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COMMENTS ON THE NOTE BY VALERIE A. RAMEY AND SARAH ZUBAIRY ON JULY 26, 2014.

Comment #1: Point-in-time multipliers vs. cumulative multipliers

The note argues that the difference in results in the paper and my slides may stem from using different definitions of multipliers. The paper uses cumulative multipliers, while my discussion showed point-in-time multipliers. These two definitions are closely related and there is a simple mapping from point-in-time multipliers to cumulative multipliers. For example, the two-period cumulative multiplier can be expressed as follows:

$$\frac{\beta_{Y,0}+\beta_{Y,1}}{\beta_{G,0}+\beta_{G,1}}=\frac{\beta_{Y,0}}{\beta_{G,0}}\times\frac{\beta_{G,0}}{\beta_{G,0}+\beta_{G,1}}+\frac{\beta_{Y,1}}{\beta_{G,1}}\times\frac{\beta_{G,1}}{\beta_{G,0}+\beta_{G,1}}$$

So the cumulative multipliers are just weighted sums of point-in-time multipliers. Note that when one looks at the difference between multipliers in recession and expansion, the ***level*** difference in the response of government spending across regimes is irrelevant since the weights sum up to one. However, there could be a difference in cumulative multipliers across states because the government spending response could be front- or back-loaded.

Also, my discussion was meant to replicate Figure 4 in the paper (Figure 1 in the note) and give a sense of how multipliers vary by horizon and how strong identification of these multipliers is since the cumulative response is just a weighted sum.

Comment #2: Difference in multipliers

The multipliers in recession are larger than multipliers in expansion. While the magnitude of the difference in the paper is smaller than in Auerbach-Gorodnichenko estimates, the difference is still large and statistically significant. Furthermore, while the standard errors are tight on multipliers in expansion, the standard errors for multipliers in recession are such that one cannot reject the null of recession multipliers being above one and close to 1.5. So there is no contradiction with the estimates of multipliers reported in earlier studies.

