

Manufacturing in the Fifth District: Assessing Its Role During the Great Recession

BY ROBERT H. SCHNORBUS

The manufacturing sector offers many potential benefits to a regional economy. Jobs are the most obvious. The arrival of major manufacturing facilities, such as the Boeing aircraft plant in South Carolina recently and the opening of auto assembly and supplier plants in the Fifth District and throughout much of the South over the last decade, has caused understandable excitement — both for states seeking new tax revenues and for workers seeking better jobs. Yet manufacturing jobs, especially in auto-related industries, are also notoriously cyclical. Indeed, the expansion of manufacturing industries that are highly cyclical may actually compound the Fifth District's total employment losses during recessions. How problematic was the total employment decline in the manufacturing sector during the recent recession for those states with high concentrations of manufacturing employment?

States that have an above-average concentration of their employment in manufacturing, relative to the nation, typically have some comparative advantage that attracts the industry to the region such as access to markets, raw materials, or workers with desired skills. In the case of the Fifth District and the South in general, they seem to be attracting new industries (most notably the auto industry, but also aerospace, pharmaceuticals, and other relatively high-tech industries) that are replacing at least some of the older industries which have been declining over the years (such as textiles, apparel, and furniture). However, looking at employment and industry specialization data shows that states in the Fifth District — and, indeed, throughout the

South — with more specialized manufacturing industries saw greater employment declines during the last recession.

Manufacturing Trends in the South

Over the last 30 years, there has been impressive economic growth throughout the South, as population and jobs have shifted away from the Northeast and Midwest. The population of the region as a whole has nearly doubled since 1970, with a growth rate about 40 percent faster on average than the nation as a whole. Over that period, its share of the nation's population has risen from less than 22 percent to just over 25 percent, and its per capita income has increased rapidly to a level nearly equaling the national average.

People have been drawn to the region for a variety of reasons, perhaps most importantly for its job opportunities — many of which over the years have been in manufacturing. Indeed, the migration of manufacturing jobs to the South has been part of a natural cycle of regional growth and development, as production processes in one region move out of their formative stages toward maturity and firms seek lower-cost regions where they can increase their profitability and competitiveness by lowering their production costs. The South has long benefited from such a cycle as, for example, textile and apparel industries left the North and settled in the South — often moving later offshore as cost advantages emerged in other countries. As textile and other jobs left the South, they were often replaced in recent decades by more skilled manufacturing jobs that were leaving the Midwest, helping to raise incomes and the standard of living throughout the South.

About the Analysis

The South is defined here to include the 12 states comprising the Census Bureau's South Atlantic and East South Central regions. The West South Central region, which includes Arkansas, Louisiana, Texas, and Oklahoma, is excluded from the analysis because it has a much larger energy sector and is less closely related to economic trends in the Fifth District.

Although part of West Virginia is not within the Fifth District, analyses of the Fifth District in this article include all Fifth District states (Maryland, North Carolina, South Carolina, Virginia, and West Virginia) in their entirety. The District of Columbia, which is also part of the Fifth District, is excluded from the analyses of both the South and the Fifth District on account of the limited manufacturing activity that takes place there.

High-tech industries are often defined as any industry at the four-digit NAICS code level in which employment in technology-oriented occupations account for a proportion of that industry's total employment that is

at least twice as great as the 4.9 percent average for all industries. Since industries in this analysis are considered only at the three-digit industry level, a high-tech status was given to any three-digit industry that contained one or more of the officially designated four-digit high-tech industries.

For example, the high-tech classification for Aerospace Product and Parts Manufacturing (NAICS code 3364) is transferred to the more aggregated Transportation Equipment Manufacturing (NAICS code 336). While the three-digit industries may include other industries that do not meet the four-digit rule, they are assumed in this analysis to be more likely to reflect high-tech industry behavior than industries that do not contain any four-digit high-tech industries. (For the complete classification of high-tech industries, see "High-tech employment: a NAICS-based Update," *Monthly Labor Review*, July 2005.)

That shift of employment to new industries in the South might be expected to create some cushion to a recessionary downturn, compared to the older, more mature industries they were replacing (many of which might simply go out of business during a recession). As it turns out, however, the changing specialization within manufacturing may have only amplified the effects of the recent recession on the South and particularly the Fifth District.

