

Supplemental Analysis: Education - Bachelor's Field of Degree in the Appalachian Region, 2009-2013

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During the 2009-2013 period, 3.7 million adults in the Appalachian Region (ages 25 and over) had a bachelor's degree or more. About 31 percent of these adults held degrees in science and engineering (see Table 2, page 7). While this was the largest share among major fields, it was slightly lower than the national share of 35 percent. An additional 10 percent were in the fields related to science and engineering (examples in this category include nursing, architecture, and mathematics teacher education). The remaining 59 percent of college graduates was distributed fairly equally among the other three major fields: 20 percent each in business and arts/humanities, and 19 percent in education. (Table 1 on page 6 provides a list of detailed subjects for each of the five major fields.)

Although the percentage of college-educated adults with a science and engineering degree was lower in Appalachia than in the nation as a whole, that wasn't necessarily the case among the other fields. In particular, the share who received their bachelor's in education was five percentage points higher than the national average of 14 percent. The percentages in the other three major fields roughly mirrored the national average, and were within a percentage point or two (see Table 2, page 7).

Yet as with almost any other demographic, social, and economic measure, levels for Appalachia as a whole mask various differences within the Region.

Subregional Differences

For each of Appalachia's five subregions, the share of college-educated adults with science and engineering degrees was consistently below the national average. It was particularly low in Central Appalachia: Just 26 percent of adult college graduates had science and engineering degrees (see Table 2, page 7). In contrast, the rates in both Northern and South Central Appalachia (32 percent each) were closer to the national share.

One can find a similar subregional pattern when examining the education field—only in reverse. Here, the share of BA/BS holders with education degrees was higher than the national average in each subregion. The rate was particularly high in Central Appalachia: More than one-fourth of adult college graduates (28 percent) had a bachelor's degree in education. Indeed, Central Appalachia had the unique distinction of having more college graduates with education degrees than with science and engineering degrees. In contrast, education degree holders were 17 percent of graduates in both Southern and South Central Appalachia—both of which were below the regional average.

What about the other major fields?

- Science- and engineering-related fields. The share of adult college graduates with degrees in the science- and engineering- related fields ranged from 12 percent in North Central Appalachia to 9 percent (just above the national average) in Southern Appalachia.
- Business. Business degree holders made up nearly one-fourth (24 percent) of Southern Appalachia's adult college graduates, making it the only subregion where the share was higher than the national average. In contrast, just one-sixth (16 percent) of BA/BS holders in Central Appalachia held degrees in business.
- Arts and humanities. The share of college graduates with arts and humanities degrees in South Central Appalachia matched the national average of 22 percent. Yet it was below 20 percent in three other subregions.

Differences Among County Types

The share of college graduates with science/engineering (S&E) and education degrees each followed an urban-rural pattern. College graduates in metropolitan areas were more likely to hold S&E degrees than their counterparts in more rural counties (see Table 2, page 7). While almost one-third of metropolitan BA/BS recipients had degrees in science and engineering, the same was true for only one-fourth of nonmetropolitan and rural degree holders. On the other hand, about one in four college-educated adults in Appalachia's nonmetropolitan and rural counties held degrees in education, compared with just one in six graduates in the Region's metropolitan areas.

The above patterns manifested in another way: In metropolitan Appalachia, the percentage of graduates with science and engineering degrees was nearly twice that of education degree holders. In the Region's nonmetropolitan and rural areas, the respective shares were almost equal, although there were slightly more college graduates with education degrees than with S&E degrees in rural counties.

One other major field also followed an urban/rural pattern: business. Among the Region's college graduates living in large metropolitan areas, nearly one-fourth (24 percent) held bachelor's degrees in business. Meanwhile, just 17 percent of Appalachia's rural college graduates had majored in this field.

Differences Among Economic Status Types

Counties that were most economically well-off (as of Fiscal Year 2015) had the largest share of graduates with a science and engineering degree. For example, 34 percent of college graduates in the 12 most economically advantaged counties (i.e., the counties classified as either Competitive or Attainment) had an S&E degree (see Table 2, page 7), compared with only one-fourth of the college graduates in counties classified as Distressed or At-Risk.

