

Leverage and the Fifth District Economy

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The sluggish pace of the economic recovery in the past few years has been driven in part by unusually slow growth in consumption. Some economists have suggested that the rise in household indebtedness before the recession contributed to both the severity of the recession and the sluggishness of the recovery. These economists have analyzed the extent to which higher debt levels caused consumers to rein in spending during the recession and reduce consumption to lower outstanding debt (or “deleverage”) during the recovery, leading to a deeper recession and a more tepid economic recovery. Although many of these studies looking at national data have found that larger increases in leverage led to more severe deterioration in consumer spending and labor market conditions, the situation in the Fifth District economy during the recession seems to have been different.

Economic Theory and Consumer Debt

Standard economic models tell us that a household’s consumption is determined by its income, wealth, preferences, and return on savings. More complicated models will include a household’s ability to borrow or the economic uncertainty it faces. In the simplest models, debt does not exert an influence on consumption independent of other factors. Instead, all that matters in these models for the levels of consumption and savings at any point in time is the “permanent” lifetime wealth of a household. And for most of us, this is primarily the present discounted value of incomes over our lifetimes.

Yet there may be good reason to consider debt as an independent influence on household spending and saving decisions. For example, in a model where households try to

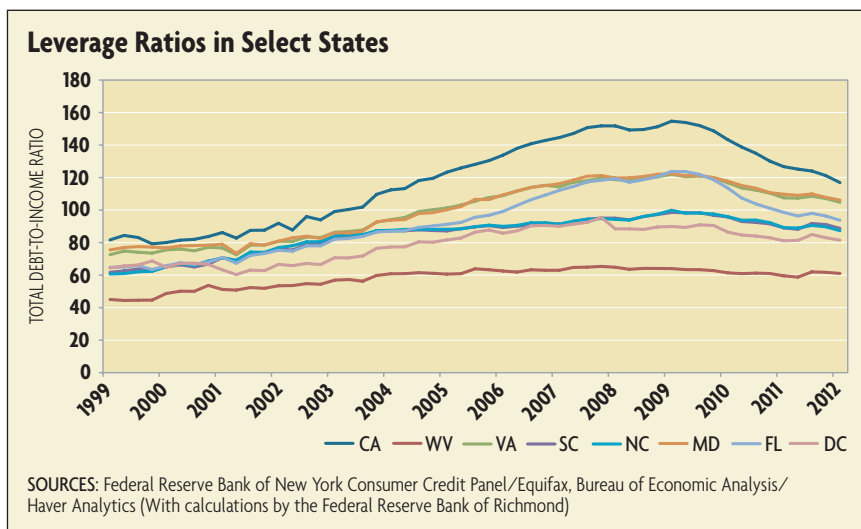
keep their debt-to-income ratios under a target level, a decline in house prices that results in a fall in net worth could lead a household to reduce spending in order to pay down debt and move back to the leverage target. Indeed, this intuitive idea is captured in modern models of consumption and savings. Christopher Carroll of Johns Hopkins University outlined a model in a 1992 article in the *Brookings Papers on Economic Activity* in which households not only target a “buffer-stock” of wealth, but respond to increases in uncertainty (say, a greater risk of becoming unemployed) by attempting to move their financial wealth to higher target levels. (See his interview in this issue of *Econ Focus*, page 30.) In addition, the model suggests that consumers are reluctant to increase debt and that they become uncomfortable holding previously assumed debt when there is an increase in labor market uncertainty. As a result, when faced with greater uncertainty, consumers are more likely to reduce consumption in order to raise their level of wealth and/or reduce debt levels.

Leverage and Economic Outcomes

In the papers that have emerged from the housing crisis and its aftermath, there has been evidence that increases in household leverage were a driving factor in the consumption decline from 2007-2009. Atif Mian of the University of California, Berkeley and Amir Sufi of the University of Chicago have written a number of papers documenting the rise in debt to income in U.S. counties and analyzing the relationship between leverage and other economic outcomes. In a 2010 working paper, they found that household leverage predicts variation in mortgage default, house price movements, unemployment, residential investment, and

and durable goods consumption from 2007 to 2009. The recession began earlier and became more severe in counties with high leverage growth than in counties with low leverage growth.

