

**THE UPSKILLING OF APPALACHIA:  
EARNINGS AND THE IMPROVEMENT OF SKILL  
LEVELS, 1960 TO 2000**

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When President Lyndon B. Johnson signed the Appalachian Regional Development Act in 1965 (creating the Appalachian Regional Commission), Appalachia was economically distressed—particularly when compared with the rest of the United States. Per capita income in the region was \$1,267 in 1960, 77 percent of the national average. Nearly one-third (31 percent) of Appalachian residents lived below the federal poverty line, compared with just over one-fifth (22 percent) of all Americans.<sup>1</sup> Labor force and employment levels in Appalachia also compared unfavorably with those in the rest of the United States.

The results of the most recent decennial census, however, show that, economically, Appalachia more closely resembles the rest of the United States than it did in 1964. For example:

- Per capita income in 1999 was \$18,200, 84 percent of the national average of \$21,600.<sup>2</sup> In 14 of the 410 Appalachian counties, per capita income exceeded the national average.
- At 13.6 percent, Appalachia's poverty rate in the 2000 Census is less than half its level 40 years earlier. Moreover, the rate is just 1.3 percentage points higher than in the rest of the United States.
- Appalachia's labor force participation rate in 2000 was 67 percent for men and 53 percent for women—only slightly less than the rates outside the region (71 percent and 58 percent, respectively). And the 2000 Census found that 5.8 percent of Appalachia's civilian labor force was unemployed, almost identical to the 5.7 percent rate in the rest of the country.

- The typical Appalachian county had a median household income (\$32,500) that was 89 percent of the median for the typical U.S. county.<sup>3</sup>

Although Appalachia still lags behind the rest of the United States, its economy has grown faster than that of the country as a whole. What this report will do is twofold. First, it will examine the convergence between Appalachia's economic fortunes and those in rest of the country since 1960, particularly among men and women of prime working age (ages 25 to 64). Second, it will examine the effect that a variety of social and demographic factors (including such critical measures as age and education) have had on this convergence. By doing the latter, this report hopes to shed some light on the degree that rising relative skills among Appalachia's adult population helped increase the relative prosperity of Appalachian families.

### **Appalachia and the Decennial Census**

As in many previous reports,<sup>4</sup> we use the definition of Appalachia adopted by the Appalachian Regional Commission (ARC), a federal-state government partnership designed to improve conditions in the Appalachia. The 410-county ARC region covers all of West Virginia and parts of New York, Pennsylvania, Ohio, Maryland, Virginia, the Carolinas, Tennessee, Kentucky, Georgia, Alabama, and Mississippi. In addition to examining the entire region, we will analyze convergence levels and patterns in Appalachia's three subregions: (1) northern Appalachia (from southern New York state through most of West Virginia); (2) central Appalachia (southern West Virginia, eastern Kentucky, and part of Appalachian Virginia and Tennessee); and (3) southern Appalachia (from southwestern Virginia southward).<sup>5</sup>

The data in this report come from the long forms of the U.S. decennial censuses from 1960 through 2000. We begin with the 1960 Census because it captured the conditions that ultimately led President Johnson to sign the bill forming the ARC. Since 1970, the U.S. Census Bureau has

tabulated county-level statistics on various measures of housing and consumption and made these publicly available in electronic form. Two reasons, however, prevent us from using these files for this analysis: 1) the files do not measure the same statistics consistently over time; and 2) no such public statistics are available for the 1960 data. As a result, we accessed data from the Census Bureau's internal long-form data files from 1960 to 2000. These data include 25 percent of all U.S. households in 1960, 20 percent of households in 1970, and 17 percent of households in the remaining three census years. All tabulations in this report were done within the Census Bureau using special sworn status and have been cleared for public release through the Bureau's Disclosure Review Committee.