On the other hand, the counties that are least economically secure had the largest shares of education degree recipients among their college-educated adults. More than one-fourth of college graduates in counties classified as Distressed (29 percent) or At-Risk (26 percent) earned a bachelor's degree in that field. This is roughly double the share of college-educated adults in the Competitive and Attainment counties with an education degree.

Business was the only other major field where there was a clear pattern among the economic status categories in Appalachia. In the 12 counties classified as either Competitive or Attainment, nearly one in four adults with a college degree or higher (23 percent) earned bachelor's degrees in business. By comparison, only one in six college-educated adults (17 percent) in the counties classified as Distressed had a business degree. The share was similar (19 to 20 percent) among college graduates in the At-Risk and Transitional counties.

Variations Among Individual Counties

Some of the most interesting variations within Appalachia occur among the individual counties in the Region. In 35 Appalachian counties, for example, the share of college graduates with S&E degrees matched or exceeded the national average. Included in this group were five of Appalachia's 12 counties classified as either Competitive or Attainment.

Also, 19 of the 35 counties were in metropolitan areas. Many of these counties (as well as some of the non-metropolitan counties in this group) are notable for housing major colleges and universities, or for becoming major hubs for technology. Some notables include:

- Tompkins County, N.Y. (Cornell University, Ithaca College) 50.1%
- Montgomery County, Va. (Virginia Tech) 48.2%
- Centre County, Pa. (Penn State University) 45.2%
- Anderson and Roane counties, Tenn. (Oak Ridge) 42.9% and 35.7% respectively
- Madison County, Ala. (Huntsville) 42.7%
- Monongalia County, W.Va. (West Virginia University) 41%

In contrast, the share of college graduates with S&E degrees was less than one-fifth in 65 Appalachian counties. Among the counties in this group, 54 were outside metropolitan areas—and 35 of these were in the most rural areas that did not border any metro. In each of these counties, science and engineering degree holders did not comprise the largest share of college graduates. (In most of them, the largest share held degrees in education.)

With respect to the education field, a slight majority (211) of Appalachia's 420 counties had at least one-fourth of the college graduates—nearly twice the national average—with an education degree. The share was at least 30 percent in 108 counties. These counties were overwhelmingly outside metropolitan areas, and a large number were in the most rural communities. (Of the 108 counties with the highest shares of graduates with education degrees, 91 were nonmetropolitan, and 55 of those were rural.) Moreover, in 43 of Central Appalachia's 82 counties, at least 30 percent of college graduates had education degrees. That was also true in 55 of the 90 Appalachian counties classified as Distressed.

In contrast, there were only 19 Appalachian counties where the share of college-educated adults with an education degree was below the national average, and 15 of those were in metropolitan areas.

There were 26 counties where at least one-fourth of college-educated adults held business degrees. In 120 counties, by contrast, the share of college graduates with business degrees was less than 15 percent—five percentage points below the national (and regional) average. Most of the counties in the latter group were either outside metropolitan areas or economically stressed.

While science and engineering accounted for the greatest share of adults with at least a BA/BS degree, that wasn't the case everywhere in Appalachia. For example, college graduates with an education degree outnumbered science and engineering degree holders in 183 counties. In all but a handful of these counties, at least 25 percent of college-educated adults held education degrees.

Association With Selected Other Measures

Appalachian counties where a relatively small percentage of college graduates have science and engineering degrees tend to fare poorly on other measures. For example, in nearly all of the 65 counties where S&E graduates were less than 20 percent of all college-educated adults, the share of adults with at least a bachelor's degree was also less than 20 percent. In 22 of these counties, less than one in 10 adults had earned a BA/BS degree.

In a similar vein, all but three of the 65 counties had poverty levels at or above the national rate of 15.4 percent. Poverty was 20 percent or more in 49 of these counties, and at least 25 percent in 23 of them.

