

# FEDERAL RESERVE BANK *of* NEW YORK *Serving the Second District and the Nation*

## Weekly Economic Index (WEI)

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### What is the Weekly Economic Index (WEI)?

The WEI is an index of real economic activity using timely and relevant high-frequency data. It represents the common component of ten different daily and weekly series covering consumer behavior, the labor market, and production. The WEI is scaled to the four-quarter GDP growth rate; for example, if the WEI reads -2 percent and the current level of the WEI persists for an entire quarter, we would expect, on average, GDP that quarter to be 2 percent lower than a year previously.

### What are the key features of the approach?

The WEI extracts the first principal component of the ten underlying series. This approach serves to filter out the high level of noise prevalent in individual weekly releases while also providing a more representative measure than any one weekly data series. Prior to February 2022, an initial estimate of the WEI for the past week was computed each Tuesday based on the historical relationship between the WEI and the available series. This value was updated on Thursday and again the following Tuesday with additional releases, before being finalized the following Thursday. As of February 2022, the WEI moved to a once-weekly update schedule, with an initial estimate for the preceding week published each Thursday at 11:30am ET and a final estimate published the following Thursday. Historically, the WEI tracks familiar series such as GDP and industrial production very well, but provides a far timelier signal. The decision to reduce the WEI publication frequency reflects the diminished volatility of the data relative to the inception of the WEI publication at the onset of the pandemic.

As of January 20, 2022, WEI updates reflect re-estimation of the series weights. These weights are applied to a standardized version of the data series, in annual log changes, to compute the index. (For more information, see [this article](#).) Going forward, re-estimation of the weights will take place twice a year, in January and July, to incorporate both new data and revisions to old data. The new weights may imply revisions for the past WEI, which will be available with previous vintages in the Downloads tab; however, past values of the WEI shown in the interactive chart and associated commentary will not change. The current and previous series weights are also provided in the downloadable data file.

### What are the input data?

The WEI is composed of ten underlying series, detailed in the table below. To measure consumer behavior, we include the Redbook same-store retail sales index and the Rasmussen Consumer Index. To measure labor market conditions, we include initial and continuing unemployment insurance claims, the American Staffing Association Index of temporary and contract employment, and federal tax withholding data from Booth Financial Consulting. For production, we include U.S. steel production from the American Iron and Steel Institute, U.S. electricity output data from the Edison Electric Institute, a measure of fuel sales based on Energy Information Administration data, and total railroad traffic from the Association of American Railroads.

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Data Series Employed in the WEI	
	Description
Redbook Research: Same-store retail sales average	Measures year-over-year same-store sales growth for around 9,000 general merchandise stores in the United States
Unemployment insurance: Initial claims	Reports the number of people making new unemployment insurance claims from state unemployment offices
Unemployment insurance: Continuing claims	Reports the number of people making unemployment insurance claims for a continuing spell of unemployment from state unemployment offices
American Staffing Association Staffing Index	Tracks temporary and contract employment with data coming from a large panel of staffing companies
Rasmussen Consumer Index	Constructed with a daily survey of 1,500 American adults using questions about personal finances and the economy more broadly
Raw steel production (from American Iron and Steel Institute)	Estimates the weekly production of raw steel from domestic producers
Electric utility output: United States ex. Hawaii and Alaska (from Edison Electric Institute)	Measures electricity output for the United States excluding Alaska and Hawaii
U.S. fuel sales to end users (our calculations based on underlying data from the U.S. Energy Information Administration)	Estimates gasoline, diesel, and jet fuel sales to retailers and end users
U.S. railroad traffic	Tracks total freight transported as reported by railroad companies to the Association of American Railroads
Federal withholding tax collections (Booth Financial Consulting)	Measures Treasury receipts of income and payroll taxes withheld from paychecks, filtered and adjusted for policy changes

### How do you transform the input series so that they are in comparable units?

The native units for Redbook retail sales and the tax withholding series are year-on-year percentage changes. We transform the other series to comparable units by taking 52-week log changes. This serves two purposes. First, it provides a reasonable seasonal adjustment of the raw data. Second, by casting the WEI in annual percentage changes, we construct an index well-suited to match the units of four-quarter GDP growth. Additionally, all series are standardized before the principal component is estimated.

For reference, we plot the WEI alongside the four-quarter annual real GDP growth rate, using the latest quarterly GDP data release from the U.S. Bureau of Economic Analysis, and a 13-week moving average of the WEI, which approximates the four-quarter annual real GDP growth rate for a hypothetical quarter ending in a given week.

### When and why was the WEI developed?

The WEI is based on earlier work described in Council of Economic Advisers (2013). The Lewis, Mertens, and Stock WEI presented here was initiated in early March 2020 in response to the need for tools to monitor the rapid evolution of economic conditions at the onset of the COVID-19 pandemic. The index offers a timelier reading of economic developments than common indicators reported at monthly or quarterly frequencies and available only at a considerable time after the reference period has ended.

### How does the WEI differ from the New York Fed Staff Nowcast?

The WEI differs from the New York Fed Staff Nowcast in two key ways. First, the nowcast is designed to target quarterly GDP growth. While the WEI is ultimately scaled to GDP units, it is a measure of real economic activity more broadly, providing a strong signal of industrial production, employment, and other series, as explored in Lewis, Stock, and Mertens (2020). Second, by virtue of targeting quarterly GDP growth, the nowcast smooths variation from week to week, since the target is a thirteen-week average of economic conditions. The WEI seeks to represent precisely that week-to-week variation.

### How should large positive readings of the WEI in spring 2021 be interpreted?

*[Note: The alternative measure described below was discontinued in June 2022, as it was no longer relevant given the evolution of the economy.]*

Since the WEI is computed in annual percentage changes, it increased dramatically in April 2021. This is for the most part due to so-called base

effects: the reference weeks for those readings of the WEI, during April 2020, saw a sharp deterioration in economic conditions, and all of the subsequent rebound in economic activity therefore appears abruptly in the WEI during April 2021. We are temporarily publishing an alternative indicator of the state of activity relative to pre-pandemic levels alongside the final value of each week's WEI. Instead of annual percentage changes, the input data for this alternative measure consists of percentage changes relative to February 2020, combined using the baseline WEI weights. This alternative measure, which appears in the commentary displayed beside the interactive, provides an indication of where current activity lies relative to just before the pandemic.

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## References

Lewis, D., K. Mertens, J.H. Stock, and M. Trivedi. 2020. "Measuring Real Activity Using a Weekly Economic Index." Federal Reserve Bank of New York *Staff Reports*, no. 920, April, revised September.

Council of Economic Advisers. 2013. "Economic Activity during the Government Shutdown and Debt Limit Brinksmanship," Report of the Executive Office of the President, October.

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