

### Education and Vulnerability to Economic Shocks in the Carolinas

BY RICHARD KAGLIC

The role of technological disruption in the economy and its effect (actual and potential) on workers is a lively topic of discussion among labor market economists. Certainly, the steady — some would say accelerating — march of information technology and robotics into the workplace, coupled with lingering anxieties from the Great Recession, has heightened workers’ insecurities about their own place in the economy of the future. Technological changes, combined with other economic forces, dramatically altered the economic landscape of the Carolinas over the course of a generation. During this evolution, the region’s economy evolved to look less like it did in the 1990s (overly reliant on manufacturing) and more like the national economy of today.

Still, the region and its workers appear more exposed to economic disruptions than with the nation as a whole. In some measure, this vulnerability can be viewed as a human capital development challenge. The states need to do a better job of training workers for today’s economy as well as preparing them for the disruptions that will inevitably come in the future, whether those disruptions are technological or cyclical in their origin.

#### Technological Disruptions and Changing Industry Structure

In the Carolinas, the region’s experience with economic disruptions (cyclical and technological) in its manufacturing industries is relatively recent when compared to similar travails in the New England and Midwestern regions of the United States. Indeed, for many years, the Southeastern United States generally, and the Carolinas specifically, successfully lured some of those other regions’ mainstay

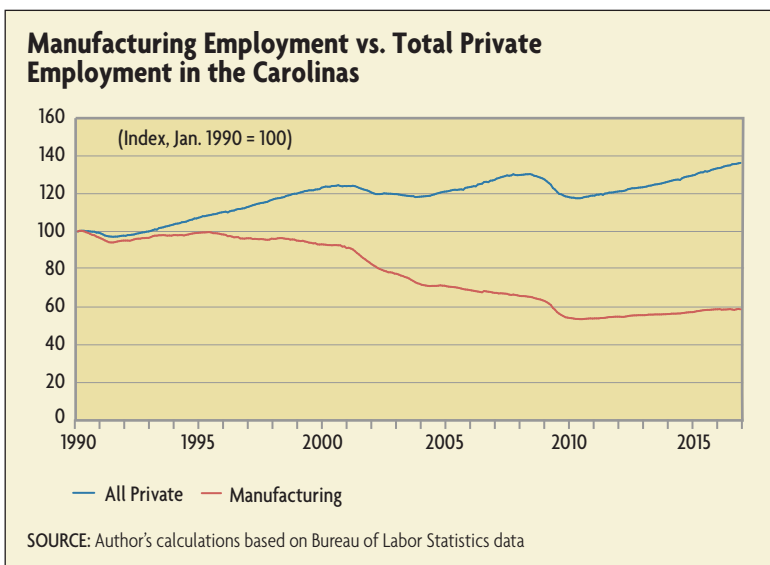
manufacturing industries, such as textiles and vehicle production. The reasons for manufacturing’s migration south are many — the spreading use of air conditioning, lower labor costs, and relatedly, low unionization rates, to name just a few.

Thus, North Carolina and South Carolina both developed hard-earned reputations as “manufacturing states.” As recently as 1990, manufacturing firms employed nearly 1.2 million workers in the two states. Moreover, the Carolinas’ employment base had become more manufacturing-intensive than some traditional industrial giants such as Michigan, Ohio, and Wisconsin. In 1990, manufacturing accounted for a little more than 30 percent of private payroll employment in the two states combined, whereas it accounted for between 25 percent and 27 percent of jobs in Michigan, Ohio, and Wisconsin.

But in the lead-up to the new century, employment in some of the region’s important manufacturing industries came under pressure from (among other factors) changing consumer demands and technological advances. These technological advances were not limited to improvements in capital equipment, such as robotics and automation. They also included efficiencies gained from so-called process technologies — such as improved logistics, outsourcing (and “off-shoring”), and global sourcing business models. The result was that the two states saw manufacturing jobs eroding during the 1990s and falling throughout the first decade of the new millennium leading into the Great Recession. In fact, manufacturing employment in the two-state region fell by more than 406,000 between 1990 and 2007, or by more than 34 percent. And manufacturing’s share of total private employment fell to 16 percent (from 31 percent) and actually

ended up below the comparable share in each of the Midwestern states noted above (Michigan, Ohio, and Wisconsin).

During this period of industrial restructuring, many argued that the loss of manufacturing jobs would doom the states’ economies. It didn’t. While manufacturing jobs were on the decline, innovative businesses and people in the two states were creating jobs in other industries, many of which would have been hard to predict 10 years earlier. Firms brought new and innovative goods and services to consumer and business markets. And they created jobs, lots of them. Between 1990 and 2007, total private employment in the two states plowed forward even as technology was depressing manufacturing employment. (See chart.)