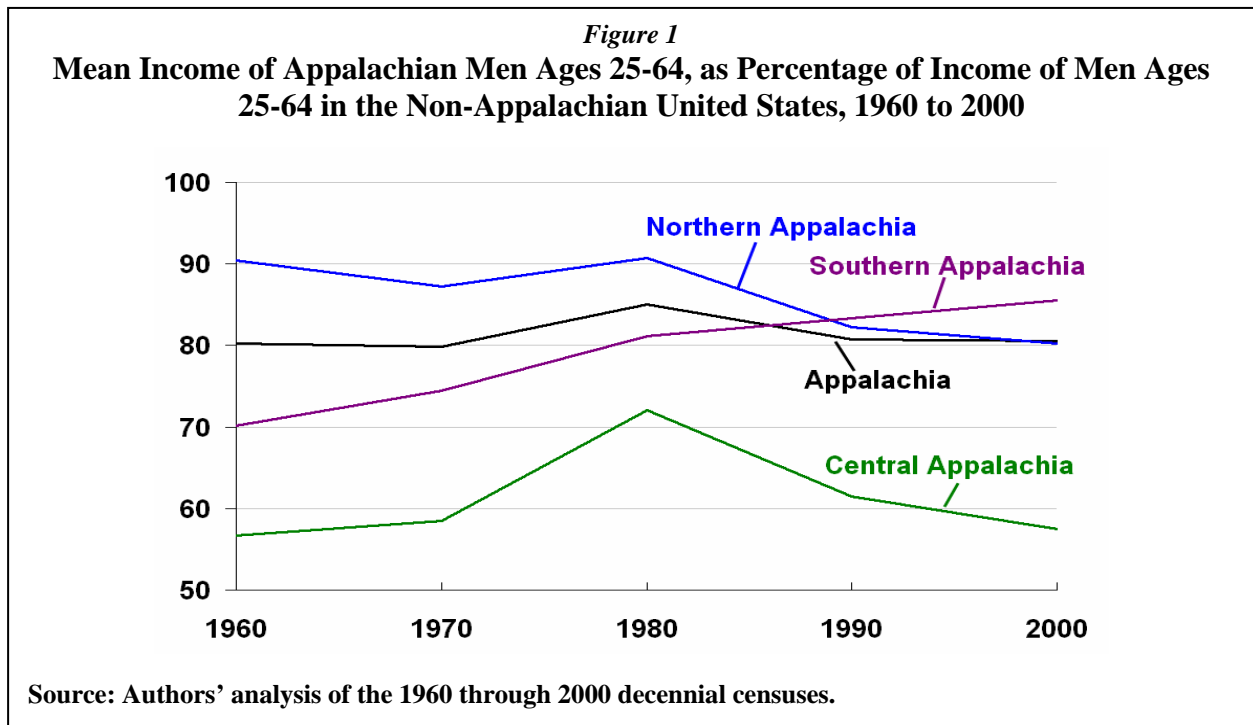
The focus of this report will be men and women ages 25 to 64—the ages of prime working life. We will examine two economic measures—mean income and year-round employment.

### **Income and Year-Round Employment, 1960 to 2000**

*Income.* At first glance, the last 40 years of the 20th century showed little convergence between the average incomes of working-age men in Appalachia and their counterparts in the rest of the country. Appalachian men between ages 25 and 64 earned, on average, 81 percent of the incomes of men outside the region in 2000 (\$38,600 to \$47,900, in 2006 dollars), compared with 80 percent in 1960 (\$28,500 to \$35,500).

But this masks two stories: a convergence of incomes between 1960 and 1980 and divergence afterward (see Figure 1, page 4). In 1980, men's mean income in Appalachia was \$35,600, which was 85 percent of the \$41,800 for men outside the region that year.<sup>6</sup> This convergence coincided with several factors. First, Appalachia's economy began a long-term diversification, undergoing strong growth in services and retail employment, steady growth in

governmental employment, and a restructuring in manufacturing employment, which yielded better-paying jobs in durable goods. Second, Appalachia benefited from the nationwide trend in the 1970s of new population growth in intermediate-size cities and rural areas.<sup>7</sup> And on a lesser scale, central Appalachia benefited from the boom in the coal industry in during the 1960s and 1970s. Similarly, the post-1980 divergence in men’s income coincided with the 1980s population contraction in northern and central Appalachia as mining and manufacturing suffered economic downturns. (Income for Appalachian men, even when adjusted for inflation, continued to rise in the 1980s and 1990s—particularly as Appalachia benefited from the national economic expansion in the 1990s and the continued restructuring of the regional economy. But the income for men outside the region rose even faster during those decades.)



