pennsylvania (a drop from 45 to 37). With this measure, 30 counties are competitive (up from 26 under the ARC Index) and 11 are in attainment (up from 7).

Candidate Index 6: Population Growth, Employment/Population Rate, At Least One Year College Attainment, and Per-capita Market Income

Turning to our last candidate index, the results in Figures 4.6a and 4.6b show that the core ARC region appears in red, along with a number of green counties, but with relatively fewer blue counties. In the southwestern corner of the region, a few scattered blue and green counties appear, along with five red counties clustered into two groups. In the national map, a number of blue counties appear in the West, along with nearly a dozen along the Rio Grande River region (Figure 4.6a). Figure 4.6c portrays the ARC region using County Economic Levels, again with the familiar core set of counties stretching through Kentucky and West Virginia. The dark red counties are often, but not always, near or surrounded by pink counties, suggesting that the highest amount of distress is concentrated in the core region, tapering off as one moves away from this core, especially towards the northeast (Pennsylvania).

Based on this sixth index, 95 counties are distressed, compared to 74 with the ARC Index. Major changes in county classifications occur in Ohio (3 counties are added), Tennessee (4 are added), Virginia (an increase of 8, from 1 to 9 counties), and in West Virginia, where the increase is 7, from 16 to 23 counties. Kentucky actually has one less county in distress under this scenario (33 rather than 34 using the ARC Index). In Pennsylvania the number of distressed counties drops from 1 under the FY2007 ARC Index to zero if this sixth candidate index is used. The number of at-risk counties jumps by 24, from 88 to 112: more than two-thirds of this increase occurs in Pennsylvania, where the number skyrockets from only one to 18. The number of transitional counties drops from 225 to 168, with significant declines occurring in Pennsylvania (from 45 to 29) and in West Virginia (from 21 to 10 counties). Eleven more counties are competitive using this indicator compared to the FY2007 ARC Index (with most of this change occurring in Georgia with a doubling of counties from 6 to 12). Eight counties are now found to be in attainment, which is virtually unchanged from the ARC case.

Summary of Results

Overall, the new sets of candidate variables included in our comprehensive analysis give us greater confidence in the final county distress designations. Of equal importance, these variables are good indicators both of current distress conditions and the conditions that are likely to exist in the future. One striking result is the strong persistence of a core set of ARC counties across Kentucky and West Virginia that remain in distress even after other measures are included, especially the employment-to-population ratio, educational attainment and population growth. Yet, there are also many changes in the counties that are classified as distressed, with between 28-47 counties changing status using the Candidate Indexes versus the current ARC Index (74 counties are classified as distressed with the current ARC Index). Remarkably, our analysis reveals a strong and immutable association between poverty and people being in the workforce.

In other words, employment remains one of the most powerful tools available to move people out of poverty, but in turn, employment depends on levels of education.

Our analysis then leads us to classify a greater number of ARC counties as being in distress (compared to the U.S. benchmark), with these counties most generally in Alabama, Tennessee, Virginia, and West Virginia. Not a single county in New York or Pennsylvania is identified as distressed as a product of our investigation, although Pennsylvania usually adds several more counties designated as at-risk. Figure 4.7 shows the general geographical pattern applies even after increasing the weight on the population growth variable in the overall index fourfold to assess the sensitivity of the results.³ As shown in Figure 4.7, the distribution of distressed counties is fairly similar to the six Candidate Indexes, even after heavily weighting population growth.

³We strongly weight population growth because distress appears to more greatly manifest itself along that dimension in Pennsylvania and New York (see Partridge et al., 2008).

Figure 4.1a: Candidate Index 1: Population Growth, Employment/Population Rate, Four-Year College Attainment, Poverty Rate

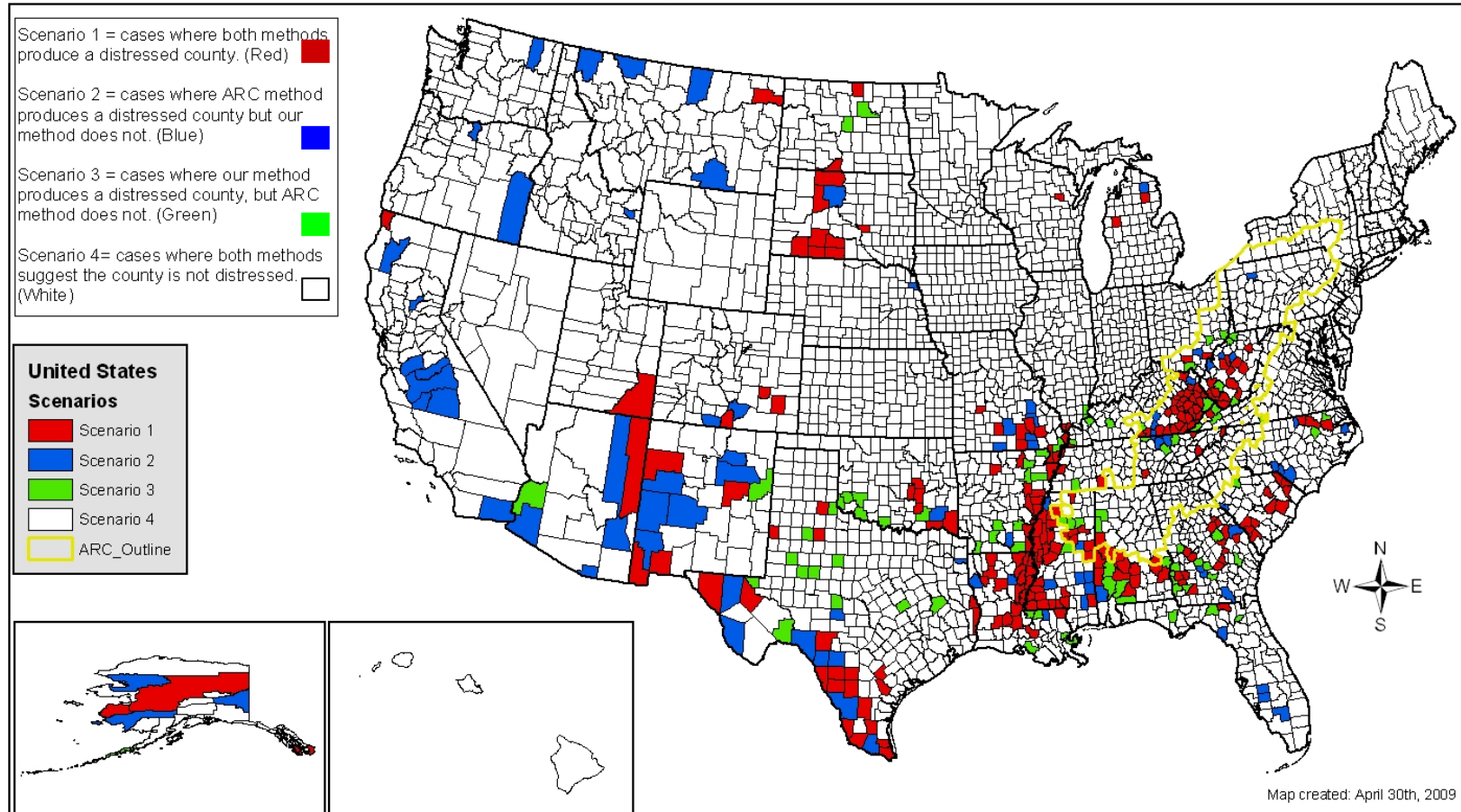


Figure 4.1b: Candidate Index 1: Population Growth, Employment/Population Rate, Four-Year College Attainment, Poverty Rate

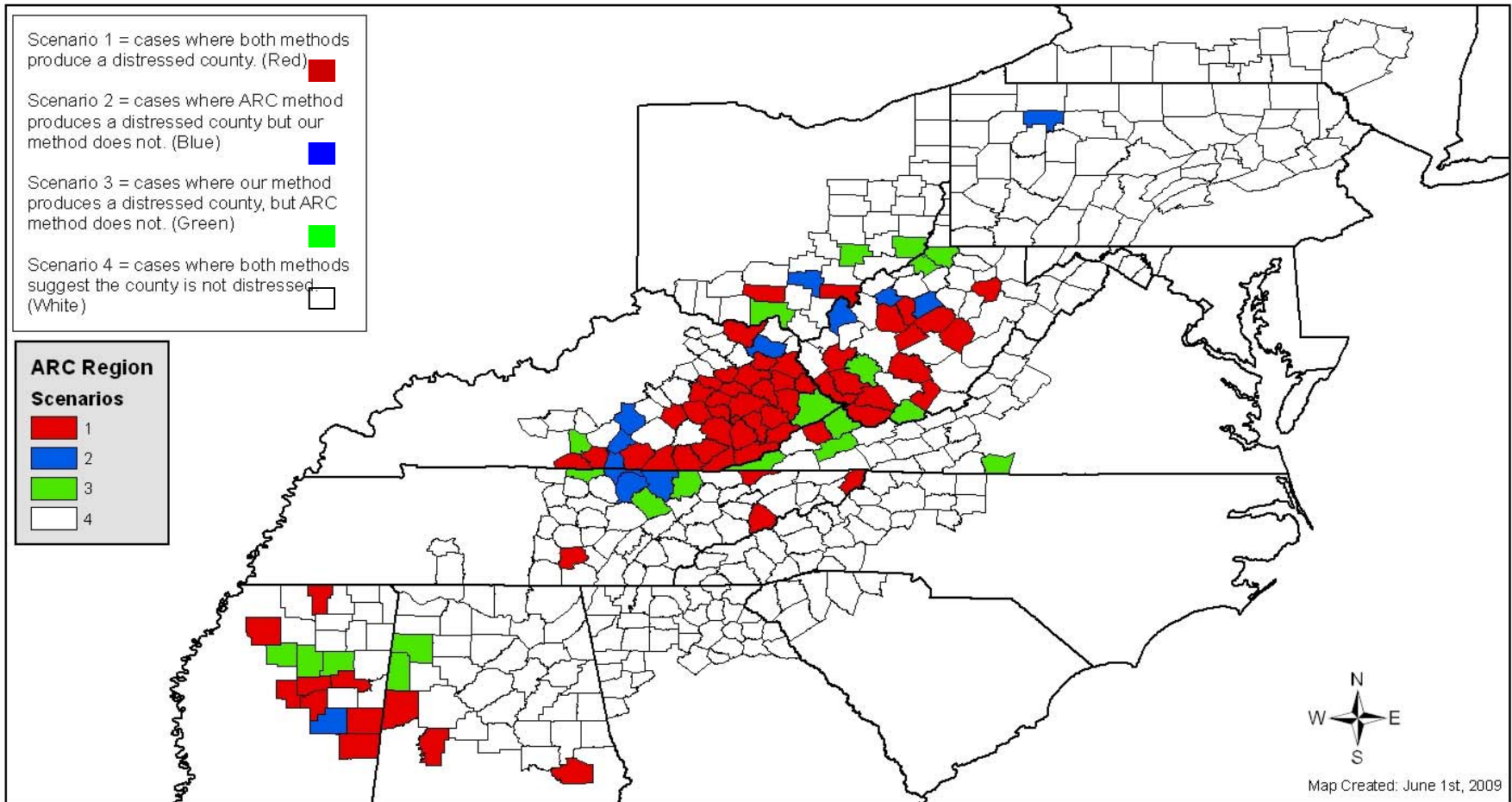


Figure 4.1c: County Economic Status, Candidate Index 1: Population Growth, Employment/Population Rate, Four-Year College Attainment, Poverty Rate

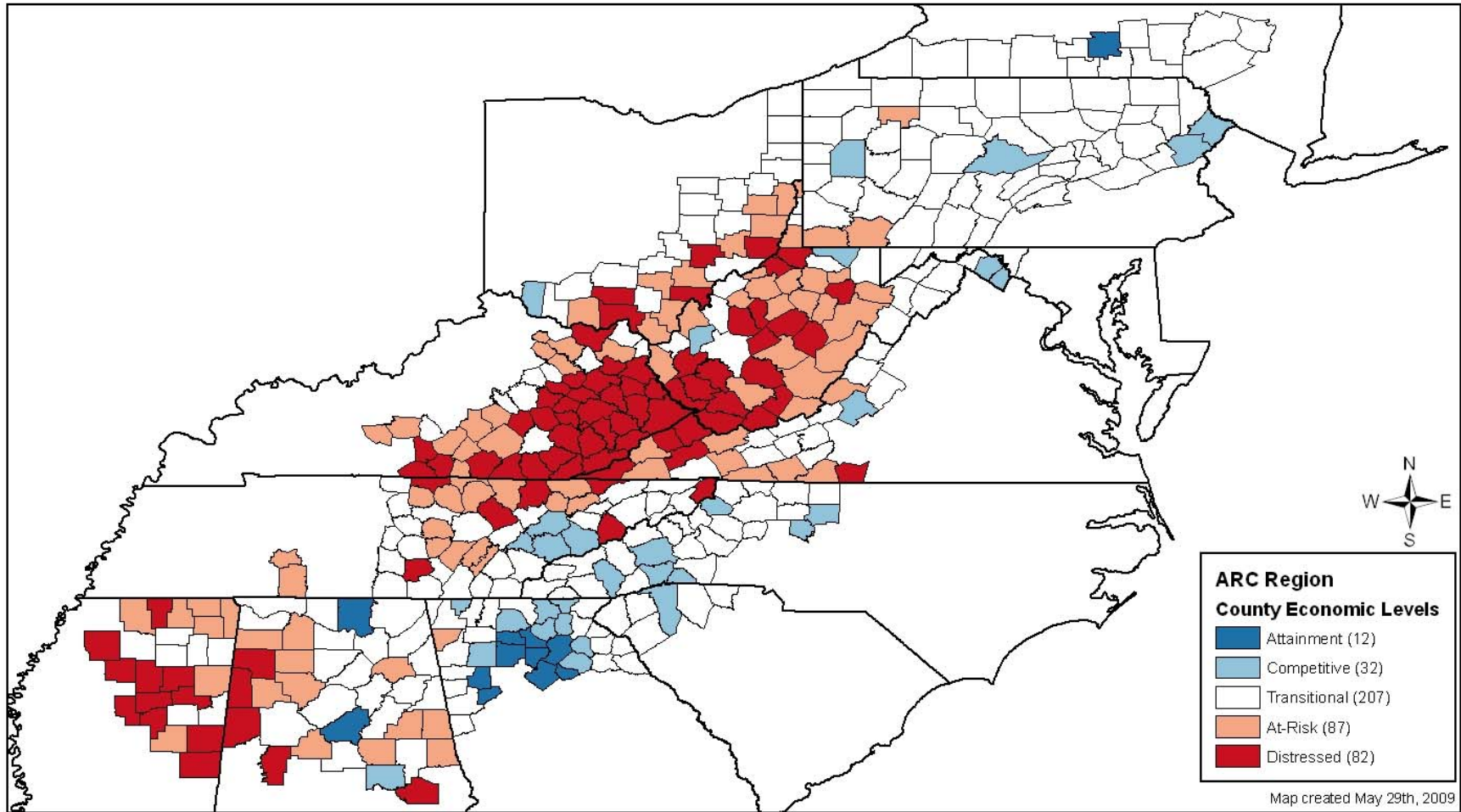


Figure 4.2a: Candidate Index 2: Population Growth, Employment/Population Rate, Four-Year College Attainment, Poverty Rate, Per-Capita Market Income

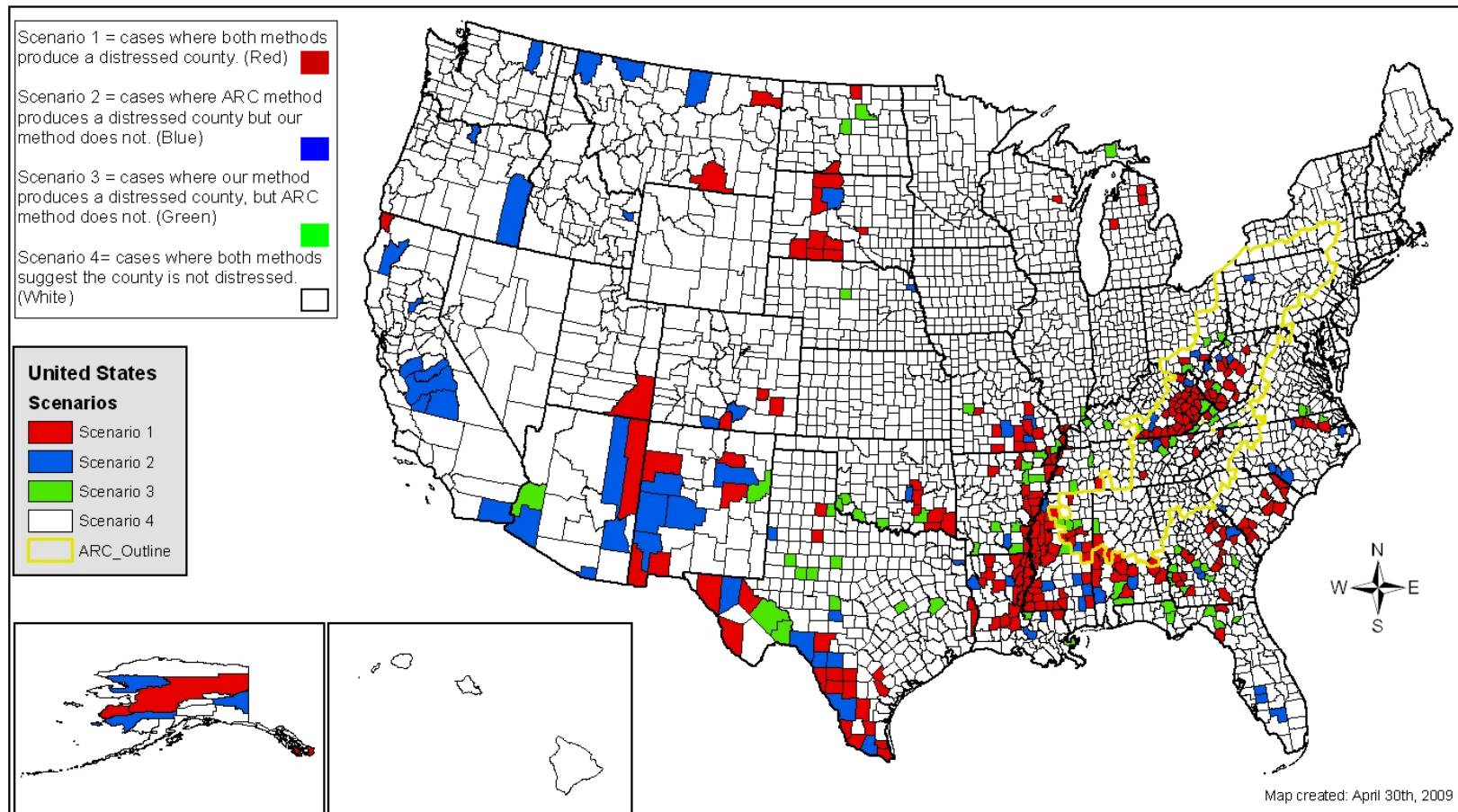


Figure 4.2b: Candidate Index 2: Population Growth, Employment/Population Rate, Four-Year College Attainment, Poverty Rate, Per-Capita Market Income

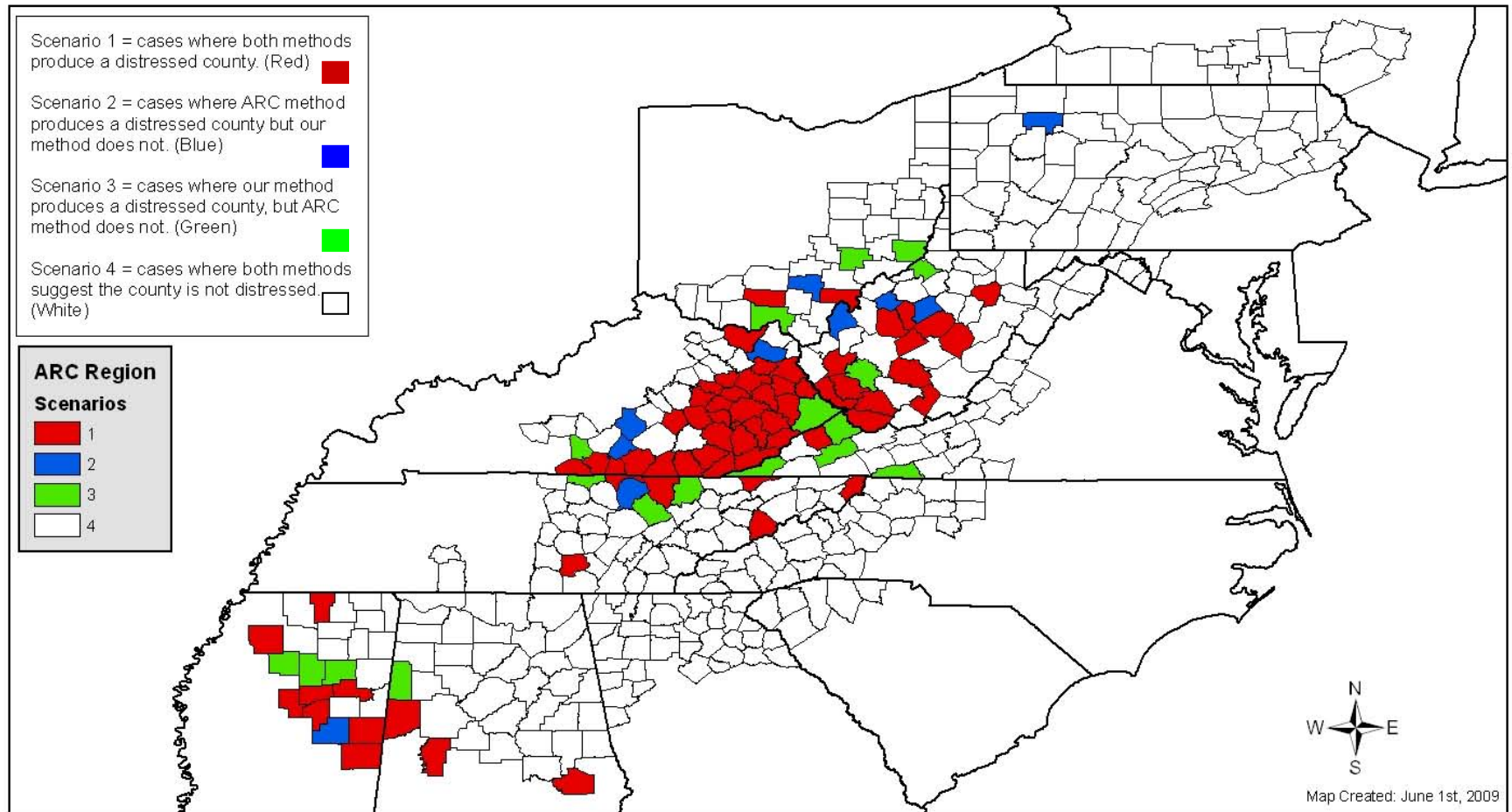


Figure 4.2c: County Economic Status, Candidate Index 2: Population Growth, Employment/Population Rate, Four-Year College Attainment, Poverty Rate, Per-Capita Market Income

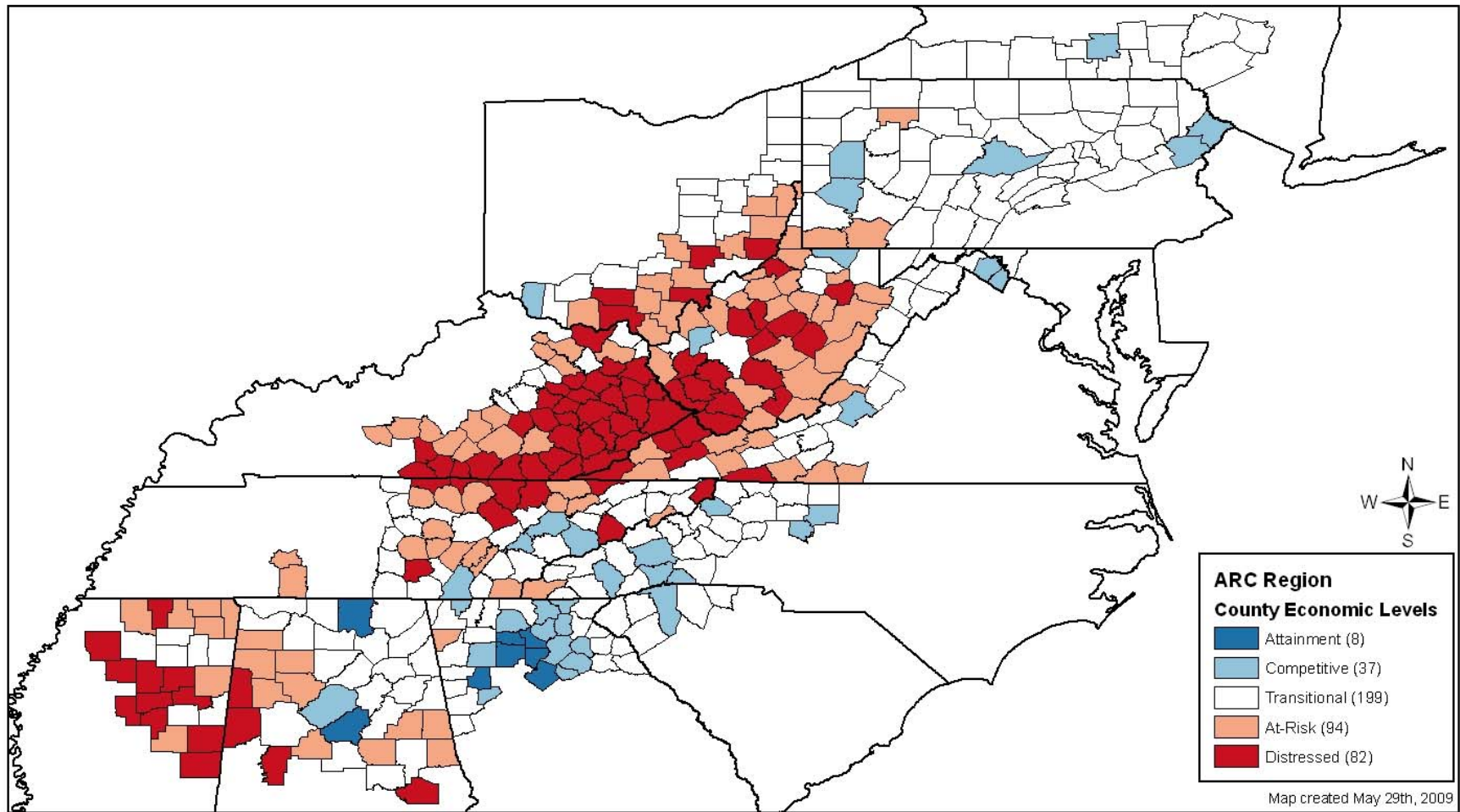


Figure 4.3a: Candidate Index 3: Population Growth, Employment/Population Rate, Four-Year College Attainment, Per-Capita Market Income