Appalachian counties where a large share of college graduates had earned education degrees also tended to fare poorly on selected social and economic variables. In all but one of the 108 counties where at least 30 percent of college graduates had education degrees, less than one-fifth of the adult residents had at least a bachelor's degree. In 37 of these counties, college graduates made up less than one-tenth of adults ages 25 and over.

Moreover, poverty was at or above the national average in 100 of the 108 counties where at least 30 percent of college graduates held education degrees. In 76 of these counties, at least one-fifth of residents were poor, and 36 of them had poverty rates of 25 percent or greater.

Yet counties where college graduates were the most likely to have received a BA/BS in science and engineering did not fare especially well on other social and economic measures. Among the 35 Appalachian counties where the percentage of college graduates with a science and engineering degree was at or above the national average, there were just seven where the share of adults with at least a bachelor's degree was also at or above the national share of 29 percent. Similarly, poverty was below the U.S. rate of 15.4 percent in just 13 of these counties.

There seems to be more of an association between the “field of degree” distribution and relatively high levels of residential mobility. For example, in 16 of the 35 Appalachian counties where the share of college graduates receiving an S&E degree matched or exceeded the national average, at least 6 percent of the residents had migrated from another county. In 12 of these counties, at least 3 percent of the residents had migrated from another state. (The respective U.S. migration rates were 6 percent and 3 percent.) Similarly, inter-county migration levels were at or above the national average in 11 of the 19 Appalachian counties where the share of college graduates with education degrees was below the national average.

At the other end of the mobility scale, inter-county migration rates were less than 5 percent in 36 of the 65 counties where fewer than one in five college graduates had S&E degrees. This was also the case for 67 of the 108 counties where at least 30 percent of bachelor’s degree holders had education degrees.

Younger College Graduates and Gender Differences

What about younger college graduates? An analysis of the degree fields they chose can provide a better picture of recent trends.

Nearly 1.2 million young adults ages 25 to 39 in the Appalachian Region had received at least a bachelor’s degree. Among that population, 33 percent held a degree in the science and engineering field—slightly more than the rate for all adults in the Region, but still slightly below the 37 percent national share for that age group (see Table 3, page 8). Likewise, the share of young college graduates holding arts and humanities degrees was slightly higher than for all adults in the Region (23 percent). Yet the 14 percent share of young college graduates in Appalachia who held an education degree was smaller than the rate for all adults in the Region with a BA/BS degree. The percentages of young adult college graduates with business (20 percent) and science- and engineering-related (10 percent) degrees were each about the same as with the general college-educated population.

The patterns among the Appalachian subregions, county types, and economic status types were similar for younger graduates as for the entire college-educated population. Central Appalachia, counties in nonmetropolitan areas, and counties classified as either Distressed or At-Risk had the lowest shares of graduates ages 25-39 holding science and engineering degrees, but the highest percentages of young graduates with degrees in education. The reverse was true for metropolitan counties and counties with the highest economic status classifications (i.e., Competitive and Attainment). And Appalachian counties that are part of large metros—as well as those in the Competitive and Attainment categories—have the highest shares of young graduates with business degrees.

There is one major deviation: There is not a single major geographic or economic subcategory within the Appalachian Region where young graduates with education degrees outnumbered their counterparts in science and engineering. (There were just 100 counties—mainly in nonmetropolitan areas—where education graduates ages 25-39 did outnumber science and engineering graduates in that age group.)

Among young adult college graduates, men were significantly more likely than women to hold science and engineering degrees, both in Appalachia (40 percent to 27 percent) and in the nation as a whole (44 percent to 31 percent). (See Table 4, page 9.) College-educated men were also more likely than college-educated women to have earned business degrees (23 percent to 17 percent). Conversely, female college graduates ages 25-39 were more likely than their male counterparts to have earned degrees in education (19 percent to 7 percent) and in science- and engineering-related fields (13 percent to 6 percent). These percentages mirror national trends. Young college-educated men and women are equally likely to hold degrees in arts and humanities, at 23 percent each.