Among the subregions, central Appalachia followed the above pattern. Between 1960 and 1980, the average income of central Appalachian men ages 25 to 64 rose from 57 percent to 72

percent of that for non-Appalachian men. By 2000, however, central Appalachian men were earning just 58 percent as much as men outside the Appalachian region—almost the same proportion as in 1960. In fact, the average income for central Appalachian men actually *fell* 9 percent between 1980 and 2000, after accounting for inflation.

In contrast, both northern and southern Appalachia took different paths. Mean incomes for men in northern Appalachia were about 90 percent of the mean for men outside Appalachia between 1960 and 1980, then fell to about 80 percent by 2000. Meanwhile, incomes of men in southern Appalachia (which continued its demographic and economic boom after 1980) have converged with those of men outside Appalachia over the past 40 years—from 70 percent in 1960, to 81 percent in 1980, to 86 percent in 2000.

Appalachian women's incomes moved closed to women in the rest of the country. In 1960, the mean income of Appalachian women ages 25 to 64 (\$5,400 in 2006 dollars) was 74 percent of the mean income of non-Appalachian women of the same age (\$7,300 in 2006 dollars). In 2000, Appalachian women were earning 78 percent of the average income of women outside the region (\$19,200 to \$24,600, respectively). As with the men, this convergence occurred mainly during the 1960s and 1970s. The income gap widened in the 1980s, then narrowed slightly in the 1990s.

Within Appalachia, however, women experienced different income trends than did men. In central Appalachia, for example, the income gap between central Appalachian women and women outside Appalachia closed from 44 percent in 1960 to 57 percent in 1980, but the trend did not worsen after 1980, instead leveling off to 55 percent in 2000. Meanwhile, women in northern Appalachia took home, on average, 77 percent of the income for non-Appalachian women in 2000, about the same as in 1960 (and slightly better than in 1980). And southern

Appalachian women (unlike the men) did not continue to close the income gap with their counterparts outside Appalachia after 1980; the 2000 income disparity rate (83 percent) was slightly worse than it was in 1980 (87 percent)—although it was still an improvement over the 1960 rate (77 percent).