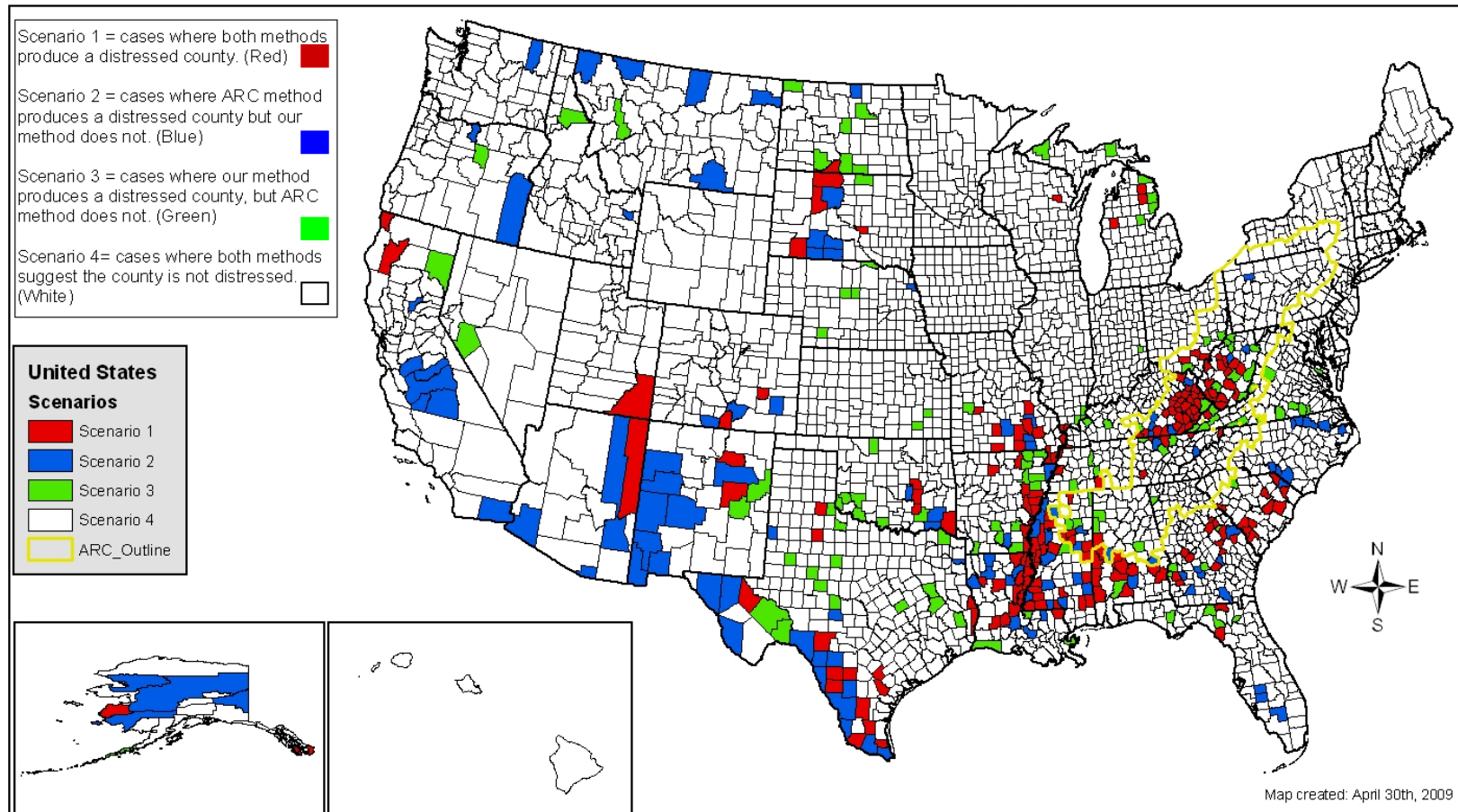


Figure 4.3b: Candidate Index 3: Population Growth, Employment/Population Rate, Four-Year College Attainment, Per-Capita Market Income

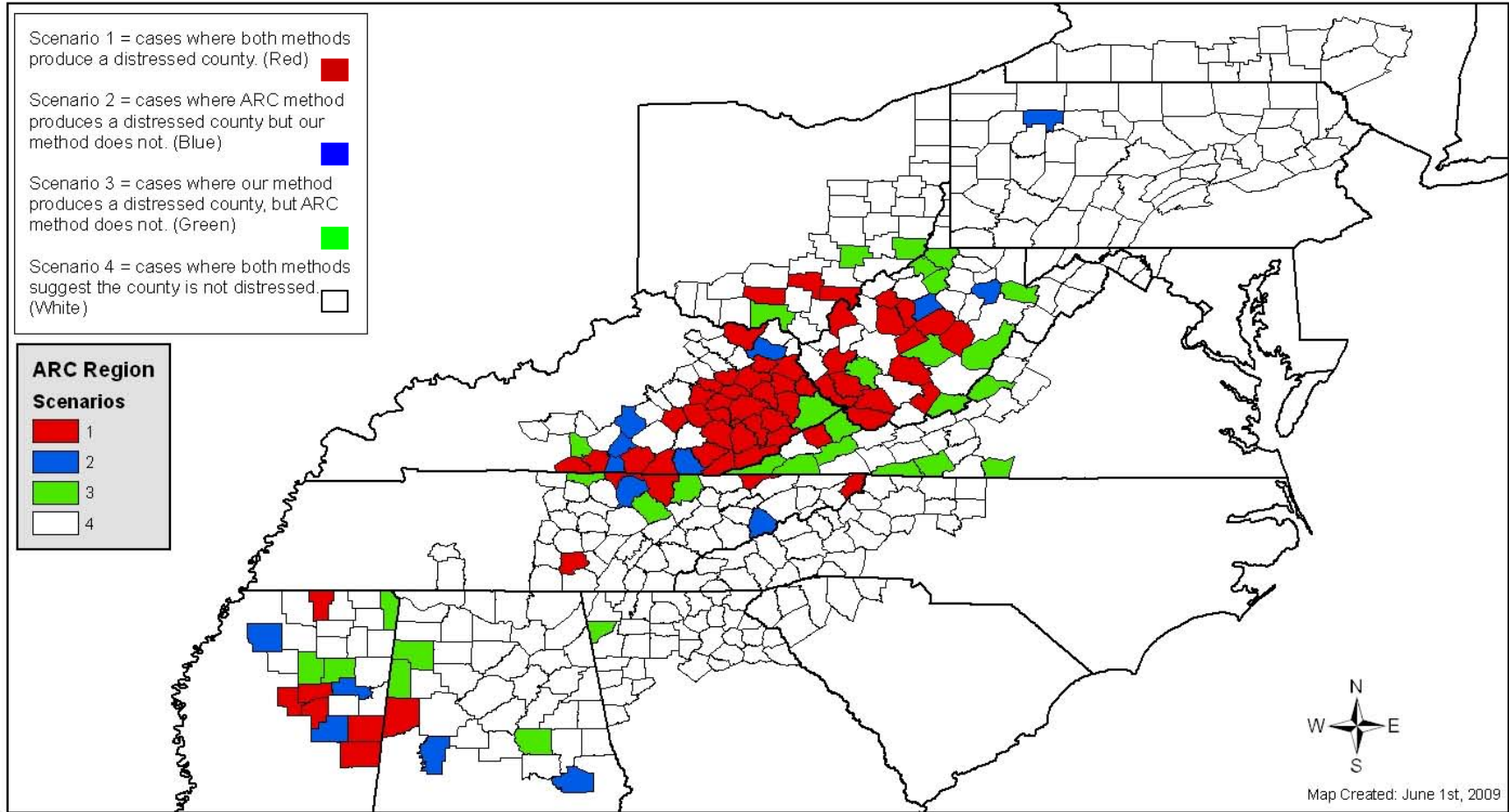


Figure 4.3c: County Economic Status, Candidate Index 3: Population Growth, Employment/Population Rate, Four-Year College Attainment, Per-Capita Market Income

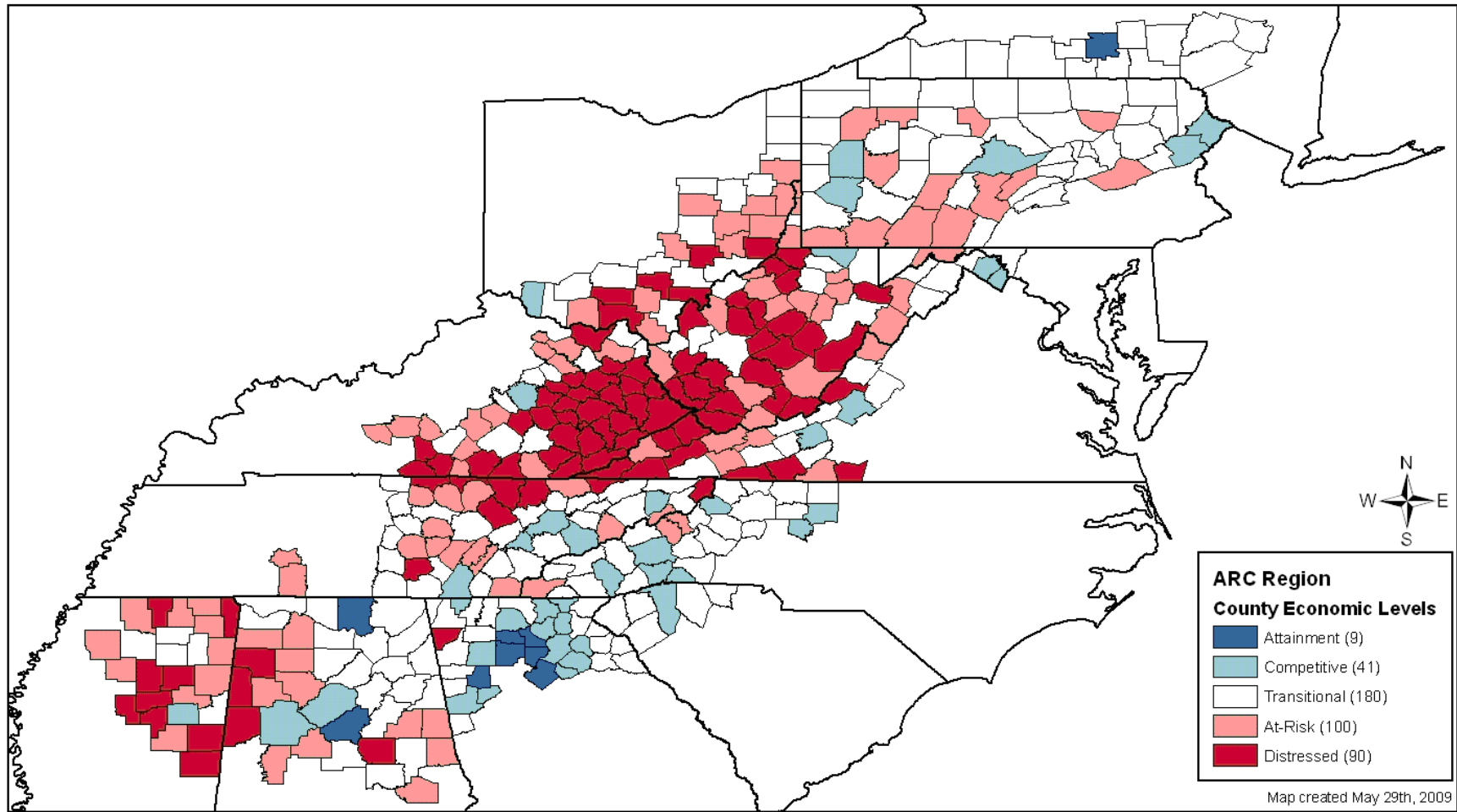


Figure 4.4a: Candidate Index 4: Population Growth, Employment/Population Rate, One-Year College Attainment, Poverty Rate, Per-Capita Market Income

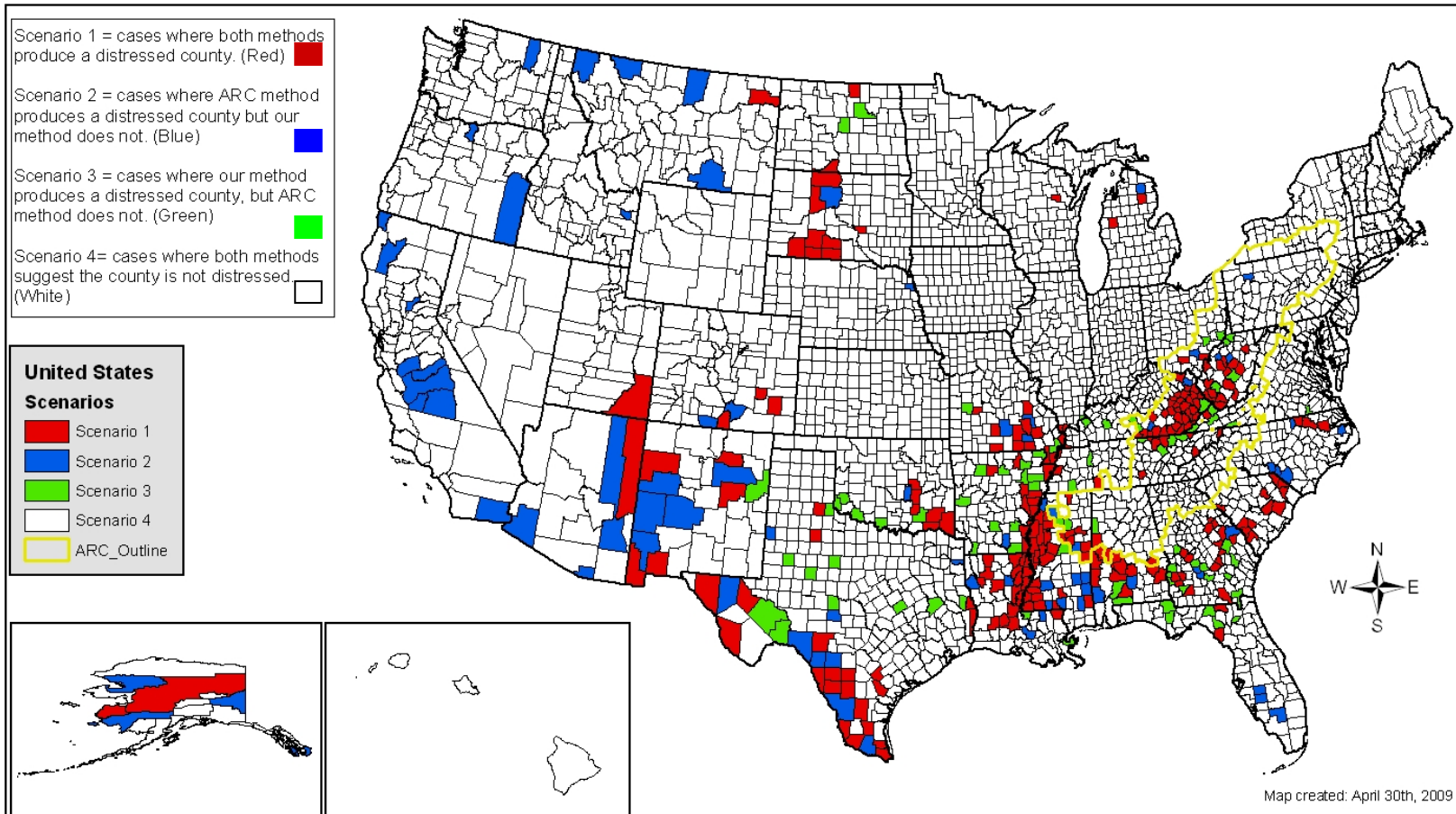


Figure 4.4b: Candidate Index 4: Population Growth, Employment/Population Rate, One-Year College Attainment, Poverty Rate, Per-Capita Market Income

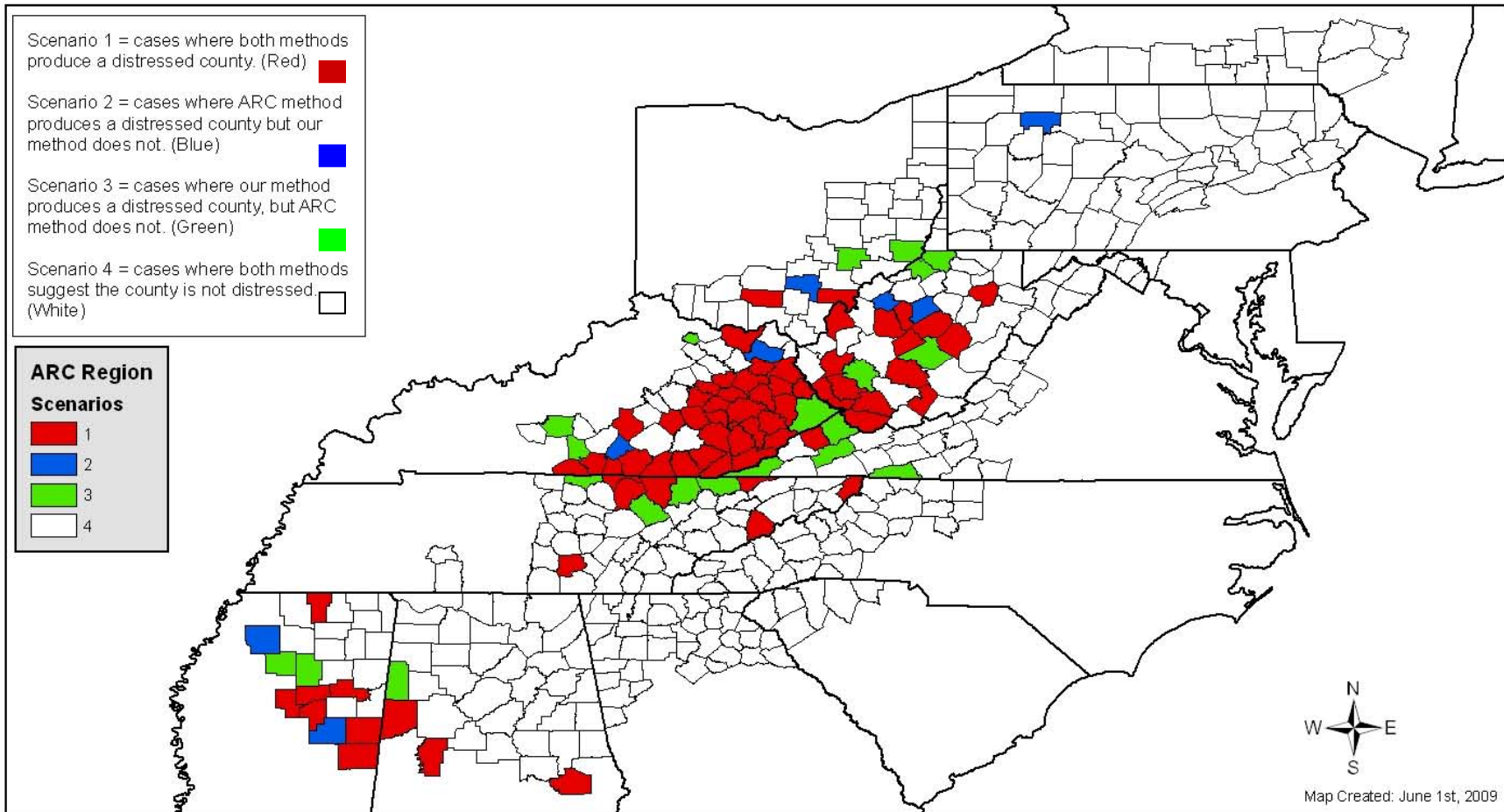


Figure 4.4c: County Economic Status, Candidate Index 4: Population Growth, Employment/Population Rate, One-Year College Attainment, Poverty Rate, Per-Capita Market Income

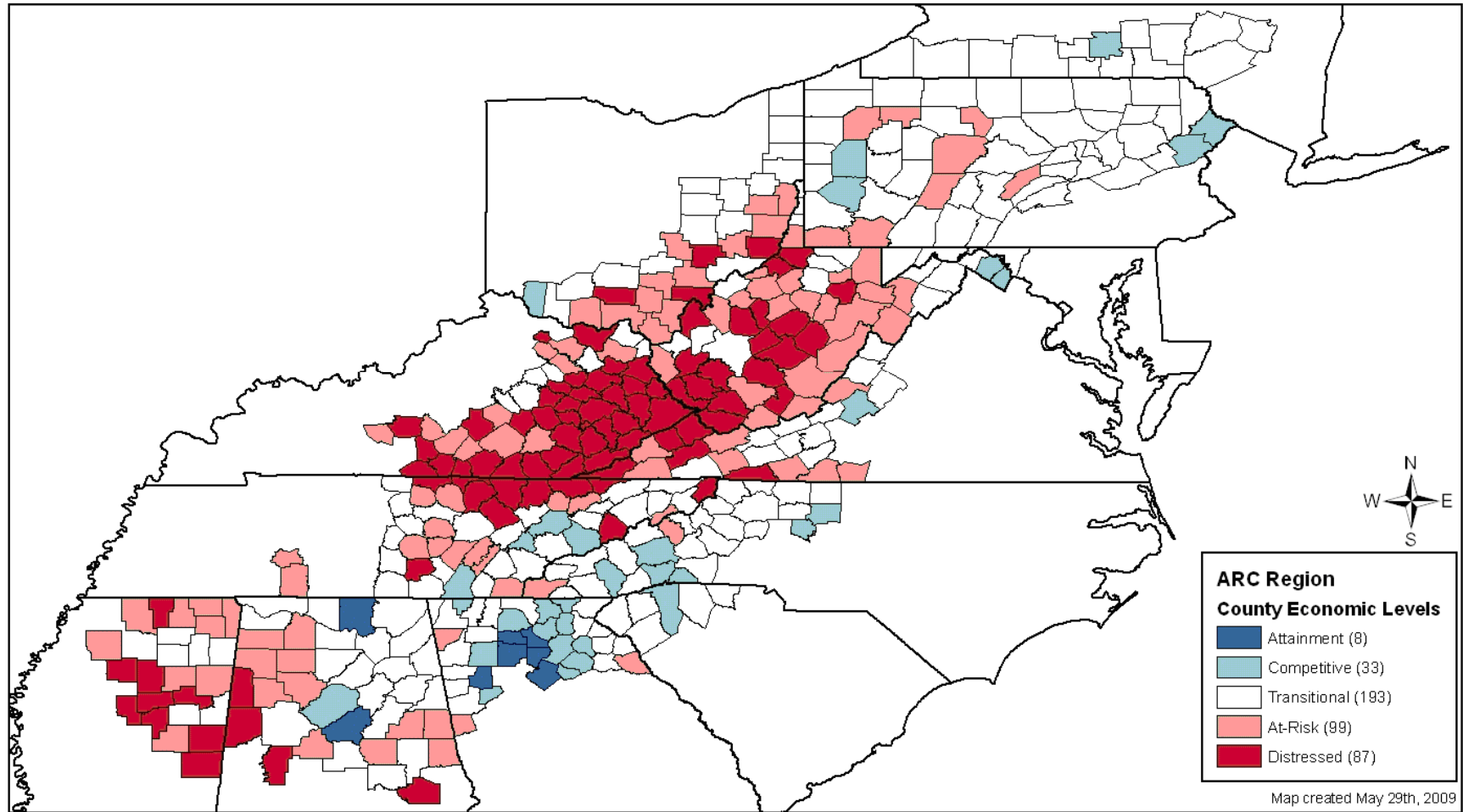


Figure 4.5a: Candidate Index 5: Population Growth, Employment/Population Rate, One-Year College Attainment, Poverty Rate