In a 2011 paper with Kamallesh Rao of MasterCard Advisors, Mian and Sufi argued that households in high-leverage counties experienced a severe shock to their balance sheets in 2007 and 2008 as house prices in those areas declined, in aggregate, by almost 30 percent. This balance sheet shock was followed by a significant drop in consumption. They concluded that a one-standard-deviation increase in household leverage as of 2006 was associated, all else equal, with a 9 percent to 13 percent drop in durable goods consumption and a 5 percent to 8 percent drop



in nondurable goods consumption.

In a 2012 working paper, Karen Dynan of the Brookings Institution examined whether households with the greatest mortgage leverage reduced their spending the most. She found that following the collapse of real estate prices, highly leveraged households had larger declines in spending than their less-leveraged counterparts despite having smaller changes in net worth, suggesting that their mortgage leverage weighed on consumption above and beyond what would have been predicted by wealth effects alone.

Despite the findings of these papers, there is not unanimous agreement on the relationship between debt and consumption, independent of other variables. In a 2012 *Public Policy Brief*, Daniel Cooper of the Federal Reserve Bank of Boston defined deleveraging as a deliberate household balance sheet adjustment that lowers consumption beyond what would be predicted by changes in income and wealth. In his analysis, he found little evidence that deleveraging has had a sizeable effect on U.S. consumer spending. He wrote that consumption changes prior to, during, and following the Great Recession are consistent with those implied by fluctuations in household income and net worth using standard economic relationships. In fact, Cooper argued that households potentially underspent relative to income and net worth during the housing boom and overspent since the recession began.

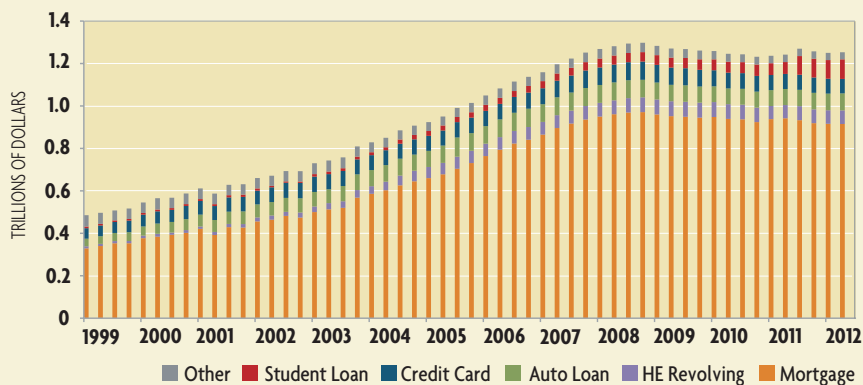
The empirical literature, in short, provides somewhat diverging evidence concerning the role of leverage in the recession and recovery.

Leverage and Economic Outcomes in States

The trend in the ratio of household debt to disposable personal income preceding and during the recession of 2007-09 has been well documented. According to Federal Reserve Board Flow of Funds Accounts (FF) data, household debt peaked at the end of 2007 at almost 130 percent of disposable personal income, declined abruptly, then rebounded to almost that high in the first quarter of 2009 before beginning a steady decline. The Equifax data (FRBNY CCP/Equifax) indicate a slightly lower peak — at about 115 percent — but the same rebound in the second half of 2008 before a steady decline beginning in the first quarter of 2009.

