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# Wages in Chattanooga: Measurement, Trends, and Composition

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### Summary

This paper analyzes wage trends in the Chattanooga metro area between 2001 and 2023. Throughout this period, wages in the area were below those for the country as a whole. The first half of the period, which had two recessions, saw Chattanooga's real median wage fall while the country's rose. During the second half, however, median wage growth was significantly higher locally. Real wages in Chattanooga rose across the wage distribution between 2012 and 2023, with especially strong growth at the lower end. Chattanooga's wage inequality was lower than the country's throughout 2001-2023 and plunged after the COVID pandemic. When account is taken of Chattanooga's relatively low cost of living, its effective real median wage in 2023 is less than a dollar below the national level.

## Introduction

This paper examines wage trends in the six-county Chattanooga Metropolitan Statistical Area (MSA) between 2001 and 2023. As has been documented in previous CRER white papers, strong job growth in Chattanooga over the past decade has changed the employment mix across industries, benefited most demographic groups, and was accompanied by net in-migration from the rest of the country.<sup>i</sup> All of these changes have had an effect on wages, which are the core of residents' financial well-being. The analysis below uses data from the Bureau of Labor Statistics' Occupational Employment and Wage Statistics program to examine wage trends in the Chattanooga MSA since 2001.<sup>ii</sup>

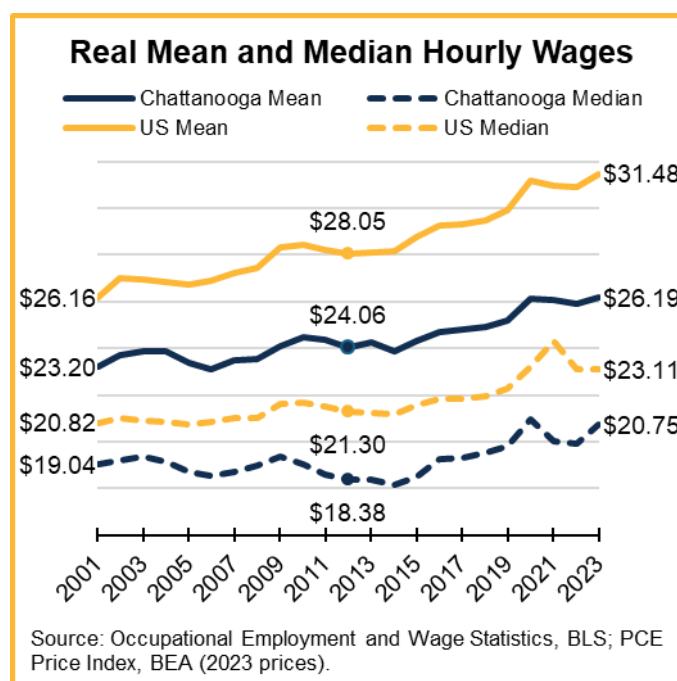
Although rising average wages are usually thought of as good news for an economy, it is not always that simple. First and most obviously, if wages are not keeping up with inflation, then real wages are falling, and the average person is probably worse off. All of the data below are real wages in 2023 dollars using the Personal Consumption Expenditures (PCE) price index to account for inflation. The inset on the next page discusses various measures of inflation and explains why the PCE index is the better choice of the official inflation indices.

Second, changes in the composition of employment tend to matter a lot and can work in the opposite direction of the demand for labor. For example, because recessions usually mean job losses that are felt disproportionately by lower-paid workers, average wages can rise during recessions and fall during recoveries. In Chattanooga, the employment boom over the past ten years has had its largest effects for younger workers and those without college degrees.

This beneficial change in the composition of employment means that the increases in the mean and median wage understate the wage gains that most people experienced as the economy grew and employment boomed.