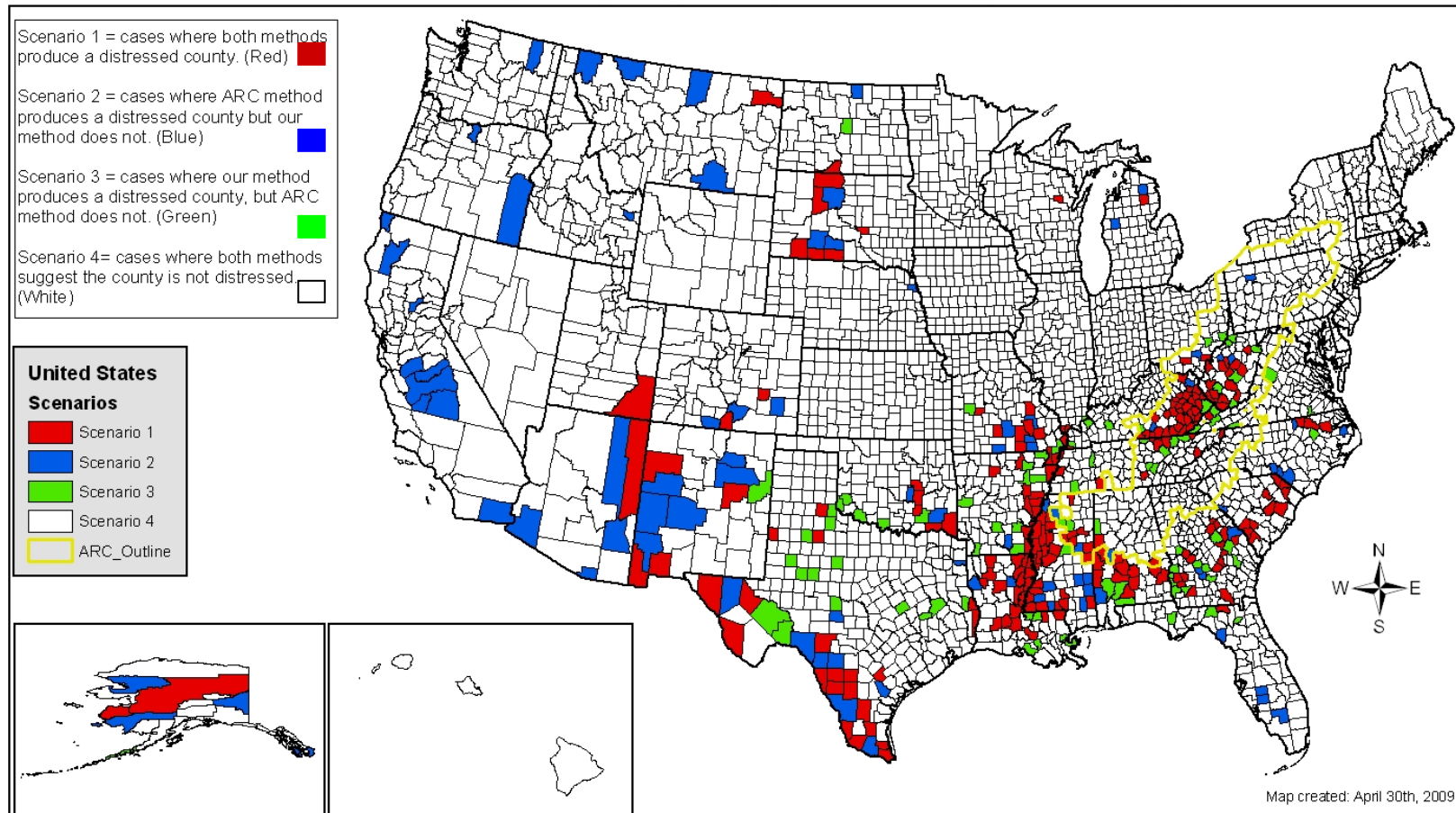


Figure 4.5b: Candidate Index 5: Population Growth, Employment/Population Rate, One-Year College Attainment, Poverty Rate

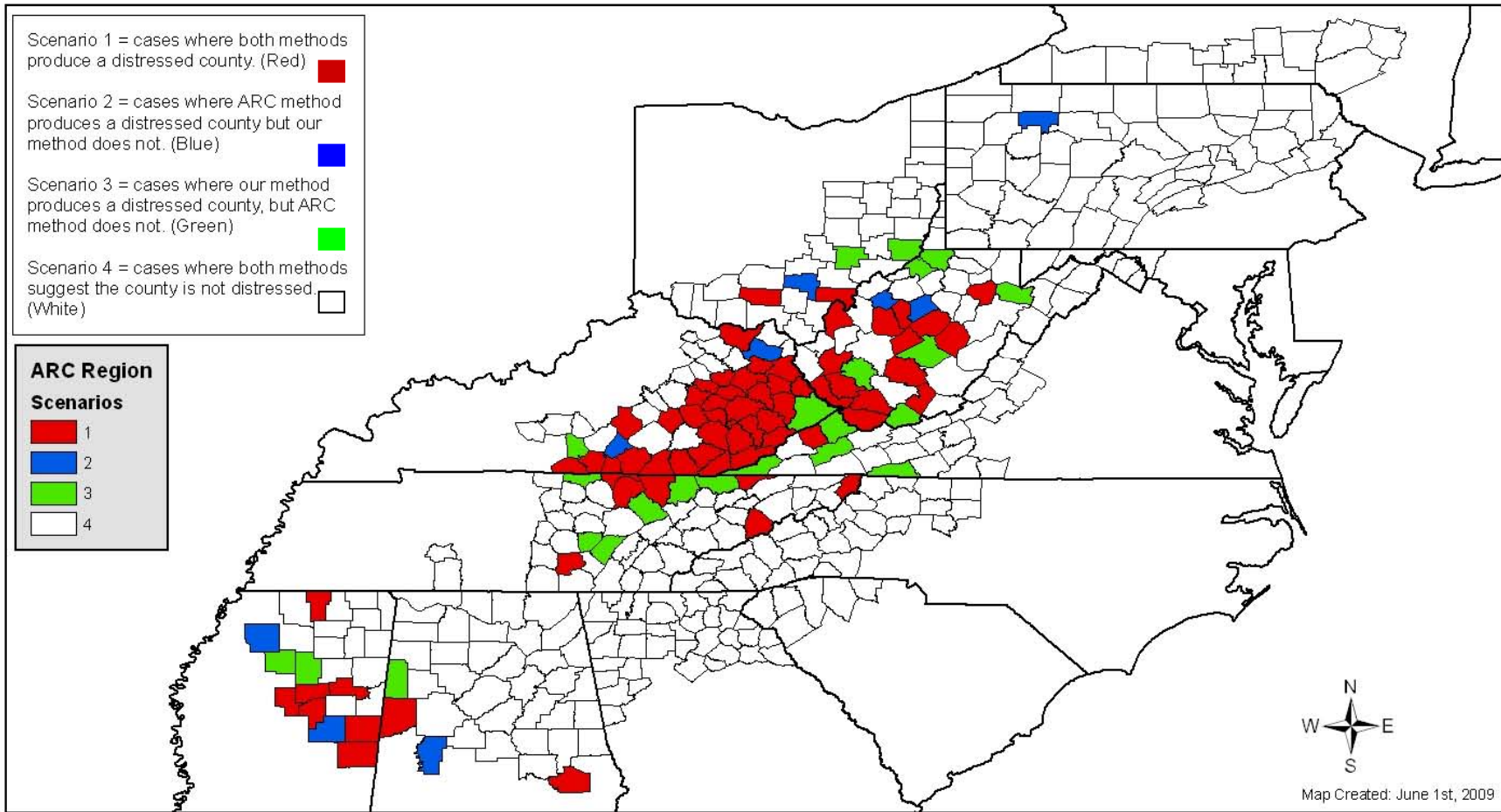


Figure 4.5c: County Economic Status, Candidate Index 5: Population Growth, Employment/Population Rate, One-Year College Attainment, Poverty Rate

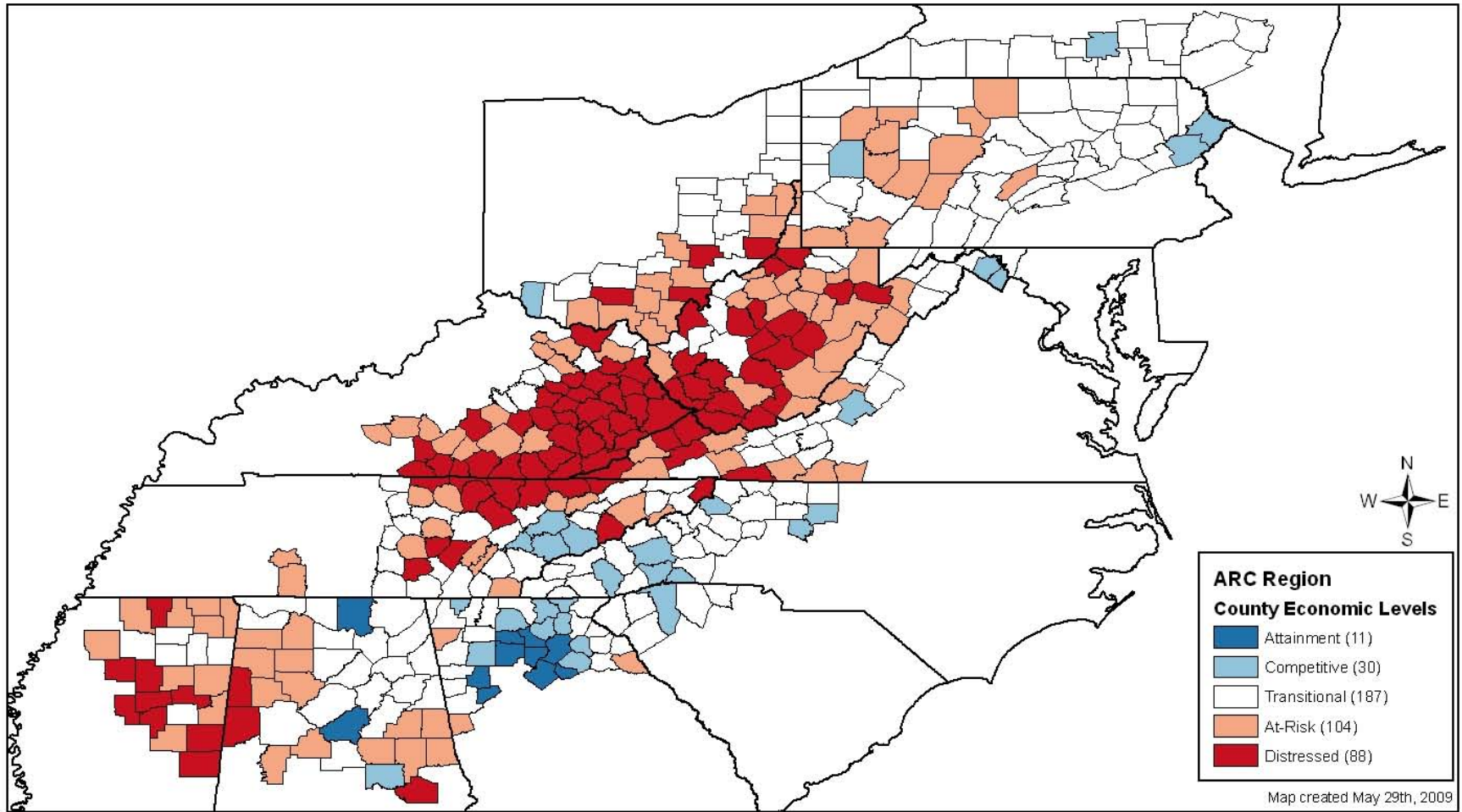


Figure 4.6a: Candidate Index 6: Population Growth, Employment/Population Rate, One-Year College Attainment, Per-Capita Market Income

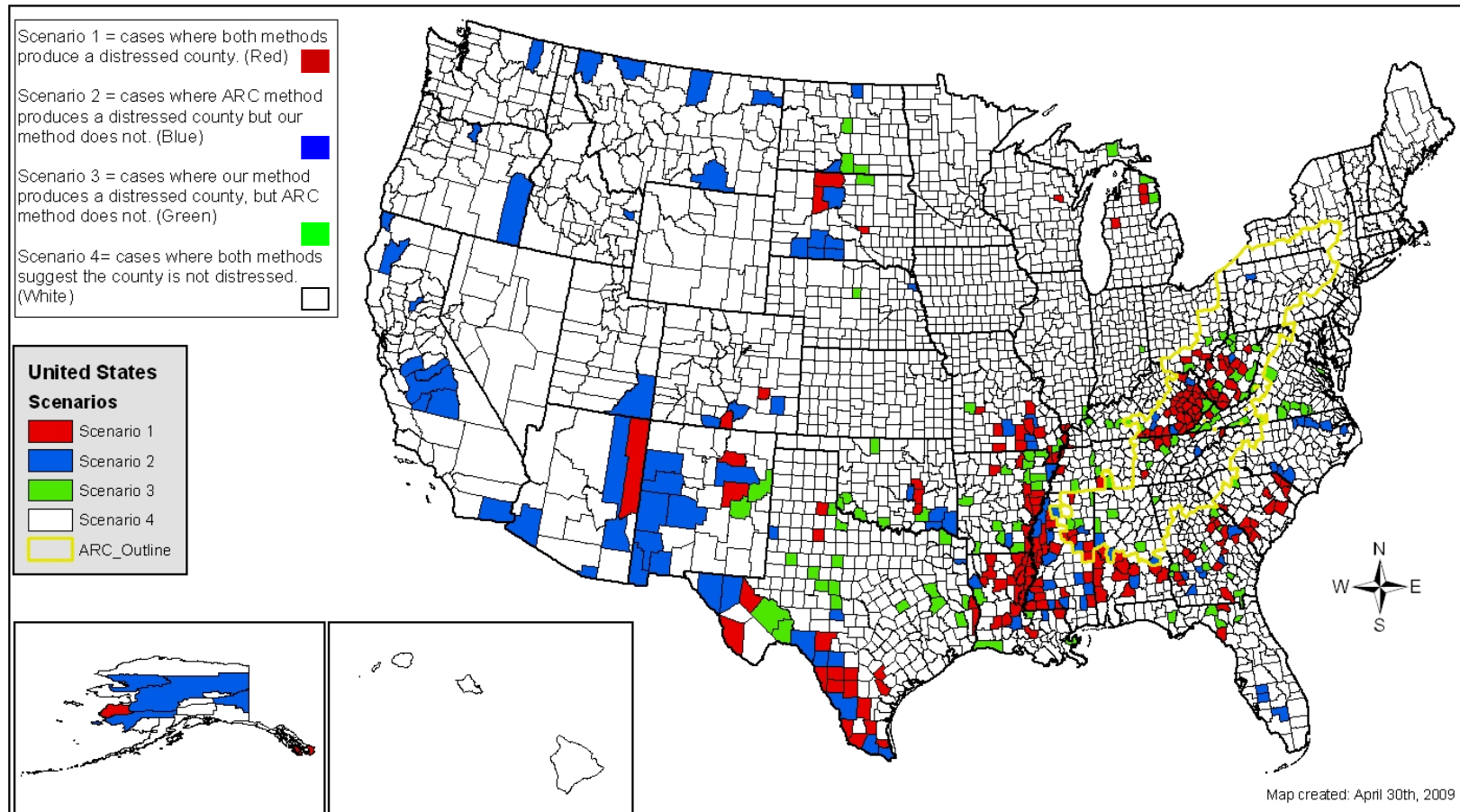


Figure 4.6b: Candidate Index 6: Population Growth, Employment/Population Rate, One-Year College Attainment, Per-Capita Market Income

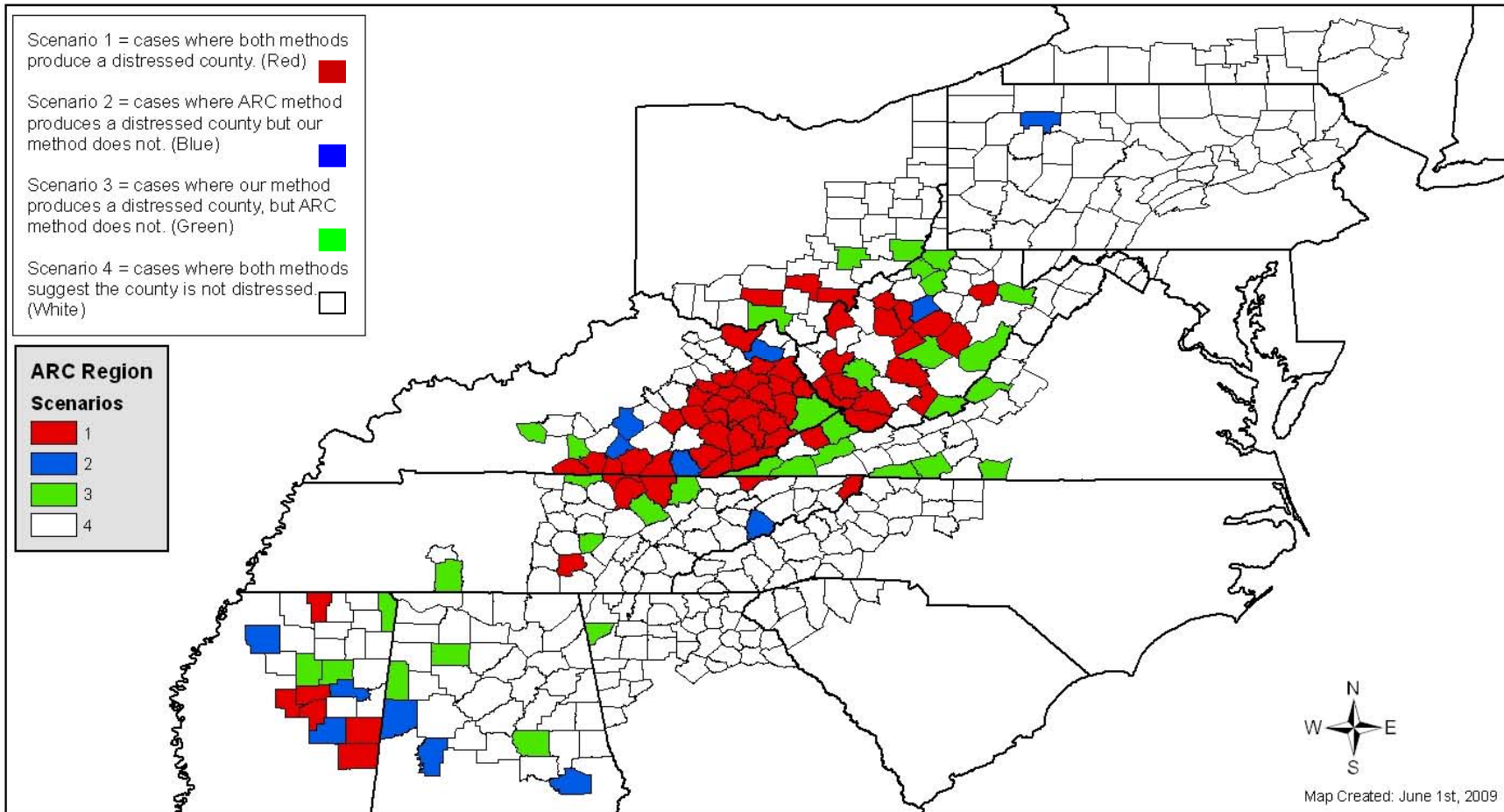


Figure 4.6c: County Economic Status, Candidate Index 6: Population Growth, Employment/Population Rate, One-Year College Attainment, Per-Capita Market Income

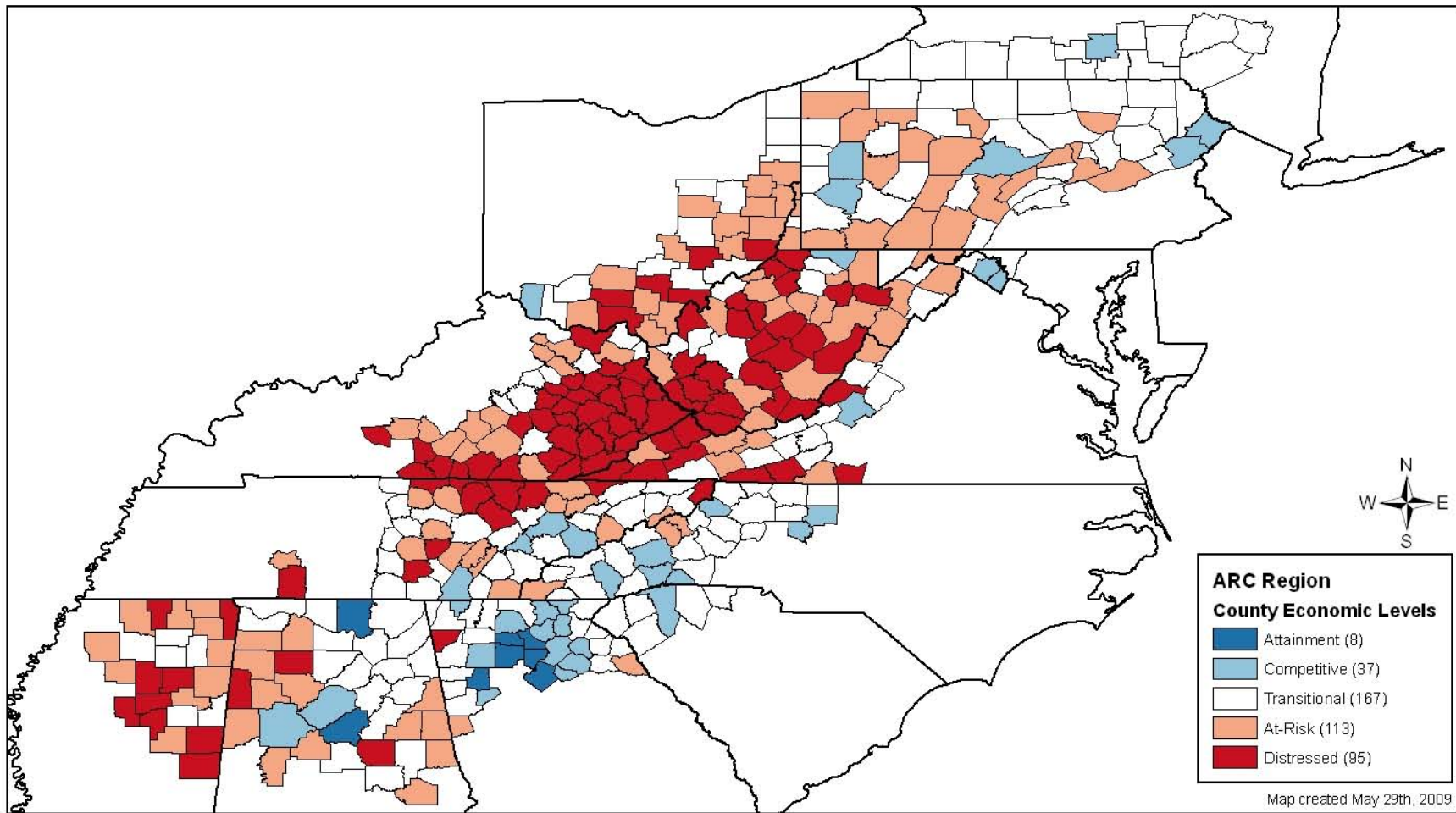


Figure 4.7: Weighted Version of Candidate Index 1: Population Growth (weighted by a multiple of 4), Employment/Population Rate, Four-Year College Attainment, Poverty Rate

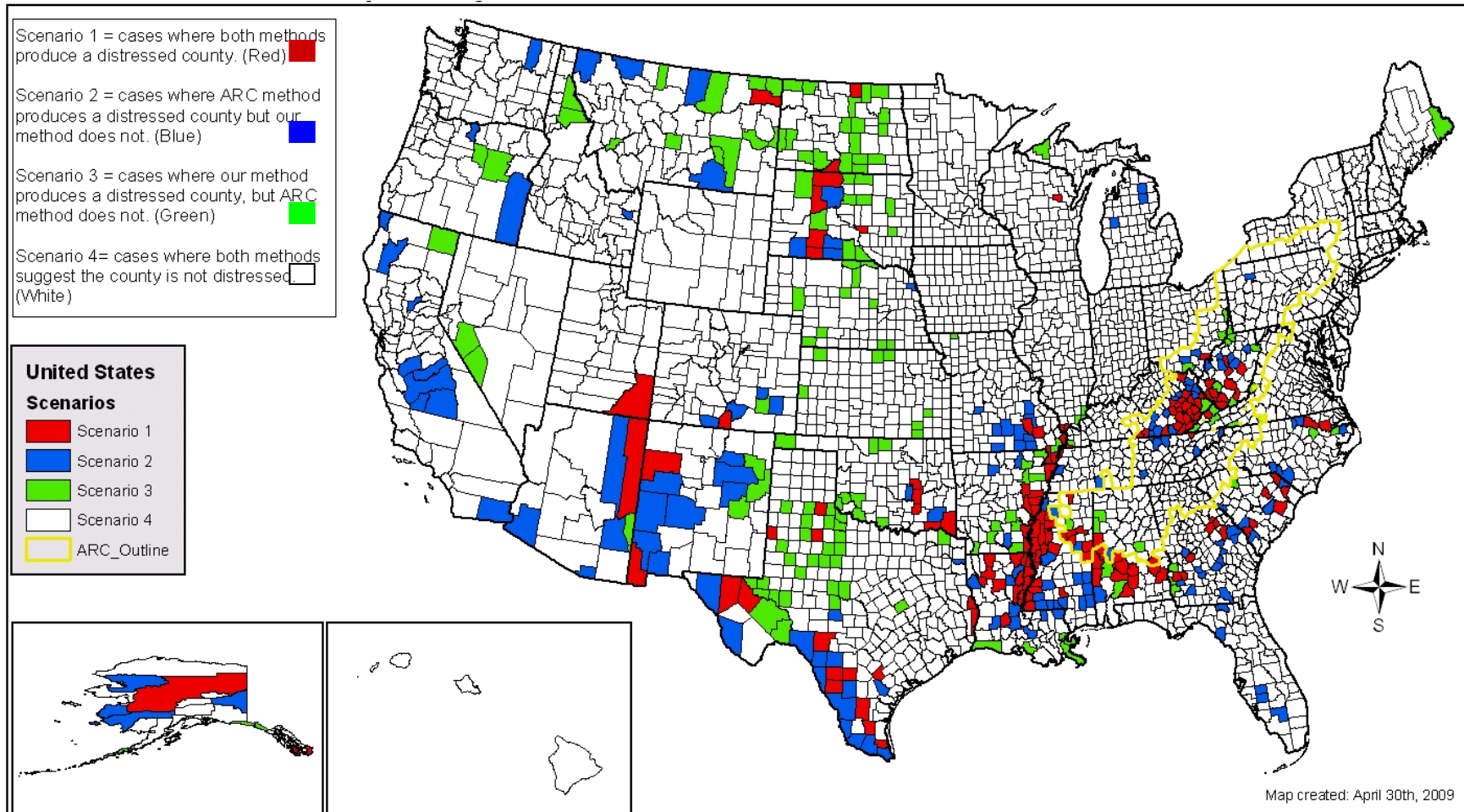


Table 4.0: Change in County Economic Distress Status When Switching from Current FY2007 ARC Index to Proposed Indexes

	Candidate Index 1		Candidate Index 2		Candidate Index 3	
	Population Growth, Employment/ Population Rate, Four-Year College Attainment, Poverty Rate		Population Growth, Employment/Population Rate, Four-Year College Attainment, Poverty Rate, Per-Capita Market Income		Population Growth, Employment/Population Rate, Four-Year College Attainment, Per-Capita Market Income	
	Distressed using ARC method but not ours	Distressed using our method but not ARC	Distressed using ARC method but not ours	Distressed using our method but not ARC	Distressed using ARC method but not ours	Distressed using our method but not ARC
	13	21	10	18	15	31
Total counties that change distress status	34		28		46	
Net counties moving into distress	8		8		16	
	Candidate Index 4		Candidate Index 5		Candidate Index 6	
	Population Growth, Employment/Population Rate, One-Year College Attainment, Poverty Rate, Per-capita Market Income		Population Growth, Employment/Population Rate, One-Year College Attainment, Poverty Rate		Population Growth, Employment/Population Rate, One-Year College Attainment, Per-capita Market Income	
	Distressed using ARC method but not ours	Distressed using our method but not ARC	Distressed using ARC method but not ours	Distressed using our method but not ARC	Distressed using ARC method but not ours	Distressed using our method but not ARC
	8	21	9	23	13	34
Total counties that change distress status	29		32		47	
Net counties moving into distress	13		14		21	

Notes: In FY 2007, there were four ARC counties “grandfathered” as distressed even though they were ranked as “at risk” using the ranking process. These results do not classify these four “grandfathered” counties as distressed to be comparable with our Candidate Index. In FY2007 the ARC region included 410 counties. However, for comparable geography, the ARC Index shown in the table classifies the 420 counties that currently comprise the region.

