Labor-supply shifts and economic fluctuations

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Abstract

We propose a new VAR identification scheme that distinguishes \textit{shifts of} and \textit{movements along} the labor demand schedule to identify labor-supply shocks. According to our VAR analysis of post-war US data, labor-supply shifts account for about 30 percent of the variation in hours and about 15 percent of the output fluctuations at business cycle frequencies. To assess the role of labor-supply shifts in a more structural framework, estimates from a dynamic general equilibrium model with stochastic variation in home production technology are compared to those from the VAR.

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1. Introduction

A leading question in macroeconomics is the identification of forces that cause the cyclical allocation of time. Modern dynamic general equilibrium analysis emphasizes shifts in labor demand due to technological change. Empirical studies on the decomposition of sources of business cycles by Shapiro and Watson (1988) and Hall (1997) have called for an attention to labor-supply shifts. This paper examines the importance of labor-supply shifts as a source of economic fluctuations.

First, we develop and apply a new identification procedure for vector autoregressions (VAR). It decomposes the fluctuations of aggregate hours and output into movements along the labor demand schedule and shifts of the schedule itself. The former is interpreted broadly as response to a labor-supply shock. Our VAR identification is based on the notion that an increase in hours due to a labor-supply shock leads to a fall in labor productivity, as the production capacity is fixed in the short run and the economy operates along the decreasing marginal-product-of-labor schedule. We place a prior distribution on the slope of the short-run labor-demand curve and on the reduced-form VAR parameters and conduct Bayesian inference.

Second, we impose additional restrictions by estimating a fully specified dynamic stochastic general equilibrium model (DSGE). The DSGE model potentially yields a more precise estimate of the relative importance of labor supply shifts. We consider an aggregate home production model (Benhabib et al., 1991; Greenwood and Hercowitz, 1991) in which labor-supply shifts are caused by the stochastic variation in home production technology.

The main empirical findings can be summarized as follows. Based on the VAR variance decomposition, temporary shifts in labor supply are an important source of hours fluctuations. They account for about 30 percent of the cyclical variation of hours worked. The DSGE model attributes more than 50 percent of the variation of hours to temporary labor-supply shifts. This larger estimate, however, may partly be due to misspecified over-identifying restrictions as the time-series fit of the DSGE model is significantly worse than the VAR fit. According to both VAR and DSGE model, labor-supply shocks are less important for aggregate output as they explain only about 15 percent of its variation at business cycle frequencies.

Our estimates of the contribution of labor-supply shifts to economic fluctuations are somewhat smaller than those reported by Shapiro and Watson (1988) and Hall (1997). Shapiro and Watson (1988) identify labor-supply shocks through the stochastic trend in hours worked. While the empirical evidence on the stationarity of hours worked is not conclusive, we assume hours are stationary, which is consistent with a large class of dynamic equilibrium models. In Hall (1997), Parkin (1988), and Baxter and King (1991) labor-supply shocks (or preference shocks) are identified as deviations from the optimality condition associated with the labor supply of competitive households. However, these residuals also reflect the extent to which a representative-agent model is inconsistent with aggregate
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