

Recession and Recovery in Chattanooga, 1990-2023

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Summary

Although recessions are usually thought of as national-level events, there can be substantial differences across states and metro areas in when they occur. This paper determines and compares the timing of recessions for Chattanooga and four nearby metro areas. In part because it experienced its own recession in 1997, recession has been more common in Chattanooga than elsewhere since 1990. This fact combined with its relatively large manufacturing sector and relatively small education and health sector has meant that Chattanooga's job losses during recessions have tended to be larger than average. Chattanooga's continuing reliance on manufacturing suggests that future recessions will be as costly as past ones. On the other hand, area's manufacturing sector has been transformed and is much more competitive than during previous recessions.

Introduction

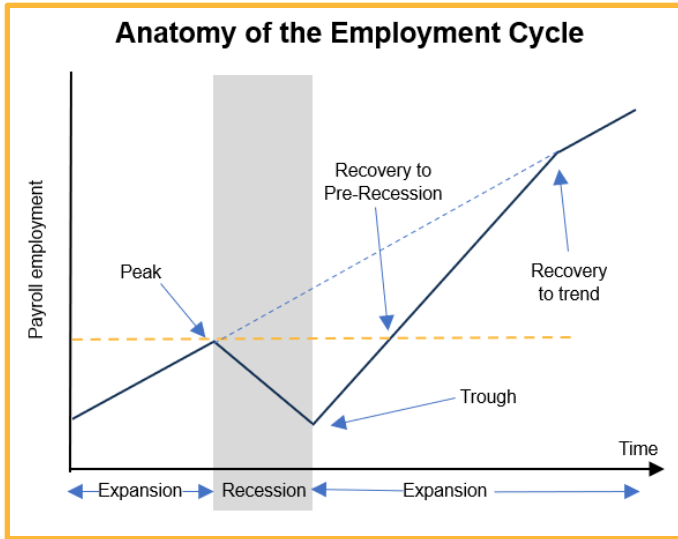
It is common to look at the business cycle as alternating periods of expansion and recession. In the United States, a recession is defined as a period in which there is a broad decrease in national economic activity, and the timing of recessions is determined semi-officially by a panel of academic economists with the National Bureau of Economic Research (NBER). The NBER panel looks at a range of data series, including industrial output, payroll employment, and gross domestic product to assign dates for when the economy enters and exits recessions. There are no hard and fast rules about when recessions occur, and the NBER's determination of them is usually done several quarters after the fact.

Although recessions are usually thought of as national occurrences, the framework can be applied to states and metro areas to see a great deal of subnational variation related to geography, industrial structure, educational attainment, and financial variables.ⁱ Even during the Great Recession of 2008-09 there was significant geographic variation, with some areas experiencing brief and shallow downturns during the worst national recession since the Great Depression.ⁱⁱ Because broad measures of economic activity below the national level have not been available until very recently, subnational analysis of the business cycle has relied on employment data. It is more accurate, therefore, to say that these were *employment cycles* rather than broader business cycles. Nevertheless, the employment cycle is similar to the business cycle in that employment recessions are associated with general recessions, but the dates at which they begin and end can differ (i.e., the 'jobless' recoveries following the 1990-91 and 2001 recessions).

This paper considers how the occurrence of employment recessions in the Chattanooga Metropolitan Statistical Area (MSA) has differed from those of the four large MSAs in its immediate region. More precisely, the paper uses nonfarm payroll employment data for 1990-2023 and splits the employment cycle into recession and expansion phases for the United States and the Chattanooga, Atlanta, Birmingham, Knoxville, and Nashville MSAs.ⁱⁱⁱ

Splitting the Cycle into Phases

The illustration below shows the various parts of the employment cycle, which are analogous to the parts of the general business cycle. During an expansionary period, employment tends to rise steadily at a rate not too far from the rate at which demographic trends generate working-age people. Employment growth stops when the economy is thrown into recession, perhaps following a sharp increase in oil prices or a crisis in the financial sector. That is, employment hits a peak, enters a recessionary phase, and starts falling. This period



of declining employment is sustained for several months or quarters before employment bottoms out or reaches a trough, at which time an expansionary phase begins.

The expansionary period following a recession can itself be split according to when employment achieves recovery milestones. The first milestone is when employment recovers to its pre-recession level, the level of employment that existed at the peak. This milestone understates the extent to

which the economy has recovered, however, because the recession interrupted steady growth in employment. Thus, the second post-recession milestone is reached when employment recovers to its trend level—the level it would have been if there had not been a recession (along the dotted line in the chart).