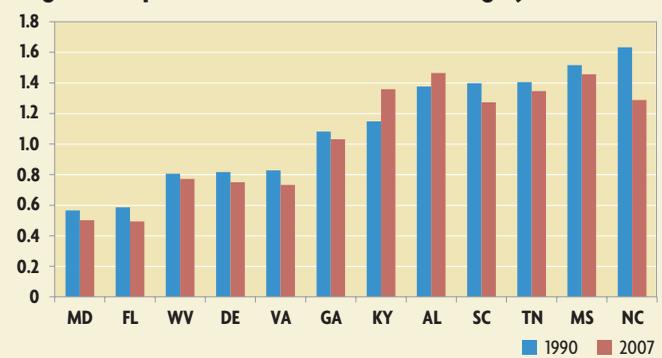
A region's concentration in a particular industry relative to the national average, often defined as its "degree of specialization," is measured by the ratio of the share of the region's total employment in that industry to the share in the nation as a whole. Any region with a higher share than the nation is considered to be relatively specialized in that industry. (See chart.) For example, about 14 percent of the Fifth District's total employment in 2000 (just as the decline in manufacturing was beginning to accelerate) was in its manufacturing sectors, compared to 13 percent for the nation — a small, but still notable, difference for a fairly large region. Technically, the degree of specialization, or the ratio of the Fifth District's share of manufacturing to total employment, was 1.05. In the South as a whole, manufacturing's degree of specialization was 1.01 — still somewhat specialized, but much less than in the Fifth District. However, the specialization of individual states within the Fifth District, as well as other southern states, shows much greater variation than suggested by either region as a whole. For example, North Carolina in 2007 had the highest specialization in the South (1.48), and Maryland had the lowest (0.54). In most cases, specialization in manufacturing among states in the South has been declining since 1990, the exceptions being Kentucky and Alabama. That specialization in manufacturing can then be tied to the effect of the last recession on total employment in each of the states in the Fifth District and the South.

Specialization and the Great Recession

Given that the manufacturing sector is inherently cyclical, large losses in manufacturing output and jobs during recessions should not be surprising. Indeed, during the last recession, nearly half of a total decline in GDP between 2007 and 2009 was attributed to manufacturing output losses. Manufacturing output was only 13 percent of GDP in 2007, but its contribution to the recession was well over three times its share of the economy. In the case of manufacturing employment, nationally it accounted for 10 percent of total employment in 2007, but accounted for 27 percent of the total employment losses during the recession — less of a contribution than in the case of output, but still significant. The difference between the two measures could again be a reflection of the role of technological changes and increased productivity over time that allows output to grow at a faster pace than employment in manufacturing.

From a regional perspective, both the Fifth District and the South overall have tended to be slightly more cyclical with respect to their total employment and slightly less

Degree of Specialization in Manufacturing by State



SOURCE: Bureau of Economic Analysis, Federal Reserve Bank of Richmond

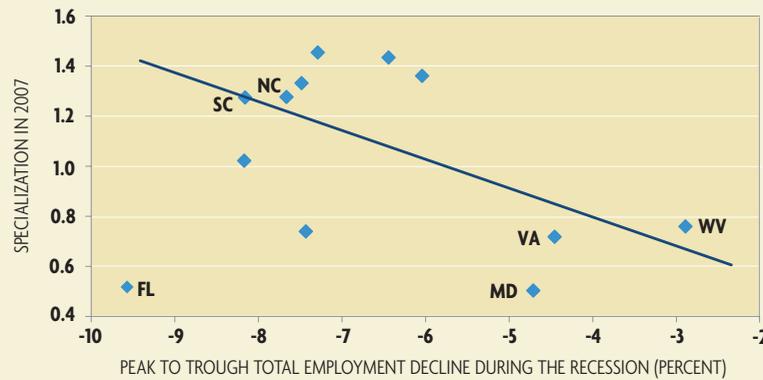
cyclical with respect to manufacturing employment than the nation on average over the last several recessions, adjusting for relative size differences and underlying trend over time to focus on just the cyclical component of employment.

As with their differences in specialization, individual states within the Fifth District exhibited a much wider variation in cyclical sensitivity, as measured by the magnitude of their employment swings in employment from peaks to troughs during the last three recessions. For example, both North and South Carolina tended to have much greater cyclicity in both total and manufacturing employment, while Maryland and West Virginia were actually much less cyclical than the nation. Virginia tended to experience cyclical swings in both their total and manufacturing employment that were similar to the nation. Since each state had different degrees of specialization in their manufacturing sectors, this variety offered an interesting comparison of the relationship between specialization in manufacturing and the impact of recessions in the region.