The Fifth District experienced a similar rise in debt, with the highest-leverage states of Virginia and Maryland peaking in the first quarter of 2009 at just more than 120 percent of total personal income. (See chart.) California and Florida are included in the chart to contrast the experiences of these states with those of the Fifth District states. (Because of data availability, we use total personal income for states rather than disposable personal income, which is the

Total Debt Balance and Its Composition: Fifth District



SOURCES: Federal Reserve Bank of New York Consumer Credit Panel/Equifax (With calculations by the Federal Reserve Bank of Richmond)

standard for U.S. debt-to-income calculations. If we use total personal income from FF data as our denominator in the U.S. leverage calculation, the debt-to-income peaks at about 103 percent.) In the end, states such as California, Florida, Nevada, and Arizona, which saw the largest real estate losses, have probably played a significant role in the findings of most of the empirical papers written on both household credit conditions and mortgage default in the past five years.

Not surprisingly, most of the rise in debt within the Fifth District was mortgage debt. (See chart.) From 1999 to the peak in the third quarter of 2008, total outstanding debt in the Fifth District rose by more than \$800 billion, an increase of 166 percent. Nearly 80 percent of that increase was a rise in mortgage debt (either first mortgage or home equity installment loans). Although student loan debt rose more than fivefold, it still made up only 4.4 percent of the increase in debt and only just more than 3 percent of total debt at the end of 2008. These numbers are remarkably similar to those for the United States as a whole, where almost 77 percent of the \$7.8 trillion debt increase from 1999 through the third quarter of 2008 was from rising mortgage debt.

Meanwhile, the decline in debt that occurred from the third quarter of 2008 to the first quarter of 2012 was also driven by a decline in mortgage debt. While total debt in the Fifth District fell by about \$43 billion over the period (despite a \$45 billion increase in student loan debt), outstanding mortgage debt dropped by over \$52 billion. This decline was driven by the unprecedented number of foreclosures and mortgage write-downs that occurred over this period. In the United States as a whole, the decline in outstanding mortgage debt accounted for 98 percent of the \$1 trillion net decline in outstanding debt from 2008 to 2012.

Because mortgage debt makes up most total household debt, it makes sense to start with housing markets when analyzing the effect of leverage on the broader economy of a state or locality. In fact, at the state level, there was a strong relationship between leverage and housing outcomes in the recession. The correlation between all U.S. states' debt to

income in the fourth quarter of 2006 and the change in house prices from 2007 through 2009 was -0.72 , reflecting a strong and statistically significant negative relationship. The higher the debt-to-income level in 2006, the sharper the decline in house prices from 2007 through 2009. In addition, the states with the sharpest declines from 2007 to 2009 were also those with the biggest increases prior to 2007. In other words, the states that saw the sharpest house price growth in the years before 2007 (boom) were the states where homebuyers took on considerably more debt to buy a house and where house prices fell the most sharply (bust).

Leverage also appears to be correlated with labor market conditions at the state level. With a statistically significant correlation of -0.57 , the data indicate that among states, the higher the average leverage in 2006, the deeper the labor market deterioration from 2007 to 2009. This is similar to the county-level result found in the empirical work of Mian and Sufi. Of course, correlation does not indicate causation; it is reasonable to think that the housing boom in states like California or Nevada resulted in both higher debt levels and a housing crash that hurt labor markets. In other words, it is possible that the only mechanism through which debt levels affected employment was through the housing market and that the driving force in the relationship between leverage and labor markets was the few states that saw sharp booms and busts. Indeed, the relationship between leverage and employment is the strongest in California, Arizona, Nevada, and Florida; excluding those four states alone pushes the correlation between leverage in 2006 and change in employment from 2007 to 2009 to -0.40 , in addition to a reduction in statistical significance. This is not solely the result of a change in sample size — the correlation does not decline to the same extent with the exclusion of any other four states. In fact, the relationship between leverage and labor markets strengthens with the exclusion of four Fifth District states: Virginia, Maryland, North Carolina, and South Carolina. The relationship between leverage and house prices, however, is relatively consistent. Looking at state-level data, then, it appears that the states with the largest housing busts strongly influence the overall relationship between leverage and employment.