## Overall Mean and Median Wages

The figure to the right shows the annual levels of real mean and median wages for the Chattanooga MSA and the United States from 2001 to 2023. The average real wage is significantly lower in Chatt-



## Measuring Inflation

It goes without saying that it is important to have a good measure of inflation. The Federal Reserve needs to know what the inflation rate is so that it can use the appropriate monetary policy to control it, many government programs and private contracts are tied to inflation and have built-in cost-of-living adjustments, and an understanding of trends in economic well-being, such as average wages or per capita income, requires an accurate accounting of the changes in purchasing power.

The Bureau of Labor Statistics (BLS) constructs its Consumer Price Index (CPI) by collecting price data for a basket of goods and services purchased by the average urban household. It creates an average price using information on the shares of spending on the goods in the basket. The CPI is the oldest and best-known price index, and it requires constant adjustments and reformulations. For example, spending shares can change a great deal over time as the prices of individual goods rise and fall, some goods didn't exist until relatively recently (think smart phones), and many goods such as vehicles, computers, and television sets have improved greatly in quality over time.

The Bureau of Economic Analysis (BEA) constructs an alternative to the CPI called the Personal Consumption Expenditure (PCE) price index.<sup>a</sup> The PCE index includes a wider range of goods and considers all households, not just urban households. Also, because of how it is constructed, adjustments to spending shares can be done more frequently than with the CPI. It is fair to say that the PCE index is viewed as more accurate than the CPI, as evidenced by its adoption by the Federal Reserve as its target inflation variable.

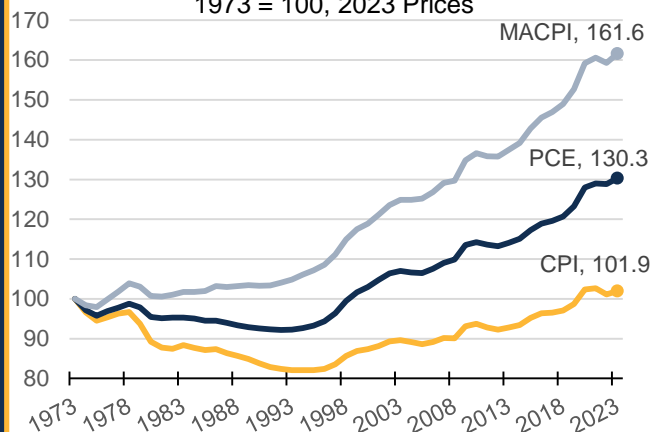
Although the PCE index is seen as more accurate than the CPI, the latter is more familiar to the public and is still used by government data agencies to adjust for inflation. The differences between the indices usually do not matter much over short periods, but they can yield very different lessons when applied to periods longer than ten years or so. Note further that, although the PCE index is an improvement on the CPI, it still tends to overstate actual inflation. To illustrate the extent of this problem, Scott Winship of the American Enterprise Institute applied estimates of the overstatement to create a More Accurate Consumer Price Index (MACPI).<sup>b</sup>

To illustrate how the choice of inflation index affects our view of long-term trends, the figure shows how the three indices described above result in dramatic differences in changes in real wages over the past five decades. The gold line shows the average real hourly wage when the CPI is used to express wages

in terms of 2023 price levels. It indicates that real wages increased by less than 2 percent between 1973 and 2023, which has led to the claim that the United States has seen decades of wage stagnation. The dark blue line, however, indicates that the wage stagnation claim is just an artefact of a faulty inflation measure. When wages are adjusted using the PCE index, the conclusion is that real wages increased by about 30 percent since 1973, although with 20 years of slow decline until 1993. According to the MACPI, on the other hand, the increase in real wages was actually greater than 60 percent.

### Average Wage Under Alternative Inflation Measures, United States, 1973-2023

1973 = 100, 2023 Prices



Sources: Average hourly earnings of private production and nonsupervisory workers (BLS), CPI for all urban consumers: All items U.S. city average (BLS), PCE price index (BEA), More Accurate Consumer Price Index (Winship, 2024).

