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On the size of fiscal multipliers: A counterfactual analysis

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HIGHLIGHTS

- Policy instruments react to each other over time.
- The effects on GDP derived from standard SVAR estimations in the literature include these interactions.
- We report counterfactual multipliers that abstract from policy responses.

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ABSTRACT

We point out that fiscal multipliers derived from SVAR-models include the predicted future path of policy instruments. After the initial shock, net taxes and government expenditures react to each other and are autocorrelated. In a counterfactual simulation, we report fiscal multipliers that abstract from these dynamic responses.

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1. Introduction

The structural VAR approach to estimating the fiscal multipliers developed by Blanchard and Perotti (2002) has been applied widely in the literature in recent years.[2] It made a substantial progress in solving the identification problem, associated with the contemporaneous correlation of shocks.[3] In the present paper we point out that while the identification of shocks has been achieved, the approach still includes the dynamic interaction among policy instruments. The derived multipliers are therefore best characterized as *forecasting multipliers* where governments are assumed to follow their predicted paths after an initial fiscal shock.[4] In this paper, we raise the question whether this assumption is reasonable, when using the results for policy advice, as a benchmark for the DSGE modeling, or for testing the Keynesian model.

We start our analysis by illustrating that there exists a significant and economically sizable effect of a shock in expenditure on net taxes and vice versa. We find that the effect of a shock in expenditure on net taxes is positive, i.e., expenditures today tend to be financed by tax increases in the immediately following quarters. With regard to taxes, we have the opposite finding. After a standard positive shock to net taxes, there is a significant response of expenditure which is negative. Furthermore both series are autocorrelated. A fiscal policy shock will lead to further changes in a fiscal policy in the subsequent quarters.

In order to isolate the effects of a pure spending and pure tax shock, we implement the following counterfactual analysis: we

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[2] See Ramey (2011a) and Parker (2011) for an overview.

[3] Earlier approaches to identification include the military approach of Barro (1981) as well as Ramey and Shapiro (1998).

[4] As a forecasting tool, the procedure has recently been evaluated by Blanchard and Leigh (2013).

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first estimate the model using the Blanchard and Perotti (2002) approach. When computing the impulse response functions, however, we shut down the channel that captures the discretionary dynamic interaction among policy instruments as well as each policy instruments' autocorrelation (i.e., restrict their responses to zero).[5] All other responses remain unrestricted. In particular the indirect effect that government spending has on net taxes – via automatic stabilizers – remains included in the simulation.

The main result of our analysis is that our *counterfactual multiplier* is substantially larger than the *forecasting multiplier* from standard SVAR estimates in the case of an expenditure shock. The tax multiplier is initially smaller, but gets larger at longer horizons. Finally, when both spending and net taxes experience a shock at the same time, the counterfactual multiplier is close to one, as predicted by Haavelmo (1945), while the forecast multiplier is nearly zero.

We investigate the sensitivity of our findings in several robustness regressions. First, we extend the analysis to a 5-variable VAR, including inflation and interest rates as additional control variables. Second, we exclude the post-financial crisis time period from our sample and also estimate the regressions in the original Blanchard and Perotti (2002) sample. Furthermore, we add a dummy variable, capturing the 1975Q2 tax cut period. Finally, we also extend the lag length of the VAR and control for the level of public debt. Overall, the differences between the *counterfactual* and the *forecasting multipliers* remain remarkably robust across these different specifications.

Our analysis does not imply that the Blanchard and Perotti (2002) procedure is incorrect or yield biased results. We do argue however that it must be interpreted with caution whenever there is a sizable interaction among policy instruments or the autocorrelation of policy instruments is high. If the dynamic responses are strong, the Blanchard and Perotti multiplier must be interpreted as a forecast of the future reaction of GDP that includes further future changes in spending and net taxes, which are triggered by the initial fiscal shock.