Counties in the Fifth District

Household debt-to-income levels vary considerably across counties in the Fifth District. Since Maryland and Virginia experienced the greatest increase in household leverage prior to the recession, it is not surprising that the majority of highly leveraged counties in the District are in those two states. The Carolinas and West Virginia had markedly fewer highly leveraged counties than Virginia and Maryland. In fact, in the fourth quarter of 2006, 18 of the 25 most leveraged counties or cities were located in Virginia or Maryland. (For a corresponding table, please see this article on our website at www.richmondfed.org/publications.) Leverage varied notably within both states, however. Prince George's and Charles counties in Maryland had the highest

debt-to-income levels, with 240 percent and 230 percent, respectively. In contrast, the Maryland counties with the lowest debt-to-income levels were Allegany County (110 percent) and Garrett County (120 percent). Although county debt-to-income levels were generally higher in Maryland than in Virginia, there were a number of Northern Virginia counties with extremely high levels. Prince William and Loudoun counties, for example, had the highest percentages at 280 percent and 260 percent, respectively. At the same time, there were a number of Virginia counties with debt-to-income percentages below 100 percent.

So what are some explanations for the differences in leverage across Fifth District counties? As already illustrated in the state analysis, local housing market conditions play an important role in household debt levels. Those areas of the District where home prices rose the fastest also experienced the greatest increase in leverage due to higher levels of mortgage debt. This partly explains the higher leverage percentages in Northern Virginia and Maryland counties and cities. The average increase in home prices across Maryland counties was 132 percent from the beginning of 2001 through the fourth quarter of 2006. In Northern Virginia, home prices increased by 162 percent in Prince William County and by 123 percent and 135 percent in neighboring Loudoun and Stafford Counties, respectively. In contrast, in those counties where there was less increase in leverage, home price increases over the period were more moderate. Home prices rose by roughly 40 percent across counties in North Carolina, 49 percent in South Carolina, and 73 percent in West Virginia, for example. For the entire Fifth District, the correlation between home price changes from the first quarter of 2001 to the fourth quarter 2006 and increases in debt-to-income ratios over the same period was fairly strong at 0.51 .

A related factor that likely influenced household debt levels was the strength of the local economy. In other words, just as standard models suggest that increases in unemployment risk lead to attempts by households to reduce debt, they imply that stable employment prospects allow households to carry debt. Although Northern Virginia and Maryland counties saw the sharpest housing boom and bust in the Fifth District, these counties also have strong labor markets, with lower unemployment rates, higher job growth, and greater income growth than other areas. For example, the unemployment rate in the fourth quarter of 2006 was 3.8 percent in Maryland and just 2.1 percent in Northern Virginia — compared to 4.8 percent, 6.2 percent, and 4.4 percent in North Carolina, South Carolina and West Virginia, respectively. Stronger labor markets and income prospects may have helped households to assume greater debt loads than those in areas with weaker labor markets and income prospects. In fact, the correlation between debt-to-income levels and unemployment rates in the fourth quarter of 2006 was -0.43 , indicating a relatively strong negative relationship between labor market conditions and household leverage.

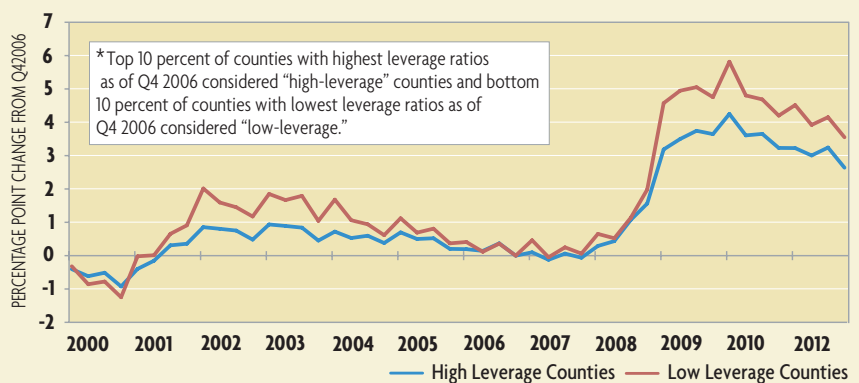
Fifth District counties that experienced an increase in leverage from 2000 to 2006 were more likely to experience a sharp fall in home prices between 2006 and 2009. The correlation between the two was -0.54 . This is a relationship found in previous empirical studies, such as in Mian and Sufi's 2010 paper. Unlike in that study, however, increases in leverage in the Fifth District did not seem to have a negative impact on housing construction. The correlation between leverage increase from 2000 to 2006 and the change in housing permits from 2006 to 2009 was slightly positive (0.20). Once the recession began, the decline in construction activity was relatively widespread across the District with little distinction between counties with high or low leverage.

