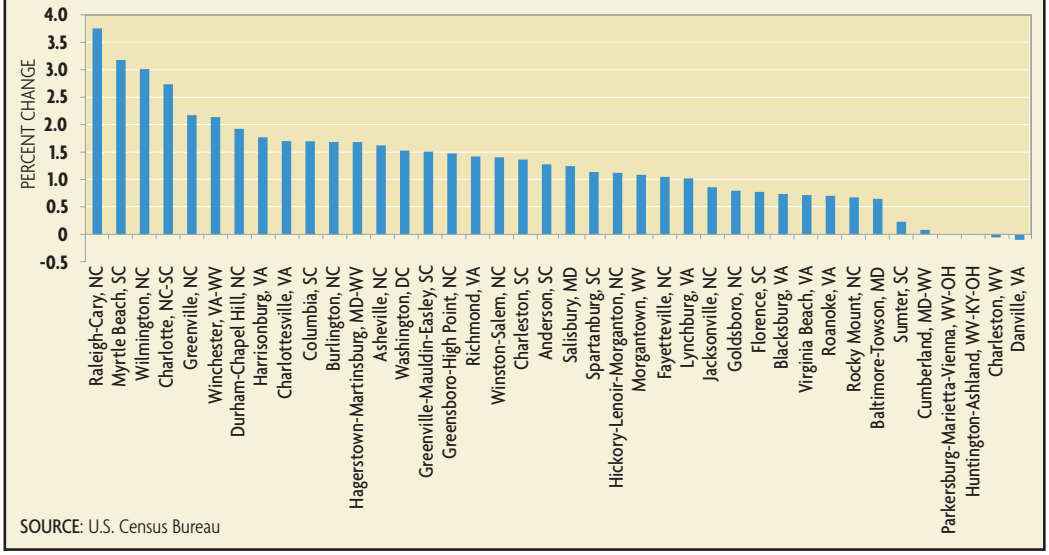
Dimensions and Drivers of Metro Area Growth: How Do Fifth District Metros Stack Up?

BY ANN MACHERAS AND JAKE BLACKWOOD

Metropolitan areas across the country vie to be the fastest growing, the most attractive to younger generations, and the most suitable for new business. Growth provides a city with tax revenues to finance maintenance and enhancements to infrastructure, public spaces, cultural amenities, education, and other benefits, perpetuating the positive cycle that attracts even more businesses and skilled workers to remain competitive. A city with a stagnating or contracting population will soon find fewer of its young people returning home after college because of a lack of employment opportunities. Indeed, the quality of life that comes along with a healthy job environment and plentiful options for cultural and recreational activities requires a critical mass of population to support and participate in the life of the city.

Growth in a metropolitan area can be measured in various ways. The most obvious is an increase in the population, but of course, growth in the number of residents is not beneficial in and of itself unless there are productive opportunities for work. Both population growth and income growth are important for assessing the vitality of metropolitan areas. By looking at data on drivers of growth for different metro areas in the Fifth District, we can get a better understanding of where the region's growth is likely to be strongest in the future (see chart).