In fact, job growth in the Carolinas outpaced the nationwide average. Between 1990 and 2007, total private employment in the Carolinas increased by slightly more than 30 percent compared to 27 percent for the United States as a whole, with the vast majority of those new jobs created in services rather than goods-producing industries. Whereas goods-producing industries (mostly manufacturing and construction, with a little natural resource extraction thrown in) accounted for more than 37 percent of private-sector jobs in the Carolinas in 1990, they accounted for just 23 percent in 2007. Meanwhile, some key services industries — professional and business services, education and health services, and leisure and hospitality — accounted for just 28 percent of jobs in the two states in 1990 but accounted for more than 41 percent of employment 17 years later. As a result, the employment base of the Carolinas just prior to the Great Recession looked dramatically different than it did in 1990.

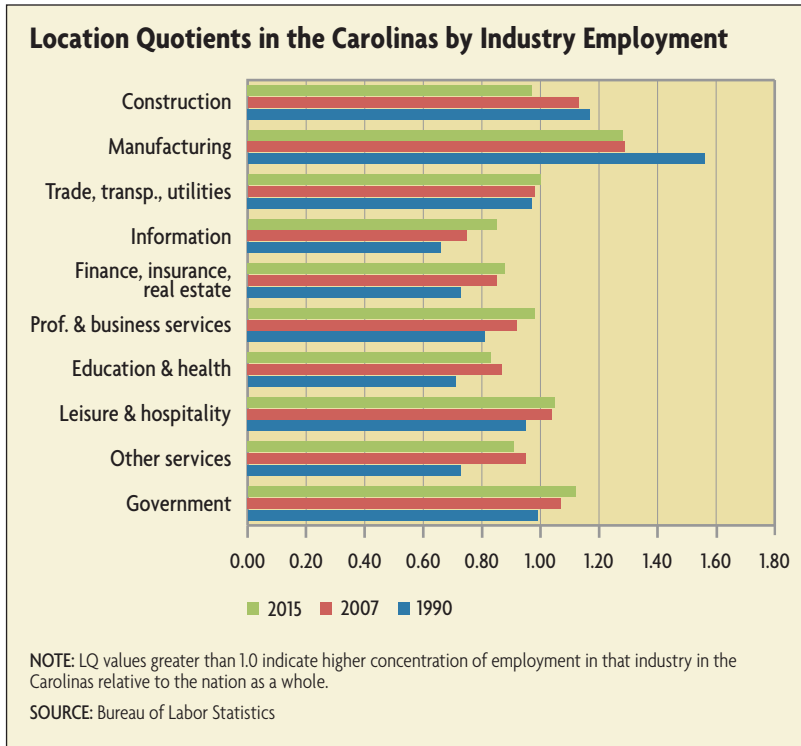
Of course, the Carolinas economy was not the only area going through this type of industrial restructuring at the time. The entire national economy was changing as well. In the United States, manufacturers reduced their payrolls by nearly 4.1 million workers between 1990 and 2007, or a little more than 23 percent. And manufacturing's share of private-sector employment in the United States declined from 19 percent to just under 12 percent.

### Measuring a Changing Jobs Base

One statistical tool that analysts use to assess the structure of a region's economy is the location quotient, or LQ. LQs can be derived using many different economic data — such as income, output, or demographic data. Here, it will be helpful to look at LQs constructed from payroll employment data.

An LQ based on employment is derived by comparing employment shares in the region to the corresponding shares in the nation as a whole, specifically by dividing the former by the latter. For example, in 1990, manufacturing's share of total payroll employment (private sector and public sector) in the Carolinas was 25.2 percent, while manufacturing accounted for just 16.2 percent of the nation's total employment. Thus the region's manufacturing employment LQ in 1990 was 1.55 (25.2/16.2). The key point to remember when using employment LQs is that an LQ equal to 1.00 means that the region's share of employment in an industry is equal to the national average. If the LQ is less than 1.00, the industry is less concentrated in the region than it is in the nation; an LQ greater than 1.00 indicates that employment in that industry is more heavily concentrated in the region than it is for the nation as a whole.

In the LQs for employment by industry concentration



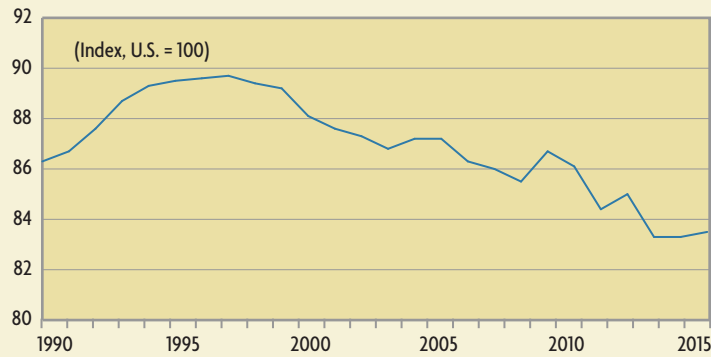
in the Carolinas for 1990, the region's dependence on goods-producing industries at that time is readily apparent. (See chart.) The manufacturing LQ of 1.55 indicates that the region was 55 percent more concentrated in manufacturing employment than the nation, while the construction LQ of 1.17 shows that the region was 17 percent more concentrated in construction employment. In contrast, each of the service-providing industries had employment LQs well below 1.00 in 1990, suggesting that the region was much less concentrated in those particular service-providing industries.