In fact, an initial look at household finances suggests that household leverage did not have a considerable impact on the Fifth District economy during the recession. Some of the studies cited earlier found that increases in leverage led to more severe declines in consumer spending and labor market conditions during the recession. Those effects were not readily evident in the data for the Fifth District, however. The correlation between an increase in leverage between 2000 and 2006 and the change in the unemployment rate from the end of 2006 through 2009 was negative — opposite the result found in some studies. There were a number of counties in the Fifth District that had large increases in leverage prior to the recession, yet relatively smaller increases in the unemployment rate during the recession. In addition, the relationship between increasing leverage and the change in employment between the end of 2006 and the end of 2009 was positive, suggesting that areas with greater increases in leverage prior to the recession also had stronger employment conditions. There seems to be no relationship between changes in leverage and the change in the number of establishments between 2006 and 2009.

Increases in leverage within the Fifth District may have reflected stronger local economies and income prospects in addition to rising home values and increased mortgage debt associated with the housing boom. As a consequence, when the housing market collapsed and the recession began, the impact of higher levels of consumer indebtedness was partially buffered by a more resilient local economy and relatively stronger income prospects.

In fact, labor market conditions worsened to a greater extent in low-leverage counties (the bottom decile of counties, by debt to income) during the recession than high-leverage counties (the top decile of counties, by debt to

Change in Unemployment Rate for High- and Low-Leverage Counties*



SOURCES: Bureau of Labor Statistics, Federal Reserve Bank of New York Consumer Credit Panel/Equifax, Bureau of Economic Analysis/Haver Analytics (With calculations by the Federal Reserve Bank of Richmond)

income). The average increase in the unemployment rate from the end of 2006 to the end of 2009 was roughly 6 percentage points in low-leverage counties, while in high-leverage counties, the increase was 4 percentage points. (See chart.)

Housing construction, as measured by housing permits, showed little difference between high- and low-leverage counties during the recession. Prior to 2006, permit activity was considerably higher in the high-leverage counties, reflecting the heightened activity during the housing boom, while for low-leverage counties the level of activity was only moderately higher in 2003 to 2005. During the recession, in contrast, the decline in permits for both high- and low-leverage counties was fairly similar in depth and duration. This is notable given the very different path of home prices. As expected, home prices rose more quickly and fell considerably faster and further in high-leverage counties than in low-leverage counties.

Conclusion

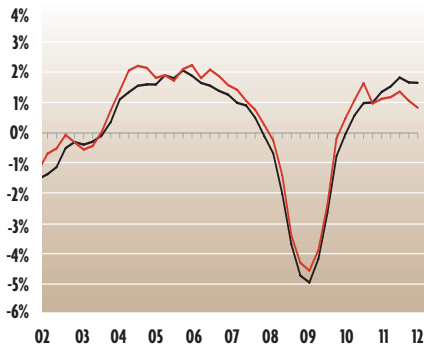
Debt-to-income levels varied considerably across the Fifth District during the recession and recovery, driven in part by changes in housing market conditions as well as by the strength of local economic conditions. Not surprisingly, those areas within the Fifth District that experienced large house price increases also experienced sharper increases in mortgage debt and leverage. Increases in leverage did not necessarily translate to a more severe downturn during the recession, however. In fact, some areas that experienced the largest increase in leverage were areas with relatively stronger economic performance. Further work will continue to investigate the robustness of these initial observations as well as contrast these observations with some of the previous empirical findings. **EF**