Fifth District Metros: Average Annual Population Growth, 1990-2010



SOURCE: U.S. Census Bureau

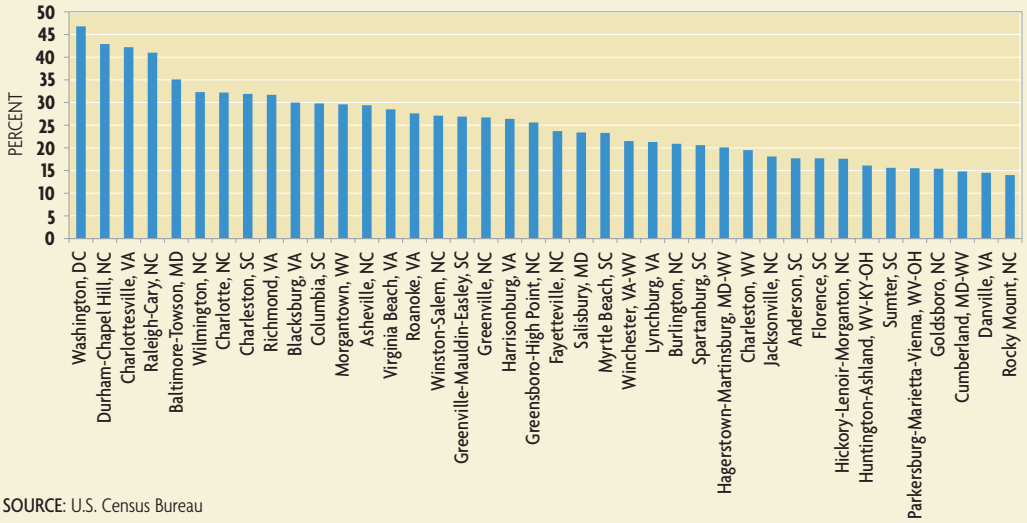
Understanding the Drivers of Regional Growth

What causes some metropolitan areas to grow more quickly than others? Many factors matter, but their relative importance evolves over time. For example, many metros thrived due to natural advantages such as proximity to waterways for easier transportation of goods or access to nearby natural resources for production. This was particularly true when manufacturing activity dominated the economy, but it does not matter as much in the more diverse economy today. More recently, metropolitan areas in the South and West have benefited from migration based on their climates, which are considered more favorable than those of their counterparts in the North. Beyond these place-specific elements, a major focus in urban economics research has highlighted the importance of agglomeration economies, more generally referred to as economies of scale, as a contributor to the growth of metropolitan areas.

Agglomeration effects relate to the size and density of the city, known as urbanization economies, or to the concentration of a particular industry within a city or region, referred to as localization economies. Increased urbanization provides firms across industries with the variety of business services and easy access to specialized labor that improve productivity. An example of this is the wide range of industries that have thrived in New York City, where industries as different as financial services and fashion design can benefit from an array of service providers, such as law firms that offer specialized legal counsel to sophisticated businesses, as well as from a highly educated pool of labor. Similarly, localization economies offer firms within the same and closely related industries benefits from knowledge spillovers, access to a common specialized labor pool, and economies of scale in accessing intermediate goods.

In Upstate South Carolina, growth in companies that produce automotive parts and equipment has flourished since BMW established an automotive assembly plant in Spartanburg in 1994. These companies, which

Fifth District Metros: Educational Attainment, Percent of Population 25+, Bachelor's Degree or Higher



SOURCE: U.S. Census Bureau

now number over 150, benefit from a skilled local workforce and nearby university and community college programs that support ongoing training and research needs for the automotive cluster. Moreover, when firms and their workers operate in closer proximity to each other, they are afforded opportunities to learn from each other and apply expanded knowledge to production or to the provision of services. It makes sense, then, that as production has shifted toward services and toward goods that rely on more skilled labor and greater technology, the importance of agglomeration effects has likely overtaken the contribution of natural advantage in explaining growth across metropolitan areas.

Agglomeration economies drive growth in metropolitan areas, but what matters most in creating these economies? Improvements in data collection and estimation methods have allowed for empirical research that clearly connects the importance of human capital to metropolitan area growth. Population growth in metropolitan areas with high educational attainment has far surpassed growth of metropolitan areas with low educational attainment. A 2004 study by Edward Glaeser of Harvard University and Albert Saiz of the University of Pennsylvania found that metropolitan areas where less than 10 percent of adults had bachelor's degrees in 1980 grew by 13 percent in the 1980-2000 period, while metropolitan areas with a higher share of college-educated adults (more than 25 percent) grew almost three times as fast, at an average rate of 45 percent (see chart).

The researchers tested the direction of the relationship as well. They looked at the question of whether skilled workers flock to the cities that are already growing or whether cities grow because they have a higher share of educated workers. They found that many variables are positively correlated with metropolitan area growth, including a warmer and drier climate, but that the human capital related variables have the most significant effect. Furthermore, measures of human capital matter for growth even when controlling for other important variables. On the other hand, when they considered the possibility of reverse causality — that differences in growth rates predict the percentage of the population with a college education — they found that this holds for only a small number of declining metro areas and found no support for this in growing metro areas.