<sup>a</sup> Joseph G. Haubrich and Sara E. Millington, "PCE and CPI Inflation: What's the Difference?," FRB of Cleveland *Economic Trends*, April 17, 2014.

<sup>b</sup> Scott Winship, "Introducing the 'More Accurate Consumer Price Index'," AEI Center on Opportunity and Social Mobility Working Paper, November 7, 2024

Chattanooga than in the country as a whole. In 2001, the average employed Chattanoogaan earned about \$3 (12.8 percent) less per hour than the average American worker, and by 2023 this gap had increased to more than \$5 (20.2 percent). Note, however, that much of this gap is because Chattanooga's wage distribution is less skewed toward the high end. Because of this difference, median wages are much closer to one another than mean wages are, especially by the end of the period. In 2001, the US median wage was \$1.78 higher (9.3% higher) than the Chattanooga median wage and increased to \$2.36 (11.4 percent) by 2023.

As reported in the table to the right, between 2001 and 2023, mean wages in Chattanooga and the United States rose by 12.9 percent and 20.3 percent, respectively. The increases in their median wages were more similar, however. Note also that there were stark differences between the first and second half of this period in the state of the overall labor market and, therefore, wages. The figure to the right shows the employment rate (the percentage of the population that is employed) for those of working age. In 2012, on the heels of the Great Recession, less than 67 percent of those ages 15 to 64 were employed, a 6-point drop from 2001. By 2023, the employment rate had risen to about 72 percent, despite the COVID recession in 2020.

During the first half of the period, 2001-2012, the real median wage in Chattanooga fell by 3.5 percent as the two recessions in 2001 and 2008-09 that hit the Chattanooga economy especially hard.<sup>iii</sup>

National median wage growth was low but positive over the same period. For 2012-2023, on the other hand, the median wage rose by 12.9 percent in Chattanooga versus 8.5 percent nationally. Note, however, that the mean wage grew more nationally than it did in Chattanooga. The reason for this difference is that job growth during this period was stronger for younger workers and those without any college in Chattanooga than in the rest of country.<sup>iv</sup> Because these groups tend to have lower than average wages, their

**Percentage Change in Real Hourly Wages**

	Chattanooga MSA		United States	
	Mean	Median	Mean	Median
2001-23	12.9%	9.0%	20.3%	11.0%
2001-12	3.7%	-3.5%	7.2%	2.3%
2012-23	8.8%	12.9%	12.2%	8.5%

Source: Occupational Employment and Wage Statistics, BLS; PCE Price Index, BEA (2023 prices).