Based on the experience over the last recession, a clear pattern of a higher degree of specialization in manufacturing being associated with deeper total employment losses was evident among all five states in the Fifth District. (See top chart on page 50.) The relationship that emerges is statistically significant when measured across all states in the South, with one exception: Florida has only about 5 percent of its employment in manufacturing, or less than half the national average, but experienced a particularly harsh recession. Florida, along with California, Arizona, and Nevada, was one of the major centers of the housing crisis during the recession, and that may have amplified the impact of the recession compared to other states in the region.

This relationship between specialization and cyclicity does not hold true across all states in the nation or for all recessions, but seems to be consistently true of the South over the last three recessions. Indeed, if the states in the West South Central region are included in the analysis (and most of them are highly specialized in manufacturing), the relationship between specialization in manufacturing and total employment decline during the last recession breaks down, perhaps due to the spillover effects from a booming

Relationship Between Employment Loss and Degree of Specialization During the Recession



NOTE: Florida is not included in calculation of best-fit line.
SOURCE: Bureau of Economic Analysis, Federal Reserve Bank of Richmond

energy sector on total employment in states such as Texas. Also, the relationship failed to hold up for the South in the recession in the early 1980s — the only recession to rival the last recession in intensity of both output and employment decline. The relationship was present, however, for the South in both the 1990-91 and 2000 recessions. Thus, the pattern observed in the last recession is not unusual for the region, at least over the last three recessionary periods, even as specialization declined among most states in the region.

Specialization in North Carolina and Virginia

North Carolina and Virginia, two states of approximately equal employment size, provide an opportunity to look in more depth at the role of the manufacturing sector over the last recession. Both are quite different in the degree to which they are specialized in manufacturing employment — North Carolina being fairly highly specialized and Virginia not being specialized on average. And both have different cyclical patterns in employment — North Carolina being much more cyclical than Virginia, especially during the last recession. (See adjacent chart.) Indeed, North Carolina, not surprisingly, experienced a much larger percentage decline in total employment during the recession than Virginia (-7.7 percent and -4.5 percent, respectively). As with the region as a whole, the difference in specialization in manufacturing between the two states was associated with significantly different rates of decline in total employment during the last recession.

To get more insight into the relationship between specialization in manufacturing and employment decline, the research department of the Richmond Fed took a closer look at selected manufacturing industries in the two states. Industries within the manufacturing sector were selected from two categories: first, those experiencing the greatest increase in the degree of their specialization between 1990 and 2007 (before the onset of the last recession), and second, those experiencing the greatest decrease during that period. The top five industries in each category were included from each state.

Many factors could account for these changes in special-

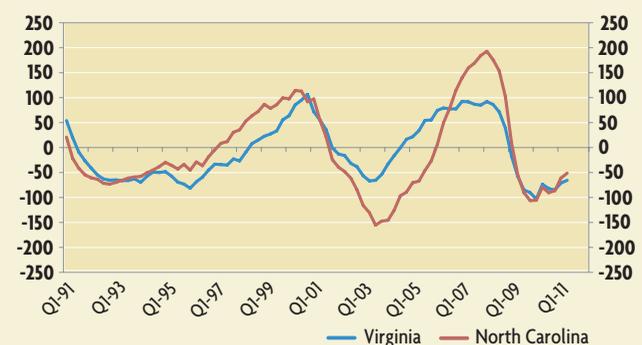
ization, as each state underwent shifting comparative advantages that may have attracted or driven away employment in these industries. But since each industry has a fairly consistent pattern of response to business cycle fluctuations over time, it is possible to gain insight into their contribution to changes in manufacturing employment in the region during the last recession.

To make comparisons among the specific industries within manufacturing, it is helpful to differentiate them using three classifications. The first is whether the industry was already specialized or not, to determine its relative importance to the state's economy. The second is whether the industry was more or less cyclical than manufacturing on average at the national level, to

determine if it was increasing or dampening the decline in employment during recessions relative to other manufacturing industries. The third is whether the industry was more or less likely to contain high-tech manufacturing firms, in order to determine if the attraction of high-tech firms might be related to differences in the cyclical behavior of total employment in the two states. (See table.)