The degree attainment patterns discussed earlier for subregions, county types, and economic status categories generally held true for both men and women ages 25-39. Among young college-educated women, however, there were some areas in the Appalachian Region (Central Appalachia, counties outside metropolitan areas, and both Distressed and At-Risk counties) where college graduates with education degrees outnumbered graduates holding degrees in science and engineering.

Summary

Some closing thoughts regarding this analysis:

- Given that science and engineering jobs are becoming increasingly important in keeping the United States competitive in the global economy, it makes sense that counties with a high percentage of college graduates holding S&E degrees tend to be better off socioeconomically (the lack of association with high educational attainment and low poverty rates notwithstanding).
- Nationally, college graduates with science and engineering degrees have historically had the highest median earnings, while those with education degrees have had the lowest.¹ Therefore, it is probably no coincidence that the parts of the Region having the highest percentages of S&E degree holders were also the areas that had the highest mean and median incomes, or that those parts having high shares of graduates holding education degrees were areas with the lowest income levels.²
- A comparison of the “field of degree” distribution among college graduates ages 25-39 with that for all adults suggests that science and engineering, along with business, seem to be increasingly attractive fields for younger graduates. Conversely, education (at least as an undergraduate degree field) seems to be less attractive.

¹ U.S. Census Bureau, “Field of Bachelor’s Degree in the United States: 2009,” *American Community Survey Reports ACS-18* (February 2012): 3, accessed online at www.census.gov/prod/2012pubs/acs-18.pdf (June 24, 2015).

² Kelvin Pollard and Linda A. Jacobsen, “The Appalachian Region: A Data Overview from the 2009-2013 American Community Survey,” *Appalachian Regional Commission and Population Reference Bureau* (February 2015): 37, Table 7.1.

Table 1: Organization of Field of Degree Groups

Broad fields	Detailed fields (and examples of majors)
Science and engineering	<p>Computers, mathematics, and statistics (includes computer science, mathematics, computer and information systems)</p> <p>Biological, agricultural, and environmental sciences (includes biology, general agriculture, animal sciences)</p> <p>Physical and related science (includes chemistry, physics, geology and earth science)</p> <p>Psychology (includes psychology, counseling psychology)</p> <p>Social sciences (includes sociology, economics, anthropology and archeology, political science and government)</p> <p>Engineering (includes mechanical engineering, electrical engineering, civil engineering)</p> <p>Multidisciplinary studies (includes multidisciplinary or general science, nutrition science, interdisciplinary social sciences)</p>
Science- and engineering-related	Science- and engineering-related (includes nursing, architecture, mathematics teacher education)
Business	Business (includes business management, accounting, general business)
Education	Education (includes elementary education, general education)
Arts, humanities, and other	<p>Literature and languages (includes English language and literature, French, German, Latin and other foreign languages)</p> <p>Liberal arts and history (includes history, liberal arts, philosophy and religious studies)</p> <p>Visual and performing arts (includes fine arts, commercial art, music)</p> <p>Communications (includes communications, journalism, mass media)</p> <p>Other (includes criminal justice and fire protection, social work, family and consumer sciences)</p>

Source: U.S. Census Bureau, "Field of Bachelor's Degree in the United States: 2009," *American Community Survey Reports ACS-18* (February 2012): 2, accessed online at www.census.gov/prod/2012pubs/acs-18.pdf (June 24, 2015).