**Employment Rate: 15 to 64 Years of Age, United States**

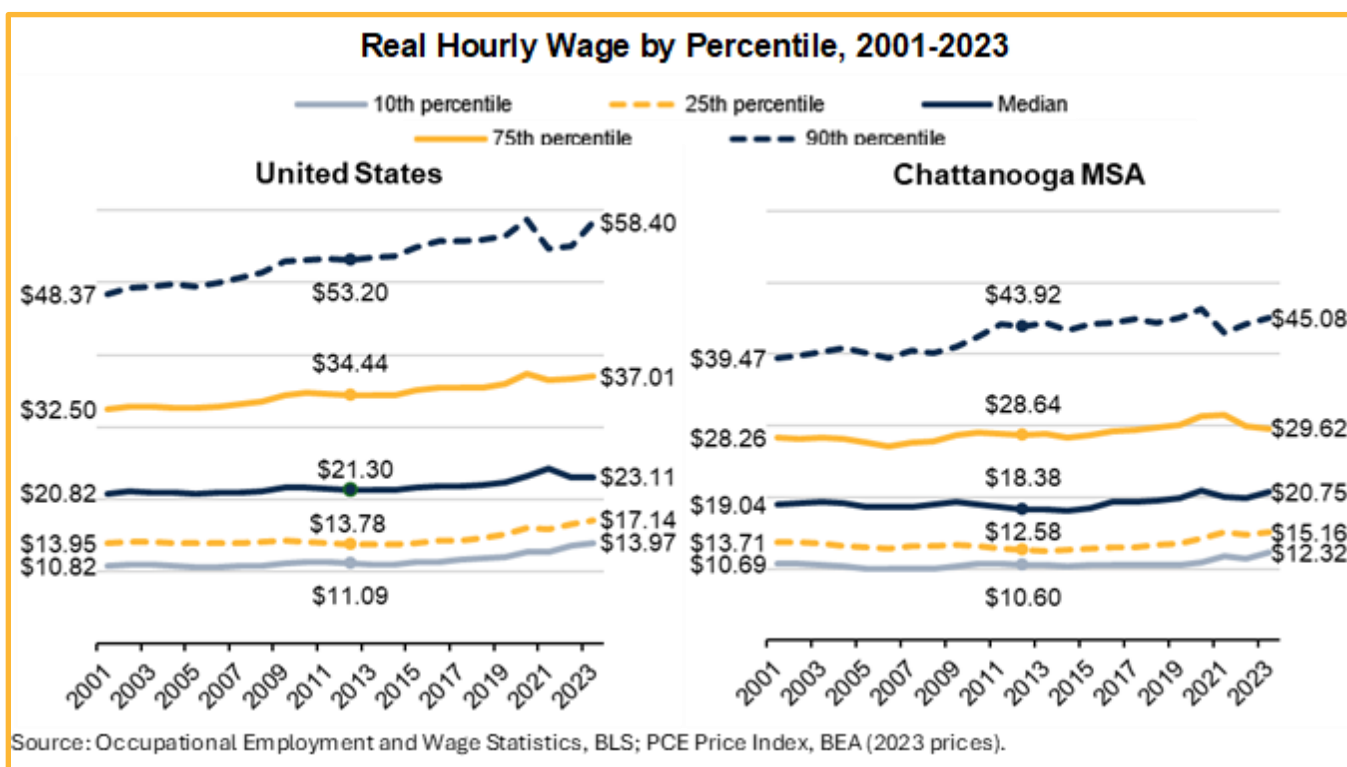


Source: Organization for Economic Cooperation and Development

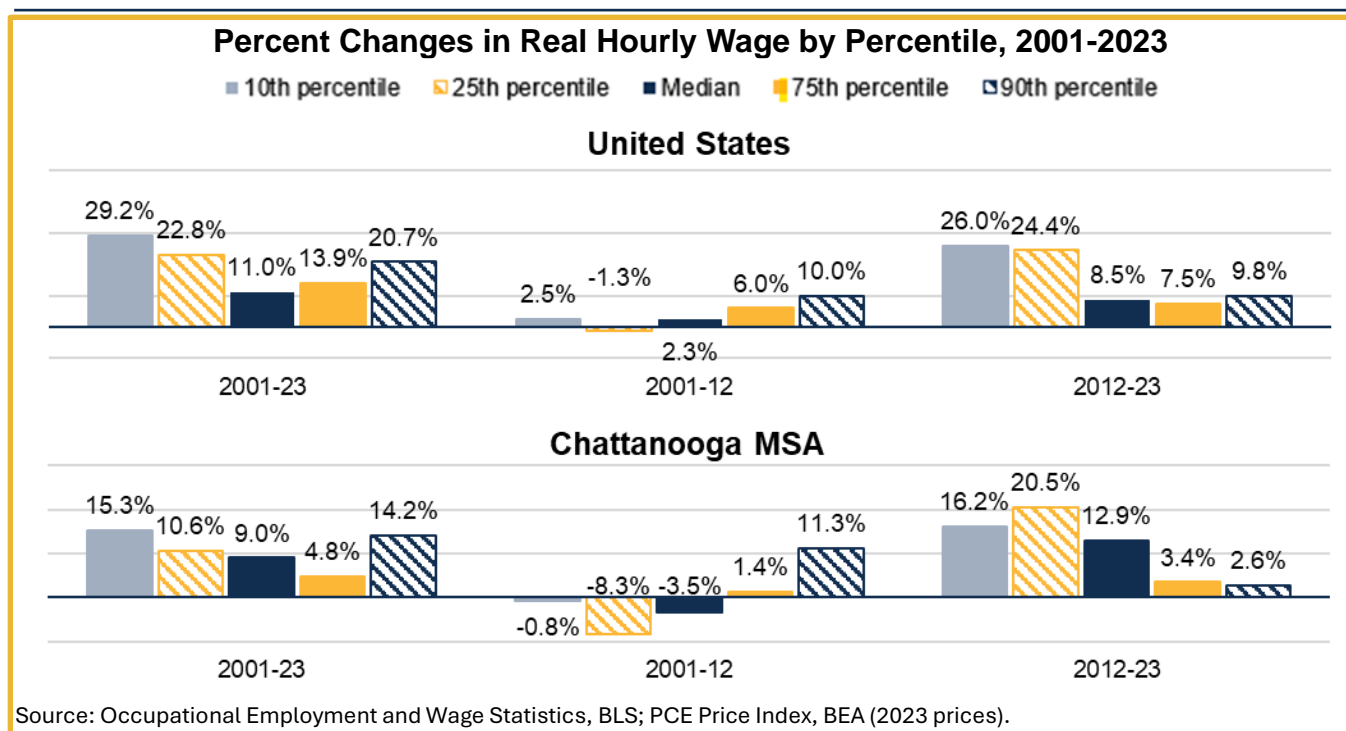
disproportionate entry into employment lowered the average wage while also pushing up the median wage. This composition effect occurred nationally, also, but was not as significant.