Using an alternative approach to analyze the growth path of metropolitan areas, economists from the St. Louis Fed and the University of Oregon found in a 2008 article in the *Journal of Urban Economics* that different factors may influence growth in metropolitan areas during periods of low growth versus periods of high growth. They found that human capital plays an important role in high-growth phases, but does not seem to matter as much in low-growth phases. (However, the share of employment engaged in manufacturing is a significant contributor to declining growth when the economy is in a low-growth phase.)

Another area of economic research on urban growth focuses on clusters of occupations in a metropolitan area and how they can be classified to provide additional information on the level of knowledge within the area, beyond the simple share of college-educated adults. This research stresses the fact that college graduates are not all alike, representing a broad array of skills, and that some of the occupation clusters, such as those that demonstrate a high level of knowledge about commerce and information technology, are stronger predictors of growth than other occupations.

Comparing Drivers of Growth Across Metros

Metropolitan areas in the United States grew on average at a rate of 1.2 percent from 1990 to 2010, a period sufficiently long to examine how base-year attributes, such as educational attainment and industry mix, correspond with slower or faster growth in population. For a simple examination of these key variables, the metropolitan areas were combined into four groups based on quartiles of population growth from 1990 to 2010. Each quartile contains 90 metropolitan areas, for a total of 360 for which the data is complete over the period. The summary information on educational attainment, industry mix, and population growth revealed some interesting patterns that align reasonably well with the economic theory (see Table 1).

The slowest-growing group of metropolitan areas had the lowest level of educational attainment in 1990, with 75.2 percent of the population over age 25 having graduated from high school and 16.6 percent holding a bachelor's degree or more. The average annual population growth for this group of metros was only 0.1 percent from 1990 to 2010. Further, the industry mix for these areas was heavily weighted toward manufacturing, which accounted for more than 20 percent

of employment in 1990. In contrast, the fastest-growing 25 percent of metropolitan areas started the period with nearly 20 percent of the population over age 25 holding a bachelor's degree or more and a much smaller share of employment, only 13.8 percent, engaged in the manufacturing sector. Population growth for this group of metros averaged 2.4 percent annually from 1990 to 2010, more than 20 times faster than the slowest-growing group.

The comparison of metropolitan areas using the indicators from the starting year suggests that higher growth rates occurred where skilled workers were already more concentrated. When we review the same growth determinants for the end of the period, we find that the same relative advantages hold up, as the faster-growing half of the metropolitan areas had higher levels of college attainment (see Table 2).

In addition, we have information on occupation mix for 2010 that we do not have for the earlier base year. As measured by the number of workers per thousand, the fastest-growing metropolitan areas had a higher share of workers in knowledge intensive occupations in 2010. Combining computer science and mathematical occupations as well as architectural and engineering occupations, the slowest-growing metropolitan areas averaged 31 workers (per thousand) engaged in this type of work, while the fastest-growing metropolitan areas averaged 37 workers in these highly skilled occupations. Thus, a worker in a fast-growing area is 20 percent more likely to be in a knowledge-intensive occupation than a worker in a slow-growing area. Conversely, the slowest-growing metropolitan areas had a much higher concentration of production workers per thousand employed — 83 workers compared to 59 workers in the fastest-growing areas.

Growth in per capita income is often viewed as an indicator of growth and economic development because it suggests an improvement in standard of living and not just an increase in the number of inhabitants. To explore the relationship between income growth and the key growth indicators, we divided the metropolitan areas into four quartiles based on average annual growth in per capita income from 1990 to 2010. Similar to the findings for population growth, the share of college-educated adults increased as we moved from the slower-growing metropolitan areas to the group that had higher income growth. This is not surprising, since college-educated workers tend to earn higher wages than less-educated workers. Also, the share of employment in manufacturing declined when we compared metropolitan areas with slower per capita income growth to those areas with higher income growth, similar to the comparison for population growth.

