

## ***Postscript to***

**“Macroeconomic Shocks and their Propagation”**  
in *Handbook of Macroeconomics*, 2016, by Valerie A. Ramey.

Last update: September 12, 2019

This document serves as a running postscript to my *Handbook* chapter on macroeconomic shocks. It contains corrections, clarifications, revised thinking on several issues, as well as a summary of a few key new results that have emerged in the literature. This postscript is not meant to serve as a continuing update on all of the related research, but rather as an update only on the research that is closely related to particular statements I made or particular specifications I chose in the chapter. All page numbers refer to the published version.

### **Corrections**

1. Equation (9), p. 81. The index on the second and third summations (involving  $\Delta Y_2$  and  $\Delta Y_3$ ) should start at  $j=0$ , not  $j=1$ .
2. Figure 2B. The impact effects on the federal funds rate should range between 0.74 and 0.77. The unit impact effect shown in the graph is an error. The “monetary shocks” programs I posted online have been corrected. (I am grateful to LSE alumna Irene Benito for alerting me to this error.)

### **Further thoughts, clarifications, and some directly relevant new research**

1. **Number of lags of control variables.** In my chapter, I typically used only two lags of control variables in the local projections since I was using external instruments and wanted to be parsimonious. I have subsequently discovered that two lags was probably too little in some cases. I think that more lags is probably better. For example, in subsequent work in Ramey-Zubairy, 2018 JPE, we used four quarterly lags.
2. **HAC standard errors.** When calculating Newey-West standard errors, I set the bandwidth to be equal to  $(\text{horizon} + 1)$  as recommended by Jordà (2005). However, in subsequent research I used automatic bandwidth selection, which typically chose a much greater bandwidth.
3. **Necessary control variables.** On page 84, the statement concerning the control variables needed in a Jordà local projection may not be strong enough. See the Stock and Watson 2018 paper referenced below for the conditions needed.

4. **Robustness of local projections.** On page 84, I repeated Jordà's (2005) claim that the local projection method was more robust to misspecification. That claim is not correct. See the Plagborg-Møller and Wolf (2019) paper, referenced below, for more details.
5. **Shocks vs. External Instruments.** My discussion of the Gertler-Karadi high frequency variables in Section 3.5.3 too often blurred the distinction between "shocks," "news," and "instruments." Several times I used the term "shock" when I should have used the term "instrument," contrary to the distinctions I made in Section 2 of my chapter. (I am grateful to Mark Kerßenfischer (Kerssenfischer) of the Bundesbank for bringing this to my attention.)
6. **Lead-Lag Exogeneity.** Stock and Watson, "Identification and Estimation of Dynamic Causal Effects in Macroeconomics using External Instruments," *Economic Journal*, May 2018, is a very useful rigorous investigation of external instruments in SVARs and in the local projections-IV methods I used in my Handbook chapter. It establishes the importance of "lead-lag exogeneity," the requirement that the instrument be uncorrelated with past and future shocks.
7. **Relationship between SVARS and Local Projections.** Mikkel Plagborg-Møller and Christian Wolf, "Local Projections and VARs Estimate the Same Impulse Response Functions," July 2019 working paper, Princeton University. This paper formally clarifies the relationship between local projections and SVARs, including proxy SVARs (or external instruments). It shows, contrary to a number of statements in the literature, that *in population* local projections and VARs estimate the same impulse response functions. In sample, where one is forced to use finite lags, etc., they will generally differ. This paper works through numerous issues involved and is a very helpful clarification of the relationship between the two methods. It also validates a procedure I used in my 2011 QJE paper, where I ordered the external instrument first in an SVAR.