Table 4.1: Number of Counties in Each Economic Status Category by State Using the Current FY2007ARC Index vs. 2007 Candidate Index 1 (Population Growth, Employment/Population Rate, Four-Year College Attainment, Poverty Rate)

States	Distressed		At-risk		Transitional		Competitive		Attainment		Total
	ARC	Population growth 96-06, Employment/population ratio 07, Percent of adults with a four-year college degree 00, Poverty Rate 07	ARC	Population growth 96-06, Employment/population ratio 07, Percent of adults with a four-year college degree 00, Poverty Rate 07	ARC	Population growth 96-06, Employment/population ratio 07, Percent of adults with a four-year college degree 00, Poverty Rate 07	ARC	Population growth 96-06, Employment/population ratio 07, Percent of adults with a four-year college degree 00, Poverty Rate 07	ARC	Population growth 96-06, Employment/population ratio 07, Percent of adults with a four-year college degree 00, Poverty Rate 07	
Alabama	3	5	9	11	23	18	1	1	1	2	37
Georgia	0	0	0	1	26	18	6	9	5	9	37
Kentucky	34	32	13	13	7	9	0	0	0	0	54
Maryland	0	0	0	0	2	3	1	0	0	0	3
Mississippi	9	11	11	7	4	6	0	0	0	0	24
New York	0	0	0	0	14	13	0	0	0	1	14
North Carolina	0	0	7	0	18	22	4	7	0	0	29
Ohio	3	5	10	9	18	17	1	1	0	0	32
Pennsylvania	1	0	1	3	45	45	5	4	0	0	52
South Carolina	0	0	1	0	4	5	1	1	0	0	6
Tennessee	7	7	14	15	27	26	4	4	0	0	52
Virginia	1	5	6	8	16	11	1	1	1	0	25
West Virginia	16	17	16	20	21	14	2	4	0	0	55
Total	74	82	88	87	225	207	26	32	7	12	420

Notes: In FY 2007, there were four ARC counties “grandfathered” as distressed even though they were ranked as “at risk” using the ranking process. These results do not classify these four “grandfathered” counties as distressed to be comparable with our Candidate Index. In FY2007, the ARC region included 410 counties. However, for comparable geography, the ARC index shown in the table classifies the 420 counties that currently comprise the region.

Table 4.2: Number of Counties in Each Economic Status Category by State Using the Current FY2007ARC Index vs. 2007 Candidate Index 2 (Population Growth, Employment/Population Rate, Four-Year College Attainment, Poverty Rate, Per-Capita Market Income)

States	Distressed		At-risk		Transitional		Competitive		Attainment		Total
	ARC	Population growth 96-06, Employment/population ratio 07, Percent of adults with a four-year college degree 00, Poverty Rate 07, Per-capita market income 06	ARC	Population growth 96-06, Employment/population ratio 07, Percent of adults with a four-year college degree 00, Poverty rate 07, Per-capita market income 06	ARC	Population growth 96-06, Employment/population ratio 07, Percent of adults with a four-year college degree 00, Poverty rate 07, Per-capita market income 06	ARC	Population growth 96-06, Employment/population ratio 07, Percent of adults with a four-year college degree 00, Poverty rate 07, Per-capita market income 06	ARC	Population growth 96-06, Employment/population ratio 07, Percent of adults with a four-year college degree 00, Poverty rate 07, Per-capita market income 06	
Alabama	3	4	9	10	23	20	1	1	1	2	37
Georgia	0	0	0	1	26	18	6	12	5	6	37
Kentucky	34	33	13	14	7	7	0	0	0	0	54
Maryland	0	0	0	0	2	3	1	0	0	0	3
Mississippi	9	11	11	7	4	6	0	0	0	0	24
New York	0	0	0	0	14	13	0	1	0	0	14
North Carolina	0	0	7	1	18	21	4	7	0	0	29
Ohio	3	5	10	11	18	15	1	1	0	0	32
Pennsylvania	1	0	1	3	45	44	5	5	0	0	52
South Carolina	0	0	1	0	4	5	1	1	0	0	6
Tennessee	7	9	14	16	27	23	4	4	0	0	52
Virginia	1	5	6	9	16	10	1	1	1	0	25
West Virginia	16	15	16	22	21	14	2	4	0	0	55
Total	74	82	88	94	225	199	26	37	7	8	420

Notes: In FY 2007, there were four ARC counties “grandfathered” as distressed even though they were ranked as “at risk” using the ranking process. These results do not classify these four “grandfathered” counties as distressed to be comparable with our Candidate Index. In FY2007, the ARC region included 410 counties. However, for comparable geography, the ARC index shown in the table classifies the 420 counties that currently comprise the region.

Table 4.3: Number of Counties in Each Economic Status Category by State Using the Current FY2007ARC Index vs. 2007 Candidate Index 3 (Population Growth, Employ./Pop. Rate, Four-Year College Attainment, Per-Capita Market Income)

States	Distressed		At-risk		Transitional		Competitive		Attainment		Total
	ARC	Population growth 96-06, Employment/population ratio 07, Percent of adults with a four-year college degree 00, Per-capita market income 06	ARC	Population growth 96-06, Employment/population ratio 07, Percent of adults with a four-year college degree 00, Per-capita market income 06	ARC	Population growth 96-06, Employment/population ratio 07, Percent of adults with a four-year college degree 00, Per-capita market income 06	ARC	Population growth 96-06, Employment/population ratio 07, Percent of adults with a four-year college degree 00, Per-capita market income 06	ARC	Population growth 96-06, Employment/population ratio 07, Percent of adults with a four-year college degree 00, Per-capita market income 06	
Alabama	3	4	9	11	23	18	1	2	1	2	37
Georgia	0	1	0	0	26	17	6	13	5	6	37
Kentucky	34	31	13	13	7	9	0	1	0	0	54
Maryland	0	0	0	1	2	2	1	0	0	0	3
Mississippi	9	9	11	10	4	4	0	1	0	0	24
New York	0	0	0	0	14	13	0	0	0	1	14
North Carolina	0	0	7	3	18	19	4	7	0	0	29
Ohio	3	6	10	11	18	14	1	1	0	0	32
Pennsylvania	1	0	1	13	45	34	5	5	0	0	52
South Carolina	0	0	1	0	4	5	1	1	0	0	6
Tennessee	7	8	14	15	27	24	4	5	0	0	52
Virginia	1	9	6	6	16	8	1	2	1	0	25
West Virginia	16	22	16	17	21	13	2	3	0	0	55
Total	74	90	88	100	225	180	26	41	7	9	420

Notes: In FY 2007, there were four ARC counties “grandfathered” as distressed even though they were ranked as “at risk” using the ranking process. These results do not classify these four “grandfathered” counties as distressed to be comparable with our Candidate Index. In FY2007, the ARC region included 410 counties. However, for comparable geography, the ARC index shown in the table classifies the 420 counties that currently comprise the region.

Table 4.4: Number of Counties in Each Economic Status Category by State Using the Current FY2007 ARC Index vs. 2007 Candidate Index 4 (Population Growth, Employment/Pop. Rate, One Year College Attainment, Poverty Rate, Per-capita Market Income)

States	Distressed		At-risk		Transitional		Competitive		Attainment		Total
	ARC	Population growth 96-06, Employment/population ratio 07, Percent of adults with at least one year of college education 00, Poverty Rate 07, Per-capita market income 06	ARC	Population growth 96-06, Employment/population ratio 07, Percent of adults with at least one year of college education 00, Poverty Rate 07, Per-capita market income 06	ARC	Population growth 96-06, Employment/population ratio 07, Percent of adults with at least one year of college education 00, Poverty Rate 07, Per-capita market income 06	ARC	Population growth 96-06, Employment/population ratio 07, Percent of adults with at least one year of college education 00, Poverty Rate 07, Per-capita market income 06	ARC	Population growth 96-06, Employment/population ratio 07, Percent of adults with at least one year of college education 00, Poverty Rate 07, Per-capita market income 06	
Alabama	3	4	9	11	23	19	1	1	1	2	37
Georgia	0	0	0	3	26	16	6	12	5	6	37
Kentucky	34	36	13	11	7	7	0	0	0	0	54
Maryland	0	0	0	0	2	3	1	0	0	0	3
Mississippi	9	9	11	9	4	6	0	0	0	0	24
New York	0	0	0	0	14	13	0	1	0	0	14
North Carolina	0	0	7	2	18	21	4	6	0	0	29
Ohio	3	4	10	12	18	15	1	1	0	0	32
Pennsylvania	1	0	1	8	45	40	5	4	0	0	52
South Carolina	0	0	1	0	4	5	1	1	0	0	6
Tennessee	7	11	14	14	27	23	4	4	0	0	52
Virginia	1	5	6	8	16	11	1	1	1	0	25
West Virginia	16	18	16	21	21	14	2	2	0	0	55
Total	74	87	88	99	225	193	26	33	7	8	420

Notes: In FY 2007, there were four ARC counties “grandfathered” as distressed even though they were ranked as “at risk” using the ranking process. These results do not classify these four “grandfathered” counties as distressed to be comparable with our Candidate Index. In FY2007, the ARC region included 410 counties. However, for comparable geography, the ARC index shown in the table classifies the 420 counties that currently comprise the region.

Table 4.5: Number of Counties in Each Economic Status Category by State Using the Current FY2007 ARC Index vs. 2007 Candidate Index 5 (Population Growth, Employment/Population Rate, One Year College Attainment, Poverty Rate)

States	Distressed		At-risk		Transitional		Competitive		Attainment		Total
	ARC	Population growth 96-06, Employment/population ratio 07, Percent of adults with at least one year of college education 00, Poverty Rate 07	ARC	Population growth 96-06, Employment/population ratio 07, Percent of adults with at least one year of college education 00, Poverty Rate 07	ARC	Population growth 96-06, Employment/population ratio 07, Percent of adults with at least one year of college education 00, Poverty Rate 07	ARC	Population growth 96-06, Employment/population ratio 07, Percent of adults with at least one year of college education 00, Poverty Rate 07	ARC	Population growth 96-06, Employment/population ratio 07, Percent of adults with at least one year of college education 00, Poverty Rate 07	
Alabama	3	3	9	13	23	18	1	1	1	2	37
Georgia	0	0	0	3	26	16	6	9	5	9	37
Kentucky	34	34	13	13	7	7	0	0	0	0	54
Maryland	0	0	0	0	2	3	1	0	0	0	3
Mississippi	9	9	11	10	4	5	0	0	0	0	24
New York	0	0	0	0	14	13	0	1	0	0	14
North Carolina	0	0	7	0	18	22	4	7	0	0	29
Ohio	3	4	10	11	18	16	1	1	0	0	32
Pennsylvania	1	0	1	12	45	37	5	3	0	0	52
South Carolina	0	0	1	0	4	5	1	1	0	0	6
Tennessee	7	13	14	13	27	22	4	4	0	0	52
Virginia	1	5	6	8	16	11	1	1	1	0	25
West Virginia	16	20	16	21	21	12	2	2	0	0	55
Total	74	88	88	104	225	187	26	30	7	11	420

Notes: In FY 2007, there were four ARC counties “grandfathered” as distressed even though they were ranked as “at risk” using the ranking process. These results do not classify these four “grandfathered” counties as distressed to be comparable with our Candidate Index. In FY2007, the ARC region included 410 counties. However, for comparable geography, the ARC index shown in the table classifies the 420 counties that currently comprise the region.

Table 4.6: Number of Counties in Each Economic Status Category by State Using the Current FY2007 ARC Index vs. 2007 Candidate Index 6 (Population Growth, Employment/Population Rate, One Year College Attainment, Per-Capita Market Income)

States	Distressed		At-risk		Transitional		Competitive		Attainment		Total
	ARC	Population growth 96-06, employment/population ratio 07, Percent of adults with at least one year of college education 00, Per-capita market income 06	ARC	Population growth 96-06, employment/population ratio 07, Percent of adults with at least one year of college education 00, Per-capita market income 06	ARC	Population growth 96-06, employment/population ratio 07, Percent of adults with at least one year of college education 00, Per-capita market income 06	ARC	Population growth 96-06, employment/population ratio 07, Percent of adults with at least one year of college education 00, Per-capita market income 06	ARC	Population growth 96-06, employment/population ratio 07, Percent of adults with at least one year of college education 00, Per-capita market income 06	
Alabama	3	3	9	13	23	17	1	2	1	2	37
Georgia	0	1	0	2	26	16	6	12	5	6	37
Kentucky	34	33	13	13	7	8	0	0	0	0	54
Maryland	0	0	0	0	2	3	1	0	0	0	3
Mississippi	9	9	11	10	4	5	0	0	0	0	24
New York	0	0	0	0	14	13	0	1	0	0	14
North Carolina	0	0	7	3	18	19	4	7	0	0	29
Ohio	3	6	10	14	18	11	1	1	0	0	32
Pennsylvania	1	0	1	18	45	29	5	5	0	0	52
South Carolina	0	0	1	0	4	5	1	1	0	0	6
Tennessee	7	11	14	14	27	23	4	4	0	0	52
Virginia	1	9	6	6	16	9	1	1	1	0	25
West Virginia	16	23	16	19	21	10	2	3	0	0	55
Total	74	95	88	112	225	168	26	37	7	8	420

Notes: In FY 2007, there were four ARC counties “grandfathered” as distressed even though they were ranked as “at risk” using the ranking process. These results do not classify these four “grandfathered” counties as distressed to be comparable with our Candidate Index. In FY2007, the ARC region included 410 counties. However, for comparable geography, the ARC index shown in the table classifies the 420 counties that currently comprise the region.

Concluding Comments

Like many pockets of rural America, the ARC region is facing a host of challenges as a result of the economic restructuring that is occurring at the regional, national, and global levels. Adding further complexity is the demographic realities that are playing out in scores of rural communities across the region – places that are losing young people and individuals of prime working age, leaving behind an aging population to tackle the myriad of issues that will shape the long-term fate of these communities. At the same time, emerging opportunities are surfacing in such diverse areas as bio-energy, entrepreneurship, creative activities, e-commerce/information technology, and value-added agriculture, to name a few. Of central issue is how well local leaders, residents, and organizations will be able to muster the energy and resources to respond to these important possibilities. No doubt, history suggests that counties and communities that are the most socially and economically distressed will find it tough to build for the future UNLESS investments are made to strengthen their capacity to effectively act on these emerging opportunities.

In many respects, the ARC investments that have been targeted to the most distressed counties in the region are designed to even the playing field – to offer these counties an opportunity to plant and nurture the seeds that can advance their long-term viability. As such, it is crucial that the process embraced for identifying these distressed counties be pursued in a manner that is scientifically sound, methodologically rigorous, and aligned with the new economic, demographic, and social realities of the region, nation, and world. The decision by the ARC to invest in this important research study is reflective of its commitment to ensure that the best approach is in place for delineating the levels of economic distress being felt by counties in the region today (and/or years to come).

As we have stated at various places in this report, the current ARC index -- composed of the poverty rate, the unemployment rate, and per capita income – has been an important tool for identifying counties that have experienced distress. But, current and emerging economic realities have accelerated the need to explore a new mix of variables that might further improve ARC's ability to define distress in these changing times. The intent of this project has been to identify a core set of variables and respective indexes that can monitor the region's progress over time, and evaluate the long-term vitality and sustainability of ARC member counties.

Careful attention and consideration has been given to approximately 40 variables during the course of our study, measures that capture key components of the socioeconomic vitality of ARC counties. After our in-depth analyses, we have honed in on a handful of that constitute the most viable candidate measures. In particular, we recommend that four of the following Candidate Variables be incorporated into a new ARC index of distress:

- The employment/population (16 and over) ratio;
- Poverty rate;
- Per-capita market income;

- Percent of population (25+ years old) with at least a four-year college degree; and,
- Ten-year percent change in population.

In particular, we found three new Candidate Indexes composed of combinations of four or five these variables to be more powerful in discerning county-level distress than the metrics currently in use by the ARC (specifically the first three indexes in Table 3.4). We also identified three additional new Candidate Indexes that use at least one-year of college educational attainment to be more powerful than the current ARC Distress Index (Indexes 4 through 6 in Table 3.4). With the use of the six new Candidate Indexes, a greater number of ARC counties are classified as either distressed or at-risk when compared to the current ARC Index (FY2007). In light of the theoretical and empirical strengths associated with these alternative indexes, we suggest that these indices translate into a more accurate set of benchmarks for charting the future progress of the Appalachian Region.

Although the research team engaged in this important research has provided its recommendations to the ARC, we recognize that these indexes must be corroborated with the “on the ground” knowledge and experiences of ARC state partners and county leaders. It is when these additional and vital pieces of information are in place that the ARC will be in a strong and defensible position to propose adoption of a new strategy for defining economic distress in the region, if not for the U.S. as a whole.

Edmiston, Kelly D. 2004. "The Net Effects of Large Plant Locations and Expansions of County Employment." *Journal of Regional Science* 44: 289-319.

Kilkenny, Maureen and Mark D. Partridge. forthcoming. "Export Sectors and Rural Development." *American Journal of Agricultural Economics*.

Partridge, Mark D., Linda Lobao, Wilner Jeanty, Lionel J. "Bo" Beaulieu, and Stephan Goetz. 2008. *An Assessment of Alternative Measures for Determining Economically Distressed Counties and Areas in the Appalachian Region*. Report prepared for the Appalachian Regional Commission (March 31), 104 pages. Available at: http://www.arc.gov/images/reports/2008/states/ARC_measures_counties_full.pdf (accessed on September 5, 2008).

Poppert, Patrick E. and H. W. Herzog Jr. 2003. "Force Reduction, Base Closure, and the Indirect Effects of Military Installations on Local Employment Growth." *Journal of Regional Science* (43): 459-481.

U.S. Census Bureau. 2009. "Census Bureau's Proposal For American Community Survey (ACS) 5-Year Data Products." Available at: http://www.census.gov/acs/www/Downloads/proposal_acs5yearproducts.pdf (accessed on April, 18, 2009).

U.S. Office of Management and Budget. 2009 *Federal Register*, Vol. 74, No. 43 / Friday, March 6, 2009. Available at: http://www.census.gov/acs/www/Downloads/FedRegNotice_E9-4803.pdf

Appendix Tables A.1 – A.7

Table A.1: Correlations between 1996/1997 Candidate Variables and 2006/2007 Economic Outcome, ARC Counties

Candidate Variables	Poverty Rate 2007	Δ Poverty Rate 1997-07	Per-capita Market Income 2006	$\% \Delta$ Per-capita Market Income 1996-06	% Job Growth 1996-06	% Population Growth 1996-06	Employment-Pop ratio 2007	Labor Force Part. rate 2007	Housing Units 2007	Nonfarm Self Employ. share of Total Empl., 2006	$\% \Delta$ in Pop. Under 20 yrs. old, 2000-07	$\% \Delta$ in Housing Units, 1990-00	$\% \Delta$ in Housing Units, 2000-07	Average value of Building Permits during 96-07
ARC Distress Index 1997	0.73	-0.08	-0.71	0.19	-0.27	-0.35	-0.64	-0.63	-0.35	-0.02	-0.38	-0.21	-0.19	0.02
%Population Change 1986-96	-0.41	0.04	0.40	-0.17	0.70	0.89	0.50	0.49	0.12	0.25	0.74	0.81	0.53	0.10
%Job Growth 1986-96	-0.25	0.07	0.32	-0.15	0.49	0.68	0.36	0.35	0.12	0.16	0.58	0.66	0.42	0.01
Per-capita Market Income 1996	-0.77	0.09	0.93	-0.16	0.31	0.41	0.71	0.69	0.53	-0.11	0.48	0.22	0.25	0.03
%Growth Per-capita Market Income 1986-96	-0.08	0.12	0.16	-0.16	0.12	0.22	0.20	0.21	0.02	0.13	0.17	0.29	0.15	-0.10
% share of adult population with less than a high school degree, 2000	0.70	0.00	-0.73	-0.05	-0.20	-0.10	-0.55	-0.53	-0.41	0.11	-0.12	0.11	-0.08	0.00
% share of adult population with only high school degree, 2000	-0.27	-0.17	-0.10	0.01	-0.11	-0.27	-0.02	-0.01	-0.16	0.17	-0.37	-0.34	-0.20	-0.11
% share of adult population with an associates degree or more (associates+BA+MA+professional+PhD), 2000	-0.44	0.12	0.75	0.09	0.23	0.22	0.51	0.48	0.52	-0.25	0.28	0.06	0.15	0.09
% share of adult population with a 4-yr college degree or more (BA+MA+professional+PhD), 2000	-0.37	0.15	0.72	0.11	0.26	0.26	0.47	0.45	0.51	-0.25	0.32	0.11	0.16	0.09
% share of adult pop. with more than one year of college (> 1 year at some college +associates+BA+MA+professional+PhD), 2000	-0.47	0.13	0.77	0.06	0.26	0.28	0.53	0.51	0.51	-0.24	0.35	0.12	0.20	0.08
% share of adult population with less than a year of college, 2000	-0.48	-0.08	0.44	-0.06	0.21	0.25	0.40	0.38	0.18	0.04	0.33	0.17	0.24	0.01
Employment-Population ratio 2000	-0.74	0.10	0.69	-0.21	0.40	0.56	0.84	0.84	0.28	0.09	0.55	0.43	0.32	0.01
Labor Force Participation rate 2000	-0.73	0.11	0.68	-0.21	0.38	0.55	0.83	0.84	0.27	0.08	0.53	0.42	0.30	0.00

Poverty Rate 1997	0.92	-0.13	-0.77	0.17	-0.28	-0.34	-0.73	-0.72	-0.31	-0.06	-0.35	-0.17	-0.20	0.07
Unemployment Rate 1997	0.45	-0.13	-0.56	0.09	-0.25	-0.34	-0.47	-0.44	-0.27	0.05	-0.37	-0.24	-0.24	-0.06
Nonfarm Proprietor Income as a share of Total Personal Income 1997	-0.09	-0.01	0.04	-0.03	0.04	-0.01	0.11	0.12	0.05	0.23	-0.02	0.00	-0.01	-0.07
Average Nonfarm Proprietor Income to Wage-and-Salary Income ratio 1997	0.03	0.04	0.03	-0.05	-0.03	-0.07	0.03	0.04	0.14	-0.08	-0.01	-0.09	-0.04	-0.05
Population Under 20 yrs, 2000	-0.25	0.04	0.52	0.06	0.04	0.05	0.27	0.26	0.92	-0.22	0.18	-0.07	0.10	0.05
Housing Units 2000	-0.26	0.05	0.55	0.07	0.02	0.01	0.27	0.26	0.99	-0.22	0.11	-0.10	0.03	0.06
Building Permits 2000	-0.10	-0.02	0.13	-0.02	0.10	0.07	0.14	0.14	0.07	0.00	0.07	0.01	0.07	0.12
Nonfarm Self Employment as a Share of Total Employment, 1996	-0.11	-0.16	-0.09	0.04	0.40	0.28	0.07	0.07	-0.21	0.75	0.09	0.33	0.18	0.02
% Change in Housing Units from 1980-90	-0.34	-0.01	0.36	-0.14	0.61	0.78	0.42	0.41	0.16	0.20	0.68	0.70	0.51	0.11
% Change in Housing Units from 1990-2000	-0.16	0.01	0.14	-0.15	0.62	0.85	0.32	0.32	-0.06	0.31	0.67	1.00	0.51	0.10
Non-farm self employment returns (total non farm proprietor income/total non farm proprietor employment), 1997	-0.14	0.04	0.28	-0.01	-0.07	-0.13	0.09	0.08	0.40	-0.26	-0.01	-0.23	-0.06	-0.02
Percent Change in Housing Units from 1990-00	-0.16	0.01	0.14	-0.15	0.62	0.85	0.32	0.32	-0.06	0.31	0.67	1.00	0.51	0.10
Average value of Building Permits during period 96-07	0.03	-0.11	0.03	0.01	0.15	0.11	0.04	0.05	0.06	0.07	0.05	0.10	0.06	1.00
Building permits per capita, 1996	0.02	0.00	-0.05	-0.09	0.02	0.03	0.04	0.04	-0.03	0.01	0.01	-0.01	0.02	0.04
Average value of Building Permits during period 86-96	-0.03	-0.12	0.10	-0.04	0.17	0.14	0.09	0.10	0.15	0.01	0.11	0.09	0.09	0.77

Table A.2: Correlations between 1996/1997 Candidate Variables and 2006/2007 Economic Outcomes, All U.S. Counties