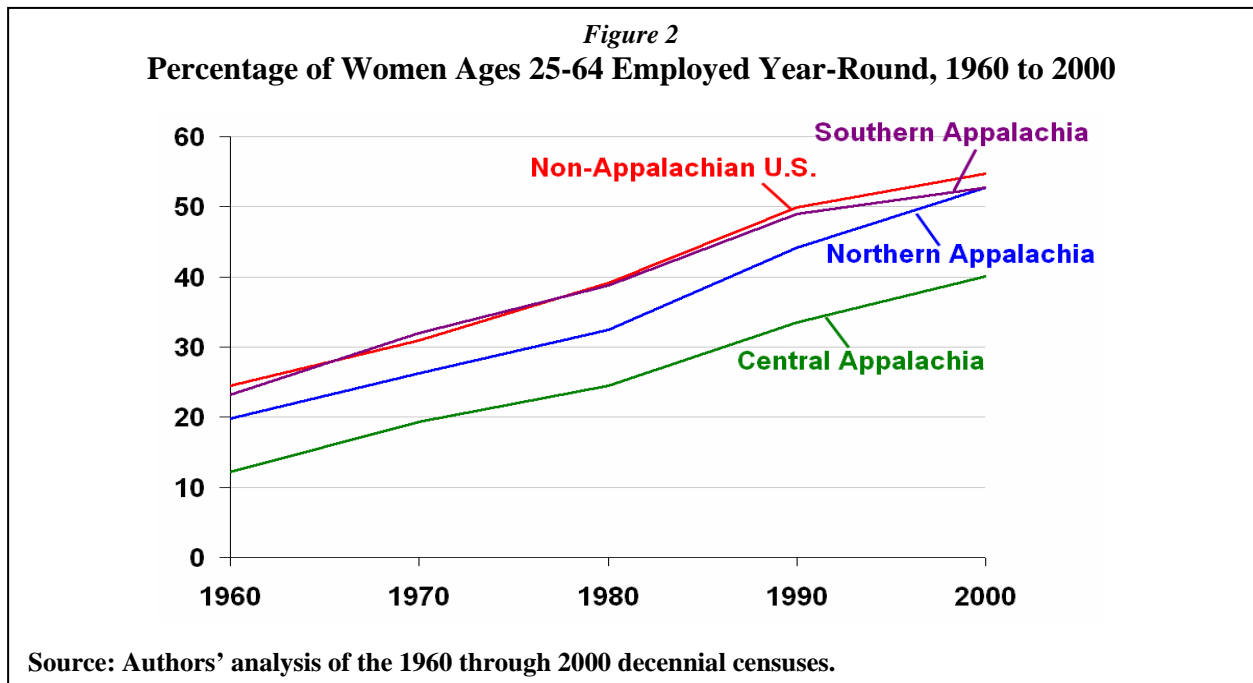
***Employment.*** Employment patterns among men and women yield similar evidence of economic convergence between Appalachia and the rest of the country. This convergence can be illustrated with trends in year-round employment—a key barometer of how well a population’s skills match with their community’s economic opportunities. In 1960, just 64 percent of Appalachian men ages 25 to 64 were employed during the entire year, compared with 75 percent of working-age men in the rest of the United States. Just 10 years later, the share of Appalachian men with full-year employment had risen to 76 percent, much closer to the 80 percent share outside Appalachia. During the 1970s and 1980s, year-round employment among men slipped in both regions at a similar pace, although it rebounded slightly during the 1990s. In 2000, 70 percent of Appalachian men and 72 percent of men outside the region had full-time employment.

Each Appalachian subregion exhibited the same pattern. Between 1960 and 1970, the full-year employment rate for men rose from 65 percent to 78 percent in northern Appalachia, from 49 percent to 61 percent in central Appalachia, and from 67 percent to 77 percent in southern Appalachia. By 2000—after slight declines in the 1970s and 1980s followed by small rebounds in the 1990s—these shares stood at 70 percent for northern Appalachian men, 56 percent for central Appalachian men, and 73 percent for southern Appalachian men. Southern Appalachian working-age men actually were slightly more likely to be employed year-round than men outside Appalachia.



Women's employment has dramatically increased since 1960, following the upward trend in women's work force participation nationwide. Year-round employment rates among working-age women in Appalachia approach those among women outside Appalachia. In 1960, for example, 20 percent of women between ages 25 and 64 worked year-round in Appalachia, compared with 25 percent of women in the rest of the country. By 2000, 52 percent of Appalachian women were full-year employees, compared with 55 percent of non-Appalachian women.

Similar patterns held for the Appalachian subregions (see Figure 2). Year-round employment in 2000 was 53 percent for women in northern and southern Appalachia, and 40 percent for women in central Appalachia (where the rate was just 12 percent in 1960).



## **The Influence of Social and Demographic Factors**

How much do social and demographic differences between Appalachia and the rest of the United States explain the income convergence between the two regions? We examined the effects of six social and demographic factors: (1) age structure, (2) educational attainment, (3) racial composition (defined here as African Americans' share of the population), (4) nativity (percentage foreign-born), and (5) county population size. On each of these characteristics, the population of Appalachia, and the three Appalachian subregions, is noticeably different from that in the rest of the United States.

For each of the six factors, we investigated the following questions: If the population outside Appalachia had the same demographic characteristics as the rest of the U.S. population, would the economic differences between Appalachia (and the subregions) and rest of the country be smaller? Would the post-1960 convergence be even greater? In other words, to what extent (if any) do social and demographic characteristics account for the differences explained above?