Table 2: Bachelor's Degree Field (First Major) for Persons Ages 25 and Over in the Appalachian Region With a Bachelor's Degree or More, 2009-2013

Bachelor's Degree Field (First Major)	Total Population Ages 25 and Over With a Bachelor's Degree or More, 2009-2013	Percent of Population Ages 25 and Over With a Bachelor's Degree or More				
		Science and Engineering	Science- and Engineering-Related Fields	Business	Education	Arts, Humanities, and Other
United States	59,583,138	34.7	9.0	20.4	13.6	22.4
Appalachian Region	3,735,689	30.7	10.4	20.1	18.8	20.0
Subregions						
Northern Appalachia	1,311,915	31.6	11.0	17.9	19.2	20.2
North Central Appalachia	306,397	28.5	12.0	18.4	21.7	19.3
Central Appalachia	167,820	26.5	11.3	16.0	27.6	18.6
South Central Appalachia	726,569	31.7	10.2	19.0	17.1	22.1
Southern Appalachia	1,222,988	30.2	9.3	24.2	17.3	19.0
County Types						
Large Metros (pop. 1 million +)	1,139,394	31.7	9.9	23.6	15.0	19.8
Small Metros (pop. <1 million)	1,672,265	32.1	10.3	19.5	17.7	20.5
Nonmetro, Adjacent to Large Metros	240,037	26.5	11.2	17.6	25.5	19.2
Nonmetro, Adjacent to Small Metros	423,542	27.7	11.3	17.0	24.4	19.7
Rural (nonmetro, not adj. to a metro)	260,451	25.8	10.9	17.1	26.8	19.4
Economic Status Types (FY15)						
Distressed Counties	151,696	24.5	10.6	16.8	29.1	19.0
At-Risk Counties	316,203	25.8	10.9	18.5	25.8	19.1
Transitional Counties	2,545,031	30.6	10.5	19.8	18.7	20.4
Competitive and Attainment Counties	722,759	34.5	9.7	22.8	13.8	19.2

Note: In Fiscal Year 2015 (FY15), only two Appalachian counties were classified as Attainment Counties. As a result, they were combined with the Region's 10 Competitive Counties to facilitate better analysis.

Data Source: U.S. Census Bureau, 2009-2013 American Community Survey.

Table 3: Bachelor's Degree Field (First Major) for Persons Ages 25 to 39 in the Appalachian Region With a Bachelor's Degree or More, 2009-2013

Bachelor's Degree Field (First Major)	Total Population Ages 25 to 39 With a Bachelor's Degree or More, 2009-2013	Percent of Population Ages 25 to 39 With a Bachelor's Degree or More				
		Science and Engineering	Science- and Engineering-Related Fields	Business	Education	Arts, Humanities, and Other
United States	19,843,459	37.1	8.4	20.3	9.0	25.2
Appalachian Region	1,164,431	32.9	10.0	19.8	14.1	23.2
Subregions						
Northern Appalachia	416,999	34.1	10.0	17.9	14.1	23.9
North Central Appalachia	98,346	32.2	12.4	18.7	14.4	22.2
Central Appalachia	50,859	30.7	12.1	15.2	19.7	22.2
South Central Appalachia	206,766	34.2	9.7	17.6	12.8	25.7
Southern Appalachia	391,461	31.3	9.4	23.8	14.0	21.6
County Types						
Large Metros (pop. 1 million +)	390,517	33.2	9.4	23.0	11.4	22.9
Small Metros (pop. <1 million)	516,591	34.3	9.9	18.6	13.4	23.8
Nonmetro, Adjacent to Large Metros	69,286	28.2	10.9	18.4	20.3	22.2
Nonmetro, Adjacent to Small Metros	114,998	30.0	11.6	16.7	19.1	22.6
Rural (nonmetro, not adj. to a metro)	73,039	29.8	11.2	16.7	19.7	22.5
Economic Status Types (FY15)						
Distressed Counties	43,608	28.1	11.9	15.3	21.2	23.5
At-Risk Counties	85,911	29.1	11.2	17.5	21.0	21.2
Transitional Counties	791,411	32.5	10.2	19.5	14.1	23.6
Competitive and Attainment Counties	243,501	36.1	8.9	22.3	10.3	22.4

Note: In Fiscal Year 2015 (FY15), only two Appalachian counties were classified as Attainment Counties. As a result, they were combined with the Region's 10 Competitive Counties to facilitate better analysis.

Data Source: U.S. Census Bureau, 2009-2013 American Community Survey.