Candidate Variables	Poverty Rate 2007	Δ Poverty Rate 1997-07	Per-capita Market Income 2006	%Δ Per-capita Market Income 1996-06	%Job Growth 1996-06	%Population Growth 1996-06	Employment-Pop ratio 2007	Labor Force Part. rate 2007	Housing Units 2007	Nonfarm Self Employ. share of Total Empl., 2006	%Δ in Pop. Under 20 yrs. old, 2000-07	%Δ in Housing Units, 1990-00	%Δ in Housing Units, 2000-07	Average value of Building Permits during 96-07
%Population 1986-96	-0.22	0.00	0.26	0.04	0.61	0.82	0.06	0.06	0.15	0.12	0.61	0.83	0.15	0.08
%Job Growth 1986-96	-0.18	0.02	0.19	0.00	0.36	0.54	0.12	0.12	0.04	0.01	0.38	0.56	0.09	0.03
Per-capita Market Income 1996	-0.65	0.11	0.91	-0.03	0.20	0.25	0.52	0.51	0.35	-0.07	0.23	0.13	0.05	0.16
Per-capita Market Income Percent Change 1986-96	-0.03	0.14	0.18	-0.23	0.06	0.12	0.07	0.08	-0.01	0.00	0.11	0.15	0.02	0.05
% share of adult population with less than a high school degree, 2000	0.71	-0.05	-0.59	-0.10	-0.20	-0.13	-0.57	-0.56	-0.14	-0.05	-0.04	0.00	-0.04	-0.12
% share of adult population with only high school degree, 2000	-0.04	0.09	-0.41	-0.18	-0.23	-0.26	-0.13	-0.11	-0.31	0.13	-0.26	-0.23	-0.05	-0.08
% share of adult population with an associates degree or more (associates+BA+MA+professional+PhD), 2000	-0.49	0.07	0.75	0.17	0.28	0.27	0.48	0.46	0.33	-0.08	0.23	0.16	0.05	0.15
% share of adult population with a 4-yr college degree or more (BA+MA+professional+PhD), 2000	-0.43	0.07	0.75	0.18	0.29	0.29	0.44	0.43	0.34	-0.07	0.25	0.19	0.05	0.13
% share of adult population with more than 1 year of college (> 1 year at a college+associates+BA+MA+professional+PhD), 2000	-0.51	0.02	0.71	0.18	0.29	0.26	0.49	0.48	0.30	-0.04	0.19	0.15	0.06	0.14
% share of adult population with less than a year of college, 2000	-0.37	-0.10	0.09	0.00	0.04	0.01	0.26	0.25	-0.05	0.11	-0.06	-0.08	0.04	0.03
Employment-Population ratio 2000	-0.70	0.09	0.57	0.05	0.23	0.24	0.84	0.84	0.12	0.03	0.16	0.14	0.06	0.11
Labor Force Participation rate 2000	-0.68	0.09	0.56	0.05	0.22	0.24	0.83	0.84	0.12	0.03	0.15	0.15	0.06	0.10

Poverty Rate 1997	0.91	-0.25	-0.60	0.01	-0.20	-0.22	-0.58	-0.58	-0.10	-0.09	-0.15	-0.11	-0.04	-0.14
Unemployment Rate 1997	0.53	-0.15	-0.38	0.01	-0.11	-0.10	-0.47	-0.43	-0.06	0.00	-0.09	0.02	-0.03	-0.09
Nonfarm Proprietor Income as a share of Total Personal Income 1997	-0.09	-0.17	0.12	0.19	-0.02	-0.12	0.20	0.19	0.06	0.26	-0.15	-0.14	-0.03	-0.01
Average Nonfarm Proprietor Income to Wage-and-Salary Income ratio 1997	0.16	-0.01	0.00	-0.07	-0.08	-0.13	-0.02	-0.02	0.10	-0.04	-0.07	-0.15	-0.03	0.00
Population Under 20 yrs, 2000	-0.09	-0.03	0.30	0.06	0.06	0.12	0.05	0.06	0.95	-0.11	0.18	0.03	0.03	0.01
Housing Units 2000	-0.10	-0.02	0.36	0.08	0.07	0.13	0.07	0.07	0.99	-0.13	0.19	0.03	0.00	0.02
Building Permits 2000	-0.02	0.01	0.04	0.00	0.05	0.05	0.03	0.03	0.08	-0.03	0.05	0.05	0.00	0.03
Nonfarm Self Employment as a share of Total Employment, 1996	-0.25	-0.25	0.04	0.11	0.29	0.15	0.12	0.11	-0.15	0.71	-0.06	0.14	0.06	0.02
% Change in Housing Units from 1980-90	-0.19	-0.09	0.29	0.14	0.56	0.67	0.07	0.07	0.17	0.11	0.51	0.65	0.10	0.07
% Change in Housing Units from 1990-2000	-0.10	0.02	0.15	0.05	0.61	0.82	0.03	0.03	0.06	0.12	0.60	1.00	0.15	0.07
Non-farm self employment returns (total non farm proprietor income/total non farm proprietor employment), 1997	-0.02	0.04	0.39	0.01	-0.03	0.01	0.04	0.05	0.40	-0.21	0.11	-0.06	-0.02	0.04
Percent Change in Housing Units from 1990-00	-0.10	0.02	0.15	0.05	0.61	0.82	0.03	0.03	0.06	0.12	0.60	1.00	0.15	0.07
Building permits per capita 96	0.03	-0.03	-0.03	0.01	-0.01	-0.06	0.00	0.00	-0.03	0.05	-0.05	-0.03	-0.01	0.01
Average value of building permits during period 86-96	-0.13	0.02	0.15	-0.03	0.10	0.10	0.10	0.09	0.04	-0.02	0.07	0.08	0.02	0.74

Table A.3: Correlations between Candidate Distress Indexes and 2006/2007 Economic Outcomes, ARC Counties*

ARC ranking	Candidate Distress Indexes	ARC Distress Indic. 2007	ARC Distress Indic. 2009	Poverty Rate 2007	Δ in Poverty Rate 1997-07	Per-capita Market Income 2006	%Δ Per-capita Market Income 1996-06	% Job Growth 1996-06	% Pop. Growth 1996-06	Employ/Pop ratio 2007	Labor Force Part. rate 2007	Housing Units 2007	% Nonfarm Self Employ of Total Employ.	% Under 20 yr. old Pop Change, 2000-07	%Δ in Housing Units, 1990-00	%Δ in Housing Units, 2000-07	Average Value of Build. Permits, 1996-07	Average
1	Population growth 86-96, Employment /population ratio 00, Percent of adults with at least one year of college 00, Poverty Rate 97	-0.83	-0.80	-0.79	0.12	0.81	-0.16	0.51	0.64	0.80	0.80	0.37	0.06	0.62	0.48	0.39	0.03	0.71
2	Population growth 86-96, Employment /population ratio 00, Poverty Rate 97	-0.81	-0.77	-0.80	0.10	0.72	-0.21	0.53	0.69	0.80	0.80	0.27	0.15	0.64	0.54	0.40	0.02	0.71
3	Population growth 86-96, Employment /population ratio 00, Per-capita market income 96	-0.80	-0.76	-0.73	0.09	0.76	-0.21	0.55	0.73	0.79	0.78	0.34	0.10	0.69	0.58	0.43	0.06	0.71
4	Population growth 86-96, Employment /population ratio 00, Percent of adults with at least one year of college 00, Poverty Rate 97, Per-capita market income 96	-0.87	-0.84	-0.86	0.08	0.85	-0.15	0.45	0.55	0.80	0.79	0.39	0.04	0.53	0.36	0.33	0.02	0.70
5	Population growth 86-96, Employment /population ratio 00, Percent of adults with at least one year of college 00, Per-capita market income 96	-0.81	-0.78	-0.72	0.11	0.83	-0.15	0.52	0.67	0.78	0.77	0.42	0.01	0.66	0.50	0.40	0.07	0.70
6	Percent of adults with at least one year of college 00, Per-capita market income 96, Population growth 86-96, Poverty Rate 97	-0.84	-0.82	-0.79	0.12	0.86	-0.14	0.49	0.60	0.75	0.74	0.44	0.00	0.60	0.42	0.37	0.04	0.70
7	Population growth 86-96, Percent of adults with at least one year of college 00, Poverty Rate 97	-0.82	-0.79	-0.76	0.12	0.81	-0.13	0.53	0.64	0.74	0.73	0.39	0.04	0.61	0.47	0.40	0.04	0.70
8	Population growth 86-96, Poverty Rate 97	-0.79	-0.74	-0.79	0.10	0.69	-0.20	0.58	0.72	0.73	0.72	0.25	0.18	0.64	0.58	0.43	0.02	0.70
9	Population growth 86-96, Per-capita market income 96	-0.76	-0.71	-0.66	0.07	0.73	-0.20	0.61	0.79	0.69	0.67	0.35	0.11	0.73	0.64	0.47	0.08	0.70

10	Population growth 86-96, Employment /population ratio 00, Percent of adults with at least one year of college 00	-0.76	-0.73	-0.67	0.11	0.75	-0.14	0.56	0.72	0.77	0.76	0.36	0.05	0.68	0.57	0.44	0.08	0.69
11	Population growth 86-96, Employment /population ratio 00	-0.71	-0.65	-0.64	0.08	0.61	-0.21	0.60	0.81	0.74	0.74	0.22	0.18	0.72	0.69	0.47	0.06	0.68
12	Employment /population ratio 00, Per-capita market income 96	-0.85	-0.82	-0.80	0.10	0.85	-0.20	0.38	0.53	0.83	0.82	0.41	0.00	0.56	0.36	0.31	0.02	0.68
13	Employment /population ratio 00, Percent of adults with at least one year of college 00, Per-capita market income 96, Poverty Rate 97	-0.86	-0.85	-0.83	0.13	0.89	-0.14	0.36	0.45	0.81	0.79	0.45	-0.05	0.50	0.27	0.28	0.01	0.67
15	Population growth 86-96, Percent of adults with at least one year of college 00, Per-capita market income 96	-0.77	-0.75	-0.65	0.10	0.83	-0.11	0.53	0.66	0.69	0.68	0.45	-0.02	0.65	0.49	0.41	0.09	0.67
16	Employment /population ratio 00, Percent of adults with at least one year of college 00, Poverty Rate 97	-0.85	-0.84	-0.83	0.13	0.86	-0.13	0.36	0.46	0.82	0.81	0.42	-0.03	0.49	0.28	0.28	0.00	0.67
17	Employment /pop. ratio 00, Poverty Rate 97	-0.84	-0.82	-0.87	0.12	0.77	-0.20	0.36	0.47	0.83	0.82	0.31	0.07	0.48	0.32	0.27	-0.03	0.66
18	Employment /population ratio 00, Percent of adults with at least one year of college 00, Per-capita market income 96	-0.83	-0.82	-0.74	0.12	0.89	-0.12	0.37	0.48	0.79	0.78	0.49	-0.09	0.53	0.30	0.30	0.05	0.66
19	Per-capita market income 96, Poverty Rate 97	-0.87	-0.87	-0.89	0.12	0.88	-0.17	0.31	0.39	0.75	0.74	0.42	-0.02	0.43	0.20	0.23	-0.03	0.64
20	Employment /population ratio 00, Percent of adults with at least one year of college 00	-0.79	-0.77	-0.70	0.13	0.84	-0.10	0.38	0.49	0.80	0.79	0.45	-0.08	0.53	0.33	0.30	0.05	0.64
21	Population growth 86-96, Percent of adults with at least one year of college 00	-0.67	-0.63	-0.53	0.10	0.70	-0.08	0.60	0.73	0.62	0.61	0.37	0.02	0.68	0.59	0.46	0.11	0.64
22	% adults with at least one year of college 00, Per-capita market income 96, Poverty Rate 97	-0.85	-0.85	-0.81	0.13	0.91	-0.10	0.32	0.38	0.74	0.72	0.49	-0.10	0.44	0.19	0.24	0.01	0.63
23	% of adults with at least one year of college 00, Poverty Rate 97	-0.82	-0.83	-0.81	0.15	0.88	-0.07	0.31	0.35	0.73	0.71	0.46	-0.09	0.40	0.17	0.23	0.00	0.61
24	% of adults with at least one year of college 00, Per-capita market income 96	-0.76	-0.77	-0.65	0.12	0.90	-0.05	0.31	0.36	0.66	0.63	0.56	-0.19	0.44	0.17	0.24	0.06	0.57
1b	Population growth 86-96, Employment /population ratio 00, Percent of adults with a four-year college degree 00, Poverty Rate 97	-0.83	-0.79	-0.78	0.13	0.80	-0.15	0.52	0.65	0.80	0.79	0.37	0.06	0.62	0.49	0.39	0.04	0.71

2b	Population growth 86-96, Employment /population ratio 00, Percent of adults with a four-year college degree 00, Poverty Rate 97, Per-capita market income 96	-0.85	-0.82	-0.79	0.12	0.85	-0.15	0.49	0.62	0.80	0.79	0.41	0.03	0.61	0.44	0.37	0.04	0.71
3b	Population growth 86-96, Employment /population ratio 00, Percent of adults with a four-year college degree 00, Per-capita market income 96	-0.80	-0.77	-0.70	0.11	0.83	-0.14	0.53	0.67	0.78	0.77	0.42	0.01	0.66	0.51	0.40	0.07	0.70
4b	% of adults with a four-year college degree 00, Per-capita market income 96, Population growth 86-96 , Poverty Rate 97	-0.84	-0.82	-0.77	0.13	0.86	-0.13	0.50	0.61	0.75	0.73	0.44	0.00	0.60	0.43	0.37	0.04	0.70

**Notes: Average in the final column refers the average of the five variables in grey: 2007 poverty rate, 2006 per-capita market income, 1996-2006 total job growth including proprietors, 1996-2006 population growth, and 2007 employment/population ratio. See sections 2 and 3 for more details. The four indexes 1b-4b at the bottom of the table are Candidate Distress Indexes 1, 4, 5 and 6 replacing at least one-year of college education with at least a four-year bachelor's degree.*

Table A.4: Correlations between Candidate Distress Indexes and 2006/2007 Economic Outcomes, All U.S. Counties*

ARC ranking	U.S. ranking	Candidate Distress Indexes	Poverty Rate 2007	Δ in Poverty Rate 1997-07	Per-capita Market Income 2006	%Δ Per-capita Market Income 1996-06	%Job Growth 1996-06	%Pop. Growth 1996-06	Employ/Pop ratio 2007	Labor Force Part. rate 2007	Housing Units 2007	% Nonfarm Self Employ of Total Employ ^{Employ}	% Under 20 yr. old Pop Change, 2000-07	%Δ in Housing Units, 1990-00	%Δ in Housing Units, 2000-07	Average Value of Building Permits, 1996-07	Average
1	1	Population growth 86-96, Employment /population ratio 00, Percent of adults with at least one year of college 00, Poverty Rate 97	-0.78	0.12	0.72	0.08	0.44	0.52	0.66	0.65	0.22	0.07	0.37	0.41	0.10	0.16	0.62
2	4	Population growth 86-96, Employment /population ratio 00, Poverty Rate 97	-0.80	0.15	0.63	0.03	0.45	0.56	0.64	0.64	0.16	0.11	0.40	0.47	0.11	0.14	0.62
3	2	Population growth 86-96, Employment /population ratio 00, Per-capita market income 96	-0.69	0.09	0.77	0.02	0.46	0.58	0.62	0.62	0.27	0.04	0.44	0.49	0.11	0.15	0.62
4	3	Population growth 86-96, Employment /population ratio 00, Percent of adults with at least one year of college 00, Poverty Rate 97, Per-capita market income 96	-0.83	0.13	0.77	0.04	0.37	0.44	0.67	0.67	0.22	0.06	0.31	0.32	0.09	0.16	0.62
5	5	Population growth 86-96, Employment /population ratio 00, Percent of adults with at least one year of college 00, Per-capita market income 96	-0.68	0.07	0.81	0.07	0.44	0.52	0.63	0.62	0.30	0.02	0.39	0.41	0.10	0.16	0.62
6	6	Percent of adults with at least one year of college 00, Per-capita market income 96, Population growth 86-96, Poverty Rate 97	-0.75	0.12	0.81	0.06	0.42	0.51	0.54	0.54	0.29	0.03	0.39	0.40	0.10	0.17	0.61
7	12	Population growth 86-96, Poverty Rate 97	-0.72	0.16	0.55	0.02	0.52	0.67	0.41	0.41	0.16	0.13	0.48	0.61	0.12	0.14	0.57
8	8	Population growth 86-96, Percent of adults with at least one year of college 00, Poverty Rate 97	-0.73	0.12	0.70	0.09	0.49	0.58	0.51	0.50	0.24	0.07	0.42	0.49	0.11	0.16	0.60

9	14	Population growth 86-96, Per-capita market income 96	-0.55	0.07	0.74	0.00	0.51	0.67	0.37	0.36	0.31	0.03	0.53	0.61	0.13	0.15	0.57
10	7	Population growth 86-96, Employment /population ratio 00, Percent of adults with at least one year of college 00	-0.63	0.05	0.69	0.12	0.50	0.59	0.62	0.61	0.25	0.05	0.42	0.50	0.12	0.15	0.61
11	9	Population growth 86-96, Employment /population ratio 00	-0.60	0.06	0.54	0.05	0.54	0.69	0.58	0.58	0.18	0.10	0.49	0.63	0.14	0.12	0.59
12	16	Employment /population ratio 00, Per-capita market income 96	-0.75	0.11	0.82	0.01	0.24	0.27	0.75	0.75	0.26	-0.02	0.21	0.15	0.06	0.15	0.56
13	10	Employment /population ratio 00, Percent of adults with at least one year of college 00, Per-capita market income 96, Poverty Rate 97	-0.81	0.14	0.82	0.05	0.27	0.29	0.71	0.71	0.25	0.00	0.21	0.15	0.06	0.16	0.58
14	11	Population growth 86-96, Percent of adults with at least one year of college 00, Per-capita market income 96	-0.59	0.05	0.80	0.08	0.47	0.57	0.46	0.45	0.34	0.00	0.44	0.48	0.11	0.17	0.58
15	13	Employment /population ratio 00, Percent of adults with at least one year of college 00, Poverty Rate 97	-0.82	0.14	0.74	0.09	0.28	0.28	0.75	0.74	0.20	0.03	0.19	0.16	0.06	0.15	0.57
16	21	Employment /population ratio 00, Poverty Rate 97	-0.86	0.18	0.63	0.02	0.23	0.25	0.76	0.76	0.12	0.06	0.16	0.13	0.05	0.13	0.55
17	15	Employment /population ratio 00, Percent of adults with at least one year of college 00, Per-capita market income 96	-0.72	0.08	0.84	0.07	0.28	0.29	0.71	0.70	0.29	-0.03	0.22	0.16	0.06	0.16	0.57
18	20	Per-capita market income 96, Poverty Rate 97	-0.85	0.19	0.82	-0.02	0.22	0.26	0.60	0.59	0.24	0.01	0.20	0.13	0.04	0.16	0.55
19	18	Employment /population ratio 00, Percent of adults with at least one year of college 00	-0.68	0.06	0.73	0.13	0.29	0.28	0.76	0.75	0.24	0.00	0.20	0.17	0.06	0.14	0.55
20	22	Population growth 86-96, Percent of adults with at least one year of college 00	-0.45	0.01	0.60	0.13	0.56	0.67	0.34	0.33	0.28	0.05	0.50	0.61	0.13	0.14	0.52

21	17	% of adults with at least one year of college 00, Per-capita market income 96, Poverty Rate 97	-0.80	0.15	0.85	0.05	0.26	0.28	0.61	0.60	0.28	-0.01	0.22	0.15	0.05	0.17	0.56
22	19	% of adults with at least one year of college 00, Poverty Rate 97	-0.82	0.16	0.75	0.10	0.28	0.28	0.62	0.61	0.23	0.03	0.20	0.15	0.05	0.16	0.55
23	23	% of adults with at least one year of college 00, Per-capita market income 96	-0.63	0.07	0.88	0.08	0.26	0.28	0.55	0.54	0.35	-0.06	0.23	0.15	0.06	0.17	0.52
1b	1b	Population growth 86-96, Employment /population ratio 00, Percent of adults with a four-year college degree 00, Poverty Rate 97	-0.76	0.14	0.74	0.08	0.45	0.53	0.65	0.64	0.24	0.06	0.39	0.43	0.10	0.15	0.63
2b	2b	Population growth 86-96, Employment /population ratio 00, Percent of adults with a four-year college degree 00, Poverty Rate 97, Per-capita market income 96	-0.77	0.14	0.82	0.06	0.40	0.48	0.65	0.64	0.28	0.03	0.37	0.37	0.09	0.16	0.62
3b	3b	Population growth 86-96, Employment /population ratio 00, Percent of adults with a four-year college degree 00, Per-capita market income 96	-0.66	0.09	0.82	0.07	0.44	0.53	0.61	0.61	0.31	0.01	0.41	0.43	0.10	0.16	0.61
4b	4b	% of adults with a four-year college degree 00, Per-capita market income 96, Population growth 86-96, Poverty Rate 97	-0.73	0.14	0.83	0.05	0.43	0.52	0.53	0.52	0.31	0.02	0.41	0.42	0.09	0.17	0.61

**Notes: Average in the final column refers the average of the five variables in grey: 2007 poverty rate, 2006 per-capita market income, 1996-2006 total job growth including proprietors, 1996-2006 population growth, and 2007 employment/population ratio. See sections 2 and 3 for more details. The four indexes 1b-4b at the bottom of the table are Candidate Distress Indexes 1, 4, 5 and 6 replacing at least one-year of college education with at least a four-year bachelor's degree.*

Table A.5: Summary Statistics of Candidate Indexes

	Candidate Index 1	Candidate Index 2	Candidate Index 3	Candidate Index 4	Candidate Index 5	Candidate Index 6
Mean of Z-score for US Counties excluding ARC Counties	0.20	0.27	0.21	0.31	0.24	0.25
Standard deviation of Z-score for US counties excluding ARC counties	2.79	3.60	2.91	3.59	2.91	2.87
Mean of Z-score for only ARC Counties	-1.31	-1.77	-1.38	-2.01	-1.55	-1.62
Standard deviation of Z-score only ARC counties	2.51	3.01	2.31	3.08	2.58	2.36

Table A.6: Z-scores and Rankings of ARC Counties Relative to the ARC Region (n=420) and the U.S. (n=3,102)

County	Candidate Index 1			Candidate Index 2			Candidate Index 3			Candidate Index 4			Candidate Index 5			Candidate Index 6			Current ARC Index FY07			
	Z-score	US rank	ARC rank	Z-score	US rank	ARC rank	Z-score	US rank	ARC rank	Z-score	US rank	ARC rank	Z-score	US rank	ARC rank	Z-score	US rank	ARC rank	Index	US rank	ARC rank	
Alabama																						
Bibb County, Alabama	-2.13	2499	274	-2.96	2544	279	-2.46	2590	282	-2.97	2523	270	-2.14	2485	263	-2.47	2571	263	152.2	2612	303	
Blount County, Alabama	0.48	1188	77	0.03	1396	93	-0.29	1407	100	0.20	1377	78	0.64	1164	62	-0.13	1401	86	108.1	1302	82	
Calhoun County, Alabama	-1.15	2069	189	-1.18	1903	166	-0.86	1753	147	-1.02	1861	142	-1.00	2010	163	-0.70	1687	117	122.8	1836	167.5	
Chambers County, Alabama	-2.35	2567	288	-3.00	2555	281	-2.92	2748	323	-3.07	2553	277	-2.42	2568	279	-2.99	2735	306	136.6	2278	246	
Cherokee County, Alabama	-1.39	2198	219	-1.95	2235	227	-1.34	2033	188	-2.23	2323	231	-1.67	2309	228	-1.62	2203	193	124.7	1904	186	
Chilton County, Alabama	-0.68	1823	151	-1.09	1871	160	-0.84	1739	145	-1.27	1973	163	-0.86	1952	152	-1.01	1876	151	122.4	1824	164	
Clay County, Alabama	-2.30	2550	282	-2.83	2502	267	-2.77	2709	315	-2.89	2504	265	-2.36	2549	274	-2.83	2695	294	142.1	2398	261	
Cleburne County, Alabama	-1.33	2164	213	-1.72	2142	210	-1.67	2222	209	-1.95	2224	209	-1.56	2261	217	-1.90	2341	216	123.7	1872	180	
Colbert County, Alabama	-1.23	2115	204	-1.65	2111	202	-1.43	2080	194	-1.53	2071	175	-1.11	2063	170	-1.31	2032	173	130.8	2125	225.5	
Coosa County, Alabama	-2.87	2703	320	-3.65	2713	318	-3.65	2945	365	-3.76	2698	309	-2.99	2697	311	-3.77	2928	353	146.3	2491	278	
Cullman County, Alabama	-0.34	1628	123	-0.55	1649	123	-0.70	1656	129	-0.35	1602	105	-0.13	1554	99	-0.49	1585	102	112.9	1494	110.5	
DeKalb County, Alabama	-1.54	2251	228	-2.01	2263	231	-1.48	2116	200	-2.03	2268	220	-1.55	2255	215	-1.50	2141	187	121.3	1792	158	
Elmore County, Alabama	1.84	685	41	1.88	787	46	1.27	819	53	1.93	803	43	1.89	704	38	1.31	817	47	97.6	904	41	
Etowah County, Alabama	-1.75	2358	257	-2.06	2282	236	-1.69	2233	211	-1.67	2111	185	-1.37	2166	191	-1.31	2029	172	127.9	2020	206.5	
Fayette County, Alabama	-2.78	2684	316	-3.37	2648	305	-3.04	2786	328	-3.44	2638	292	-2.84	2660	302	-3.10	2769	318	144.5	2453	270	
Franklin County, Alabama	-2.39	2583	294	-3.01	2561	283	-2.21	2498	261	-3.09	2559	278	-2.47	2578	281	-2.29	2492	241	155.9	2663	310	