STATE DATA, Q3:12

	DC	MD	NC	SC	VA	WV
Nonfarm Employment (000s)	733.8	2,573.8	3,954.0	1,853.2	3,721.4	750.4
Q/Q Percent Change	-0.5	-0.1	0.0	0.1	0.0	-1.0
Y/Y Percent Change	0.9	0.9	0.8	0.9	1.1	-0.8
Manufacturing Employment (000s)	1.0	110.6	438.1	223.4	226.9	47.1
Q/Q Percent Change	-6.3	-0.9	0.4	0.4	-1.1	-1.9
Y/Y Percent Change	-6.3	-2.6	0.7	2.3	-1.0	-5.0
Professional/Business Services Employment (000s)	148.5	412.6	522.4	233.5	667.0	63.3
Q/Q Percent Change	-1.7	1.3	0.8	-0.6	0.3	-0.2
Y/Y Percent Change	-0.8	3.9	1.9	1.7	1.1	1.0
Government Employment (000s)	242.0	510.5	691.8	342.5	710.1	150.3
Q/Q Percent Change	-1.7	0.4	-1.4	0.5	-0.8	-1.5
Y/Y Percent Change	-0.9	0.4	-0.5	0.0	0.3	-1.5
Civilian Labor Force (000s)	355.0	3,076.0	4,656.7	2,136.5	4,328.9	799.5
Q/Q Percent Change	0.9	-0.3	-0.1	-0.7	-0.2	-0.6
Y/Y Percent Change	3.7	0.2	0.0	-1.0	0.4	0.1
Unemployment Rate (%)	8.8	7.0	9.6	9.5	5.9	7.5
Q2:12	9.3	6.8	9.4	9.1	5.6	6.9
Q3:11	10.5	7.2	10.7	10.4	6.4	8.1
Real Personal Income (\$Mil)	40,582.5	262,901.7	309,769.4	139,743.3	331,564.2	55,428.0
Q/Q Percent Change	-0.1	0.1	0.0	0.3	0.1	-0.2
Y/Y Percent Change	1.5	1.4	1.4	2.0	1.2	1.6
Building Permits	1,302	3,724	11,442	4,611	6,653	450
Q/Q Percent Change	30.7	12.1	-5.5	-15.9	-3.0	-22.9
Y/Y Percent Change	46.5	15.4	45.9	26.7	8.0	-13.0
House Price Index (1980=100)	587.3	407.5	301.4	305.4	396.9	216.0
Q/Q Percent Change	1.3	1.2	0.9	0.7	1.0	0.9
Y/Y Percent Change	3.5	-1.1	-1.5	-0.7	-0.3	0.6