Table 1

Growth and 1990 Baseline Variables	Metropolitan Areas Grouped by Average Annual Population Growth, 1990-2010			
	Bottom 25%	2nd quartile	3rd quartile	Top 25%
Average annual population growth, 1990-2010	.11	.81	1.3	2.4
Percent high school graduate and above (1990)	75.2	75.5	76.6	75.1
Percent bachelor's degree or above (1990)	16.6	19.2	20.3	19.6
Manufacturing share of total employment, 1990	20.4	18.3	16.3	13.8
Professional and business services share of total employment, 1990	6.9	7.6	7.5	7.8

SOURCES: U.S. Census Bureau and Bureau of Labor Statistics

Table 2

Summary for 2010	Metropolitan Areas Grouped by Average Annual Population Growth, 1990-2010			
	Bottom 25%	2nd quartile	3rd quartile	Top 25%
Percent high school graduate and above	87.3	86.0	87.0	84.3
Percent bachelor's degree or above	23.0	25.6	27.3	26.2
Manufacturing share of total employment	11.6	11.1	10.0	7.7
Professional and business services share of total employment	9.7	10.2	10.8	11.3
Patents per 100,000 population	22	39	27	24
Management worker share*	40	43	42	42
Computer and mathematical worker share*	15	19	20	20
Architectural and engineering worker share*	16	17	17	17
Production worker share*	83	76	72	59

*Per 1,000 workers

SOURCES: U.S. Census Bureau and Bureau of Labor Statistics

Fifth District Metropolitan Area Growth

Within the Fifth District, there are 40 metropolitan areas for which we have data to make similar comparisons of the key growth drivers (see Table 3). Annual population growth for 1990 through 2010 averaged 1.3 percent for Fifth District metropolitan areas, compared with a slower 1.1 percent for other metro areas. Per capita income growth was the same for Fifth District metros and non-District metros, however, with average growth at 3.8 percent.

Educational attainment at both the high school and college level was lower for the Fifth District in the base year of 1990. The percentage with a high school diploma or above was 71.3 percent for Fifth District metros, but 76.2 percent for other metro areas. The share of college educated was 18.1 percent in the Fifth District metros and 19.1 percent in other metro areas. The base year share of employment in the manufacturing sector was nearly 21 percent in the Fifth District metros, but not quite 17 percent elsewhere.

If we fast forward to 2010, college education attainment in Fifth District metros had largely caught up to the non-District metros, with both running at just over 25 percent. The difference in manufacturing concentration also diminished substantially, although it was still a bit higher in the Fifth District metros than it was for non-District metros (11 percent compared to 10 percent). As might be expected, because of the Fifth District metro areas' higher concentration in manufacturing, they had a higher share of production workers per 1,000 employees. The Fifth District metro

areas also had a higher share of computer and mathematical workers compared to metros outside of the Fifth District.

Two Fifth District metropolitan areas — Burlington, N.C., located in the north central part of the state, and Danville, Va., in Southside Virginia — can serve as a case study illustrating the effect of educational attainment. The two had a nearly equal population in 1990: 108,213 for Burlington and 108,711 for Danville. Population remained nearly flat in Danville over the period from 1990 to 2010, while Burlington experienced an average annual population growth rate of 1.7 percent over this period, higher than the average rate of growth for all metropolitan areas nationally. Both metropolitan areas were dependent on textile manufacturing and have undergone structural shifts in their economies toward nonmanufacturing sectors. In 1990, manufacturing accounted for just over 21 percent of employment in Burlington and 16 percent in Danville, but by 2010 the concentration in manufacturing had declined dramatically in both areas, to 8.4 percent and 6.4 percent, respectively.