***Age Composition.*** Appalachia has an older population than the rest of the United States—even among working-age residents. In 2000, Appalachian men ages 25 to 64 had an average age of 43.6 years—more than a full year older than the average of their counterparts outside the region (42.3 years). Moreover, the age gap has been progressively wider since 1970. Similarly, working-age women in Appalachia are, on average, older than working-age women outside Appalachia, with an average age of 43.8 years compared with 42.9 years.

Given the age difference between the two populations and the strong link (at least among men) between age and labor market experience,<sup>8</sup> we adjusted the actual incomes and employment participation rates to the age structure of Appalachia's working-age population. Age structure explained very little of either the differences or the trends. For both men and

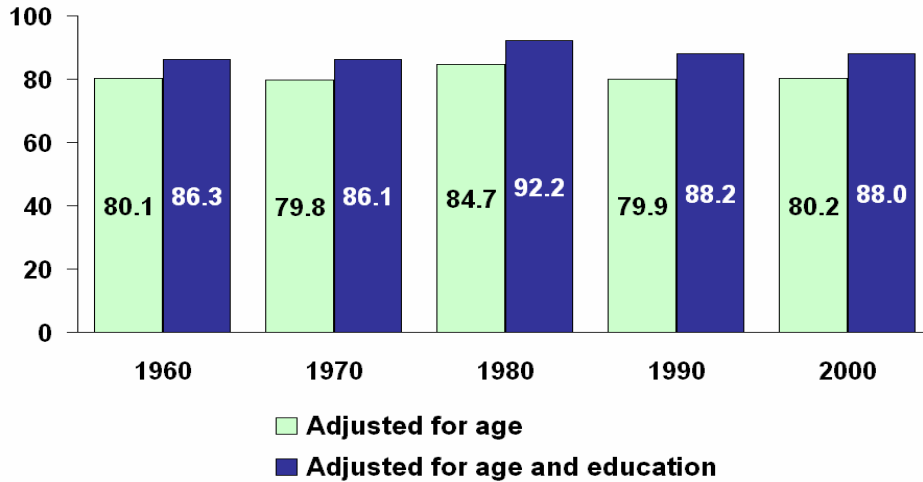
women, the age-standardized ratios between Appalachia and the rest of the country were practically identical to the observed ratios in every census year. This was the case for mean income and full-year employment, and for all three Appalachian subregions.

***Educational Attainment.*** With age structure explaining none of the differences or the trends in income or employment, we then examined educational attainment. Appalachia has been closing a substantial education gap with the rest of the country, but there are still wide disparities within the region. In 1960, for example, 35 percent of working-age men in Appalachia were high school graduates, compared with 45 percent of working-age men in the rest of the United States. By 2000, the respective percentages had risen to 80 percent in Appalachia and 83 percent outside the region. The share of working-age men completing college in 2000 was 20 percent in Appalachia and 28 percent in the rest of the United States.

There were greater disparities within Appalachia: In northern Appalachia, 86 percent of working-age men had completed high school in 2000, compared with 78 percent in southern Appalachia and just 67 percent in central Appalachia. The percentage completing college ranged from around 20 percent in northern and southern Appalachia to just 11 percent in the central subregion. The variation in educational attainment among working-age women was similar.

Adjusting for education noticeably narrowed the income gap between Appalachia and the rest of the country (see Figure 3, page 10). When adjusted for age and education, Appalachian men ages 25 to 64 earned 88 percent of the income of men in the rest of the country in 2000, compared with 80 percent when adjusted for age alone. In fact, the education-adjusted shares were from six to eight percentage points greater than the age-adjusted shares in each census year.

*Figure 3*  
**Mean Income of Appalachian Men Ages 25-64, as Percentage of Income of Men Ages 25-64 in the Non-Appalachian United States, Adjusted for Appalachia's Age and Educational Composition, 1960 to 2000**



Source: Authors' analysis of the 1960 through 2000 decennial censuses.