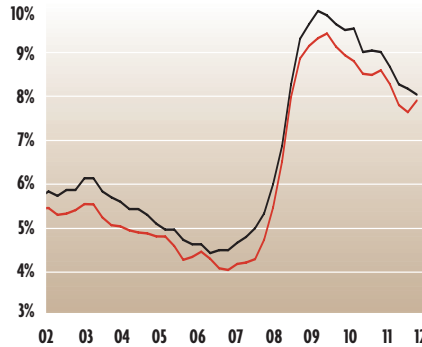
Nonfarm Employment

Change From Prior Year
First Quarter 2002 - Third Quarter 2012



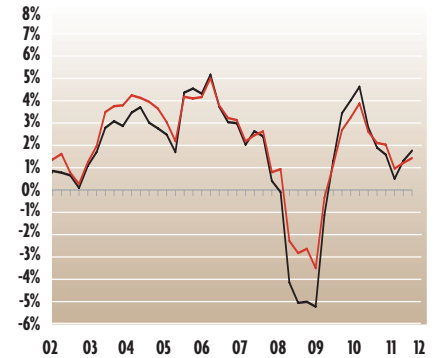
Unemployment Rate

First Quarter 2002 - Third Quarter 2012



Real Personal Income

Change From Prior Year
First Quarter 2002 - Third Quarter 2012

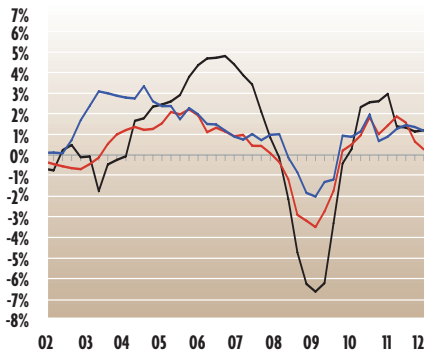


— Fifth District

— United States

Nonfarm Employment Metropolitan Areas

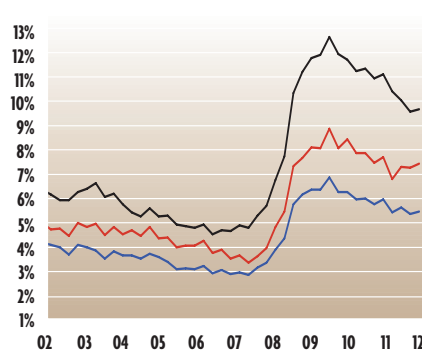
Change From Prior Year
First Quarter 2002 - Third Quarter 2012



— Charlotte — Baltimore — Washington

Unemployment Rate Metropolitan Areas

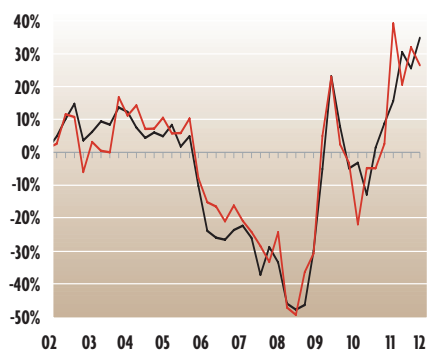
Change From Prior Year
First Quarter 2002 - Third Quarter 2012



— Charlotte — Baltimore — Washington

Building Permits

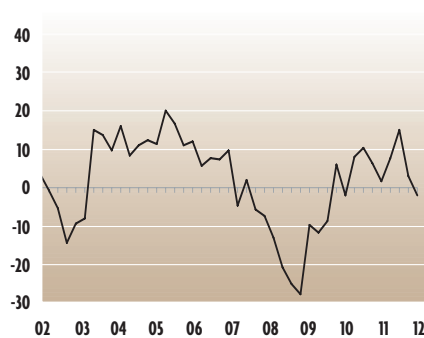
Change From Prior Year
First Quarter 2002 - Third Quarter 2012



— Fifth District — United States

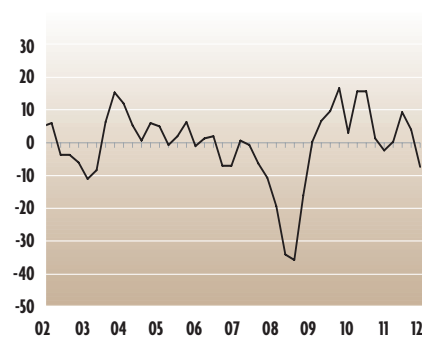
FRB—Richmond Services Revenues Index

First Quarter 2002 - Third Quarter 2012



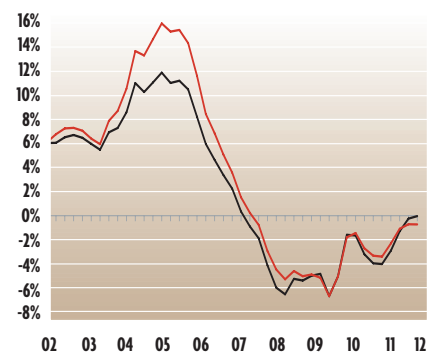
FRB—Richmond Manufacturing Composite Index