Hale County, Alabama	-3.33	2812	343	-4.27	2822	344	-2.84	2728	319	-4.29	2806	338	-3.36	2784	330	-2.87	2705	298	184.4	2950	365
Jackson County, Alabama	-1.32	2154	211	-1.66	2121	205	-1.27	1990	182	-1.75	2137	191	-1.40	2182	199	-1.35	2054	176	126.8	1980	200
Jefferson County, Alabama	0.59	1132	69	2.11	728	44	2.11	595	37	2.11	761	40	0.59	1196	65	2.11	604	32	100.5	1027	54
Lamar County, Alabama	-3.78	2900	369	-4.59	2870	357	-4.05	3013	382	-4.75	2873	352	-3.94	2887	357	-4.20	3000	378	151.6	2603	300
Lauderdale County, Alabama	-0.63	1794	147	-0.79	1738	132	-0.31	1419	102	-0.99	1845	137	-0.83	1936	149	-0.51	1592	103	126.4	1970	198
Lawrence County, Alabama	-1.83	2397	262	-2.16	2314	242	-2.18	2483	259	-2.37	2375	244	-2.04	2453	258	-2.39	2534	254	127.3	2003	203.5
Limestone County, Alabama	1.36	842	49	1.43	892	50	1.02	871	56	1.36	962	48	1.29	904	46	0.96	930	52	104.5	1165	66
Macon County, Alabama	-4.05	2937	377	-5.08	2929	375	-2.75	2703	312	-5.05	2907	364	-4.02	2908	365	-2.72	2663	288	198.9	3003	381
Madison County, Alabama	4.11	219	8	5.29	234	7	4.67	204	7	4.97	263	7	3.80	247	10	4.36	234	7	85.8	434	12
Marion County, Alabama	-3.39	2824	345	-3.91	2754	331	-3.17	2822	338	-3.90	2724	316	-3.38	2790	332	-3.16	2780	320	144.8	2459	272
Marshall County, Alabama	-0.94	1968	173	-0.99	1817	152	-0.27	1390	99	-0.93	1823	134	-0.89	1969	155	-0.21	1444	89	115.1	1582	122
Morgan County, Alabama	0.50	1176	75	1.02	1012	59	0.87	913	59	1.06	1051	53	0.54	1218	67	0.91	954	53	107.9	1293	79
Pickens County, Alabama	-3.73	2891	365	-4.39	2847	350	-3.25	2850	344	-4.30	2808	339	-3.64	2845	346	-3.16	2779	319	173.9	2880	351
Randolph County, Alabama	-2.66	2652	309	-3.46	2669	309	-2.53	2622	291	-3.66	2683	305	-2.86	2664	303	-2.74	2669	289	147.7	2514	283
Shelby County, Alabama	7.18	43	5	9.15	52	2	7.83	53	2	8.61	54	2	6.64	54	5	7.29	57	2	63.8	55	1
St. Clair County, Alabama	0.85	1018	58	0.91	1043	63	0.35	1105	71	1.05	1054	54	0.99	1016	52	0.49	1111	61	106.7	1242	73
Talladega County, Alabama	-1.46	2223	224	-1.59	2086	198	-1.13	1906	169	-1.53	2067	173	-1.39	2179	197	-1.06	1906	153	136	2259	244
Tallapoosa County, Alabama	-1.63	2295	240	-2.05	2279	234	-1.73	2255	216	-2.17	2308	229	-1.75	2342	231	-1.85	2319	208	134.6	2210	241
Tuscaloosa County, Alabama	0.82	1030	60	1.29	933	52	1.85	642	43	1.15	1027	51	0.67	1157	60	1.71	710	42	110.9	1417	102
Walker County, Alabama	-2.75	2675	314	-3.06	2572	286	-2.42	2579	280	-2.92	2510	267	-2.60	2613	286	-2.28	2484	240	132.4	2166	234
Winston County, Alabama	-2.46	2597	295	-3.19	2605	293	-3.05	2789	329	-3.37	2622	288	-2.63	2622	290	-3.23	2795	326	155.1	2656	309

Georgia																					
Banks County, Georgia	2.69	451	25	2.74	587	32	2.52	496	24	2.46	668	31	2.40	536	30	2.23	575	28	98.9	963	44
Barrow County, Georgia	3.97	239	10	3.80	381	13	3.17	374	14	4.00	360	10	4.17	203	7	3.37	345	10	92.9	708	28
Bartow County, Georgia	2.69	452	26	2.77	577	29	2.21	565	35	2.63	618	26	2.55	500	24	2.07	616	33	92.3	687	25
Carroll County, Georgia	1.52	787	45	1.34	920	51	1.69	697	44	0.91	1091	57	1.08	986	50	1.26	838	49	114	1530	115
Catoosa County, Georgia	2.75	433	24	2.66	610	33	2.12	590	36	2.77	591	24	2.86	417	15	2.24	572	27	88.8	557	15
Chattooga County, Georgia	-2.63	2646	307	-3.64	2711	317	-3.18	2825	339	-3.87	2718	314	-2.86	2665	304	-3.41	2836	334	126.1	1953	195
Cherokee County, Georgia	7.46	41	3	8.50	65	3	7.03	77	4	8.48	60	3	7.43	31	2	7.01	67	4	68.4	102	4
Dade County, Georgia	0.51	1172	74	0.14	1344	87	-0.14	1330	92	0.31	1332	75	0.68	1155	59	0.03	1322	82	101.4	1067	58
Dawson County, Georgia	5.29	118	6	5.80	190	6	4.84	192	6	6.02	175	6	5.50	95	6	5.05	171	6	78.8	258	6
Douglas County, Georgia	4.03	230	9	4.15	336	9	3.40	342	11	4.13	347	9	4.02	217	8	3.39	340	9	86.2	447	13
Elbert County, Georgia	-1.60	2281	236	-2.14	2303	241	-1.85	2312	227	-2.51	2402	248	-1.97	2429	254	-2.23	2464	236	131.7	2152	232
Fannin County, Georgia	0.13	1371	97	-0.45	1605	120	-0.42	1477	108	-0.58	1676	116	0.01	1489	90	-0.55	1611	107	119	1717	147.5
Floyd County, Georgia	0.23	1321	87	0.37	1238	78	0.61	1002	63	0.08	1427	83	-0.06	1532	96	0.31	1182	67	109.8	1357	90
Forsyth County, Georgia	12.13	4	1	13.44	13	1	11.84	13	1	12.99	8	1	11.69	4	1	11.40	9	1	66	77	2
Franklin County, Georgia	-0.44	1683	135	-0.95	1795	145	-0.82	1728	141	-1.14	1916	150	-0.62	1832	136	-1.01	1874	150	114.9	1573	121
Gilmer County, Georgia	2.92	388	17	2.47	654	38	2.40	516	26	2.09	773	41	2.54	504	26	2.02	632	36	109.9	1363	92
Gordon County, Georgia	1.32	855	50	1.05	999	56	0.92	898	58	0.84	1111	61	1.11	973	49	0.71	1031	58	99.3	985	46.5
Gwinnett County, Georgia	7.54	39	2	8.45	66	4	7.37	66	3	8.31	65	4	7.39	35	4	7.23	58	3	71.3	141	5
Habersham County, Georgia	1.24	876	52	0.87	1054	64	0.75	952	60	0.51	1244	71	0.88	1062	54	0.39	1154	64	101.7	1077	59
Hall County, Georgia	3.88	253	11	4.06	350	11	3.56	320	10	3.69	412	13	3.50	297	11	3.19	369	12	97.3	891	40

Haralson County, Georgia	-0.58	1754	143	-0.96	1805	149	-0.84	1740	146	-1.28	1978	164	-0.90	1972	156	-1.16	1961	159	122.2	1816	162.5
Hart County, Georgia	-1.07	2029	182	-1.81	2187	218	-1.38	2053	190	-2.10	2291	226	-1.35	2156	190	-1.67	2227	196	122.8	1831	167.5
Heard County, Georgia	-1.27	2135	209	-2.05	2280	235	-1.84	2310	226	-2.54	2409	249	-1.77	2346	233	-2.34	2514	248	128.3	2043	213
Jackson County, Georgia	2.83	408	20	2.82	561	27	2.35	526	28	2.59	631	28	2.60	491	22	2.12	603	31	101.2	1061	56.5
Lumpkin County, Georgia	3.11	361	16	2.94	537	26	2.65	468	22	2.77	594	25	2.94	401	14	2.47	521	20	105.6	1205	69
Madison County, Georgia	1.24	875	51	1.03	1003	57	0.56	1022	65	0.68	1181	63	0.88	1060	53	0.21	1232	71	96.3	840	34.5
Murray County, Georgia	0.86	1012	57	0.36	1248	79	0.43	1074	68	0.09	1419	81	0.60	1192	64	0.17	1253	74	109.9	1362	92
Paulding County, Georgia	7.40	42	4	7.58	93	5	6.26	105	5	7.58	90	5	7.40	34	3	6.26	96	5	79.9	274	7
Pickens County, Georgia	4.26	208	7	4.78	279	8	4.17	263	9	4.49	302	8	3.96	222	9	3.87	290	8	85.5	416	11
Polk County, Georgia	-0.66	1808	149	-1.42	2011	183	-1.02	1855	164	-1.59	2089	179	-0.83	1937	150	-1.19	1973	160	129.5	2078	219.5
Rabun County, Georgia	0.38	1236	79	0.19	1319	84	0.01	1255	84	-0.13	1514	96	0.06	1463	89	-0.31	1494	91	100	1010	52
Stephens County, Georgia	-0.71	1836	153	-1.15	1895	164	-0.68	1639	124	-1.46	2042	169	-1.02	2021	165	-0.98	1850	145	122.9	1840	171.5
Towns County, Georgia	2.67	455	27	2.48	652	37	2.03	617	40	2.35	696	35	2.54	502	25	1.89	668	40	101.2	1057	56.5
Union County, Georgia	2.49	497	31	2.18	717	43	1.62	713	45	2.31	709	37	2.62	485	21	1.74	699	41	110.1	1375	98
Walker County, Georgia	-0.51	1719	137	-1.03	1837	155	-0.88	1765	149	-1.15	1925	152	-0.63	1836	137	-1.00	1862	148	110	1370	95.5
White County, Georgia	2.88	395	18	2.42	666	39	2.34	531	29	2.36	692	34	2.82	430	16	2.27	561	25	100.6	1034	55
Whitfield County, Georgia	0.52	1167	73	0.84	1061	65	1.06	864	55	0.56	1227	68	0.24	1368	82	0.78	1010	56	94.4	766	33
Kentucky																					
Adair County, Kentucky	-1.82	2391	259	-2.88	2518	275	-1.87	2318	230	-3.33	2610	285	-2.27	2520	269	-2.32	2509	245	163.4	2752	323
Bath County, Kentucky	-2.47	2601	298	-3.48	2671	310	-2.07	2424	250	-4.12	2767	326	-3.11	2718	316	-2.71	2658	286	164.2	2763	324
Bell County, Kentucky	-6.01	3061	408	-7.35	3065	408	-5.16	3082	408	-7.84	3070	408	-6.49	3068	408	-5.64	3085	408	213.3	3052	391

Boyd County, Kentucky	-1.51	2240	225	-1.65	2114	203	-1.44	2090	196	-1.41	2029	168	-1.28	2122	180	-1.21	1979	163	121.4	1793	159
Breathitt County, Kentucky	-5.49	3043	400	-6.85	3051	403	-4.46	3055	395	-7.22	3057	404	-5.86	3050	400	-4.83	3061	397	217.8	3061	396
Carter County, Kentucky	-1.83	2396	261	-2.98	2552	280	-2.31	2530	268	-3.34	2616	287	-2.19	2491	264	-2.67	2640	281	180.2	2930	360
Casey County, Kentucky	-2.89	2708	321	-4.05	2782	336	-2.69	2677	302	-4.56	2837	346	-3.39	2793	333	-3.19	2787	324	176.1	2900	354
Clark County, Kentucky	0.20	1334	91	0.43	1210	72	0.38	1097	70	0.31	1330	74	0.09	1444	87	0.26	1202	69	98.4	941	42
Clay County, Kentucky	-8.34	3096	418	-10.00	3097	418	-5.70	3096	417	-10.61	3099	418	-8.95	3098	418	-6.31	3100	419	265.5	3097	408
Clinton County, Kentucky	-3.00	2743	327	-4.19	2814	343	-2.75	2701	311	-4.74	2871	351	-3.54	2826	342	-3.29	2816	329	190.7	2980	372
Cumberland County, Kentucky	-4.04	2934	376	-5.55	2979	384	-4.12	3021	385	-6.09	2999	385	-4.58	2962	380	-4.67	3043	389	186.3	2964	369
Edmonson County, Kentucky	-2.33	2560	285	-3.31	2632	301	-2.96	2763	326	-3.63	2677	302	-2.65	2623	291	-3.28	2811	328	158.8	2703	317
Elliott County, Kentucky	-4.13	2947	379	-5.75	2994	387	-3.78	2969	374	-6.45	3018	389	-4.82	2986	385	-4.47	3029	385	217.1	3060	395
Estill County, Kentucky	-4.64	2994	388	-5.97	3007	389	-4.17	3027	388	-6.53	3022	391	-5.20	3013	390	-4.73	3050	392	184.8	2952	366
Fleming County, Kentucky	-2.05	2470	270	-3.11	2584	290	-2.43	2581	281	-3.32	2605	283	-2.25	2514	268	-2.63	2623	277	147.4	2508	281
Floyd County, Kentucky	-5.99	3060	407	-7.03	3056	405	-4.17	3026	387	-7.13	3055	402	-6.10	3059	403	-4.28	3010	381	192.3	2988	375
Garrard County, Kentucky	-0.38	1653	128	-1.02	1832	154	-0.75	1692	136	-1.04	1865	144	-0.40	1707	114	-0.76	1723	122	122.8	1834	167.5
Green County, Kentucky	-1.67	2319	247	-2.87	2513	273	-2.53	2624	292	-3.33	2611	286	-2.14	2483	262	-3.00	2742	310	151.9	2609	301.5
Greenup County, Kentucky	-1.55	2255	229	-1.87	2206	222	-1.86	2315	228	-1.78	2146	192	-1.45	2207	205	-1.77	2289	204	125.4	1935	192
Harlan County, Kentucky	-6.46	3071	410	-7.81	3074	410	-5.54	3092	415	-8.22	3076	409	-6.87	3074	410	-5.94	3094	414	223.2	3071	401
Hart County, Kentucky	-2.81	2689	317	-4.07	2790	337	-2.76	2708	314	-4.49	2828	345	-3.23	2755	322	-3.17	2783	322	165.7	2785	330
Jackson County, Kentucky	-6.81	3081	415	-8.52	3089	416	-5.47	3091	414	-9.14	3091	416	-7.43	3087	415	-6.09	3095	415	218.3	3063	398
Johnson County, Kentucky	-3.91	2919	372	-4.93	2915	373	-3.44	2907	356	-5.05	2909	365	-4.03	2911	367	-3.56	2883	342	173.4	2873	349
Knott County, Kentucky	-5.86	3056	405	-7.07	3059	406	-4.40	3048	394	-7.47	3063	406	-6.26	3062	405	-4.80	3057	395	202.8	3017	385

Knox County, Kentucky	-4.92	3014	394	-6.03	3015	393	-3.47	2912	357	-6.66	3034	395	-5.55	3031	395	-4.10	2986	373	205.5	3026	386
Laurel County, Kentucky	-1.56	2266	233	-2.34	2368	252	-1.23	1964	175	-2.63	2433	254	-1.85	2378	244	-1.52	2150	188	149.5	2560	290.5
Lawrence County, Kentucky	-4.68	2996	390	-6.00	3012	390	-4.36	3044	392	-6.17	3001	386	-4.86	2988	386	-4.53	3035	387	212.5	3046	389
Lee County, Kentucky	-6.79	3080	414	-8.25	3081	413	-5.08	3081	407	-8.78	3085	412	-7.31	3084	414	-5.60	3084	407	218.5	3064	399
Leslie County, Kentucky	-7.13	3086	416	-8.46	3086	414	-5.91	3099	419	-8.84	3089	414	-7.51	3088	416	-6.29	3098	417	227.6	3078	403
Letcher County, Kentucky	-5.64	3050	403	-6.68	3047	402	-4.77	3071	402	-6.90	3043	397	-5.86	3051	401	-4.99	3066	398	195.3	2993	377
Lewis County, Kentucky	-5.00	3020	396	-6.57	3045	400	-4.36	3043	391	-6.93	3044	398	-5.36	3024	394	-4.71	3047	391	212.6	3048	390
Lincoln County, Kentucky	-2.22	2528	277	-3.25	2622	298	-2.42	2576	279	-3.73	2693	307	-2.71	2640	295	-2.90	2708	299	162.8	2748	320
Madison County, Kentucky	1.50	791	46	1.02	1010	58	1.60	719	46	0.79	1143	62	1.27	911	47	1.36	802	46	124.5	1901	184.5
Magoffin County, Kentucky	-6.51	3073	411	-7.91	3076	411	-5.26	3085	411	-8.37	3079	411	-6.97	3076	411	-5.73	3088	411	252.5	3092	407
Martin County, Kentucky	-7.66	3093	417	-8.91	3092	417	-5.58	3094	416	-9.46	3093	417	-8.21	3093	417	-6.14	3096	416	220.5	3067	400
McCreary County, Kentucky	-6.69	3078	413	-8.46	3087	415	-5.19	3083	409	-8.82	3088	413	-7.05	3078	412	-5.55	3082	406	248.1	3090	405
Menifee County, Kentucky	-3.75	2893	367	-5.33	2962	379	-3.39	2894	352	-6.26	3008	387	-4.67	2970	383	-4.32	3013	382	214	3054	392
Metcalf County, Kentucky	-3.41	2828	346	-4.62	2877	360	-3.23	2841	343	-5.15	2919	369	-3.94	2889	359	-3.76	2926	352			
Monroe County, Kentucky	-4.19	2949	380	-5.38	2972	381	-3.77	2964	372	-5.84	2984	382	-4.65	2969	382	-4.22	3003	380	168.7	2820	338
Montgomery County, Kentucky	-0.41	1664	131	-0.93	1788	144	-0.26	1388	98	-1.48	2047	171	-0.95	1992	159	-0.80	1738	124	128.6	2052	215
Morgan County, Kentucky	-5.09	3026	397	-6.53	3043	399	-4.61	3062	399	-7.09	3052	400	-5.65	3037	396	-5.16	3073	400	211.1	3044	388
Nicholas County, Kentucky	-2.89	2712	324	-3.62	2706	316	-2.94	2753	325	-3.85	2714	313	-3.13	2724	318	-3.17	2781	321			
Owsley County, Kentucky	-8.80	3099	419	-10.45	3100	419	-5.74	3098	418	-11.00	3100	419	-9.35	3101	419	-6.30	3099	418	265.9	3098	409
Perry County, Kentucky	-5.51	3046	401	-6.28	3032	395	-3.66	2946	366	-6.59	3028	393	-5.82	3046	399	-3.98	2962	365	191.5	2984	373
Pike County, Kentucky	-4.11	2945	378	-4.64	2884	362	-3.73	2958	368	-5.01	2905	362	-4.48	2954	378	-4.09	2984	372	166	2790	331

Powell County, Kentucky	-3.71	2885	362	-4.79	2900	368	-3.11	2794	331	-5.33	2935	374	-4.25	2931	373	-3.65	2903	346	176.4	2904	356
Pulaski County, Kentucky	-2.19	2521	276	-2.87	2514	274	-1.81	2293	221	-3.06	2552	276	-2.39	2557	276	-2.01	2392	221	143.8	2442	268
Robertson County, Kentucky	-2.61	2642	305	-3.85	2744	327	-2.69	2679	304	-4.35	2813	340	-3.11	2719	317	-3.19	2788	325			
Rockcastle County, Kentucky	-3.76	2895	368	-5.02	2924	374	-3.15	2813	336	-5.72	2970	379	-4.46	2951	377	-3.85	2940	358	169.5	2826	340
Rowan County, Kentucky	-0.64	1797	148	-1.52	2062	192	-0.02	1272	88	-2.06	2278	222	-1.18	2084	172	-0.56	1615	108	146.2	2490	277
Russell County, Kentucky	-2.50	2606	299	-3.57	2692	314	-2.41	2574	277	-3.94	2733	317	-2.88	2670	307	-2.79	2683	292	175.1	2890	352
Wayne County, Kentucky	-3.95	2926	373	-5.17	2944	377	-3.26	2854	345	-5.61	2962	377	-4.40	2949	376	-3.70	2918	350	188.4	2972	371
Whitley County, Kentucky	-3.51	2851	354	-4.64	2885	363	-2.62	2651	295	-5.12	2915	368	-3.99	2899	362	-3.10	2767	317	180.9	2932	362
Wolfe County, Kentucky	-6.53	3074	412	-8.20	3080	412	-4.74	3069	401	-8.85	3090	415	-7.18	3082	413	-5.39	3076	402	250.1	3091	406
Maryland																					
Allegany County, Maryland	-1.23	2114	203	-1.86	2200	219	-2.00	2386	238	-1.92	2214	206	-1.30	2138	183	-2.07	2410	223	131.6	2148	230.5
Garrett County, Maryland	0.29	1282	82	0.18	1325	86	-0.17	1344	93	-0.11	1508	95	0.00	1503	91	-0.47	1568	98	114.1	1537	116
Washington County, Maryland	0.52	1166	72	0.97	1025	60	0.23	1160	76	0.86	1108	60	0.40	1291	73	0.11	1280	77	91.8	672	22.5
Mississippi																					
Alcorn County, Mississippi	-1.80	2378	258	-2.54	2430	261	-2.13	2455	256	-2.61	2423	252	-1.86	2382	245	-2.19	2449	232	144.9	2464	273.5
Benton County, Mississippi	-4.22	2951	382	-5.63	2984	385	-4.57	3060	398	-5.76	2975	380	-4.35	2944	375	-4.70	3046	390	201.1	3011	383
Calhoun County, Mississippi	-3.73	2889	363	-4.42	2850	352	-3.11	2796	332	-4.59	2846	347	-3.90	2884	355	-3.28	2810	327	144.7	2457	271
Chickasaw County, Mississippi	-3.29	2804	342	-4.18	2812	342	-3.38	2890	350	-4.19	2789	333	-3.30	2776	326	-3.39	2832	333	166.1	2791	332
Choctaw County, Mississippi	-4.32	2964	386	-5.52	2978	383	-3.89	2994	376	-5.71	2969	378	-4.51	2955	379	-4.08	2979	369	206.4	3030	387
Clay County, Mississippi	-3.99	2931	374	-4.47	2853	353	-2.86	2735	321	-4.64	2855	348	-4.16	2923	370	-3.04	2751	313	173.6	2878	350
Itawamba County, Mississippi	-1.67	2316	245	-2.18	2317	243	-2.28	2519	267	-1.89	2201	204	-1.39	2174	195	-1.99	2388	220	124.9	1918	187.5

Kemper County, Mississippi	-4.25	2954	384	-5.47	2974	382	-3.73	2959	369	-5.47	2944	375	-4.25	2929	372	-3.74	2921	351	195.8	2996	378.5
Lee County, Mississippi	0.23	1325	88	0.50	1188	70	0.54	1030	66	0.65	1193	64	0.38	1307	75	0.69	1039	59	108	1298	80.5
Lowndes County, Mississippi	-1.61	2286	238	-1.71	2137	209	-0.72	1671	132	-1.83	2179	198	-1.74	2335	229	-0.84	1753	125	149.5	2559	290.5
Marshall County, Mississippi	-2.89	2710	323	-3.58	2698	315	-2.39	2565	273	-3.78	2702	310	-3.10	2713	314	-2.60	2610	272	166.5	2793	333
Monroe County, Mississippi	-2.39	2582	293	-2.94	2536	278	-2.41	2575	278	-2.95	2518	268	-2.40	2561	277	-2.42	2544	258	148.9	2547	288
Montgomery County, Mississippi	-4.01	2933	375	-4.90	2911	371	-3.65	2944	364	-5.10	2912	367	-4.21	2927	371	-3.85	2942	359	186	2961	368
Noxubee County, Mississippi	-5.87	3058	406	-7.17	3062	407	-4.33	3042	390	-7.59	3068	407	-6.29	3063	406	-4.75	3051	393	223.4	3072	402
Oktibbeha County, Mississippi	-0.91	1949	169	-1.08	1864	158	1.53	739	48	-1.83	2175	195	-1.65	2299	227	0.79	1009	55	156.4	2667	311
Panola County, Mississippi	-3.42	2830	347	-4.18	2811	341	-2.03	2400	244	-4.09	2762	324	-3.33	2780	329	-1.94	2361	217	182.2	2938	363
Pontotoc County, Mississippi	-0.53	1729	139	-1.06	1848	157	-0.88	1771	151	-1.05	1871	146	-0.52	1779	127	-0.87	1776	132	124	1890	182
Prentiss County, Mississippi	-2.25	2534	279	-3.34	2635	303	-2.89	2742	322	-3.16	2572	280	-2.07	2462	261	-2.72	2661	287	148.2	2527	285.5
Tippah County, Mississippi	-2.55	2626	301	-3.45	2665	308	-2.74	2696	309	-3.40	2628	290	-2.51	2590	283	-2.70	2644	282	150.7	2581	294.5
Tishomingo County, Mississippi	-2.67	2657	312	-3.77	2732	323	-3.34	2878	348	-3.88	2719	315	-2.78	2653	301	-3.45	2851	337	158	2691	315
Union County, Mississippi	-0.34	1629	124	-0.88	1773	141	-1.00	1837	161	-0.99	1844	136	-0.44	1729	117	-1.10	1926	154	125.3	1928	190.5
Webster County, Mississippi	-3.69	2884	361	-4.93	2914	372	-4.18	3028	389	-5.20	2922	371	-3.96	2892	361	-4.44	3025	384	199.2	3004	382
Winston County, Mississippi	-2.97	2733	326	-3.78	2734	324	-2.76	2705	313	-4.01	2746	319	-3.21	2745	320	-2.99	2738	308	178.7	2920	358
Yalobusha County, Mississippi	-3.42	2831	348	-4.36	2840	348	-2.80	2719	316	-4.41	2821	342	-3.48	2812	340	-2.85	2701	296	165.5	2781	329
North Carolina																					
Alexander County, North Carolina	0.21	1330	90	0.11	1352	89	-0.42	1478	109	0.19	1381	79	0.30	1343	79	-0.34	1512	92	105.8	1214	70