## Wage Growth Across the Wage Distribution

The figures below show the evolution of five points on the wage distributions of the United States and Chattanooga. They include the median hourly wages shown above, along with wages at the 10<sup>th</sup>, 25<sup>th</sup>, 75<sup>th</sup> and 90<sup>th</sup> percentiles. Throughout the period, the biggest differences between the Chattanooga and the United States were in their wages at the 75<sup>th</sup> and 90<sup>th</sup> percentiles. For example, the average difference in the wage at the 90<sup>th</sup> percentile Chattanooga and the United States was about 25 percent whereas the average difference at the 10<sup>th</sup> percentile was only about 8 percent. The figures also show how real hourly wages increased nationally and locally across the wage distribution from 2001 to 2023. For Chattanooga they rose by \$1.63 at the 10<sup>th</sup> percentile, \$1.45 at the 25<sup>th</sup> percentile, \$1.71 at the 50<sup>th</sup> percentile, \$1.26 at the 75<sup>th</sup> percentile, and \$5.61 at the 90<sup>th</sup> percentile. These might seem like small increases, but composition effects have suppressed the good news that lies within them.



The figures below provide percentage changes in wages for Chattanooga and the United States for the entire period and for its two halves. Looking at the entire period, for both Chattanooga and the United States the wage changes were U-shaped in that the wages at the top and bottom percentiles increase substantially more than did the median. As previously discussed, it really was a tale of two time periods, as illustrated by the



center and right-most panels of the figures. For 2001-2012, the demand for most types of labor fell a great deal because of the effects of the two recessions. This demand effect meant that wage growth for most types of workers was negative or relatively low. In addition, because the job losses were disproportionately at the lower end of the wage distribution, there was a composition effect that pushed the wages at the 90<sup>th</sup> percentile upward. As a consequence, the wage at the 90<sup>th</sup> percentile rose significantly in both Chattanooga and the United States by 2012. It was not necessarily because these people saw higher real wages, but that the wage cutoff for the top 10 percent rose because there were a lot fewer workers at lower wages.