Table 4: Bachelor's Degree Field (First Major) for Persons Ages 25 to 39 in the Appalachian Region With a Bachelor's Degree or More, 2009-2013, By Gender

Bachelor's Degree Field (First Major)	Men Ages 25 to 39 With a Bachelor's Degree or More, 2009-2013	Percent of Men Ages 25 to 39 With a Bachelor's Degree or More				
		Science and Engineering	Science- and Engineering-Related Fields	Business	Education	Arts, Humanities, and Other
United States	8,867,045	44.1	5.2	23.0	4.3	23.4
Appalachian Region	506,838	40.5	6.0	23.1	7.4	23.0
Subregions						
Northern Appalachia	184,970	41.3	6.2	21.1	8.4	23.1
North Central Appalachia	42,901	40.6	7.1	21.9	7.7	22.7
Central Appalachia	21,041	39.3	5.9	17.7	11.6	25.5
South Central Appalachia	89,356	41.3	6.0	20.9	5.9	25.8
Southern Appalachia	168,570	39.4	5.5	27.4	6.5	21.2
County Types						
Large Metros (pop. 1 million +)	172,117	40.8	5.8	26.1	5.9	21.4
Small Metros (pop. <1 million)	228,232	41.6	6.0	22.1	6.7	23.6
Nonmetro, Adjacent to Large Metros	28,720	36.4	6.1	21.6	12.0	23.9
Nonmetro, Adjacent to Small Metros	47,203	38.7	6.8	19.4	10.8	24.3
Rural (nonmetro, not adj. to a metro)	30,566	37.8	5.7	20.6	11.0	24.9
Economic Status Types (FY15)						
Distressed Counties	17,350	37.9	6.2	18.5	12.0	25.5
At-Risk Counties	35,193	37.5	6.5	21.1	11.7	23.3
Transitional Counties	343,812	39.6	6.2	22.9	7.5	23.9
Competitive and Attainment Counties	110,483	44.8	5.3	25.1	4.9	19.8
Bachelor's Degree Field (First Major)	Women Ages 25 to 39 With a Bachelor's Degree or More, 2009-2013	Percent of Women Ages 25 to 39 With a Bachelor's Degree or More				
		Science and Engineering	Science- and Engineering-Related Fields	Business	Education	Arts, Humanities, and Other
United States	10,976,414	31.4	10.9	18.2	12.9	26.6
Appalachian Region	657,593	27.0	13.1	17.2	19.3	23.4
Subregions						
Northern Appalachia	232,029	28.3	13.1	15.4	18.7	24.5
North Central Appalachia	55,445	25.8	16.5	16.2	19.6	21.8
Central Appalachia	29,818	24.7	16.5	13.5	25.4	19.9
South Central Appalachia	117,410	28.9	12.5	15.2	18.0	25.5
Southern Appalachia	222,891	25.2	12.2	21.0	19.7	21.8
County Types						
Large Metros (pop. 1 million +)	218,400	27.3	12.2	20.7	15.7	24.1
Small Metros (pop. <1 million)	288,359	28.5	13.0	15.8	18.7	23.9
Nonmetro, Adjacent to Large Metros	40,566	22.4	14.3	16.1	26.1	21.1
Nonmetro, Adjacent to Small Metros	67,795	23.9	14.9	14.9	24.9	21.4
Rural (nonmetro, not adj. to a metro)	42,473	24.0	15.2	13.9	26.0	20.9
Economic Status Types (FY15)						
Distressed Counties	26,258	21.7	15.8	13.1	27.3	22.1
At-Risk Counties	50,718	23.3	14.4	15.1	27.5	19.7
Transitional Counties	447,599	27.2	13.2	16.9	19.2	23.5
Competitive and Attainment Counties	133,018	28.8	11.9	19.9	14.8	24.6

Note: In Fiscal Year 2015 (FY15), only two Appalachian counties were classified as Attainment Counties. As a result, they were combined with the Region's 10 Competitive Counties to facilitate better analysis.

Data Source: U.S. Census Bureau, 2009-2013 American Community Survey.