Burlington and Danville differ in other ways, not the least of which is the location of Burlington on a major interstate, I-85, connecting Richmond and Atlanta. In addition to its proximity to major interstates, Burlington and Danville also differ in terms of the higher education institutions that are located within each metro area or within a reasonable driving distance. The Burlington metro area is home to Elon University, with an annual on-campus enrollment of approximately 5,000 students, whereas Danville is home to Averett University, with an annual residential enrollment of only 1,000 students. Moreover, while both metro areas enjoy proximity to the larger research universities in the Greensboro metro area, including Wake Forest University and UNC-Greensboro, only the Burlington metro has the distinct advantage of a relatively short commute to Duke University and the University of North Carolina at Chapel Hill. In addition, the Burlington metro area is also close to the Research Triangle Park, which provides a unique collection of research and development facilities with a heavy concentration of knowledge intensive industry.

Notwithstanding these fortunate accidents of geography enjoyed by Burlington, the two metropolitan areas are also distinguished by important differences in human capital within their borders. As measured by completion of high school or attainment of a bachelor's degree, educational achievement for adults was much lower in Danville in 1990. Neither metro matched the all-metro area average of 76 percent high school or above and 22 percent bachelor's or higher for the population age 25 and older. Burlington had a college graduate percentage of 15 percent compared to only 10 percent in Danville, while the high school graduate and above shares were 68 percent and 57 percent, respectively.

Fortunately, both metropolitan areas made substantial progress over the subsequent 20 years, and by 2010 high school educational attainment nearly converged in the two metro areas, with just over 81 percent of the adult 25+ population holding at least a high school degree in Burlington, relative to 78 percent in Danville. The differential in college graduate achievement also held up in 2010, but both metros raised this share as well, to near 21 percent for Burlington and 15 percent for Danville. Further, the level of knowledge-based occupations in Burlington's workforce outpaced the mix in Danville in 2010, with 24 workers per thousand engaged in computer science and mathematical occupations or architectural and engineering occupations, compared to 11 workers in Danville. While other factors may also be important, it appears that Burlington had a clear advantage over Danville in terms of education and skill levels and this contributed to a faster pace of population growth.

Table 3

Growth and Key Variables	Metropolitan Areas Grouped by Average Annual Population Growth, 1990-2010			
	Fifth District		Other (non-District)	
	1990	2010	1990	2010
Average annual population growth, 1990-2010	1.3		1.1	
Per capita personal income, average annual growth, 1990-2010	3.8		3.8	
Percent high school graduate and above	71.3	84.9	76.2	86.3
Percent bachelor's degree or above	18.1	25.4	19.1	25.5
Manufacturing share of total employment	20.8	10.8	16.7	10.0
Professional and business services share of total employment	7.5	12.2	7.4	10.4

SOURCES: U.S. Census Bureau and Bureau of Labor Statistics

Implications for the Future

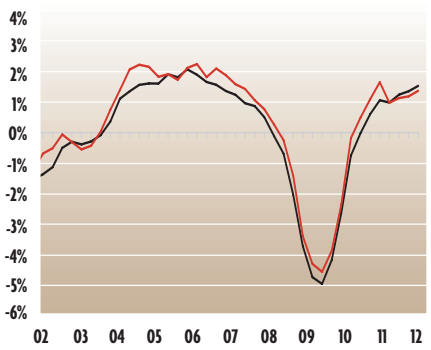
Metropolitan areas need to pay close attention to the educational opportunities and outcomes provided in their region in order to promote a growing, dynamic economy that attracts the knowledgeable workforce required for today's industries. Our review of metropolitan area data for the period from 1990 to 2010 confirms that metro areas which started with a higher concentration of skilled workers tended to grow by far the fastest in population over this two-decade period.

The fastest-growing metropolitan area in the Fifth District, Raleigh-Cary, North Carolina, is a microcosm of this effect. It ranked fifth nationally for population growth from 1990 to 2010, growing at an average annual rate of 3.8 percent. Raleigh-Cary posted very high rates of educational attainment for the adult population (25+) at the beginning of the study period, with 81 percent holding at least a high school diploma and 30 percent holding a bachelor's degree or higher. This skilled population attracted even more knowledge workers over the years, as the educational attainment rates reached 91 percent for high school and 41 percent for college-educated graduates by 2010. While Raleigh-Cary is an exceptional case, other metropolitan areas within the Fifth District have gained ground. Yet based on the comparison of Fifth District to other (non-District) metro areas, there are still opportunities for investment in human capital to continue to attract knowledge workers and the learning and innovation they foster. **RF**