First Quarter 2002 - Third Quarter 2012



House Prices

Change From Prior Year
First Quarter 2002 - Third Quarter 2012



— 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, Q3:12

	Washington, DC	Baltimore, MD	Hagerstown-Martinsburg, MD-WV
Nonfarm Employment (000s)	2,461.8	1,298.5	99.4
Q/Q Percent Change	-0.3	-0.6	-0.8
Y/Y Percent Change	1.2	0.3	1.8
Unemployment Rate (%)	5.4	7.3	7.9
Q2:12	5.5	7.3	8.0
Q3:11	5.9	7.4	9.0
Building Permits	5,534	1,742	199
Q/Q Percent Change	-4.4	11.5	30.1
Y/Y Percent Change	14.6	35.6	27.6
	Asheville, NC	Charlotte, NC	Durham, NC
Nonfarm Employment (000s)	170.8	835.2	277.6
Q/Q Percent Change	-0.3	-0.6	0.2
Y/Y Percent Change	1.5	1.2	2.1
Unemployment Rate (%)	7.8	9.7	7.5
Q2:12	7.8	9.5	7.6
Q3:11	8.5	11.0	8.2
Building Permits	384	3,150	1,172
Q/Q Percent Change	4.1	0.9	149.4
Y/Y Percent Change	10.0	68.6	122.4
	Greensboro-High Point, NC	Raleigh, NC	Wilmington, NC
Nonfarm Employment (000s)	345.9	522.6	134.7
Q/Q Percent Change	-0.7	0.4	-1.1
Y/Y Percent Change	2.1	2.8	-2.3
Unemployment Rate (%)	9.9	7.6	10.0
Q2:12	9.8	7.8	9.8
Q3:11	11.1	8.7	10.9
Building Permits	360	2,581	839
Q/Q Percent Change	-24.5	-14.8	25.0
Y/Y Percent Change	-20.2	81.9	62.9

	Winston-Salem, NC	Charleston, SC	Columbia, SC
Nonfarm Employment (000s)	203.4	301.8	352.1
Q/Q Percent Change	-1.3	0.2	-0.4
Y/Y Percent Change	-1.1	2.1	2.3
Unemployment Rate (%)	9.0	7.7	8.3
Q2:12	9.0	7.7	8.1
Q3:11	9.9	8.6	9.1
Building Permits	174	978	895
Q/Q Percent Change	-65.5	-48.2	-22.8
Y/Y Percent Change	-49.6	26.5	25.2
	Greenville, SC	Richmond, VA	Roanoke, VA
Nonfarm Employment (000s)	300.8	616.1	155.8
Q/Q Percent Change	-1.0	-0.4	-0.2
Y/Y Percent Change	-1.2	1.1	0.0
Unemployment Rate (%)	7.9	6.4	6.1
Q2:12	7.7	6.2	6.0
Q3:11	8.6	7.0	6.6
Building Permits	585	1,244	94
Q/Q Percent Change	-1.5	33.5	-22.3
Y/Y Percent Change	41.6	44.0	-4.1
	Virginia Beach-Norfolk, VA	Charleston, WV	Huntington, WV
Nonfarm Employment (000s)	748.3	147.9	115.0
Q/Q Percent Change	0.1	-0.4	-0.9
Y/Y Percent Change	0.8	-0.5	2.3
Unemployment Rate (%)	6.5	6.9	7.1
Q2:12	6.4	6.5	7.2
Q3:11	7.1	7.3	8.3
Building Permits	1,475	39	12
Q/Q Percent Change	18.2	-18.8	33.3
Y/Y Percent Change	4.7	-9.3	-42.9

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