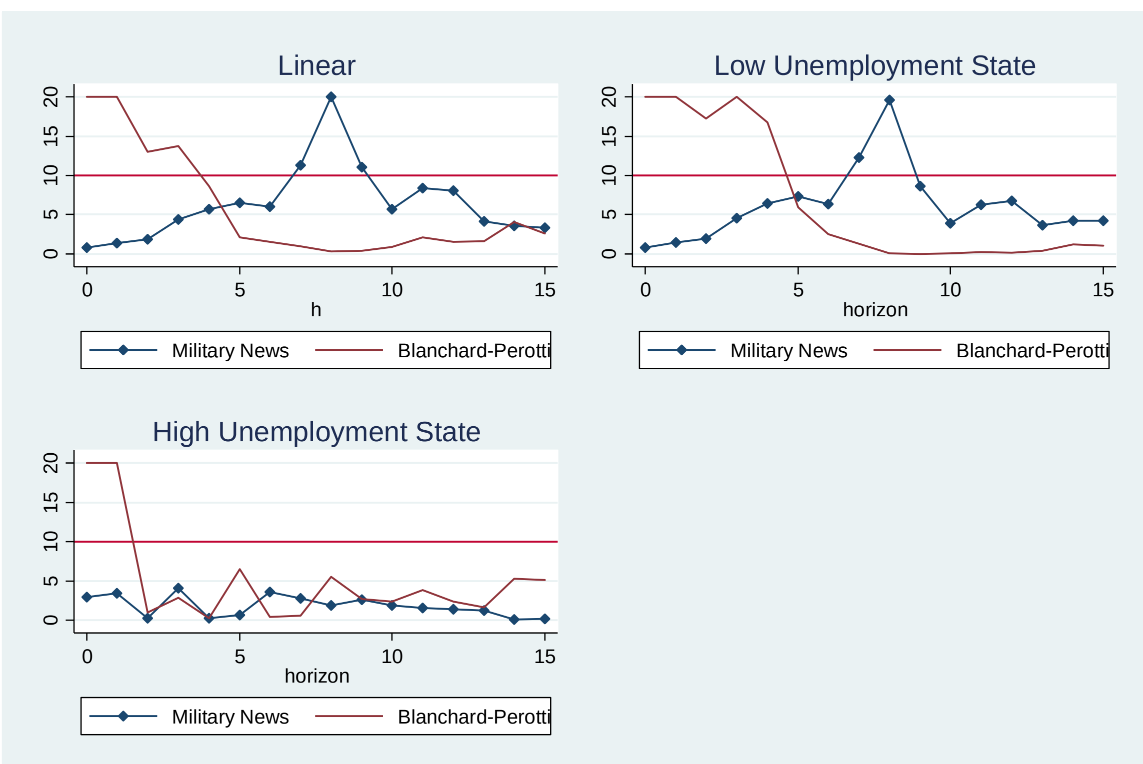
Comment #3: HP as a proxy for trend

I have used a very high smoothing parameter in the HP filter. The resulting trend is very similar to what one can get fitting a quartic trend to the data: it's very, very smooth. Given the smoothness of the trend, normalizing by potential GDP is unlikely to be a problem for approaches based on timing assumptions and aimed to study multipliers at relatively short horizons. Indeed, changes in the trend are so small relative to quarter-to-quarter variation in real GDP or government spending that using very smooth HP filtered series as a trend should not be quantitatively important in a realistic setting.

I emphasized that normalizing LHS and RHS variables by actual lagged output may be problematic. Using potential output is a safer option. The finding that the change of the normalizing variable affects the magnitudes of the multipliers (but not the qualitative result that multipliers are larger in recessions than in expansion) indicates to me a strong likelihood that using actual output can be a problem.

Comment #4: Timing of WWII

In my discussion, when I exclude WWII, I start WWII after the German invasion into Poland (1939Q3) and finish it in 1946Q4. In contrast, WWII in the paper and in the note starts in 1941Q3 and ends in 1945Q4. I add a few quarters to the end of the WWII period to get rid of the period with massive demobilization, clearly not a typical peaceful phenomenon. Also, I start the WWII period earlier because mobilization and military spending started before 1941. When one uses this extended period for WWII, the strength of the military spending instrument in recessions is small (see the figure below). This explains why there is a difference in the path of the first stage F-statistics in the note and in my discussion.



Comment #5: Strength of BP instrument vs. RZ instrument

I am glad the note compares the strength of the instruments in the Blanchard-Perotti (BP) and Ramey-Zubairy (RZ) approaches. Due to time constraints, I was not able to presents these results in my discussion. However, I tried to convey in the slides that BP dominates RZ at short horizons and RZ can dominate BP at longer horizons.

Some of the discrepancy in the strength of the instruments was determined by what was included in the 1st stage F-test. We got rid of this discrepancy now. Econometric theory is unambiguous about what should be tested: only the current value of the shock.

Comment #6: Implementation of BP

If we abstract from regimes (to keep notation simple), I ran the BP approach as follows:

$$\frac{Y_{t+h}-Y_{t-1}}{Y_{t-1}^{potential}} = M_h \frac{G_{t+h}-G_{t-1}}{Y_{t-1}^{potential}} + controls$$

and use $\frac{G_t-G_{t-1}}{Y_{t-1}^{potential}}$ as an instrument for $\frac{G_{t+h}-G_{t-1}}{Y_{t-1}^{potential}}$. M_h is the multiplier.

In the note, the implementation is

$$\frac{Y_{t+h}-Y_{t-1}}{Y_{t-1}^{potential}} = M_h \frac{G_{t+h}-G_{t-1}}{Y_{t-1}^{potential}} + controls$$

and use $\log\left(\frac{G_t}{G_{t-1}}\right)$ as an instrument for $\frac{G_{t+h}-G_{t-1}}{Y_{t-1}^{potential}}$. Given that the size of G has been changing over time dramatically, $\log\left(\frac{G_t}{G_{t-1}}\right)$ should not be used as an instrument. Intuitively, 5% growth of government spending in 1890 is small as a fraction of GDP, but 5% in 2000 is large. As a result, the estimates are likely to be driven by an earlier part of the sample with a lot of volatility in government spending but limited role of government in the economy (see my slides on volatility and G/Y share). In short, this seems to run counter to the argument that one should normalize variables by GDP to read multipliers directly rather than estimate elasticities and then convert estimated elasticities into multipliers.

It's true that BP did not use $\frac{G_t-G_{t-1}}{Y_{t-1}^{potential}}$—they used the $\log\left(\frac{G_t}{G_{t-1}}\right)$—used but they focused on the post-WWII sample when the G/Y ratio was much more stable. Again, given how smooth $Y_t^{potential}$ is, this normalization is very unlikely to alter properties of the series at business cycle frequencies.