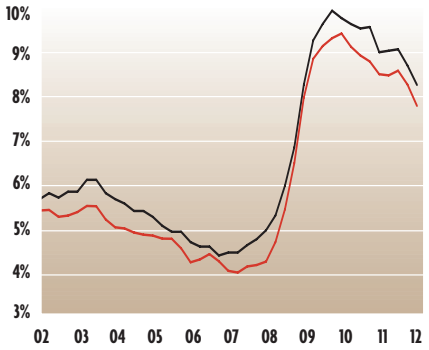
State Data, Q1:12

	DC	MD	NC	SC	VA	WV
Nonfarm Employment (000s)	**735.5**	**2,583.3**	**3,957.9**	**1,851.0**	**3,709.8**	**762.5**
Q/Q Percent Change	-0.2	0.7	0.7	0.7	0.3	0.3
Y/Y Percent Change	1.6	1.8	1.2	1.4	1.1	1.8
Manufacturing Employment (000s)	**1.0**	**111.1**	**437.3**	**221.2**	**228.1**	**48.8**
Q/Q Percent Change	0.0	-0.4	0.9	0.6	0.0	-1.2
Y/Y Percent Change	-6.3	-2.5	0.9	4.6	-0.7	-1.3
Professional/Business Services Employment (000s)	**151.3**	**406.3**	**516.3**	**226.9**	**667.1**	**63.5**
Q/Q Percent Change	-0.2	1.9	0.7	-1.4	0.7	1.3
Y/Y Percent Change	1.7	3.2	2.1	2.4	0.5	2.9
Government Employment (000s)	**246.0**	**510.0**	**702.0**	**340.0**	**715.0**	**154.8**
Q/Q Percent Change	-1.0	-0.1	0.4	0.9	0.2	0.8
Y/Y Percent Change	-1.9	1.0	-0.1	-0.4	1.0	2.6
Civilian Labor Force (000s)	**347.7**	**3,083.6**	**4,683.7**	**2,155.9**	**4,342.2**	**803.3**
Q/Q Percent Change	0.9	0.1	0.3	-0.2	0.1	0.2
Y/Y Percent Change	0.5	0.4	1.0	0.1	1.4	0.3
Unemployment Rate (%)	**9.8**	**6.5**	**9.9**	**9.1**	**5.7**	**7.1**
Q4:11	10.2	6.7	10.5	9.8	6.2	7.8
Q1:11	10.0	7.2	10.4	10.5	6.3	8.1
Real Personal Income ($Mil)	**40,034.2**	**261,840.3**	**306,693.3**	**138,570.6**	**328,991.9**	**55,027.4**
Q/Q Percent Change	0.3	0.3	0.2	0.2	0.3	0.0
Y/Y Percent Change	1.5	0.6	0.0	0.4	0.8	1.6
Building Permits	**260**	**3,011**	**11,126**	**4,417**	**6,572**	**384**
Q/Q Percent Change	-83.0	-3.1	39.5	4.2	53.8	-8.8
Y/Y Percent Change	-63.6	24.7	31.3	23.8	12.6	5.5
House Price Index (1980=100)	**577.8**	**410.0**	**303.4**	**306.6**	**397.1**	**213.9**
Q/Q Percent Change	0.3	-1.7	-1.5	-1.8	-1.5	-1.6
Y/Y Percent Change	3.2	-1.1	-2.3	-2.2	-0.6	-1.8

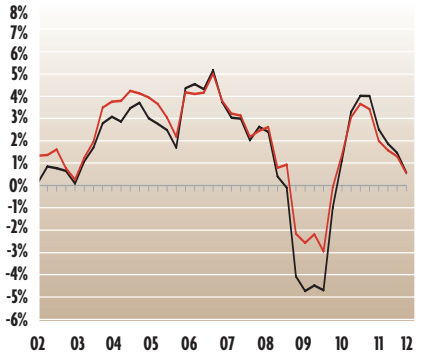
Nonfarm Employment
Change From Prior Year
First Quarter 2002 - First Quarter 2012