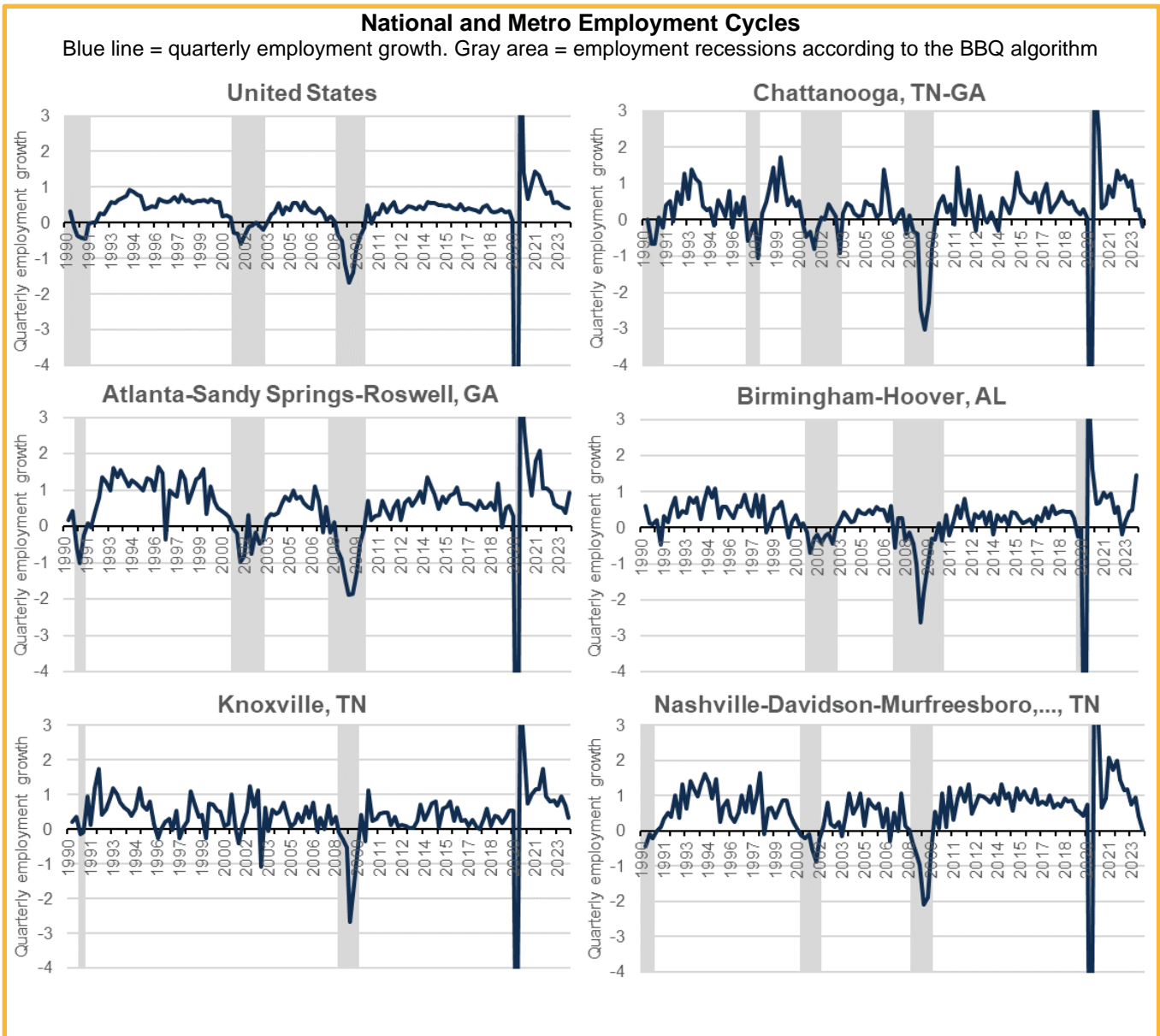
Actual data are never as neat as illustrated above: The rate of employment growth differs every month or quarter, is estimated with statistical error, is released months after the growth occurred, and is subject to revisions as better raw data come in. Further, there isn't a semi-official panel of economists to decide for us, so an empirical method is needed instead. A popular method for determining when recessions occur is the Bry-Boschan algorithm for quarterly data (the BBQ algorithm).^{iv} The algorithm says that a peak quarter is one for which the level of employment is higher than the previous two quarters and the subsequent two quarters. A symmetric rule is applied to obtain the trough. More precisely, where Y_t is the log of the level of employment for quarter t ,

