Appearance

Appendix to

"A Growth-Augmented Phillips Curve"
Kristen Tauber and Willem Van Zandweghe. 2020.
Federal Reserve Bank of Cleveland, *Economic Commentary*, 2020-XX.

Phillips curve with time-varying coefficients

Building on Ball and Mazumder's (2011) Phillips curve with a time-varying slope, we allow the coefficients α_y and α_g in the NKPC of equation (1) to be time-varying. The coefficients are assumed to evolve as follows:

$$\alpha_{y,t} = \alpha_{y,t-1} + \varepsilon_{y,t},$$

$$\alpha_{g,t} = \alpha_{g,t-1} + \varepsilon_{g,t},$$

where u_t, $\varepsilon_{y,t}$ and $\varepsilon_{g,t}$ are white noise errors with variances V, W_y, and W_g, respectively. The error variances are estimated with maximum likelihood, and the time-varying coefficients are estimated with the Kalman smoother.

Figure A1 displays the estimated time-varying coefficient for the output gap in the top panel and that for output growth in the bottom panel, using the model specification with lagged inflation. The coefficient for the output gap and its 95 percent confidence interval were greater than zero from the mid-1960s to the mid-1980s. Since then, the coefficient has been small. These results are consistent with those of Ball and Mazumder (2011), who estimate the time-varying coefficient from 1960 to 2010.

The bottom panel of figure A1 displays the estimated time-varying coefficient for output growth, which increased around the start of the previous recession. Looking at the entire sample period, the coefficient and its confidence interval were negative in the mid-1970s, the time when the US economy experienced stagflation. The estimated coefficient subsequently hovered around zero from the early 1980s to the mid-2000s—averaging 0.05 from 1980 to 2007—indicating that output growth was irrelevant for inflation dynamics during this period. Around the onset of the previous recession, the estimated coefficient increased—more than quadrupling its average magnitude to 0.23 from 2008 to 2019—although the confidence interval widened toward the end of the sample. The model specification with long-term inflation expectations instead of lagged inflation produces a qualitatively similar picture (not shown) as figure 1.

Figure A1: Time-varying coefficients of the empirical Phillips curve.
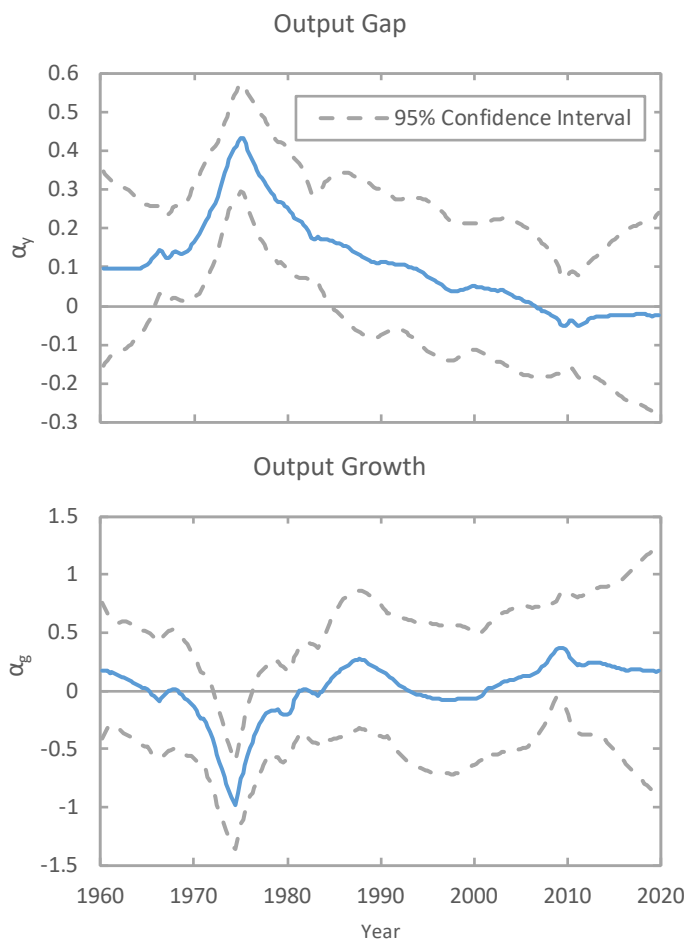
References

Ball, Laurence, and Sandeep Mazumder. 2011. "Inflation Dynamics and the Great Recession." *Brookings Papers on Economic Activity*, 42(1): 337–381. https://doi.org/10.1353/eca.2011.0005.