Adjusting for both age and education also narrowed the income gap between men in each subregion and in the non-Appalachian United States—from four to six percentage points for men in northern Appalachia, from 15 to 17 points in central Appalachia, and from seven to eight points in southern Appalachia. In 2000, for example, men in northern Appalachia earned, on average, an education-adjusted<sup>9</sup> 86 percent of the income of men outside Appalachia (80 percent when adjusted just for age). Men in central Appalachia earned 75 percent (versus 57 percent adjusted just for age), while men in southern Appalachia earned 93 percent (versus 86 percent).

Similarly, adjustment for age and education narrowed the income gap between women ages 25 to 64 in Appalachia and the rest of the country four to seven percentage points from where they stood when mean incomes were adjusted for age structure alone. Working-age women in Appalachia, for example, earned an education-adjusted 84 percent of incomes of their counterparts outside the region in 2000, compared with 78 percent when adjusted for age alone.

Age and education adjustment likewise narrowed the income differences between women in the subregions, especially in central Appalachia and in the rest of the United States. The gap narrowed by three to five percentage points in northern Appalachia, from 14 to 17 points in central Appalachia, and from six to nine points in southern Appalachia.

As for year-round employment, controlling for Appalachia's age and education composition likewise narrowed the gap between Appalachian men and women and their counterparts in the rest of the country, although not as much. Between 1960 and 2000, for example, the education-adjusted employment rate for men in the rest of the United States was about two percentage points closer to the Appalachian rate than the age-adjusted rate. Among the subregions, these adjustments improved the situation for central and southern Appalachian men relative to that of men outside Appalachia, while doing little to help men in northern Appalachia. The results were similar for women. Even with the reduced disparities, however, adjusting for age and education did not change the 40-year trends observed before we controlled for these two factors.

***Racial Composition.*** Appalachia's population is overwhelmingly white and less racially and ethnically diverse than the rest of the country. In 1960, for example, African Americans accounted for less than 2 percent of men ages 25 to 64 in the region, compared with 9 percent of men outside the region. And although blacks' share of working-age men had risen to 7 percent in Appalachia by 2000, it was still noticeably below the 11 percent share in the rest of the United States. Similarly, 7 percent of Appalachian working-age women in 2000 were African American, compared with 13 percent outside the region. Within the region, the African American share ranged from 12 percent of working-age men and 14 percent of working-age women in southern Appalachia to less than 4 percent in northern Appalachia and just 2 percent in central Appalachia.

So how does adjusting for Appalachia's share of African Americans in the population affect the economic convergence with the rest of the country? For men, doing so actually increased the relative income and employment gap between Appalachia and the non-Appalachian United States—although by only a little. In 2000, for example, the race-adjusted (adjusted for Appalachia's age, education, and racial structure) mean income for Appalachian men ages 25 to 64 was 87 percent that of men outside the region, compared with 88 percent when adjusted for age and education alone. Similar results occurred for men in northern and central Appalachia. In each case, adjustment for age, education, and race increased the education-adjusted income difference from men outside Appalachia by about two percentage points. Because the share of African Americans in southern Appalachia is about the same as it is outside Appalachia, adjusting for racial composition had no effect on men's income differences between the two areas.

Adjustment for racial composition had little effect on either the income or the employment gap between working-age women in Appalachia or its subregions and those in the rest of the country. And as with previous variables, adjusting for race did not affect the convergence or divergence of Appalachia's income or employment with that in the rest of the country.

**Nativity.** Immigration from abroad has had an impact nationally since 1960, as the share of Americans born outside the United States mushroomed from 5 percent then to 12 percent in 2005.<sup>10</sup> But Appalachia has felt relatively little impact from international migration. The 2000 Census reported that 3 percent of Appalachian men ages 25 to 64 were foreign-born, well below the 17 percent for working-age men in the rest of the country. Similarly, the share of working-age women who were foreign-born in 2000 was just 4 percent in Appalachia and 17 percent

elsewhere. Of the three Appalachian subregions, southern Appalachia had the greatest concentration of foreign-born in 2000; even there the foreign share was just 6 percent for men and 5 percent for women.