A dramatically different picture of the Carolinas job base emerges when one takes a look at those same location quotients just prior to the Great Recession. An interesting point is that as the years passed, all of the employment LQs for the Carolinas converged toward 1.00, or in other words, toward the national average. In those industries in which the region was more heavily concentrated than the nation — manufacturing and construction — the LQs moved down toward 1.00, while in those industries for which the region was less heavily concentrated than the national average — all of the service-providing industries — the employment LQs moved up toward 1.00. So at the end of the day, while the Carolinas economy was transforming to look less and less like its former self, it started to look more and more like the national economy.

### Structural vs. Cyclical

While aggregated data suggest that the Carolinas have weathered manufacturing job losses over the long term, it appears that private-sector employment in the region remains more volatile and susceptible to economic disruptions in the short

### Carolinas Per Capita Income Relative to U.S. Average



SOURCE: Census Bureau, Bureau of Economic Analysis

term. As the Carolinas economy became less reliant on the highly cyclical manufacturing and construction industries, more closely resembling the economic structure of the nation, one might assume that the Carolinas economy would closely track the nation's through the business cycle. But that has not been the case.

Prior recessions had been particularly unkind to North Carolina and South Carolina. During the recessions of 1991 and 2001, the Carolinas economy fared worse than the nation as a whole in terms of job losses. During the recession in the early 1990s, job losses in the United States amounted to 1.9 percent of private-sector employment, while in the Carolinas job losses amounted to 2.3 percent in the same time frame. And then, in the downturn in the early part of the 21st century, job losses in the Carolinas amounted to 4.7 percent of private-sector jobs during what was a relatively mild recession by most measures. In contrast, the United States shed 3.0 percent of its private-sector jobs during the same economic contraction.

How did the region fare during the Great Recession? Not well. In spite of reduced reliance on highly cyclical industries (manufacturing and construction), and despite assuming an economic profile that more closely resembles the nation's, the region once again suffered disproportionate job losses.

During the labor market downturn that resulted from the Great Recession (roughly the period between January 2008 and February 2010), the U.S. economy lost approximately 8.8 million private-sector jobs, representing a 7.6 percent decline in just over two years.

As bad as the employment numbers looked for the nation as a whole during the Great Recession, corresponding data for the region looked even worse. Combined, North Carolina and South Carolina lost nearly 500,000 private-sector jobs, or an astounding 9.8 percent. Looking at state rankings puts the severity of the region's job losses in perspective: Of the 48 U.S. states (outside of the Carolinas) and the District of Columbia, there were only six jurisdictions that exceeded the 9.8 percent decline that was experienced in the region. Moreover, three of those jurisdictions (Arizona, Florida, and Nevada) were particularly hard-hit by the sharp downturn in

the housing market, a phenomenon that was far less pronounced in the Carolinas.

So while the Carolinas economy remains on a higher-trajectory growth path in the long run, it continues to be more susceptible to economic disruptions in the short run, as evidenced by the deeper plunges into recession.

In addition to employment figures, another telling statistic is per capita personal income relative to the nation. Per capita personal income is a function of total income in a state and its population, or total income divided by population. And when one looks at per capita income in the Carolinas against the rest of the nation, the trends do not look favorable. In 1990, per capita personal income in the

Carolinas was roughly 86 percent of the national average. (See chart.) During the 1990s, the region started narrowing the gap with the national average, and by the late 1990s, the region's per capita income relative to the nation had increased to roughly 90 percent. By 2015, however, it was down to roughly 83 percent. (It is worthwhile to note that during the 1990s, manufacturing employment in the region was already on a slow downward path.)

### The Role of Manufacturing's Decline

The popular press has often pointed to the loss of manufacturing jobs as a contributing factor to the region's relative decline in income, arguing that manufacturing jobs being lost were better paying than the service-sector jobs that were replacing them. While that argument does have some merit, it does not account for two relevant facts. First, as noted earlier, manufacturing job losses were not unique to the Carolinas; they were occurring across the nation. Moreover, average manufacturing wages in the region tended to be lower than nationwide norms. Second, as the Carolinas economy evolved since 1990, its job base transformed to more closely resemble the nationwide averages. Thus, making the argument that the region was losing ground to the nation because of changes to its industry structure becomes more difficult when those changes result in the region's jobs base looking more, not less, like the national average.