$$peak \text{ at } t = \{(Y_{t-2}, Y_{t-1}) < Y_t > (Y_{t+1}, Y_{t+2})\}$$

$$trough \text{ at } t = \{(Y_{t-2}, Y_{t-1}) > Y_t < (Y_{t+1}, Y_{t+2})\}.$$

The charts below show the quarterly employment growth rates for the United States and the five metro areas, along with shaded areas indicating their employment recessions.^v Notice that the employment cycles of the United States, Atlanta, and Nashville indicate four recessions within the proximate time of NBER recessions, although the various recessions do not line up with one another. Atlanta's cycle is similar to that of the United States, but Nashville looks to have had shorter recessions than did the other two. Birmingham and Knoxville had only three recessions over the period: Birmingham's employment growth was barely negative for one quarter in 1991, so did not enter recession, and Knoxville did not have a recession in 2001

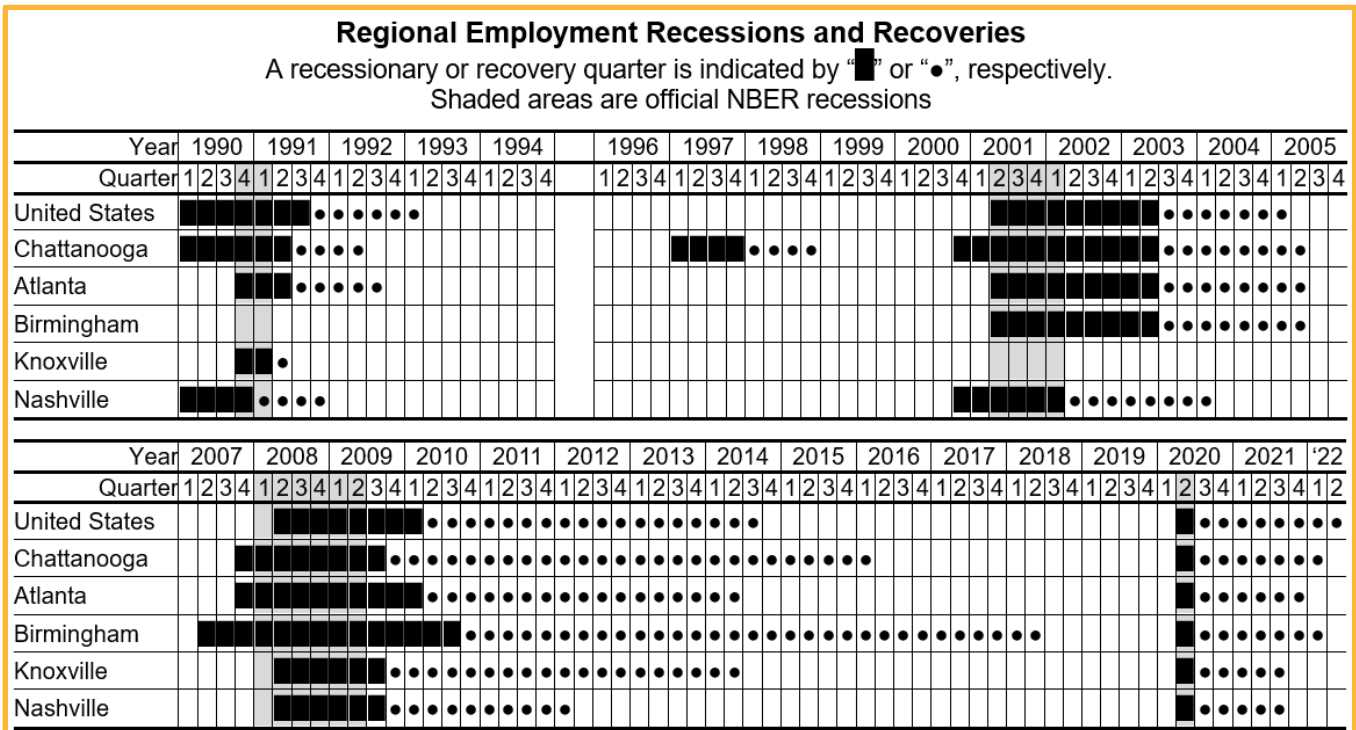
because it did not see consecutive quarters of job losses. Chattanooga, on the other hand, is shown to have had five recessions: four associated with the national recessions and one of its own in 1997.