Unemployment Rate
First Quarter 2002 - First Quarter 2012

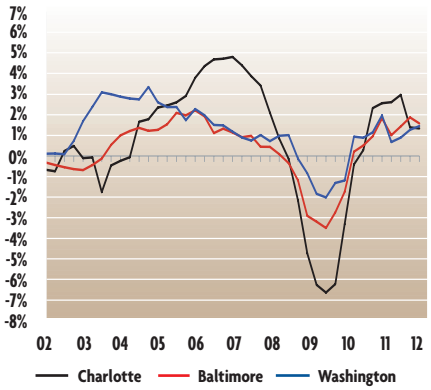


Real Personal Income
Change From Prior Year
First Quarter 2002 - First Quarter 2012

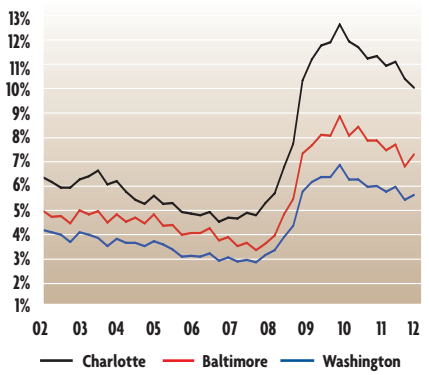


Fifth District — United States

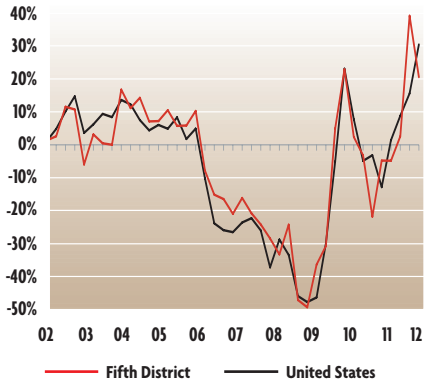
Nonfarm Employment Metropolitan Areas
Change From Prior Year
First Quarter 2002 - First Quarter 2012



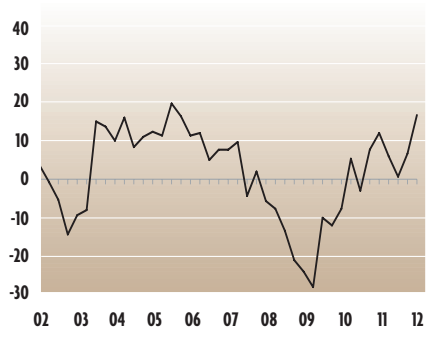
Unemployment Rate Metropolitan Areas
Change From Prior Year
First Quarter 2002 - First Quarter 2012



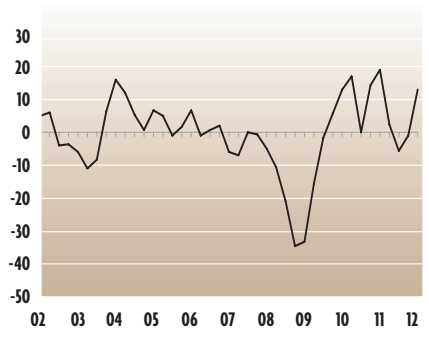
Building Permits
Change From Prior Year
First Quarter 2002 - First Quarter 2012



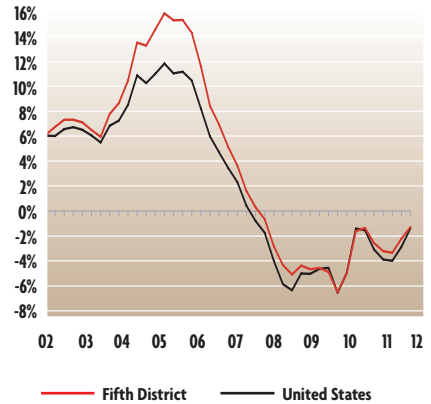
FRB—Richmond Services Revenues Index
First Quarter 2002 - First Quarter 2012