Alleghany County, North Carolina	-1.56	2262	231	-1.93	2228	226	-1.68	2224	210	-1.95	2228	210	-1.58	2268	219	-1.70	2246	198	142.8	2416	265
Ashe County, North Carolina	-0.42	1673	133	-0.84	1750	135	-0.82	1729	142	-0.96	1835	135	-0.54	1788	130	-0.95	1825	139	125.7	1940	193
Avery County, North Carolina	-0.76	1863	157	-1.31	1964	175	-0.91	1790	154	-1.26	1970	162	-0.71	1876	142	-0.86	1768	130	123.1	1850	174
Buncombe County, North Carolina	2.14	609	40	2.49	649	35	2.31	542	33	2.42	681	33	2.07	639	35	2.24	571	26	97	870	38
Burke County, North Carolina	-1.26	2131	208	-1.43	2013	184	-1.29	2001	184	-1.35	2005	166	-1.18	2086	173	-1.21	1982	164	120.2	1756	151.5
Caldwell County, North Carolina	-0.84	1903	163	-1.02	1829	153	-1.26	1986	181	-1.00	1853	141	-0.83	1933	148	-1.24	2001	168	119.1	1720	149
Cherokee County, North Carolina	-1.68	2327	251	-2.73	2481	265	-2.36	2549	270	-2.42	2384	246	-1.38	2169	192	-2.06	2408	222	157.6	2688	314
Clay County, North Carolina	0.95	982	56	0.25	1294	81	0.10	1224	82	0.34	1324	73	1.04	1001	51	0.19	1245	73	114.6	1559	120
Davie County, North Carolina	2.58	472	29	3.27	477	22	2.33	533	30	3.28	490	18	2.59	496	23	2.34	545	22	91.3	649	21
Forsyth County, North Carolina	2.47	504	33	3.55	418	17	3.39	346	12	3.23	496	19	2.15	618	34	3.07	392	13	93.4	723	29
Graham County, North Carolina	-1.06	2023	179	-1.87	2205	221	-0.73	1682	134	-1.98	2237	212	-1.17	2081	171	-0.84	1756	127	163.2	2751	322
Haywood County, North Carolina	0.23	1320	86	-0.02	1420	97	-0.30	1410	101	0.38	1299	72	0.63	1172	63	0.10	1292	80	110.3	1383	99
Henderson County, North Carolina	2.39	533	35	2.77	578	30	2.09	601	39	2.81	581	23	2.44	530	29	2.13	597	30	92.7	700	27
Jackson County, North Carolina	2.49	499	32	2.25	703	40	2.81	435	20	2.20	737	38	2.44	526	28	2.76	458	16	116.2	1629	129
Macon County, North Carolina	0.98	973	55	0.65	1134	67	0.58	1013	64	0.90	1093	58	1.23	932	48	0.83	995	54	112.1	1459	106
Madison County, North Carolina	-0.23	1563	115	-0.85	1759	138	-0.68	1641	125	-1.16	1927	153	-0.53	1787	129	-0.98	1849	144	128.2	2035	211
McDowell County, North Carolina	-0.73	1843	154	-1.39	1998	181	-1.46	2096	198	-1.17	1935	155	-0.51	1770	122	-1.24	1999	167	129.4	2071	218

Mitchell County, North Carolina	-1.39	2191	217	-2.20	2325	244	-2.09	2435	251	-2.19	2317	230	-1.38	2170	193	-2.08	2412	224	151.5	2597	299
Polk County, North Carolina	2.17	599	39	3.23	482	23	2.65	469	23	2.99	542	21	1.92	691	37	2.40	530	21	87.7	510	14
Rutherford County, North Carolina	-1.08	2035	184	-1.57	2077	196	-1.36	2042	189	-1.50	2054	172	-1.01	2015	164	-1.30	2026	171	142.2	2403	262
Stokes County, North Carolina	0.14	1367	96	-0.06	1437	99	-0.72	1674	133	0.07	1432	84	0.27	1357	81	-0.59	1631	113	104.2	1155	64
Surry County, North Carolina	-0.95	1970	174	-1.19	1908	167	-0.81	1722	140	-1.19	1940	156	-0.94	1987	158	-0.80	1737	123	123.1	1848	174
Swain County, North Carolina	0.07	1405	102	-0.75	1721	131	-0.40	1464	106	-0.49	1651	112	0.33	1327	78	-0.14	1410	87	158.3	2696	316
Transylvania County, North Carolina	0.68	1091	67	0.62	1146	68	0.26	1145	75	0.60	1216	66	0.66	1161	61	0.24	1215	70	117	1655	136
Watauga County, North Carolina	2.27	567	37	2.50	648	34	3.06	392	15	1.96	793	42	1.73	755	41	2.52	514	19	112.9	1496	110.5
Wilkes County, North Carolina	-0.94	1962	172	-0.89	1779	143	-0.89	1779	152	-0.99	1849	139	-1.04	2029	167	-0.99	1859	147	120.7	1773	155
Yadkin County, North Carolina	-0.42	1672	132	-0.63	1681	127	-0.57	1570	115	-0.55	1670	114	-0.34	1670	110	-0.49	1583	101	106.5	1232	71
Yancey County, North Carolina	-1.12	2050	186	-2.08	2288	238	-2.02	2396	241	-2.29	2346	239	-1.33	2149	188	-2.23	2466	237	150.8	2582	296
New York																					
Allegany County, New York	-1.16	2073	191	-1.95	2237	228	-1.69	2234	212	-1.81	2166	193	-1.03	2024	166	-1.56	2174	191	138.2	2312	249
Broome County, New York	0.06	1407	103	0.11	1354	90	0.01	1259	85	0.12	1401	80	0.07	1454	88	0.02	1324	83	111.6	1440	103.5
Cattaraugus County, New York	-0.93	1955	170	-1.14	1889	162	-1.03	1862	165	-1.09	1894	147	-0.87	1962	153	-0.98	1845	141	120.7	1772	155
Chautauqua County, New York	-0.80	1881	159	-1.25	1934	169	-1.25	1974	177	-1.11	1903	148	-0.66	1858	140	-1.11	1935	157	124.5	1897	184.5
Chemung County, New York	-1.02	1994	177	-1.09	1870	159	-0.95	1810	158	-1.04	1870	145	-0.97	1998	160	-0.90	1793	134	120.7	1771	155
Chenango County, New York	-0.70	1831	152	-0.97	1809	150	-1.41	2061	191	-0.86	1800	133	-0.59	1813	134	-1.29	2023	170	122.9	1842	171.5
Cortland County, New York	-0.31	1610	118	-0.64	1683	128	-0.69	1646	128	-0.49	1650	111	-0.16	1570	100	-0.54	1605	106	126.5	1971	199

Delaware County, New York	-0.63	1789	146	-0.82	1745	133	-0.97	1820	159	-0.73	1747	125	-0.54	1791	132	-0.88	1778	133	112.6	1482	108
Otsego County, New York	0.17	1352	93	0.02	1399	94	0.12	1216	80	-0.04	1476	89	0.11	1436	86	0.06	1309	81	118.1	1688	143
Schoharie County, New York	-0.19	1539	113	-0.23	1508	110	-0.62	1603	119	-0.13	1515	97	-0.09	1542	98	-0.52	1599	104	110.6	1399	100
Schuyler County, New York	0.18	1348	92	-0.09	1452	100	-0.68	1644	127	-0.03	1473	88	0.24	1374	83	-0.62	1646	114	122.2	1817	162.5
Steuben County, New York	-0.83	1895	162	-0.16	1480	105	-0.18	1347	94	-0.05	1481	90	-0.71	1877	143	-0.06	1364	85	120.8	1774	157
Tioga County, New York	0.83	1025	59	0.94	1036	62	0.17	1184	78	0.97	1072	56	0.86	1082	55	0.20	1240	72	99.3	984	46.5
Tompkins County, New York	3.53	293	12	3.89	371	12	4.55	217	8	2.61	627	27	2.24	591	32	3.26	362	11	108.8	1319	83.5
Ohio																					
Adams County, Ohio	-2.39	2579	292	-3.22	2611	295	-2.50	2606	287	-3.57	2660	300	-2.73	2642	297	-2.85	2700	295	166.6	2795	334.5
Ashtabula County, Ohio	-1.38	2186	216	-1.78	2173	215	-1.72	2249	214	-1.88	2193	201	-1.47	2223	208	-1.81	2311	207			
Athens County, Ohio	-1.75	2357	256	-2.49	2410	257	-0.20	1360	95	-2.98	2527	271	-2.24	2507	267	-0.69	1679	115	165.1	2775	328
Belmont County, Ohio	-1.85	2403	263	-2.29	2353	250	-2.26	2512	265	-2.33	2361	241	-1.89	2393	246	-2.30	2498	242	128.2	2034	211
Brown County, Ohio	-0.33	1620	122	-0.58	1666	125	-0.83	1732	143	-0.75	1758	127	-0.50	1758	120	-1.00	1863	149	118.8	1703	144.5
Carroll County, Ohio	-0.83	1894	161	-1.24	1931	168	-1.82	2297	223	-1.61	2091	180	-1.20	2093	174	-2.19	2452	234	121.7	1807	161
Clermont County, Ohio	2.87	402	19	3.77	388	14	2.79	447	21	3.59	432	14	2.70	462	19	2.61	495	18	83.8	366	8
Columbiana County, Ohio	-1.53	2248	227	-2.03	2269	233	-2.03	2404	245	-2.10	2295	227	-1.61	2283	223	-2.11	2421	227	122.8	1832	167.5
Coshocton County, Ohio	-1.13	2053	187	-1.54	2067	193	-1.91	2332	231	-1.94	2221	208	-1.53	2248	213	-2.31	2502	243	117.7	1678	140
Gallia County, Ohio	-2.77	2683	315	-3.15	2596	292	-1.87	2317	229	-3.37	2624	289	-3.00	2699	312	-2.09	2415	225	146.4	2494	279
Guernsey County, Ohio	-1.42	2209	221	-2.11	2294	239	-2.05	2412	247	-2.23	2324	232	-1.54	2251	214	-2.16	2443	230	140.4	2367	257
Harrison County, Ohio	-2.26	2538	280	-2.93	2529	276	-2.63	2657	297	-2.96	2522	269	-2.30	2527	272	-2.66	2638	280	131.1	2131	227
Highland County, Ohio	-0.38	1652	127	-0.66	1694	130	-0.83	1733	144	-0.80	1775	130	-0.52	1776	126	-0.96	1838	140	117.9	1683	141.5

Hocking County, Ohio	-1.36	2176	214	-1.89	2215	223	-1.75	2264	217	-2.00	2252	216	-1.47	2218	207	-1.86	2322	211	130.8	2122	225.5
Holmes County, Ohio	0.55	1153	71	0.13	1346	88	-0.58	1577	117	-0.67	1725	123	-0.25	1623	106	-1.38	2078	178	110	1373	95.5
Jackson County, Ohio	-1.58	2272	235	-2.34	2370	253	-2.01	2393	240	-2.66	2446	258	-1.90	2399	247	-2.33	2512	246	150.5	2576	293
Jefferson County, Ohio	-2.66	2654	311	-3.11	2583	289	-2.82	2722	318	-3.15	2570	279	-2.71	2638	294	-2.86	2704	297	133.7	2192	236
Lawrence County, Ohio	-2.63	2645	306	-3.42	2657	307	-2.33	2538	269	-3.52	2646	295	-2.74	2646	300	-2.43	2552	260	150	2566	292
Mahoning County, Ohio	-1.21	2099	199	-1.16	1897	165	-0.92	1794	155	-1.26	1966	160	-1.31	2144	186	-1.02	1880	152			
Meigs County, Ohio	-3.74	2892	366	-4.73	2897	366	-3.98	3002	379	-4.91	2892	358	-3.92	2885	356	-4.16	2995	376	180.7	2931	361
Monroe County, Ohio	-3.42	2832	349	-4.13	2803	340	-4.01	3007	381	-4.28	2802	336	-3.57	2832	343	-4.15	2992	375	144.9	2463	273.5
Morgan County, Ohio	-3.66	2880	360	-4.81	2903	369	-3.99	3004	380	-5.03	2906	363	-3.89	2881	353	-4.22	3001	379	167.1	2798	336
Muskingum County, Ohio	-1.56	2260	230	-1.93	2227	225	-1.72	2252	215	-2.01	2257	217	-1.64	2293	226	-1.80	2305	205	123.6	1870	178
Noble County, Ohio	-1.70	2333	252	-2.86	2509	271	-2.65	2667	299	-2.73	2465	260	-1.57	2263	218	-2.52	2588	267	148.2	2528	285.5
Perry County, Ohio	-1.67	2317	246	-2.52	2424	260	-2.58	2641	293	-2.66	2444	257	-1.80	2361	240	-2.71	2657	285	138.8	2327	253
Pike County, Ohio	-3.59	2865	357	-4.47	2854	354	-3.22	2839	342	-4.71	2864	350	-3.83	2873	352	-3.46	2854	338	167.6	2804	337
Ross County, Ohio	-1.21	2103	200	-1.59	2087	199	-1.80	2286	220	-1.68	2114	187	-1.30	2137	182	-1.89	2336	215	122.8	1835	167.5
Scioto County, Ohio	-3.45	2838	351	-4.28	2827	345	-3.40	2896	354	-4.19	2788	332	-3.37	2787	331	-3.31	2819	331	163	2749	321
Trumbull County, Ohio	-1.17	2081	195	-1.25	1937	170	-1.34	2030	187	-1.35	2004	165	-1.27	2119	177	-1.43	2110	185			
Tuscarawas County, Ohio	0.01	1442	105	-0.21	1502	109	-0.72	1669	131	-0.48	1647	110	-0.26	1627	107	-0.98	1848	143	107	1261	74.5
Vinton County, Ohio	-2.59	2634	303	-3.76	2728	321	-3.15	2816	337	-4.04	2753	322	-2.87	2666	305	-3.44	2846	335	171.5	2849	345
Washington County, Ohio	-0.24	1569	116	-0.34	1556	116	-0.60	1589	118	-0.30	1580	100	-0.20	1590	102	-0.56	1616	109	111.6	1443	103.5
Pennsylvania																					
Allegheny County, Pennsylvania	1.36	841	48	3.06	513	24	2.49	503	25	2.55	642	29	0.85	1088	57	1.99	637	38	90.4	610	18

Armstrong County, Pennsylvania	-1.68	2324	249	-1.67	2123	206	-1.99	2381	237	-1.99	2249	215	-2.00	2438	256	-2.32	2507	244	116.4	1634	130.5
Beaver County, Pennsylvania	-0.05	1471	109	0.04	1393	92	-0.79	1712	138	0.09	1420	82	-0.01	1506	93	-0.75	1715	120	104.6	1169	67
Bedford County, Pennsylvania	-1.23	2112	202	-1.72	2145	211	-2.12	2454	255	-2.09	2288	225	-1.60	2277	220	-2.49	2577	265	126.2	1961	196.5
Blair County, Pennsylvania	-0.68	1820	150	-0.84	1751	136	-1.05	1870	167	-1.15	1923	151	-0.99	2008	162	-1.36	2066	177	113.1	1503	112.5
Bradford County, Pennsylvania	-0.55	1738	142	-0.85	1760	139	-1.03	1864	166	-1.21	1949	158	-0.91	1975	157	-1.39	2085	180	109.9	1360	92
Butler County, Pennsylvania	2.43	513	34	3.29	472	21	2.28	548	34	2.92	556	22	2.07	640	36	1.91	662	39	91.9	675	24
Cambria County, Pennsylvania	-1.66	2313	244	-2.07	2283	237	-2.26	2513	266	-2.43	2389	247	-2.03	2449	257	-2.63	2622	276	125.3	1932	190.5
Cameron County, Pennsylvania	-1.60	2282	237	-1.89	2217	224	-2.38	2556	272	-2.27	2338	236	-1.98	2431	255	-2.76	2675	290	118.9	1710	146
Carbon County, Pennsylvania	-0.37	1642	125	-0.46	1608	121	-1.18	1934	173	-0.59	1686	117	-0.49	1757	119	-1.31	2034	174	109.3	1337	88.5
Centre County, Pennsylvania	2.58	473	30	2.96	533	25	2.90	423	19	1.76	848	47	1.38	871	44	1.70	721	44	115.6	1603	125.5
Clarion County, Pennsylvania	-1.17	2075	192	-1.36	1985	178	-1.13	1908	170	-1.98	2242	213	-1.79	2354	235	-1.76	2285	202	121.6	1801	160
Clearfield County, Pennsylvania	-1.41	2207	220	-1.86	2202	220	-1.83	2298	224	-2.28	2340	237	-1.84	2373	242	-2.25	2477	239	127.1	1992	201.5
Clinton County, Pennsylvania	-0.54	1734	140	-0.96	1803	148	-1.25	1978	179	-1.26	1967	161	-0.84	1943	151	-1.55	2170	190	131.5	2143	229
Columbia County, Pennsylvania	0.01	1446	107	-0.09	1454	101	-0.42	1473	107	-0.61	1696	120	-0.51	1772	123	-0.93	1810	136	117.4	1667	137
Crawford County, Pennsylvania	-0.79	1877	158	-1.26	1942	173	-1.42	2075	192	-1.71	2126	190	-1.24	2108	175	-1.87	2332	214	126.2	1957	196.5
Elk County, Pennsylvania	-0.37	1648	126	-0.28	1528	113	-1.17	1926	172	-0.43	1627	108	-0.52	1775	125	-1.31	2036	175	96.9	866	36.5
Erie County, Pennsylvania	0.25	1307	85	0.22	1308	82	0.10	1223	81	-0.24	1561	99	-0.21	1596	104	-0.36	1520	95	114.4	1552	119
Fayette County, Pennsylvania	-2.66	2653	310	-3.23	2613	296	-2.53	2617	290	-3.67	2684	306	-3.10	2715	315	-2.96	2727	304	143.5	2436	266.5
Forest County, Pennsylvania	-1.95	2439	268	-3.32	2633	302	-2.38	2554	271	-3.65	2679	303	-2.27	2521	270	-2.70	2652	283	179.6	2925	359
Fulton County, Pennsylvania	-0.29	1594	117	0.01	1407	95	-0.45	1489	111	-0.49	1655	113	-0.79	1912	147	-0.94	1823	138	107.1	1268	76

Greene County, Pennsylvania	-2.34	2562	287	-3.00	2556	282	-2.52	2614	289	-3.54	2650	296	-2.88	2668	306	-3.06	2758	315	138.7	2323	251.5
Huntingdon County, Pennsylvania	-0.90	1942	167	-1.45	2022	185	-1.93	2345	233	-2.07	2281	223	-1.53	2246	212	-2.56	2598	269	133.1	2177	235
Indiana County, Pennsylvania	-1.19	2089	198	-1.26	1941	172	-0.65	1621	120	-1.82	2171	194	-1.76	2343	232	-1.21	1986	165	129.5	2076	219.5
Jefferson County, Pennsylvania	-0.91	1947	168	-1.27	1948	174	-1.58	2178	205	-1.64	2099	184	-1.28	2121	179	-1.95	2368	218	119	1716	147.5
Juniata County, Pennsylvania	0.50	1177	76	0.49	1192	71	-0.58	1574	116	-0.05	1484	91	-0.03	1513	94	-1.11	1932	156	99.4	989	48
Lackawanna County, Pennsylvania	0.09	1391	99	0.39	1226	76	-0.01	1267	87	0.06	1441	85	-0.25	1619	105	-0.35	1513	93	102.6	1111	61
Lawrence County, Pennsylvania	-1.06	2021	178	-1.36	1986	179	-1.50	2123	201	-1.62	2092	181	-1.31	2143	185	-1.75	2278	201	119.5	1729	150
Luzerne County, Pennsylvania	-0.31	1612	119	-0.11	1463	102	-0.66	1635	122	-0.31	1586	101	-0.51	1773	124	-0.86	1770	131	109.2	1328	86.5
Lycoming County, Pennsylvania	-0.51	1721	138	-0.58	1663	124	-0.92	1799	157	-0.59	1689	118	-0.52	1782	128	-0.93	1809	135	110	1366	95.5
McKean County, Pennsylvania	-1.16	2070	190	-1.33	1976	176	-1.56	2167	204	-1.63	2095	183	-1.45	2203	204	-1.85	2321	210	116.6	1641	132.5
Mercer County, Pennsylvania	-0.39	1657	130	-0.63	1680	126	-1.26	1982	180	-0.99	1851	140	-0.76	1899	146	-1.62	2205	194	113.3	1510	114
Mifflin County, Pennsylvania	-1.17	2078	194	-1.73	2152	212	-1.93	2343	232	-2.33	2362	242	-1.77	2347	234	-2.52	2589	268	128.5	2047	214
Monroe County, Pennsylvania	3.19	348	15	3.33	466	20	2.37	520	27	3.11	528	20	2.97	394	13	2.14	595	29	99.5	996	49.5
Montour County, Pennsylvania	1.09	931	54	1.85	796	47	1.09	857	54	1.14	1031	52	0.38	1303	74	0.38	1160	65	89.3	573	16
Northumberland County, Pennsylvania	-1.15	2068	188	-1.40	2004	182	-1.76	2267	218	-1.85	2184	199	-1.60	2278	221	-2.21	2459	235	117.6	1673	138.5
Perry County, Pennsylvania	0.78	1048	62	0.96	1028	61	-0.09	1307	90	0.62	1203	65	0.44	1270	72	-0.42	1552	96	90.7	633	19
Pike County, Pennsylvania	3.21	343	13	3.35	463	19	2.32	537	31	3.32	478	16	3.18	353	12	2.29	558	24	94.1	751	30.5
Potter County, Pennsylvania	-1.63	2294	239	-1.52	2061	191	-1.54	2157	202	-1.69	2118	188	-1.79	2355	236	-1.71	2252	199	120.2	1755	151.5
Schuylkill County, Pennsylvania	-1.18	2083	197	-1.51	2055	189	-2.03	2398	243	-1.83	2176	196	-1.50	2239	211	-2.34	2516	250	114.3	1543	117.5

Snyder County, Pennsylvania	0.00	1447	108	-0.17	1484	106	-0.88	1770	150	-0.83	1787	131	-0.66	1854	139	-1.54	2167	189	100.4	1024	53
Somerset County, Pennsylvania	-1.01	1993	176	-1.51	2054	188	-2.11	2443	254	-1.97	2235	211	-1.48	2227	209	-2.57	2604	271	125.2	1927	189
Sullivan County, Pennsylvania	-1.18	2082	196	-1.77	2170	214	-2.17	2480	258	-2.01	2258	218	-1.42	2187	201	-2.42	2542	257	124.9	1914	187.5
Susquehanna County, Pennsylvania	-0.10	1494	111	-0.26	1519	112	-0.87	1760	148	-0.37	1609	106	-0.21	1594	103	-0.98	1847	142	116.7	1647	134
Tioga County, Pennsylvania	-0.87	1922	165	-1.52	2059	190	-1.63	2202	207	-1.70	2121	189	-1.04	2031	168	-1.81	2310	206	128	2026	208
Union County, Pennsylvania	-0.93	1960	171	-1.13	1886	161	-1.44	2087	195	-1.83	2177	197	-1.63	2287	224	-2.14	2435	228	102.1	1094	60
Venango County, Pennsylvania	-1.56	2263	232	-1.98	2247	229	-2.10	2436	252	-2.33	2363	243	-1.91	2405	248	-2.44	2560	261	124.3	1894	183
Warren County, Pennsylvania	-0.81	1889	160	-0.96	1802	147	-1.32	2016	186	-1.13	1913	149	-0.98	2002	161	-1.48	2133	186	109.1	1324	85
Washington County, Pennsylvania	0.69	1084	66	1.57	864	49	0.68	976	61	1.21	1004	49	0.34	1324	77	0.33	1176	66	98.5	947	43
Wayne County, Pennsylvania	0.64	1107	68	0.38	1233	77	-0.25	1383	97	0.28	1344	76	0.54	1220	68	-0.35	1516	94	106.6	1237	72
Westmoreland County, Pennsylvania	0.72	1075	65	1.29	936	53	0.39	1094	69	1.05	1058	55	0.48	1251	71	0.15	1267	75	96.9	868	36.5
Wyoming County, Pennsylvania	0.08	1396	100	0.00	1409	96	-0.67	1638	123	-0.16	1528	98	-0.08	1541	97	-0.84	1754	126	109.2	1330	86.5
South Carolina																					
Anderson County, South Carolina	0.28	1292	83	0.22	1309	83	0.00	1261	86	0.23	1368	77	0.29	1346	80	0.02	1326	84	114.3	1545	117.5
Cherokee County, South Carolina	-1.06	2025	180	-1.69	2133	207	-1.42	2078	193	-2.02	2259	219	-1.39	2173	194	-1.75	2277	200	140.8	2373	258
Greenville County, South Carolina	2.78	422	22	3.51	424	18	3.04	395	16	3.36	468	15	2.64	477	20	2.89	433	15	94.1	750	30.5
Oconee County, South Carolina	-0.20	1549	114	-0.13	1467	103	-0.32	1427	104	-0.33	1596	104	-0.41	1713	115	-0.53	1602	105	113.1	1504	112.5
Pickens County, South Carolina	0.35	1251	80	0.06	1383	91	0.27	1139	74	-0.10	1501	93	0.19	1401	84	0.11	1286	78	120.4	1763	153