So while it is true that the region has lost much of its manufacturing jobs base, that phenomenon alone cannot entirely explain the Carolinas' continued susceptibility to economic disruptions, nor can it wholly account for the region's relatively weak showings in per capita income relative to the nation. Consequently, it makes sense to look not only at the jobs that are being created in the Carolinas, but also at the workforce that the region is developing.

How do states prepare themselves not only to survive economic disruptions (cyclical, technological, or otherwise), but also to embrace them and thrive with them? A logical place to start is by enhancing workers' economic survival skills. And that begins with education and, more broadly, human

capital development. It also happens to be a place where data show that the Carolinas have room to improve.

### Educational Attainment

From a societal standpoint, more highly skilled workers portend more economic growth potential for a region. On an individual level, completion of postsecondary education or skills training leads to higher lifetime earnings potential. It is well documented that workers with a bachelor's degree or higher, on average, will earn considerably more income over their lifetimes than workers who have completed no more than a high school diploma. And that earnings gap is widening.

But perhaps more important to the individual worker is the flexibility that higher skills attainment provides, especially during periods of economic disruption. At no time in recent history was that more evident than during the Great Recession. During the worst of that downturn, while the nation's unemployment rate hit 10 percent, it did not rise above 5 percent for those workers with at least a bachelor's degree. The upshot here: The higher your educational attainment, the more opportunities you will have for employment and the more likely you are to stay employed even in times of significant economic disruption.

So then, how well positioned are workers in the Carolinas, from an educational attainment standpoint, to survive and thrive in periods of economic duress, technological disruptions, or both? Unfortunately, the preponderance of evidence suggests that the Carolinas are somewhat behind nationwide averages. Whether looking at high school graduation rates, college enrollment rates, or percentages of population with postsecondary degrees, the data show that both North Carolina and South Carolina fall below nationwide average levels of attainment. For example, in the United States overall, 32.0 percent of the population between the ages of 25 and 64 had attained a bachelor's degree; the comparable percentages in the Carolinas were 30.9 percent for North Carolina and 27.6 percent for South Carolina. (See table.)

Perhaps of more importance is the seeming underperformance in measurements of the states' STEM (science, technology, engineering, and mathematics) readiness. With more technology being integrated into nearly all job descriptions, there is virtually universal agreement on the need to improve education in the so-called STEM subjects. In 2011, the American Physical Society derived a measure of STEM readiness by state using available metrics for student achievement and enrollment as well as teacher qualification scores, a measure that it called SERI (Science and Engineering Readiness Index). Here again, the Carolinas fell below the nationwide average.

Given their lower level of educational attainment, the Carolinas exhibit some rather predictable economic

### Educational Attainment by Age Group

	U.S.		NC		SC	
	Total	Percent	Total	Percent	Total	Percent
Population 25-64	168,714,683		5,247,099		2,525,878	
High school graduate or higher	149,121,771	88.4	4,623,496	88.1	2,225,714	88.1
Bachelor's degree or higher	53,932,881	32.0	1,622,020	30.9	698,394	27.6

SOURCE: Bureau of the Census, 2015 American Community Survey, 1-year estimate

tendencies. As noted above, higher educational attainment results in greater labor force participation rates, lower unemployment rates, and higher average incomes, on balance. In both North Carolina and South Carolina in 2015, labor force participation rates were lower than the nationwide average, unemployment rates were higher, and average incomes were lower.

These educational attainment statistics go a long way toward explaining the relatively higher susceptibility to economic disruptions that the region has experienced. The less educated a worker is, the more likely he or she is to become unemployed in times of economic turmoil.

In addition, the relatively poor performance in per capita personal income makes sense as well. Compared to nationwide averages, both states have a smaller share of their total population actively participating in the economy (lower labor force participation rates). Of those who are participating, a smaller share are actually employed (higher unemployment rates). And those who are working earn lower wages, on average, than their national counterparts.

### Conclusion

The economies of North Carolina and South Carolina have gone through a painful adjustment process since the early 1990s as a combination of changing consumer preferences, technological advances, and cyclical disruptions dramatically reduced the number of manufacturing jobs. Over this time frame, the states have largely moved on in impressive fashion with payroll employment growth in both states exceeding the nationwide average. And manufacturing jobs are growing once again, albeit slowly. However, over the course of recent business cycles, employment growth in the region has remained more volatile than in the nation as a whole.

Moreover, the jobs being created (manufacturing and otherwise) are very different than they were just a decade ago. Most require a greater understanding of information technology and automation as well as education beyond high school. Those jobs that do not require such skills are often low paying or prime candidates to be replaced by technology one day. So long as the region lags behind the nation in most measures of educational attainment, its workers are likely to remain more susceptible to economic disruptions, technological or otherwise. **EF**