FRB—Richmond Manufacturing Composite Index
First Quarter 2002 - First Quarter 2012



House Prices
Change From Prior Year
First Quarter 2002 - First Quarter 2012



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, Q1:12

	Washington, DC	Baltimore, MD	Hagerstown-Martinsburg, MD-WV
Nonfarm Employment (000s)	**2,434.6**	**1,286.8**	**97.7**
Q/Q Percent Change	-0.1	-2.1	-1.6
Y/Y Percent Change	1.5	1.4	0.0
Unemployment Rate (%)	**5.5**	**7.0**	**8.3**
Q4:11	5.7	7.1	8.7
Q1:11	5.9	7.8	9.3
Building Permits	**3,947**	**1,323**	**125**
Q/Q Percent Change	-11.6	-12.9	-3.8
Y/Y Percent Change	-5.0	22.6	0.0

	Asheville, NC	Charlotte, NC	Durham, NC
Nonfarm Employment (000s)	**169.1**	**826.4**	**275.4**
Q/Q Percent Change	-0.9	-1.1	-0.8
Y/Y Percent Change	2.1	1.3	1.9
Unemployment Rate (%)	**8.0**	**10.0**	**7.8**
Q4:11	8.4	10.7	8.2
Q1:11	8.6	11.1	8.0
Building Permits	**223**	**2,796**	**1,037**
Q/Q Percent Change	1.8	97.9	61.8
Y/Y Percent Change	-22.3	95.7	127.4

	Greensboro-High Point, NC	Raleigh, NC	Wilmington, NC
Nonfarm Employment (000s)	**344.1**	**512.2**	**133.2**
Q/Q Percent Change	-0.6	-0.8	-2.1
Y/Y Percent Change	1.7	2.3	-0.2
Unemployment Rate (%)	**10.2**	**8.1**	**10.2**
Q4:11	10.9	8.6	10.8
Q1:11	11.0	8.5	10.4
Building Permits	**725**	**2,309**	**751**
Q/Q Percent Change	18.7	35.5	80.5
Y/Y Percent Change	11.7	111.3	93.1

	Winston-Salem, NC	Charleston, SC	Columbia, SC
Nonfarm Employment (000s)	**204.6**	**295.7**	**348.6**
Q/Q Percent Change	-2.0	-0.3	-0.6
Y/Y Percent Change	1.4	2.2	2.0
Unemployment Rate (%)	**9.4**	**7.6**	**7.8**
Q4:11	9.8	8.1	8.5
Q1:11	10.1	8.5	8.6
Building Permits	**341**	**1,032**	**836**
Q/Q Percent Change	-23.5	-16.7	35.3
Y/Y Percent Change	69.7	43.5	6.4

	Greenville, SC	Richmond, VA	Roanoke, VA
Nonfarm Employment (000s)	**303.2**	**611.5**	**154.0**
Q/Q Percent Change	-1.2	-0.5	-2.0
Y/Y Percent Change	1.6	1.9	0.2
Unemployment Rate (%)	**7.4**	**6.4**	**6.1**
Q4:11	8.0	6.8	6.6
Q1:11	8.7	7.1	6.8
Building Permits	**522**	**1,021**	**82**
Q/Q Percent Change	27.6	52.6	-8.9
Y/Y Percent Change	21.1	67.4	-23.4

	Virginia Beach-Norfolk, VA	Charleston, WV	Huntington, WV
Nonfarm Employment (000s)	**726.2**	**146.6**	113.7
Q/Q Percent Change	-1.7	-1.6	-1.0
Y/Y Percent Change	0.5	0.9	1.5
Unemployment Rate (%)	**6.6**	**6.6**	**7.7**
Q4:11	7.0	7.4	8.2
Q1:11	6.9	7.5	8.4
Building Permits	**1,897**	**31**	**31**
Q/Q Percent Change	91.6	72.2	24.0
Y/Y Percent Change	63.8	29.2	675.0

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