Adjusting for the foreign-born share in Appalachia's population produced little change in the relative difference between the income and employment status for working-age men in Appalachia and men in the rest of the country. Moreover, the little change that there was tended to worsen Appalachia's economic situation relative to the rest of the United States. In 2000, for example, working-age men in Appalachia earned, on average, 86 percent of the income of men outside the region when controlled for age, education, race, and nativity. When controlled for age, education, and race alone, that figure was 87 percent. The general situation held true for all three subregions, and for women. As with the other factors, adjusting for nativity had negligible effects on the convergence/divergence trends.

*County Size.* Basically, Appalachian residents have been more likely to live in traditionally rural areas than Americans who live outside the region. In 2000, two-fifths of working-age men and women in Appalachia lived in counties that were historically rural (that is, they had fewer than 50,000 residents in 1960), compared with just one-fifth outside the region. The subregions had even greater variation. In 2000, three-fourths of working-age men in central Appalachia lived in historically rural counties, compared with just one-fourth of men in northern Appalachia and nearly half of men in southern Appalachia.

Adjustment for the population size of Appalachian counties caused incomes for working-age men in the region to improve slightly relative to those of men in the rest of the country. In 2000, for example, the average income for men ages 25 to 64 in Appalachia—when adjusted for age, education, race, nativity, and population size—was 88 percent the average income for

working-age men in the rest of the United States. When population size was not included, Appalachian men earned 86 percent of the income of non-Appalachian men. Men in all three subregions had similar results.

### **Discussion and Implications**

The basic results in this report show that working-age men and women in Appalachia still lag behind the rest of the United States in terms of income and employment—and that the relative income gaps are only slightly narrower in 2000 than they were in 1960. However, various socioeconomic variables explain some of these differences in income and year-round employment. Our results suggest that educational attainment is the single most important factor driving improvements in income and year-round employment. Controlling for Appalachia’s educational composition raised the relative status of working-age men and women in the region by at least five percentage points. Education had an even greater effect in central Appalachia. None of the other social-demographic variables has as great an effect.

Yet as mentioned at the beginning of this report, median household income in the typical Appalachian county was nearly 90 percent the median household income in the typical county outside Appalachia. Moreover, mean family income in the typical county in Appalachia increased 32 percent (adjusting for inflation) between 1970 and 2000.<sup>11</sup> Given the continued lag between income and employment for working-age men and women in Appalachia compared with the rest of the country, these results suggest that something besides the factors we examined here might account for Appalachia’s relative gains in household and family income.

One possible answer lies in the growth in the female labor supply (and thus the rise in two-earner households and families) since 1960. In 1960, more than half of working-age



women—both inside and outside Appalachia—did not work at any time during the year (either due to unemployment or non-participation in the labor force). That proportion fell to less than half outside Appalachia 10 years later, and inside Appalachia 10 years after that. By 2000, less than one-third of working-age women in and out of Appalachia did not work at all; more than half of women in both regions had year-round employment. Appalachia's labor force increases occurred primarily in the northern and central subregions, as full-time employment for women in southern Appalachia actually had exceeded the national average by 1970. Overall, however, the level of full-year employment for Appalachian women was 94 percent that for the rest of the country in 2000—up from 82 percent in 1960.

Another potential factor may lie in the changes in occupational employment. Appalachia's (and the nation's) economic restructuring over the past 40 years has also transformed the occupational structure, as more workers have moved into higher-level employment. Data from the 2000 Census, for example, found that 29 percent of Appalachian workers were in managerial and professional jobs—up from 22 percent in 1990.<sup>12</sup> Unfortunately, various changes in the way the census has measured occupational employment over the years prevented us from using it as an adjustment factor in this analysis. Still, the nationwide trend toward higher-status (and higher-paying) occupations likely had some effect on the rising incomes of Appalachian households.

