

# Resuscitating Long-run Restrictions

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## Abstract

Despite methodological critiques, macroeconomic research often relies on vector autoregressions (VARs) identified with long-run restrictions to uncover empirical regularities. In large part, the critiques argue the method goes awry due to lag truncation. Reduced form models with short lag lengths provide poor approximations to DSGE models. Yet short lag lengths are deemed a necessity as increased parametrization would lead to prohibitively large uncertainty. We show that the trivial solution to the critique, i.e. dramatically increasing lag length, actually works. Truncation is a form of misspecification. In the face of misspecification, increasing lag length may in fact reduce uncertainty. As a result, VARs with lag lengths of, say, ten years can lead to unbiased and precise inference when identified with long-run restrictions. We document this tradeoff between bias reduction, degrees of freedom reduction and its resulting increase in uncertainty, and misspecification. For standard DSGE models, such as Chari, Kehoe and McGrattan's (2008) RBC model, reducing truncation leads to unbiased and more precise inference. We then reassess existing VAR-evidence on the technology-hours debate, which suffers from truncation bias. Controlling for truncation, two striking conclusions emerge. First, the consensus view that technology shocks have a limited role for hours fluctuations is solely due to truncation. Controlling for truncation bias, we find that technology shocks do matter for hours fluctuations. Across US manufacturing sectors, the contribution of technology shocks to hours fluctuations varies from 0 to 100% at a one-year horizon. At longer horizons, around half the variation of sectoral hours is due to technology shocks. Second, our evidence suggests there is no cause for controversy regarding the hours response. Across sectors, there is ample heterogeneity with about as many sectors exhibiting positive responses as there are sectors that reduce hours following technological improvement. This suggests there is scope for both New-Keynesian and Real Business Cycle explanations of fluctuations.

*Keywords:* VAR, Long-run restrictions, Technology, Hours

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