Given the noisiness of the data and the occurrence of unique events, the algorithm was not applied blindly. For example, the algorithm does not say that a recession occurred in 2020 due to the COVID pandemic because the deep fall in employment lasted only one quarter. Nonetheless, in alignment with the NBER, I have included employment recessions during the second quarter of 2020. Also, the algorithm detected a short recession for Chattanooga that started with the last quarter of 2013. Closer examination of the extremely small decreases in estimated employment indicates that the period was a statistical fluke during a

very weak recovery from the Great Recession. Finally, the algorithm indicates a recession in Birmingham immediately prior to the 2020 COVID recession, but those quarters would have been deemed part of the expansion if the COVID recession had not occurred.

The figure below presents the results from a different perspective, showing quarters of employment recession as black squares and national, NBER recessions as shaded areas. The figure also includes black circles to indicate the quarters during which the levels of employment remained below their pre-recession levels. That is, the first quarters without a black circle are when employment recovered to its pre-recession level. Notice that, except for the 2020 COVID recession, employment recessions tended to last beyond the end of the NBER recession. The economy was deemed to be recovering broadly, but it did so while employment continued to fall or failed to achieve sustained growth (jobless recoveries). Roughly speaking, prior to the Great Recession of 2008-09, recessions tended to be about the same length as their recoveries to pre-recession employment levels. The jobs lost during the Great Recession and the COVID recession took much longer to recover than they took to lose, however. Finally, note that Chattanooga consistently went into employment recession before the country as a whole and before the start of NBER recessions.



The table below summarizes the recession and recovery experiences of the United States and the five metro areas in terms of the number and share of quarters the area was in each phase over the time period. Chattanooga spent more time in both recession and recovery than did any of the other metro areas, largely

	Quarters of recession	Frequency of recession	Quarters in recovery	Frequency of recovery
United States	25	0.18	39	0.29
Chattanooga	30	0.22	49	0.36
Atlanta	23	0.17	36	0.26
Birmingham	25	0.19	46	0.34
Knoxville	9	0.07	25	0.18
Nashville	17	0.13	27	0.20

because of its extra recession in 1997. In total, Chattanooga was either in recession or recovering from recession for 58 percent of the time during 1990-2023, whereas the corresponding number for the United States was 47 percent. Atlanta’s experience was closest to the country’s while Nashville and Knoxville spent the least amount of

time in recession or recovery. Recession in Knoxville was especially rare in that it experienced just over half as many recessionary quarters as Nashville, just more than one third as many as the United States, and 30 percent as many as Chattanooga.

Job Losses During Employment Recessions

The table below shows the drop in employment from the area’s own peaks to their troughs for the periods surrounding the five NBER recessions and Chattanooga’s 1997 recession. With the exception of the 2020 COVID recession, Chattanooga consistently suffered larger job losses during recessions than did the country as a whole. In part, this is because of its high share of manufacturing jobs, although Atlanta and Birmingham had very costly recessions even without large manufacturing sectors. Chattanooga’s 1997

	Percent change from peak to trough				
	1990-91	1997	2001	2008-09	2020
United States	-1.0		-1.9	-6.2	-11.9
Chattanooga	-1.4	-2.0	-2.1	-9.2	-9.3
Atlanta	-1.8		-3.5	-8.3	-11.3
Birmingham			-2.5	-8.0	-8.8
Knoxville	-0.2			-5.5	-8.1
Nashville	-0.7		-2.1	-6.4	-11.6

recession was about as harmful to jobs as was the 2001 recession, despite being seven quarters shorter. The COVID recession lasted only one quarter but resulted in the largest job losses for every MSA. Chattanooga’s COVID recession job losses were very steep, but still quite a bit less than those of the country, Atlanta, or Nashville.