The aging of the Appalachian population—and, since 1990, of Appalachian workers—is yet another possible factor in the rise of household and family incomes in the region. After falling between 1970 and 1990 (as the baby-boom cohorts entered the prime working ages), the mean age of persons ages 25 to 64 rose from 41.9 years to 43.6 years among Appalachian men and from 42.3 years to 43.8 years among Appalachian women. Earnings tend to increase as

workers age and gain more experience, thus families and households headed by older workers are likely to have higher incomes than their younger counterparts. The aging of Appalachia's work force might be a minor factor by itself, however; mean family income in the region also rose in the 1970s and 1980s—decades when workers, on average, had gotten younger.<sup>13</sup>

Of course, the rise in family incomes for Appalachian households might be a simple by-product of economic growth. The 1990s in particular were a period of prolonged economic prosperity in the United States, and that prosperity touched Appalachia as well.<sup>14</sup> Indeed, as we look into the future, the continued ability of Appalachian communities to attract and keep businesses will be important for keeping local economies growing, and thus helping to raise incomes for Appalachian households and individuals.

But as shown by our analysis, educational attainment was the key variable explaining how individual earnings and employment in Appalachia continued to lag behind earnings and employment in the rest of the United States. This is a salient point given the fact that the educational level of adults is a key consideration for both economic development officials and the employers they want to attract.<sup>15</sup> While this study shows the need for deeper analysis into economic convergence between households in Appalachia and the rest of the country, it also suggests that further investment in education for the region's residents is necessary to ensure that any long-term trends toward economic parity continue.

## NOTES

<sup>1</sup> Lawrence E. Wood and Gregory A. Bischak, “Progress and Challenges in Reducing Economic Distress in Appalachia: An Analysis of National and Regional Trends Since 1960” (Washington, DC: Appalachian Regional Commission, 2000): 15, table 3. Appalachia’s income figure is in 1960 dollars.

<sup>2</sup> These figures are in 2000 dollars.

<sup>3</sup> Dan A. Black and Seth G. Sanders, “Labor Market Performance and Income Inequality in Appalachia,” *Demographic and Socioeconomic Change in Appalachia* (Washington, DC: Population Reference Bureau and Appalachian Regional Commission, 2004): 33, table 5.

<sup>4</sup> See the reports in the series *Demographic and Socioeconomic Change in Appalachia* (Washington, DC: Population Reference Bureau and Appalachian Regional Commission, 2003-2005).

<sup>5</sup> For a more detailed description of the Appalachian region, see Kelvin M. Pollard, “Appalachia at the Millennium: An Overview of Results from Census 2000,” *Demographic and Socioeconomic Change in Appalachia* (Washington, DC: Population Reference Bureau and Appalachian Regional Commission, 2003): 2.

<sup>6</sup> These figures are in 2006 dollars.

<sup>7</sup> Commission on Population Growth and the American Future, *Population Growth and America’s Future* (Washington, DC: U.S. General Accounting Office, 1971); and Niles Hanson, *Intermediate-Size Cities as Growth Centers* (New York: Praeger, 1971).

<sup>8</sup> One traditional way of measuring labor-market experience is to take a person’s age, subtract their years of education, and further subtract five (the age when most children start school) from the result. For more, see Jacob Mincer, “Investment in Human Capital and Personal Income Distribution,” *Journal of Political Economy* 66, no. 4 (1958): 281-302.

<sup>9</sup> In this report, the term “education-adjusted” means “adjusted for age and education.”

<sup>10</sup> Population Reference Bureau analysis of data from the decennial census and 2005 American Community Survey.

<sup>11</sup> Black and Sanders, “Labor Market Performance”: 61, table A6.

<sup>12</sup> Pollard, “Appalachia at the Millennium”: 20-21.

<sup>13</sup> Black and Sanders, “Labor Market Performance”: 61, table A6.

<sup>14</sup> See, for example, Kelvin M. Pollard, “Population Growth and Distribution in Appalachia: New Realities,” *Demographic and Socioeconomic Change in Appalachia* (Washington, DC: Population Reference Bureau and Appalachian Regional Commission, 2005): 20-21.

<sup>15</sup> John G. Haaga, “Educational Attainment in Appalachia,” *Demographic and Socioeconomic Change in Appalachia* (Washington, DC: Population Reference Bureau and Appalachian Regional Commission, 2004): 3.