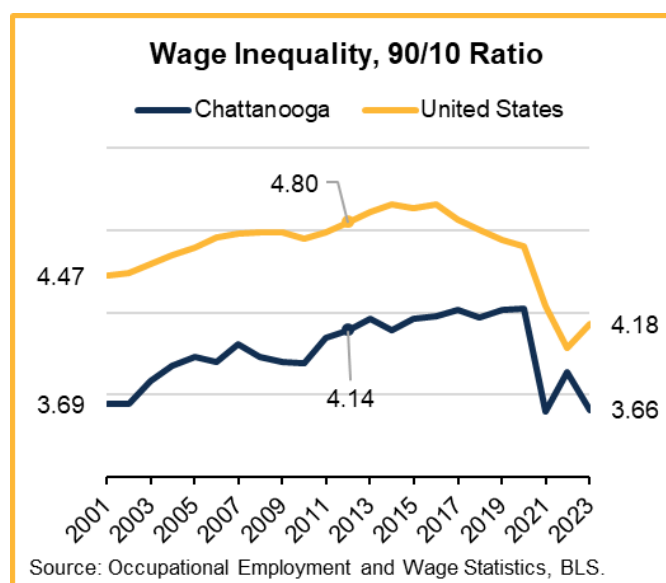
The second half of the period, 2012-2023, saw employment grow steadily but with an interruption from the COVID pandemic. By 2023, the percent of the employment rate was about 5 percentage points higher than in 2012 and had returned to its pre-Great Recession level. Real wages tended to rise for most people because of an increase in demand for workers. Further, during 2012-23, wage gains tended to be largest for low-wage occupations. In Chattanooga, for example, the occupational categories with the largest real mean wage gains were building and grounds cleaning and maintenance, food preparation and serving-related, and transportation and material moving occupations. There was also a composition effect, however, that worked in reverse of the one that occurred during 2001-2012: Because employment gains were disproportionately at the lower end of the wage distribution, the wage at the higher percentiles did not rise as much as they would have if job gains were proportional. The combination of these effects meant that real wages in Chattanooga



increased at the 10<sup>th</sup>, 25<sup>th</sup>, and 50<sup>th</sup> percentiles, but were relatively flat for wages at the 75<sup>th</sup> and 90<sup>th</sup> percentiles. These effects occurred for the United States, but were less pronounced.

## Wage Inequality

The figure to the right illustrates the changes in wage inequality in Chattanooga and the United States using a common inequality measure: the ratio of wages at 90<sup>th</sup> and 10<sup>th</sup> percentiles. Note that wage inequality has been significantly lower in Chattanooga than in the United States, as noted earlier with regard to the spread of wages. Wage inequality in both the United States and Chattanooga rose between 2001 and 2012 as the economy suffered through its recessions, and it fell



between 2012 and 2023 when the employment rate was recovering and the job market was jolted by the COVID recession. For the United States, this measure of inequality peaked in 2014-2016 and was already falling by the time the pandemic hit. Inequality was rising very slowly in Chattanooga just prior to the pandemic. In the wake of the pandemic, predominantly lower-wage workers in industries such as leisure and hospitality found new, higher-paying jobs. As we saw, median wages at the 10<sup>th</sup> and 25<sup>th</sup> percentiles rose considerably more than did the median wage for Chattanooga and the country as a whole, so inequality plunged.

## More Inflation Adjustments

### *A "More Accurate" Inflation Adjustment*

Wages are the primary source of income for most people, so they are the key financial input in determining the well-being of a typical resident. As was done throughout this analysis using the PCE index, any analysis of trends over time needs to account for changes in the prices of things that can be bought with those wages. As mentioned in the insert, the PCE index is the better of the two official inflation indices, but it still overestimates inflation over the long term. An alternative inflation index created by Winship (2024) and outlined in the inset suggests that the PCE index overstates inflation between 2001 and 2023 by about one-third of a percentage point per year, on average. That doesn't sound like much but, because of