While these classifications are somewhat subjective and the sample is limited to only the top five industries in each category, the results indicate a clear tendency for movement toward industries with greater cyclicity among the selected industries in North Carolina. For example, of the five industries in North Carolina that were increasing their degree of specialization, three had above-average cyclicity. However, among the five industries that were decreasing their specialization and thus becoming relatively less important, three had below-average cyclicity. In other words, manufacturing in the state was moving toward at least some industries that would have a tendency to increase the impact of recessions on the state and away from industries that might help dampen the impact. In Virginia, both those industries that were increasing and those that were decreasing their specialization tended to have below-average cyclicity. Thus, the effects of change on that state as a

Comparison of Cyclicity of NC and VA Total Employment, Detrended (in thousands)



SOURCE: Bureau of Economic Analysis, Federal Reserve Bank of Richmond

whole may have been offsetting, keeping the state's cyclicity relatively low.

In both states, the industries that were increasing their degree of specialization were not industries in which the states were already specialized. The lack of a high concentration of employment in such industries somewhat reduces their importance to the cyclicity of the state's employment. In contrast, the industries that were becoming less specialized and thus less important were industries in which both states were specialized; in all but one case, they were the same industries in each state — tobacco, furniture, apparel and textile mills, or the industries with which both states have been traditionally associated. Again, while the sample of industries is limited, the trend of the states away from their old manufacturing base was evident. Since these industries have below-average cyclicity, it suggested a tendency for these changes to contribute to the states becoming more vulnerable to recessions.

Finally, a pattern of change among industries classified as high-tech was also suggested from the comparison of the two categories of industries. In North Carolina, the industries that were increasing their specialization in the state tended to have at least some link to high-tech industries. The industries that were losing importance, however, tended to be more closely linked to industries that are not high-tech. Since these high-tech industries were also associated with industries with above-average cyclicity, they seemed on balance to be increasing the state's exposure to the business cycle. At the same time, industries that were becoming less specialized were the ones that tended to be less cyclical. Again, the shift among industries seemed to be favoring increasing the overall cyclicity of the state. In contrast, both the industries that were becoming more important and less important in Virginia tended not to be classified as high-tech. As such, the shifting of industries in terms of their relationship to technology again appeared to be less important than in North Carolina. Overall, the biggest changes in Virginia were coming from industries that seemed to be relatively stable, which might help explain in part why Virginia's total employment was less cyclical than North Carolina's.

Implications for the Next Recession

While many factors contribute to the cyclical behavior of any specific industry or an entire manufacturing sector in a region, two key points emerge from the analysis above with respect to the Fifth District and the South as a whole. First, while manufacturing employment over time has become a smaller share of the national and regional economy, states with above-average specialization in manufacturing were likely to experience more severe recessions. That relationship seemed to hold true over time, even as the degree of specialization in manufacturing declined among most states in the region. Second, the new, more high-tech manufacturing industries toward which the Fifth District tended to be

Top 5 Manufacturing Industries in NC and VA in Terms of Increasing vs. Decreasing Specialization

	Specialized in 2007	Highly Cyclical	High-Tech
North Carolina — Increasing Specialization			
Paper manufacturing	•		
Other transportation equipment mfg		•	•
Chemical manufacturing	•		•
Fabricated metal product mfg		•	•
Motor vehicles and parts mfg		•	•
North Carolina — Decreasing Specialization			
Apparel manufacturing		•	
Beverage and tobacco product mfg	•	•	
Furniture and related product mfg	•		
Textile mills	•		
Textile products	•		
Virginia — Increasing Specialization			
Paper manufacturing			
Textile products			
Wood product manufacturing	•	•	
Machinery manufacturing		•	•
Petroleum and coal products mfg			•
Virginia — Decreasing Specialization			
Apparel manufacturing		•	
Beverage and tobacco product mfg	•	•	
Furniture and related product mfg	•		
Textile mills	•		
Chemical manufacturing			•

NOTE: "High-Tech" designation derived from BLS studies identifying high-tech industries.
SOURCE: Bureau of Economic Analysis, Bureau of Labor Statistics, Federal Reserve Bank of Richmond

migrating showed a tendency to increase the relationship between specialization in manufacturing and the impact of recessions.

