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COVID-19 and the Seasonal Adjustment of NYC Employment Data

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Due to the wide-ranging impact of the COVID-19 pandemic, NYC OMB has modified the methodology used to seasonally adjust the monthly NYC establishment survey data released by the NYS Department of Labor (NYS DOL). This note provides details of the changes.

Large economic shocks disrupt the regular patterns that seasonal adjustment systems attempt to identify and have the potential to bias the estimates of adjustment weights (also known as “factors”). This is particularly evident when using a concurrent estimation scheme where monthly factors are re-estimated as new data becomes available. The central problem is that if the non-seasonal shock is significant, the factor estimates will erroneously incorporate the fluctuation as a seasonal pattern that will affect the adjustment of subsequent data. Wright (2013) documented this phenomenon in the national nonfarm payroll data after the 2009 Financial Crash and Lucca and Wright (2020) have uncovered a similar “seasonal echo” in the national CES employment data in the COVID-19 period.

Beach (2020) discusses some of the changes that the U.S. Bureau of Labor Statistics (BLS) has made to their seasonal adjustment approach in the wake of the pandemic. In an effort to mute the impact in many of its series, BLS switched to an additive factor model from the (usual) multiplicative factor model. For example, in April 2020 BLS identified outliers in most of the household survey (CPS) series and switched to additive factors. Likewise, in September 2020, the U.S. Department of Labor (US DOL) began using additive factors to adjust the weekly unemployment insurance claims. NYC OMB switched to additive factors starting with the April 2020 data.

While additive factors can mute swings created by the seasonal adjustment process, it is still subject to the “seasonal echo” effect since the estimation process still uses all available data. To address this issue, one approach is to manually tag problematic observations as outliers and thereby exclude them from the computation of the seasonal factors. According to Lucca and Wright (2020), as of early 2021 over half of the national employment in the establishment survey falls into sectors that BLS has designated as outliers.

To prevent the seasonal echo effect in the NYC employment data, NYC OMB will also begin to exclude the period starting in April 2020 through the latest available data from the estimation of seasonal factors – which will continue to be additive starting from the January 2020

observations. Data prior to 2020 will continue to be adjusted in the conventional manner using multiplicative factors with no designated outliers.

Table 1. Summary of Seasonal Adjustment Methods

Data Period	Type of Seasonal Adjustment Factors	Designated Outlier Period
Jan 1990 — Dec 2019	Multiplicative	None
Jan 2020 — latest obs.	Additive	Apr 2020 — latest obs.

OMB’s total NYC nonfarm employment series is seasonally adjusted *indirectly* – it is the sum of seasonally adjusted subsectors. NYS DOL publishes a seasonally adjusted total employment series that results from a direct adjustment. Treating the pandemic period as an outlier brings OMB’s 2021 total employment estimates much closer to those published by NYC DOL. Through May 2021, year-to-date seasonally adjusted total employment gains are now 121,500 vs. NYC DOL’s estimate of 96,500. If we do a direct seasonal adjustment in the same manner as NYC DOL, this number declines to 108,400 jobs. Prior estimates through May showed gains of roughly 229,000, largely due to the algorithm’s attempt to smooth the (non-seasonal) pandemic drop observed in the first half of 2020.

The drawback of the outlier approach is that it leaves open the question of when to stop treating observations as outliers and when to return to a more conventional methodology. This decision will ultimately depend on individual judgement and the stabilization of labor markets. As noted by Lucca and Wright (2020), “There are no easy answers to seasonal adjustment in this environment.”

References

William Beach, "The Challenges of Seasonal Adjustment during the COVID-19 Pandemic," *BLS Commissioner's Corner*, December 21, 2020, <https://blogs.bls.gov/blog/tag/seasonal-adjustment>.

David Lucca and Jonathan Wright, "Reasonable Seasonals? Seasonal Echoes in Economic Data after COVID-19," *Federal Reserve Bank of New York Liberty Street Economics*, March 25, 2021, <https://libertystreeteconomics.newyorkfed.org/2021/03/reasonable-seasonals-seasonal-echoes-in-economic-data-after-covid-19.html>.

U.S. Census Bureau, "X-13ARIMA-SEATS Reference Manual, Version 1.0," U.S. Census Bureau Statistical Research Division, Washington, D.C., January 15, 2013.

Jonathan H. Wright, "Unseasonal Seasonals?" *Brookings Papers on Economic Activity* 2013, no. 2 (2013): 65-126.