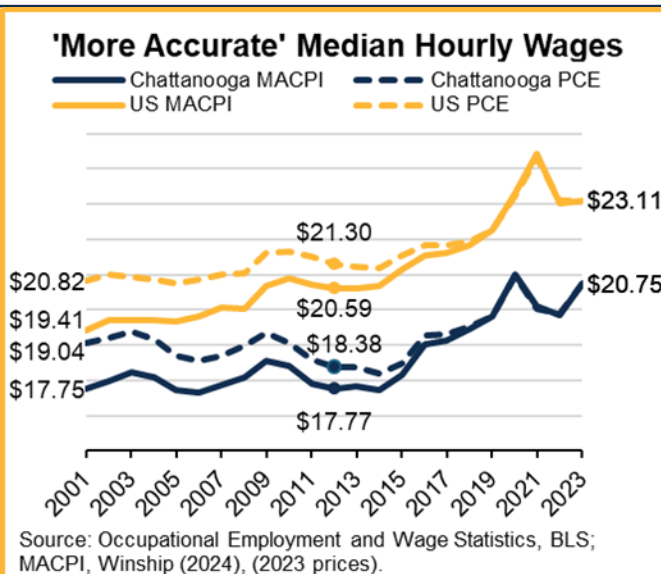
compounding, would mean that the cost of living rose by 49 percent rather than 60 percent between 2001 and 2023 as indicated by the PCE index.

The figure to the right uses Winship’s “More Accurate” CPI (MACPI) to show how real median wages might have evolved between 2001 and 2023. For reference, the dashed lines show real median wages using the PCE index. The table shows the percentage changes in the real median wage over the entire period and each of its two halves using the MACPI and the PCE index. Inflating wages by the MACPI suggests median wage growth between 2001 and 2023 in both Chattanooga and the United States was about 8 percentage points higher than if the PCE index is used. For Chattanooga, median wage growth was basically zero for the first half of this period, and 16.8 percent over the second half. As when the PCE index is used, the median wage growth was much weaker in Chattanooga than in the rest of the country during the first half, but much stronger in the second half.

### *Regional Price Parity*

The Regional Price Parities (RPPs) from the Bureau of Economic Analysis measure the differences in cost of living across states and metro areas and estimates that Chattanooga’s cost of living was about 93 percent that of the average for the United States. A proper evaluation of how well people are doing financially should take this into account. In

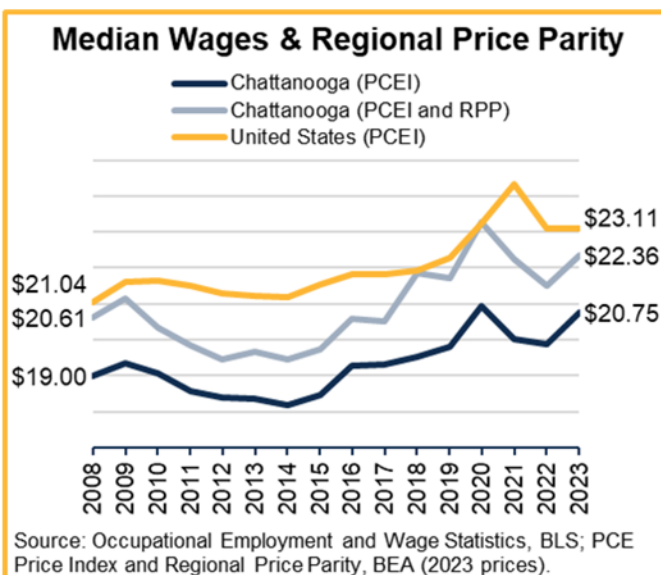
the figure to the right, the gray line shows Chattanooga’s median wage in terms of what it can buy: \$20.75 in Chattanooga in 2023 is like having \$22.36 in the average place in the country.<sup>v</sup> Instead of being 10 percent



**Percentage Change in Real Median Wages**

	Chattanooga MSA		United States	
	PCE	MACPI	PCE	MACPI
2001-23	9.0%	16.9%	11.0%	19.1%
2001-12	-3.5%	0.1%	2.3%	6.1%
2012-23	12.9%	16.8%	8.5%	12.2%