To get a better idea of the effects of recessions in Chattanooga, the table below splits the peak-to-trough job losses by sector. Despite the fact that these recessions do not have a cause that is common to any two of them, there are some semi-regularities that are summarized by the average job losses across recessions, excluding the COVID recession. The three most recession-sensitive sectors have been manufacturing; mining, logging, and construction (which is mostly construction); and transportation and utilities. At the other end are education and health (which is mostly health), financial activities, and government, the first two of which have tended to see employment *increasing* during recessions. As already noted, Chattanooga has

Chattanooga Sectoral Employment Changes During Recessions						
Percent change from peak to trough						
	1990-91	1997	2001	2008-09	2020	Average*
Total Across Sectors	-1.4	-2.0	-2.1	-9.2	-9.3	-4.1
Mining, Construction, Logging	-7.1	2.0	-16.1	-21.3	-4.8	-8.0
Manufacturing	-7.8	0.2	-19.3	-19.7	-8.4	-9.3
Wholesale Trade	-5.5	0.6	1.8	-7.4	-6.7	-2.9
Retail Trade	-1.6	-5.0	-3.3	-9.7	-6.6	-4.2
Transportation and Utilities	-7.2	-2.2	-4.7	-29.3	-5.0	-8.8
Information	-1.1	2.6	-8.2	1.9	-2.3	-1.7
Financial Activities	4.4	4.4	8.4	-3.3	-2.9	2.2
Professional and Business Services	10.0	-9.1	7.6	-14.6	-11.3	-3.4
Education and Health	1.9	2.3	12.8	5.1	-8.4	2.4
Leisure and Hospitality	-2.2	-4.4	0.7	-3.3	-30.4	-6.5
Other Services	-3.1	-3.7	-4.7	-0.8	-11.9	-4.1
Government	-0.3	-4.1	5.7	-0.2	-1.4	-0.1

* The average is calculated across all recessions except for the 2020 COVID recession.

had a relatively large manufacturing sector matched with a relatively small education and health sector, so it is no mystery why it has tended to see larger than average job losses during recessions.^{vi}

Underlying these semi-regularities were some significant differences across recessions. For example, professional and business services alternated across the first four recessions between large gains and large losses in jobs. The information sector has been similarly inconsistent, but with the opposite pattern. During Chattanooga’s 1997 recession, manufacturing employment actually rose by a small amount. The COVID recession of 2020 was nothing at all like previous recessions: every sector suffered job losses, with the largest occurring in the customer-facing sectors of leisure and hospitality, other services, and professional and business services. It was the only recession during which the education and health sector experienced net job losses.

A pessimist would say that, because of the sectoral mix of its employment, Chattanooga remains especially vulnerable to recessionary job losses. That view, which applies past patterns to the current Chattanooga economy, overlooks the changing nature of the manufacturing sector, however. Previous recessions accelerated the decline of uncompetitive manufacturers and meant large and permanent job losses in many industries. The current manufacturing-led resurgence in Chattanooga, however, is part of a national manufacturing renaissance using more technology and employing higher-skilled workers.^{vii} These new manufacturers might be less vulnerable to recessions than their predecessors.

Endnotes

- ⁱ See Owyang, M.T.; Piger, J.; and Wall, H.J. “Business Cycle Phases in U.S. States,” *Review of Economics and Statistics*, 87(4), November 2005, 604-616; and Owyang, M.T.; Piger, J.; and Wall, H.J. “Discordant City Employment Cycles,” *Regional Science and Urban Economics*, 43(2), March 2013, 367–384.
- ⁱⁱ Wall, H.J. “The Great, Greater, and Greatest Recessions of U.S. States,” *Journal of Regional Analysis & Policy*, 53(1), 2023, 34-58.
- ⁱⁱⁱ The official names of the MSAs are Chattanooga, TN-GA; Atlanta-Sandy Springs-Roswell, GA; Birmingham-Hoover, AL; Knoxville, TN; and Nashville-Davidson-Murfreesboro-Franklin, TN. The data are from the Bureau of Labor Statistics and were downloaded prior to the March benchmark revisions, which did not affect the results in this analysis.
- ^{iv} Harding, D. and Pagan, A. “Dissecting the cycle: a methodological investigation,” *Journal of Monetary Economics*, 49(2), March 2002, 365-381, propose a quarterly version of the monthly algorithm developed in Bry, G. and Boschan, C. *Cyclical Analysis of Time Series: Selected Procedures and Computer Programs*, National Bureau of Economic Research, 1971.
- ^v The charts have a maximum growth rate of 3 percent and a minimum growth rate of -4 percent because the COVID experience would otherwise dwarf the rest of the data, making the charts useless for visualizing the employment cycle.
- ^{vi} See “Chattanooga Metro Employment, 1990-2023: Decline, Recovery, & Transformation,” CRER White Paper Number 1, January 2024 for a summary of how Chattanooga’s sectoral composition differs from the national average and how it has been changing over time.
- ^{vii} See “[Delivering the US Manufacturing Renaissance](#),” August 29, 2022, McKinsey & Company.