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## *Discussion*

The discussion focused on the choice between total and military government spending, identification issues, and the consequences of implementation lags.

Rick Mishkin began the discussion by pointing out that not only was the Korean War a big event, but it was also the closest to a perfect experiment, given that it was completely unanticipated. Hence, from that viewpoint, it would be very important to keep the Korean War in the sample.

Daron Acemoglu defended the use of overall government spending rather than just defense spending by arguing that if one views the Ramey-Shapiro dummies as instruments, then the right intervening variable is not defense spending, but total spending. Valerie Ramey later confirmed that the original Ramey-Shapiro (1998) paper had indeed used total government spending, with the defense dummy variables as instruments.

Acemoglu also pointed out that the VAR method uses more data, whereas in the dummy variable approach, it is unclear how to think about “asymptotics on four observations.” He concluded by suggesting a potential reconciliation between the narrative approach and the VAR approach. The first approach is exploiting a source of variation in spending that is causing a strictly negative wealth shock, so one would tend to find a negative effect. Conversely, Perotti’s approach includes spending on education, health, and so on, which most reasonable frameworks would model as complementary to private consumption. That source of variation creates an increase in the marginal propensity of consumption, and hence would tend to result in an increase in consumption. Perhaps, he offered, the two approaches are actually consistent with each other, even without going into the econometric details, although there may be other reasons why one approach might be preferred over the other.

Michael Woodford reiterated the basic questions of the paper, partially in response to Ricardo Reis's presentation, which had implied that a neoclassical model could yield any response depending on what one assumes about the policy rules. Woodford pointed out that at least in the baseline neoclassical model there are some very simple predictions that are independent of what one assumes about the dynamics of the fiscal shock. In particular, he argued, the two key puzzles that motivate the paper come from two static equilibrium relations in the neoclassical model. First, on the firm side, the static relation between the marginal product of labor and the real wage yields a relation between hours and the real wage. Obtaining an increase in hours following a fiscal shock that leaves productivity unchanged would imply a lower product wage. Second, in the representative household's problem, the marginal rate of substitution condition between consumption, hours, and the real wage, implies that with hours going up, a reduction in the real wage would have to be associated with a decline in consumption. Woodford emphasized the fact that these two sign restrictions on the predictions of the model are independent of the dynamics of the shock to government purchases, and are in fact the focus of the paper.

Valerie Ramey highlighted the paper by Burnside, Eichenbaum, and Fisher (2004), which looks at the effect of defense spending in a neoclassical framework with distortionary taxes, whereas common New Keynesian models still assume nondistortionary taxes, and suggested that more investigation is needed in this area.

Michael Woodford also commented on the choice between defense spending and overall spending. He acknowledged that in earlier work with Julio Rotemberg (1992), they had entirely focused on military spending, to address concerns that government spending may respond to the state of productivity in the economy. But, he argued, Perotti's approach is attempting to address the endogeneity issue through a different means, which is the timing restriction. From this perspective, even if one considers other components of government spending, which may be correlated with productivity, causality might not be an issue if one believes that the assumed timing restrictions neutralize it.

The discussion then shifted to identification issues, with Mark Gertler echoing Reis's concerns about using the impulse responses to discriminate between the neoclassical and New Keynesian models. Gertler's concern stemmed from the fact that just as in the neoclassical model the responses can be very sensitive to the fiscal policy rule, in the New Keynesian model responses are sensitive to the monetary policy rule. In fact,

he argued, if the world is New Keynesian, the policy of an effective central bank can make the economy look like a real business cycle (RBC) economy, and that will make identification difficult. But the positive spin to his comment was that if one believes that there are periods in which these rules change, then one can exploit that in the identification and look for changes in the impulse responses. Gertler concluded with "a point on intellectual history," stressing that Timothy Cogley and Jim Nason (1995) were the ones to first notice the lack of persistence in the predictions of RBC models.

Olivier Blanchard sought to reconcile the debate on variable choice by suggesting that if all government spending affects outcomes, but defense spending is exogenous, then one should have defense spending be an instrument for government spending. Alternatively, one could include both variables in the VAR and look at the effects. The second point Blanchard made was on the issue of implementation lags. Blanchard and Perotti (2002) showed that in principle, if one is willing to take a stand on how long before the event takes place people actually know what will happen, then one can actually handle the issue by using spending measured next period as shocks for this period. Blanchard also stressed differences between the VAR and dummy variable approaches. First of all, the shocks of a VAR have different magnitudes compared with the binary value of a dummy. Second, different episodes have different fiscal compositions (spending versus tax revenues) which cannot be captured with a dummy approach.

[The author was unable to be present and so was not able to respond to the discussion.]