Again, the expansion of the automotive industry in the Fifth District and the South in general may be a good example of states that are moving toward more cyclically sensitive industries. The fact that this industry was also one of the hardest hit by the recent recession helps explain some of the difference in total employment losses among states. Indeed, virtually all of the states in the South that are most closely associated with the automotive industry and its supplier base (i.e., Alabama, North Carolina, South Carolina, and Tennessee) experienced more severe declines in total employment than the South on average during the last recession. (Only Kentucky managed to fare somewhat better than the region on average.) These new industries may bring with them higher paying jobs, but they may also have a greater tendency to cut employment in hard times.

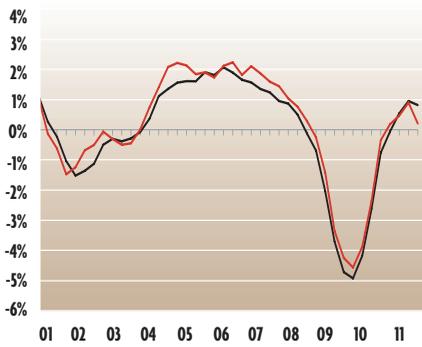
Whatever the exact causes, the changing industry specialization in the Fifth District is bringing both advantages and disadvantages to the regional economy. Obviously, more work needs to be done to obtain deeper insights into the causes of the changes that occurred over the last three recessions, but an initial look at the data suggests that the Fifth District and, perhaps, the entire South may be facing a mixed blessing as its manufacturing base expands — more employment during good times combined with greater exposure to total employment declines during recessionary periods. Yet on balance, the District's manufacturing base is growing and evolving, and that is good for the entire region as standards of living improve, even if the price may be greater exposure to the effects of recessions. **RF**

State Data, Q2:11

	DC	MD	NC	SC	VA	WV
Nonfarm Employment (000s)	713.3	2,514.5	3,881.0	1,821.5	3,653.8	751.9
Q/Q Percent Change	-0.2	0.1	0.1	0.4	0.2	0.4
Y/Y Percent Change	-0.2	-0.4	0.1	0.7	0.4	0.7
Manufacturing Employment (000s)	1.2	113.4	434.4	214.1	233.3	49.6
Q/Q Percent Change	0.0	1.1	-0.1	1.9	1.0	0.5
Y/Y Percent Change	-7.7	-1.6	0.5	3.3	0.7	0.8
Professional/Business Services Employment (000s)	151.0	392.4	497.8	224.1	664.6	63.0
Q/Q Percent Change	1.2	0.8	0.7	1.1	0.7	0.9
Y/Y Percent Change	2.0	1.6	3.9	5.1	2.8	4.2
Government Employment (000s)	247.3	497.0	688.7	334.1	704.0	149.6
Q/Q Percent Change	-0.9	-0.5	-0.9	0.0	0.1	-0.2
Y/Y Percent Change	0.0	-1.4	-3.7	-5.0	-1.0	-3.0
Civilian Labor Force (000s)	334.0	2,989.9	4,498.2	2,155.1	4,204.5	782.1
Q/Q Percent Change	0.1	0.4	0.6	0.0	0.4	0.0
Y/Y Percent Change	-0.5	0.3	-0.9	-0.5	0.4	-0.1
Unemployment Rate (%)	9.9	6.9	9.8	10.1	6.0	8.6
Q1:11	9.5	7.1	9.8	10.2	6.4	9.4
Q2:10	9.9	7.4	10.8	11.2	7.0	8.8
Real Personal Income (\$Mil)	39,137.8	261,403.4	306,829.3	138,523.6	326,472.6	54,261.6
Q/Q Percent Change	0.4	0.4	0.3	0.4	0.2	0.4
Y/Y Percent Change	2.7	2.4	1.9	2.3	2.3	2.0
Building Permits	717	2,801	8,673	4,132	5,458	460
Q/Q Percent Change	0.4	16.0	2.4	15.8	-6.5	26.4
Y/Y Percent Change	2212.9	-19.3	-10.0	4.4	-4.2	-20.7
House Price Index (1980=100)	572.7	408.7	306.2	308.7	396.4	213.5
Q/Q Percent Change	2.3	-1.8	-1.7	-2.5	-1.2	-2.8
Y/Y Percent Change	2.2	-4.6	-3.9	-4.0	-2.9	-0.0
Sales of Existing Housing Units (000s)	9.2	76.0	135.6	70.0	104.0	25.2
Q/Q Percent Change	-8.0	-7.8	-3.7	2.3	-7.5	-11.3
Y/Y Percent Change	-11.5	-12.8	-17.1	-17.5	-11.9	-12.5