Source: Occupational Employment and Wage Statistics, BLS; PCE Price Index, BEA; MACPI, Winship (2024); (2023 prices).





lower than the national median wage in 2023 (the gold line), Chattanooga's median wage was only 3 percent lower after being essential equal to it in 2018-2020. Although housing costs are still lower than average in Chattanooga, they have been rising faster than average since 2020 and account for the gap between the gold and gray lines since then. Because of its limited availability, it is not always possible to use the Regional Price Parity index to adjust Chattanooga's wages to better reflect what can be purchased with them. A conservative rule of thumb is to add 7 percent to local wages to make them comparable to wages in the rest of the country in terms of buying power.

## Conclusions

This paper analyzed 2001-2023 wage data for the Chattanooga MSA from the Bureau of Labor Statistics' Occupational Employment and Wage Program. This dataset is extremely useful because it provides the mean and median wages along with the wages at several points on the wage distribution. Most of the analysis used the PCE index from the Bureau of Economic Analysis to account for inflation. The main findings include:

- Chattanooga's mean real hourly wage was more than \$5 below that of the United States in 2023 (\$31.48 vs \$26.19). Because of Chattanooga's lower wage inequality, however, its median real hourly wage was only \$2.36 lower (\$23.11 vs. \$20.75).
- Chattanooga's median real wage rose less than the country's between 2001 and 2023, primarily because the area was hit relatively harder by the two recessions that occurred. From 2012 to 2023, on the other hand, Chattanooga's median real wage rose much faster than the country's: 12.9 percent vs 8.5 percent.
- Real wages in Chattanooga have risen across the wage distribution since 2001, but there were significant differences between time periods: From 2001 to 2012, only the wage at the 90<sup>th</sup> percentile rose significantly, but from 2012 to 2023 it was wages at the 10<sup>th</sup>, 25<sup>th</sup>, and 50<sup>th</sup> percentiles that saw significant increases.
- Chattanooga's wage inequality was lower than the country's throughout 2001-2023. It rose during the first half of the period, leveled off, and then plunged after the COVID pandemic.
- Official measures of inflation are thought to overstate actual inflation by about 0.3 percentage points per year. If so, then Chattanooga's median real wage grew by 16.8 percent rather than 9 percent from 2001 to 2023.
- If account is taken of Chattanooga's relatively low cost of living, its effective real median wage in 2023 would be 75 cents below the national median wage.

## ENDNOTES

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<sup>i</sup> See “[Chattanooga Metro Employment, 1990-2023: Decline, Recovery, and Transformation](#),” CRER White Paper Number 1, January 2024; “[The Demographics of Chattanooga Employment Growth](#),” CRER White Paper Number 5, May 2024; and “[Origins and Destinations of Chattanooga’s Young Adult Migrants](#),” CRER White Paper Number 6, July 2024.

<sup>ii</sup> Because of its sample size, the program is able to provide estimates of average wages, median wages, and wages at various percentiles for each of 22 major occupational groups. The program uses sample of 1.1 million nonfarm establishments to generate estimates for about 830 detailed occupations at the national level and several hundred occupations at the state and MSA level.

<sup>iii</sup> As discussed in “[Recession and Recovery in Chattanooga, 1990-2023](#),” CRER White Paper Number 3, March 2024, these recessions were both longer and deeper in the Chattanooga MSA and were driven by large job losses in the manufacturing and construction sectors.

<sup>iv</sup> “[The Demographics of Chattanooga Employment Growth](#),” CRER White Paper Number 5, May 2024.

<sup>v</sup> For reference, according to the RPPs for 2023 and relative to the national average, the cost of living is 1 percent higher in the Atlanta MSA, 3 percent lower in the Nashville MSA, and 7 percent lower in the Knoxville MSA.