Fiscal Stimulus with Learning-By-Doing

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This paper provides an empirical and theoretical analysis of the effects of government spending shocks on consumption, total factor productivity (TFP), the real wage and inflation. Our empirical analysis estimates a Bayesian structural VAR model on U.S. time-series for the period 1954-2007 and identifies government spending shocks using two distinct approaches, following respectively Blanchard and Perotti (2002) and Auerbach and Gorodnichenko's (2012) implementation of Ramey (2011). In line with previous empirical studies using similar methodologies and identification strategies, we find that a positive government spending shock increases consumption, TFP and the real wage and reduces inflation.

With few exceptions, the observed responses of private consumption and the real wage to innovations in government spending are hard to reconcile with the predictions of existing models with intertemporally-optimizing consumers. In these models, the higher taxes necessary to finance the increase in government spending generate a negative wealth effect that induces a fall in consumption and leisure and a decline in the real wage. This mechanism, which is at the heart of the Real Business Cycle model, is powerful enough for the result to extend to New Keynesian models with optimizing consumers. Furthermore, most theoretical models imply that inflation increases, rather than falls, in response to a fiscal expansion.

This paper proposes a novel explanation that can account for the estimated joint response of consumption, TFP, real wages and inflation to a government spending shock. The key channel is the interaction of skill accumulation through past work experience – the "learning-by-doing" (LBD) mechanism, originally proposed by Chang, Gomes and Schorfheide (2002) in a Real Business Cycle framework – with wage and price rigidities. A positive shock to government spending increases hours and, through the LBD mechanism, induces skill accumulation and higher measured TFP and real wages in subsequent periods. For a large set of values of the degrees of wage and price stickiness, the increase in future productivity lowers future marginal costs and therefore the expected rate of inflation. Through the monetary policy rule, the fall in expected inflation results in a persistent reduction in the policy rate and the short-term real interest rate. The associated decline in the current long-term real interest rate increases consumption.

It is worth noting that the presence of nominal rigidities is crucial to generate the co-movement of consumption and hours in response to a shock to government spending. The ratio between the consumption/leisure marginal rate of substitution and the marginal product of labor is constant in the absence of nominal rigidities. Since an increase in hours worked reduces the marginal product of labor but increases the marginal rate of substitution, equilibrium requires consumption to fall in the absence of nominal rigidities. Vice versa, the combination of LBD and nominal rigidities implies that an increase in hours is accompanied by a fall in the ratio between the marginal rate of substitution and the marginal product of labor which can be large enough to break the negative association between consumption and hours worked.

Though it crucially relies on nominal rigidities, our mechanism is very different from the "expected-inflation channel" which is common to all New-Keynesian models. According to this mechanism, an increase in government spending results in *higher* expected inflation and a lower real interest, and therefore higher consumption, if the central bank is non-responsive to inflation; i.e., if it *raises* the policy rate by less than the increase in expected inflation. Instead the transmission channel in our model works through a *fall* in expected inflation to which the central bank responds by *reducing* the policy rate and, by the Taylor principle, the real rate. In our framework, the consumption and output response is larger the *more*, rather than *less*, responsive the central bank is to inflation.