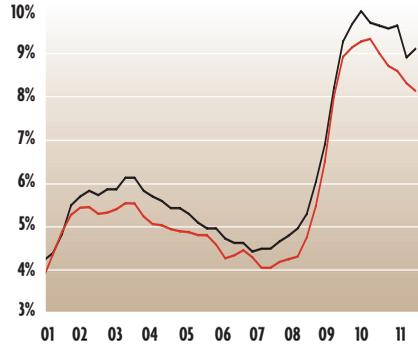
Nonfarm Employment

Change From Prior Year
First Quarter 2001 - Second Quarter 2011



Unemployment Rate

First Quarter 2001 - Second Quarter 2011



Real Personal Income

Change From Prior Year
First Quarter 2001 - Second Quarter 2011

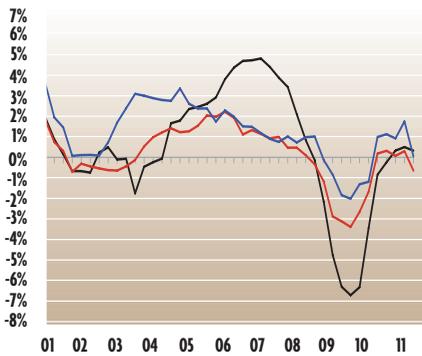


— Fifth District

— United States

Nonfarm Employment Metropolitan Areas

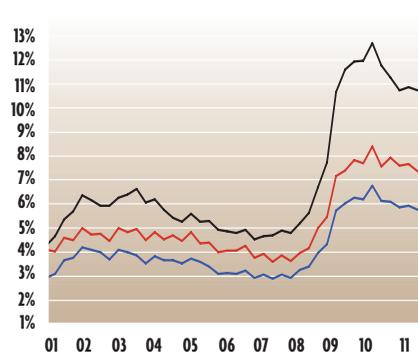
Change From Prior Year
First Quarter 2001 - Second Quarter 2011



— Charlotte — Baltimore — Washington

Unemployment Rate Metropolitan Areas

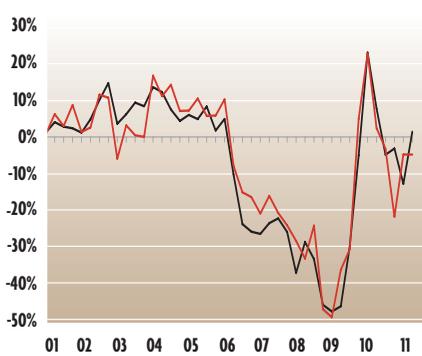
Change From Prior Year
First Quarter 2001 - Second Quarter 2011



— Charlotte — Baltimore — Washington

Building Permits

Change From Prior Year
First Quarter 2001 - Second Quarter 2011



— Fifth District — United States

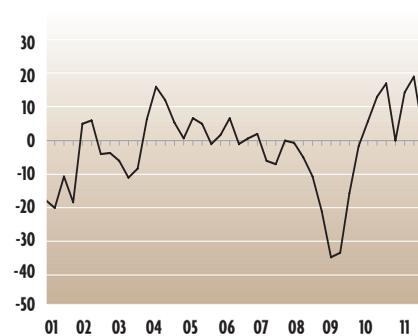
FRB—Richmond Services Revenues Index

First Quarter 2001 - Second Quarter 2011



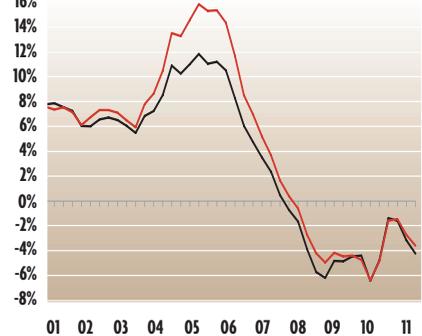
FRB—Richmond Manufacturing Composite Index

First Quarter 2001 - Second Quarter 2011



House Prices

Change From Prior Year
First Quarter 2001 - Second Quarter 2011



— Fifth District — United States

NOTES:

1) FRB-Richmond survey indexes are diffusion indexes representing the percentage of responding firms reporting increase minus the percentage reporting decrease. The manufacturing composite index is a weighted average of the shipments, new orders, and employment indexes.
2) Building permits and house prices are not seasonally adjusted; all other series are seasonally adjusted.