If the aim of the analysis is to use the results for policy consulting or as an input for other counterfactuals in a DSGE framework, the alternative approach suggested in this paper may be useful. In both cases, one would like to ask the question: what is the effect of an additional Dollar spent on future GDP, letting other instruments unchanged? Or put differently: what is the elasticity of GDP to a shock in government spending? To assess this question, and to move the analysis closer to the Keynesian model, with its various crowding-out effects, we highlight the importance of a counterfactual analysis in our paper. We also provide an example of a fiscal program that was intended to be predominantly a reduction in net taxes, by looking at the American Recovery and Reinvestment Act of 2009.

2. Data and preliminary analysis

We start our analysis by plotting the data of expenditure and net taxes as a percentage of GDP. The solid line in Fig. 1 traces the expenditure/GDP ratio and the dotted line, net taxes/GDP.[6] The years from 1960 to 1997 are familiar from the Blanchard and Perotti (2002) article. In the past years, especially since 2007/2008, there has been a widening gap between expenditure and net taxes. This gap reflects the expansionary fiscal policy in response to the financial crisis. Initially both instruments have been used, as expenditure goes up and net taxes go down—a process that has been gradually reversed in the last 4 years of the sample period. In order to abstract from this exceptional period, we conduct the later analysis also in a reduced sample that stops in 2006Q4, the year before the crisis.

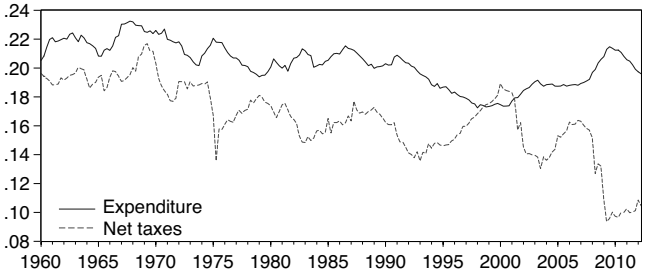

Fig. 1. Expenditure and net taxes to GDP ratios.

In the appendix of the paper (see Appendix A), we report the unit root test statistics. Applying the augmented Dickey–Fuller (ADF) as well as the Kwiatkowski–Phillips–Schmidt–Shin (KPSS) test, we find that all variables have a unit-root in levels and are stationary in 1st differences. Furthermore, the test statistics in the appendix show that the three variables are not cointegrated. We therefore estimate the dynamic interactions between the variables in a VAR in 1st differences.

3. Results

3.1. Forecast multipliers

In this section, we estimate the impulse response patterns of a shock in expenditure and net taxes on GDP, using the Blanchard and Perotti (2002) identification procedure.[7] Fig. 2 displays the point estimates and standard errors, which contain the familiar result that spending has a positive and significant impact on GDP, while taxes have a negative impact. Table 1 contains information on the exact quantitative impact. The magnitude of the multipliers is comparable to those that have been reported in the literature.

3.2. Interaction among policy instruments

Standard estimations of the Keynesian multiplier typically include the dynamic interactions among the policy instruments, i.e., the reaction of net taxes to expenditure is included, when simulating the impact of expenditure on GDP. In Fig. 3, we show that these interactions among the policy variables are economically sizable and statistically significant. Table 2, again, reports the exact corresponding values of the point estimates and confidence intervals. We find that in our sample period, there has been a significant positive response of taxes to a change in expenditure which implies that an increase in spending has been financed by a subsequent increase in net taxes.

Part of this reaction is certainly due to automatic stabilizers being at work. An increase in expenditures increases GDP, which leads to higher net taxes. The other part, however, is a discretionary response of government, the need to finance additional expenditures. In the subsequent counterfactual simulations, we only shut

[5] The same argument has been made in the context of monetary policy by Ramey (1993). In her paper, she isolates the credit channel of monetary policy by shutting down the policy-velocity channel when computing impulse response functions. Our analysis translates this idea to the context of fiscal policy and the discussion on the size of fiscal multipliers. See also the working paper version of Blanchard and Perotti (2002), who already raise this issue in the extended version of their paper, as well as Perotti (2005) who used a similar method as a robustness test.

[6] See the appendix for data sources and definitions (Appendix A).

[7] Following the methodology of Blanchard and Perotti (2002), we calculate for the updated data set a net tax elasticity to GDP of 2.76.

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