Spartanburg County, South Carolina	0.56	1150	70	0.56	1166	69	0.33	1113	73	0.52	1241	69	0.51	1239	70	0.29	1192	68	116.9	1654	135
Tennessee																					
Anderson County, Tennessee	0.03	1429	104	0.19	1324	85	0.34	1110	72	-0.01	1468	87	-0.17	1577	101	0.15	1268	76	104	1150	62.5
Bledsoe County, Tennessee	-3.18	2783	336	-3.92	2756	332	-2.92	2750	324	-4.17	2779	330	-3.43	2800	335	-3.17	2785	323	145.4	2474	276
Blount County, Tennessee	1.76	708	43	1.82	806	48	1.32	805	51	1.80	838	46	1.74	751	40	1.30	823	48	91.8	674	22.5
Bradley County, Tennessee	0.42	1212	78	0.42	1212	73	0.51	1043	67	0.52	1242	70	0.52	1234	69	0.61	1068	60	104	1149	62.5
Campbell County, Tennessee	-3.62	2872	358	-4.53	2863	356	-3.12	2805	333	-4.91	2893	359	-4.00	2902	363	-3.50	2865	340	161.6	2735	318
Cannon County, Tennessee	-0.76	1856	156	-0.98	1810	151	-0.90	1780	153	-1.46	2044	170	-1.25	2110	176	-1.39	2082	179	107.2	1272	77
Carter County, Tennessee	-1.33	2163	212	-2.11	2297	240	-1.31	2014	185	-2.23	2327	234	-1.44	2201	203	-1.43	2107	184	141.3	2380	259
Claiborne County, Tennessee	-2.96	2730	325	-3.79	2736	325	-2.64	2661	298	-4.25	2794	334	-3.43	2798	334	-3.10	2766	316	154	2639	306.5
Clay County, Tennessee	-3.66	2879	359	-4.68	2890	364	-3.37	2887	349	-5.30	2931	373	-4.28	2935	374	-3.98	2963	366	164.9	2769	327
Cocke County, Tennessee	-3.46	2840	352	-4.59	2873	359	-2.75	2700	310	-4.89	2890	356	-3.76	2864	350	-3.05	2753	314	176.2	2901	355
Coffee County, Tennessee	0.78	1045	61	0.82	1068	66	0.67	981	62	0.59	1220	67	0.55	1213	66	0.44	1132	62	108.8	1316	83.5
Cumberland County, Tennessee	-0.49	1706	136	-1.05	1840	156	-0.74	1688	135	-1.24	1959	159	-0.68	1862	141	-0.94	1816	137	128.1	2029	209
DeKalb County, Tennessee	0.15	1361	94	-0.29	1536	114	0.06	1237	83	-0.83	1790	132	-0.39	1701	113	-0.48	1579	100	123.5	1868	177
Fentress County, Tennessee	-3.13	2771	332	-4.08	2791	338	-2.49	2604	286	-4.89	2889	355	-3.94	2888	358	-3.30	2818	330	171.6	2852	346
Franklin County, Tennessee	0.33	1263	81	-0.15	1478	104	-0.68	1642	126	-0.33	1591	103	0.15	1419	85	-0.86	1765	128	115.6	1604	125.5
Grainger County, Tennessee	-1.70	2335	253	-2.50	2416	258	-1.81	2295	222	-3.03	2541	275	-2.23	2504	266	-2.34	2515	249	151.1	2588	298
Greene County, Tennessee	-1.36	2177	215	-1.54	2068	194	-0.81	1718	139	-1.93	2217	207	-1.75	2341	230	-1.20	1976	162	130.1	2097	221.5
Grundy County, Tennessee	-4.29	2963	385	-5.30	2955	378	-3.39	2893	351	-5.94	2990	384	-4.94	2994	387	-4.04	2972	368	171.4	2848	344
Hamblen County, Tennessee	-0.59	1762	144	-0.85	1757	137	-0.56	1565	114	-0.99	1846	138	-0.73	1884	144	-0.70	1685	116	116.6	1642	132.5

Hamilton County, Tennessee	1.38	829	47	2.21	709	41	1.95	629	42	2.31	708	36	1.48	828	42	2.05	621	35	91.2	648	20
Hancock County, Tennessee	-5.81	3054	404	-7.59	3070	409	-4.85	3075	404	-8.28	3077	410	-6.50	3069	409	-5.53	3080	404	230.7	3081	404
Hawkins County, Tennessee	-1.07	2033	183	-1.66	2119	204	-1.45	2095	197	-1.89	2198	203	-1.31	2140	184	-1.69	2238	197	130.1	2098	221.5
Jackson County, Tennessee	-2.68	2660	313	-3.48	2672	311	-2.41	2570	275	-4.01	2745	318	-3.21	2746	321	-2.94	2721	302	148.1	2524	284
Jefferson County, Tennessee	0.10	1384	98	-0.50	1626	122	-0.13	1327	91	-0.65	1718	122	-0.05	1524	95	-0.29	1479	90	123.7	1876	180
Johnson County, Tennessee	-3.57	2860	356	-4.85	2907	370	-3.76	2962	370	-5.28	2929	372	-4.01	2904	364	-4.19	2998	377	195.8	2995	378.5
Knox County, Tennessee	2.82	411	21	3.63	407	16	3.26	361	13	3.28	488	17	2.47	521	27	2.91	431	14	89.5	580	17
Lawrence County, Tennessee	-2.36	2572	290	-3.26	2623	299	-3.08	2791	330	-3.63	2675	301	-2.73	2643	298	-3.45	2850	336			
Lewis County, Tennessee	-1.89	2413	264	-2.94	2532	277	-2.49	2603	285	-3.01	2533	273	-1.96	2424	253	-2.56	2599	270			
Loudon County, Tennessee	1.79	699	42	2.20	712	42	1.55	733	47	2.16	753	39	1.75	744	39	1.51	767	45	94.2	757	32
Macon County, Tennessee	-1.11	2048	185	-1.64	2099	200	-1.08	1884	168	-1.99	2244	214	-1.46	2212	206	-1.43	2106	183	130.3	2105	223
Marion County, Tennessee	-1.17	2077	193	-1.47	2034	186	-1.65	2208	208	-1.59	2086	178	-1.29	2129	181	-1.76	2288	203	125.9	1950	194
McMinn County, Tennessee	-1.26	2129	207	-1.69	2134	208	-1.21	1950	174	-1.87	2192	200	-1.44	2196	202	-1.39	2088	181	134.4	2207	239
Meigs County, Tennessee	-2.31	2551	283	-3.03	2563	284	-2.10	2439	253	-3.33	2608	284	-2.60	2616	288	-2.40	2537	255	154.7	2646	308
Monroe County, Tennessee	-0.60	1773	145	-1.25	1938	171	-0.92	1796	156	-1.53	2068	174	-0.88	1964	154	-1.19	1975	161	145.3	2469	275
Morgan County, Tennessee	-3.51	2852	355	-4.53	2861	355	-3.52	2925	361	-4.91	2891	357	-3.90	2883	354	-3.90	2948	361	164.4	2765	325.5
Overton County, Tennessee	-1.89	2418	265	-2.85	2508	270	-2.06	2420	248	-3.56	2654	297	-2.60	2615	287	-2.77	2680	291	138.4	2318	250
Pickett County, Tennessee	-3.18	2784	337	-4.42	2849	351	-3.92	2997	378	-4.91	2894	360	-3.68	2856	348	-4.42	3023	383	175.5	2894	353
Polk County, Tennessee	-1.65	2306	242	-2.26	2341	248	-2.21	2496	260	-2.55	2410	250	-1.94	2421	251	-2.50	2579	266	127.4	2007	205
Putnam County, Tennessee	0.22	1329	89	-0.05	1434	98	0.99	881	57	-0.62	1701	121	-0.34	1672	111	0.43	1136	63	117.6	1674	138.5
Rhea County, Tennessee	-1.92	2430	266	-2.68	2463	262	-2.21	2499	262	-2.69	2457	259	-1.94	2418	250	-2.23	2467	238	132.2	2163	233

Roane County, Tennessee	-0.55	1737	141	-0.66	1689	129	-0.51	1526	113	-0.72	1742	124	-0.62	1827	135	-0.58	1624	112	115.8	1612	127
Scott County, Tennessee	-3.11	2769	331	-4.37	2844	349	-3.41	2899	355	-4.83	2880	353	-3.57	2833	344	-3.87	2947	360	187.3	2966	370
Sequatchie County, Tennessee	-0.32	1618	121	-0.83	1749	134	-0.24	1380	96	-1.16	1930	154	-0.65	1851	138	-0.57	1621	111	131.2	2134	228
Sevier County, Tennessee	2.26	569	38	2.48	651	36	2.09	600	38	2.44	672	32	2.23	597	33	2.06	618	34	104.7	1174	68
Smith County, Tennessee	0.01	1443	106	-0.17	1485	107	-0.43	1482	110	-0.60	1692	119	-0.42	1718	116	-0.86	1767	129	118.8	1708	144.5
Sullivan County, Tennessee	-0.43	1678	134	-0.30	1540	115	-0.32	1426	103	-0.42	1622	107	-0.54	1789	131	-0.43	1557	97	107.3	1276	78
Unicoi County, Tennessee	-1.68	2326	250	-2.26	2340	247	-2.07	2422	249	-2.38	2377	245	-1.80	2360	239	-2.19	2448	231	127.9	2023	206.5
Union County, Tennessee	-1.94	2436	267	-2.84	2503	268	-1.78	2273	219	-3.21	2582	281	-2.31	2534	273	-2.15	2440	229	147.6	2512	282
Van Buren County, Tennessee	-2.84	2695	318	-3.37	2647	304	-2.71	2684	308	-4.14	2771	327	-3.60	2839	345	-3.48	2862	339	137.2	2292	247
Warren County, Tennessee	-1.63	2298	241	-2.26	2343	249	-2.02	2397	242	-2.58	2417	251	-1.95	2422	252	-2.35	2520	251	128.8	2055	216
Washington County, Tennessee	1.10	927	53	1.13	977	55	1.49	752	49	0.89	1096	59	0.85	1087	56	1.24	843	50	112.2	1462	107
White County, Tennessee	-2.23	2530	278	-3.25	2620	297	-2.67	2675	301	-3.56	2656	298	-2.54	2598	284	-2.99	2734	305	142.3	2405	263
Virginia																					
Alleghany + Covington + Clifton Forge, Virginia	-3.01	2744	328	-3.49	2673	312	-3.89	2995	377	-3.43	2634	291	-2.95	2689	309	-3.83	2939	357	108	1297	80.5
Bath, Virginia	0.73	1069	64	1.19	958	54	0.13	1210	79	1.17	1018	50	0.71	1143	58	0.11	1289	79	84.1	380	9
Bland, Virginia	-1.52	2245	226	-2.21	2329	245	-2.47	2594	283	-2.07	2283	224	-1.39	2175	196	-2.33	2513	247	122.8	1833	167.5
Botetourt, Virginia	2.77	426	23	3.74	396	15	2.31	541	32	3.77	396	11	2.79	440	18	2.34	548	23	68.2	100	3
Buchanan, Virginia	-5.40	3041	399	-6.40	3038	397	-5.34	3088	412	-6.77	3038	396	-5.78	3045	398	-5.72	3087	410	166.6	2794	334.5
Carroll + Galax, Virginia	-2.37	2575	291	-3.10	2582	288	-3.15	2811	335	-3.28	2595	282	-2.55	2601	285	-3.32	2820	332	128.2	2037	211
Craig, Virginia	-0.14	1512	112	-0.23	1511	111	-1.01	1844	162	-0.45	1635	109	-0.36	1680	112	-1.22	1994	166	96.3	838	34.5
Dickenson, Virginia	-4.78	3003	391	-6.03	3014	392	-5.03	3079	406	-6.35	3014	388	-5.11	3007	388	-5.36	3075	401	191.6	2986	374

Floyd, Virginia	0.08	1399	101	-0.42	1594	119	-0.78	1704	137	-0.77	1766	129	-0.28	1639	109	-1.13	1945	158	107	1263	74.5
Giles, Virginia	-0.32	1617	120	-0.88	1774	142	-1.48	2115	199	-1.03	1864	143	-0.47	1745	118	-1.63	2211	195	110.7	1408	101
Grayson, Virginia	-3.18	2785	338	-4.10	2795	339	-3.70	2956	367	-4.37	2818	341	-3.46	2807	337	-3.98	2961	364	134.5	2209	240
Henry + Martinsville, Virginia	-3.27	2798	339	-3.81	2739	326	-3.51	2920	360	-3.82	2705	312	-3.28	2766	324	-3.52	2873	341			
Highland, Virginia	-1.43	2214	222	-1.56	2074	195	-1.93	2346	234	-1.62	2093	182	-1.49	2232	210	-1.99	2384	219	99.8	1004	51
Lee, Virginia	-3.79	2902	370	-4.79	2899	367	-3.54	2930	363	-5.06	2910	366	-4.06	2915	368	-3.81	2934	354	164.4	2767	325.5
Montgomery + Radford, Virginia	0.74	1067	63	0.42	1214	74	1.46	764	50	-0.32	1590	102	0.00	1504	92	0.72	1030	57	135.7	2247	242
Patrick, Virginia	-1.72	2340	254	-2.69	2468	263	-2.71	2682	306	-2.90	2506	266	-1.93	2413	249	-2.92	2718	301			
Pulaski, Virginia	-0.85	1910	164	-0.86	1764	140	-1.02	1852	163	-0.55	1671	115	-0.55	1796	133	-0.72	1692	118	115.3	1591	124
Rockbridge + Buena Vista + Lexington, Virginia	-0.96	1973	175	-0.95	1801	146	-1.25	1975	178	-1.56	2080	177	-1.56	2258	216	-1.85	2320	209	99	972	45
Russell, Virginia	-3.27	2801	340	-4.30	2834	347	-3.77	2967	373	-4.48	2827	344	-3.45	2805	336	-3.96	2958	363	143.5	2435	266.5
Scott, Virginia	-3.02	2747	330	-3.87	2746	328	-3.39	2895	353	-4.16	2776	329	-3.30	2777	327	-3.68	2907	347	139	2332	254
Smyth, Virginia	-2.13	2501	275	-2.72	2479	264	-2.41	2567	274	-2.81	2490	261	-2.21	2499	265	-2.49	2576	264	131.6	2149	230.5
Tazewell, Virginia	-2.34	2561	286	-2.84	2505	269	-2.41	2571	276	-2.86	2497	262	-2.36	2550	275	-2.43	2549	259	128.9	2061	217
Washington + Bristol, Virginia	-1.57	2270	234	-1.65	2107	201	-1.56	2165	203	-1.68	2113	186	-1.60	2280	222	-1.59	2187	192	109.3	1332	88.5
Wise + Norton, Virginia	-3.15	2774	333	-3.88	2749	329	-2.85	2731	320	-4.02	2747	320	-3.28	2768	325	-2.99	2740	309	150.7	2580	294.5
Wythe, Virginia	0.27	1299	84	-0.18	1490	108	-0.65	1625	121	-0.10	1504	94	0.35	1318	76	-0.57	1620	110	115.2	1588	123
West Virginia																					
Barbour County, West Virginia	-3.36	2821	344	-4.29	2831	346	-3.01	2776	327	-4.89	2888	354	-3.96	2891	360	-3.61	2894	344	169.7	2828	341
Berkeley County, West Virginia	2.67	456	28	2.80	568	28	1.99	623	41	2.51	656	30	2.38	542	31	1.71	711	43	99.5	997	49.5

Boone County, West Virginia	-3.73	2890	364	-4.59	2871	358	-4.09	3016	383	-5.01	2904	361	-4.15	2920	369	-4.51	3032	386	162.6	2745	319
Braxton County, West Virginia	-3.48	2845	353	-4.63	2880	361	-3.48	2915	359	-5.17	2920	370	-4.02	2909	366	-4.02	2968	367	176.5	2906	357
Brooke County, West Virginia	-1.67	2320	248	-2.01	2264	232	-2.48	2598	284	-2.14	2305	228	-1.80	2359	238	-2.61	2613	273	117.9	1682	141.5
Cabell County, West Virginia	-1.06	2026	181	-1.15	1892	163	-0.48	1504	112	-1.40	2025	167	-1.31	2146	187	-0.73	1697	119	127.3	2001	203.5
Calhoun County, West Virginia	-4.46	2981	387	-5.82	2998	388	-4.70	3066	400	-6.58	3024	392	-5.22	3015	391	-5.45	3078	403	215.8	3056	394
Clay County, West Virginia	-4.91	3013	393	-6.35	3036	396	-4.96	3078	405	-7.13	3054	401	-5.68	3039	397	-5.73	3091	413	218.1	3062	397
Doddridge County, West Virginia	-2.85	2698	319	-3.65	2715	319	-3.22	2838	341	-4.11	2766	325	-3.31	2778	328	-3.68	2909	348	153.2	2629	304
Fayette County, West Virginia	-4.22	2950	381	-5.17	2943	376	-3.76	2963	371	-5.55	2954	376	-4.60	2965	381	-4.14	2990	374	169.1	2821	339
Gilmer County, West Virginia	-2.60	2639	304	-3.40	2650	306	-2.17	2475	257	-4.03	2752	321	-3.24	2756	323	-2.80	2689	293	171.2	2845	343
Grant County, West Virginia	-1.44	2216	223	-2.00	2253	230	-2.03	2406	246	-2.62	2428	253	-2.06	2459	260	-2.65	2632	279	135.9	2255	243
Greenbrier County, West Virginia	-2.02	2456	269	-2.41	2396	254	-1.97	2362	236	-2.86	2499	263	-2.47	2580	282	-2.42	2541	256	138.7	2322	251.5
Hampshire County, West Virginia	-0.74	1850	155	-1.47	2037	187	-1.28	1999	183	-2.06	2277	221	-1.33	2151	189	-1.87	2330	213	130.6	2117	224
Hancock County, West Virginia	-1.83	2394	260	-2.22	2333	246	-2.61	2648	294	-2.23	2325	233	-1.83	2370	241	-2.61	2618	275	116	1619	128
Hardy County, West Virginia	0.14	1365	95	-0.35	1560	117	-0.70	1658	130	-0.75	1759	128	-0.26	1631	108	-1.11	1931	155	112.8	1491	109
Harrison County, West Virginia	-1.74	2354	255	-1.57	2078	197	-0.98	1824	160	-1.88	2194	202	-2.05	2457	259	-1.29	2019	169	123.1	1846	174
Jackson County, West Virginia	-1.66	2312	243	-2.31	2360	251	-2.22	2500	263	-2.29	2343	238	-1.63	2291	225	-2.19	2451	233	140.3	2362	256
Jefferson County, West Virginia	3.21	344	14	4.12	338	10	3.03	398	17	3.72	406	12	2.81	435	17	2.62	491	17	84.3	387	10
Kanawha County, West Virginia	-0.39	1654	129	0.41	1218	75	0.23	1164	77	0.04	1449	86	-0.75	1896	145	-0.14	1412	88	104.3	1159	65
Lewis County, West Virginia	-2.56	2629	302	-3.08	2575	287	-2.51	2607	288	-3.56	2658	299	-3.04	2703	313	-2.99	2737	307	149.2	2555	289

Lincoln County, West Virginia	-4.90	3011	392	-6.00	3013	391	-4.38	3047	393	-6.45	3019	390	-5.34	3023	393	-4.83	3059	396	195.9	2997	380
Logan County, West Virginia	-4.96	3016	395	-5.69	2990	386	-4.55	3058	397	-5.91	2986	383	-5.18	3010	389	-4.78	3054	394	172.1	2858	347
Marion County, West Virginia	-1.25	2128	206	-1.38	1992	180	-1.24	1966	176	-1.54	2074	176	-1.42	2184	200	-1.40	2095	182	123.7	1875	180
Marshall County, West Virginia	-2.65	2650	308	-2.87	2511	272	-2.63	2656	296	-2.88	2501	264	-2.66	2629	292	-2.64	2628	278	133.8	2196	237
Mason County, West Virginia	-3.16	2777	334	-3.97	2769	334	-3.52	2926	362	-4.28	2801	335	-3.47	2808	338	-3.83	2938	356	170.4	2835	342
McDowell County, West Virginia	-8.82	3100	420	-10.45	3101	420	-7.30	3102	420	-11.17	3102	420	-9.55	3102	420	-8.03	3102	420	271.6	3100	410
Mercer County, West Virginia	-3.28	2802	341	-3.88	2750	330	-2.81	2721	317	-4.08	2759	323	-3.47	2810	339	-3.01	2744	312	142.7	2415	264
Mineral County, West Virginia	-1.24	2123	205	-1.76	2161	213	-1.70	2236	213	-1.92	2211	205	-1.40	2180	198	-1.86	2323	212	133.9	2198	238
Mingo County, West Virginia	-6.08	3065	409	-6.97	3054	404	-5.40	3090	413	-7.24	3058	405	-6.35	3064	407	-5.67	3086	409	202.5	3015	384
Monongalia County, West Virginia	2.27	565	36	2.75	581	31	2.96	412	18	1.81	835	45	1.32	896	45	2.01	635	37	123.4	1859	176
Monroe County, West Virginia	-2.35	2568	289	-3.27	2625	300	-3.32	2874	347	-3.65	2680	304	-2.74	2645	299	-3.70	2916	349	137.3	2295	248
Morgan County, West Virginia	-0.08	1482	110	0.34	1253	80	-0.34	1436	105	-0.08	1495	92	-0.51	1766	121	-0.76	1722	121	97.2	887	39
Nicholas County, West Virginia	-3.16	2778	335	-3.92	2759	333	-3.32	2873	346	-4.42	2822	343	-3.66	2847	347	-3.81	2935	355	153.9	2636	305
Ohio County, West Virginia	-0.88	1929	166	-0.35	1564	118	-0.07	1294	89	-0.75	1756	126	-1.27	2120	178	-0.47	1569	99	111.8	1447	105
Pendleton County, West Virginia	-1.39	2193	218	-1.80	2183	216	-2.01	2391	239	-2.25	2333	235	-1.85	2376	243	-2.46	2566	262	110	1371	95.5
Pleasants County, West Virginia	-2.07	2477	272	-2.43	2401	255	-2.71	2681	305	-2.64	2439	256	-2.28	2522	271	-2.92	2717	300	127.1	1991	201.5
Pocahontas County, West Virginia	-2.46	2599	297	-3.22	2610	294	-3.12	2806	334	-3.73	2694	308	-2.98	2695	310	-3.64	2900	345	144.3	2448	269
Preston County, West Virginia	-1.29	2144	210	-1.81	2186	217	-1.59	2182	206	-2.32	2358	240	-1.80	2358	237	-2.10	2417	226	141.9	2388	260
Putnam County, West Virginia	1.56	772	44	2.06	742	45	1.27	818	52	1.93	804	44	1.42	858	43	1.14	876	51	92.4	689	26

Raleigh County, West Virginia	-2.27	2539	281	-2.50	2417	259	-2.25	2510	264	-2.63	2434	255	-2.40	2562	278	-2.37	2531	253	136.4	2269	245
Randolph County, West Virginia	-2.08	2481	273	-2.48	2409	256	-1.84	2306	225	-3.00	2532	272	-2.61	2618	289	-2.36	2528	252	139.1	2333	255
Ritchie County, West Virginia	-2.46	2598	296	-3.03	2565	285	-2.71	2683	307	-3.02	2538	274	-2.45	2576	280	-2.71	2654	284	156.5	2669	312
Roane County, West Virginia	-4.23	2952	383	-5.34	2963	380	-4.11	3019	384	-5.81	2981	381	-4.69	2972	384	-4.58	3038	388	185.8	2958	367
Summers County, West Virginia	-4.68	2995	389	-6.09	3019	394	-4.55	3057	396	-6.66	3033	394	-5.25	3018	392	-5.12	3071	399	194.8	2991	376
Taylor County, West Virginia	-2.32	2559	284	-3.12	2586	291	-2.66	2671	300	-3.47	2640	294	-2.67	2632	293	-3.01	2743	311	151.9	2610	301.5
Tucker County, West Virginia	-3.01	2745	329	-3.68	2716	320	-3.47	2913	358	-4.15	2774	328	-3.48	2815	341	-3.95	2956	362	151	2587	297
Tyler County, West Virginia	-3.81	2907	371	-4.71	2893	365	-4.13	3023	386	-4.66	2857	349	-3.76	2868	351	-4.09	2983	371	148.8	2540	287
Upshur County, West Virginia	-2.07	2476	271	-2.80	2491	266	-1.97	2360	235	-3.44	2639	293	-2.71	2641	296	-2.61	2614	274	154	2638	306.5
Wayne County, West Virginia	-2.89	2709	322	-3.52	2682	313	-2.69	2678	303	-3.78	2703	311	-3.15	2732	319	-2.95	2724	303	146.7	2496	280
Webster County, West Virginia	-5.19	3031	398	-6.47	3040	398	-4.85	3074	403	-7.16	3056	403	-5.88	3053	402	-5.54	3081	405	214.4	3055	393
Wetzel County, West Virginia	-3.44	2836	350	-4.04	2779	335	-3.83	2983	375	-4.29	2804	337	-3.69	2858	349	-4.08	2981	370	156.9	2676	313
Wirt County, West Virginia	-2.53	2616	300	-3.77	2731	322	-3.20	2829	340	-4.17	2783	331	-2.93	2681	308	-3.60	2891	343	172.4	2863	348
Wood County, West Virginia	-1.22	2108	201	-1.35	1982	177	-1.14	1914	171	-1.19	1944	157	-1.07	2045	169	-0.99	1854	146	116.4	1637	130.5
Wyoming County, West Virginia	-5.63	3049	402	-6.58	3046	401	-5.24	3084	410	-7.08	3050	399	-6.12	3060	404	-5.73	3089	412	184	2948	364

Notes: For each of the six Candidate Indexes, the table shows the Z-score for each ARC region county and the county's relative ranking among the 420 ARC counties and the relative ranking among the 3,102 U.S. counties. The final three columns provide the underlying data and rankings for the FY2007 ARC Distress Index. See Sections 3 and 4 for more details of the construction of the Candidate Index. Details of the ARC Distress Indicator can be found at www.arc.gov.

Table A.7: Distressed Counties in the ARC States, by Index

			Index 4.1	Index 4.2	Index 4.3	Index 4.4	Index 4.5	Index 4.6
	ARC '10	ARC '07	Population change 96-06, Employment/population ratio 07, Percent of adults with a four-year college degree 00, Poverty Rate 07	Population change 96-06, Employment/population ratio 07, Percent of adults with a four-year college degree 00, Poverty Rate 07, Per-capita market income 06	Population change 96-06, Employment/population ratio 07, Percent of adults with a four-year college degree 00, Per-capita market income 06	Population change 96-06, Employment/population ratio 07, Percent of adults with at least one year of college education 00, Poverty Rate 07, Per-capita market income 06	Population change 96-06, Employment/population ratio 07, Percent of adults with at least one year of college education 00, Poverty Rate 07, Per-capita market income 06	Population change 96-06, Employment/population ratio 07, Percent of adults with at least one year of college education 00, Per-capita market income 06
Alabama	2	3	5	4	4	4	3	3
Georgia	0	0	0	0	1	0	0	1
Kentucky	40	34	32	33	31	36	34	33
Maryland	0	0	0	0	0	0	0	0
Mississippi	12	9	11	11	9	9	9	9
New York	0	0	0	0	0	0	0	0
North Carolina	0	0	0	0	0	0	0	0
Ohio	6	3	5	5	6	4	4	6
Pennsylvania	1	1	0	0	0	0	0	0
South Carolina	0	0	0	0	0	0	0	0
Tennessee	9	7	7	9	8	11	13	11
Virginia	1	1	5	5	9	5	5	9
West Virginia	11	16	17	15	22	18	20	23
Total	82	74	82	82	90	87	88	95

NOTE: The table shows number of counties for each ARC state that is categorized as distressed using the ARC Distress Index for FY2007 and FY2010, as well as the number resulting from each of the six Candidate Indexes.