SOURCES:

Real Personal Income: Bureau of Economic Analysis/Haver Analytics.
Unemployment rate: LAUS Program, Bureau of Labor Statistics, U.S. Department of Labor, <http://stats.bls.gov>.
Employment: CES Survey, Bureau of Labor Statistics, U.S. Department of Labor, <http://stats.bls.gov>.
Building permits: U.S. Census Bureau, <http://www.census.gov>.
House prices: Federal Housing Finance Agency, <http://www.fhfa.gov>.

Metropolitan Area Data, Q2:11

	Washington, DC	Baltimore, MD	Hagerstown-Martinsburg, MD-WV
Nonfarm Employment (000s)	2,420.9	1,278.2	96.7
Q/Q Percent Change	1.1	2.3	1.2
Y/Y Percent Change	0.0	-0.6	-1.5
Unemployment Rate (%)	5.7	7.4	9.3
Q1:11	5.8	7.5	9.7
Q2:10	6.2	7.8	9.7
Building Permits	4,348	905	141
Q/Q Percent Change	4.6	-16.1	12.8
Y/Y Percent Change	37.7	-31.1	-48.0
	Asheville, NC	Charlotte, NC	Durham, NC
Nonfarm Employment (000s)	167.8	808.2	281.8
Q/Q Percent Change	1.9	1.3	1.0
Y/Y Percent Change	0.1	0.3	0.1
Unemployment Rate (%)	7.8	10.5	7.2
Q1:11	7.9	10.6	7.1
Q2:10	8.7	11.8	7.9
Building Permits	285	1,568	546
Q/Q Percent Change	-0.7	9.7	19.7
Y/Y Percent Change	-26.7	-7.9	8.1
	Greensboro-High Point, NC	Raleigh, NC	Wilmington, NC
Nonfarm Employment (000s)	341.8	506.0	137.3
Q/Q Percent Change	1.8	1.3	2.4
Y/Y Percent Change	0.4	1.8	-1.1
Unemployment Rate (%)	10.1	7.8	9.7
Q1:11	10.2	7.8	9.5
Q2:10	11.3	8.8	10.4
Building Permits	412	2,132	452
Q/Q Percent Change	-36.5	95.1	16.2
Y/Y Percent Change	-20.5	36.1	-23.0

	Winston-Salem, NC	Charleston, SC	Columbia, SC
Nonfarm Employment (000s)	206.3	288.7	344.6
Q/Q Percent Change	2.1	2.0	1.0
Y/Y Percent Change	0.4	1.1	-0.3
Unemployment Rate (%)	9.3	8.6	8.7
Q1:11	9.3	8.4	8.5
Q2:10	10.2	9.3	9.2
Building Permits	337	1,030	780
Q/Q Percent Change	67.7	43.3	-0.8
Y/Y Percent Change	7.7	39.0	-7.4
	Greenville, SC	Richmond, VA	Roanoke, VA
Nonfarm Employment (000s)	297.5	599.5	155.7
Q/Q Percent Change	0.8	0.8	2.5
Y/Y Percent Change	0.4	-1.3	-0.3
Unemployment Rate (%)	8.5	6.8	6.4
Q1:11	8.5	7.2	6.9
Q2:10	9.7	7.7	7.3
Building Permits	494	765	101
Q/Q Percent Change	14.6	25.4	-5.6
Y/Y Percent Change	30.3	-25.7	-27.9
	Virginia Beach-Norfolk, VA	Charleston, WV	Huntington, WV
Nonfarm Employment (000s)	739.5	151.0	114.7
Q/Q Percent Change	2.8	3.3	1.8
Y/Y Percent Change	-0.2	2.0	-0.1
Unemployment Rate (%)	6.8	7.9	8.5
Q1:11	7.0	8.8	9.3
Q2:10	7.4	7.7	8.4
Building Permits	1,175	31	29
Q/Q Percent Change	1.5	29.2	625.0
Y/Y Percent Change	1.1	-8.8	262.5

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