



Habit formation and fiscal transmission in open economies

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ABSTRACT

In this paper we analyze the ability of an open economy version of the neoclassical model to account for the time-series evidence on fiscal policy transmission. Revisiting the evidence, we find that i) government spending raises output, while inducing a simultaneous decline of investment and the current account and ii) the responses of output and investment are more muted in more open economies while current account deficits tend to be larger. Turning to the model, we explore the role of habit formation for fiscal policy transmission. Specifically, we show that the model can account for the evidence if consumption behavior is characterized by habit formation and the terms of trade adjust endogenously.

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1. Introduction

Interest in specific aspects of the fiscal transmission mechanism has grown recently, both among policy makers and within the academic literature. A number of studies have applied different identification schemes to establish time-series evidence on the effects of fiscal shocks, see, e.g., Blanchard and Perotti (2002), Mountford and Uhlig (2009), and Ramey (2011). Others have explored the ability of quantitative business cycle models, both of the neoclassical and of the New Keynesian variety, to account for the evidence, see Burnside et al. (2004) and Gali et al. (2007), respectively. Most of the analyses have been confined to closed economy models, however. In the present paper we take up the following question instead: to what extent can an open economy version of the neoclassical model account for the time-series evidence on fiscal policy transmission?¹

To set the stage for our theoretical analysis, we briefly revisit the evidence on the fiscal transmission mechanism. We estimate a vector

autoregression (VAR) model on quarterly time-series data for Australia, Canada, the UK and the US covering the period 1980–2007 and identify government spending shocks under the assumption that government spending is predetermined relative to the other variables included in the VAR model (see Blanchard and Perotti (2002)). Our results are largely in line with earlier findings. First, an exogenous increase in government spending has virtually no effect on private consumption, raises output, and lowers both investment and the current account, see, for instance, Monacelli and Perotti (2010).² Second, we find that the decline of investment is less pronounced in those economies of our sample which are more open to trade. At the same time, the current account deficit tends to be larger and the effects on output more muted in more open economies.³

We put forward a variant of the neoclassical model and assess its ability to account for these findings. Specifically, we draw on earlier work by Baxter and King (1993) but consider a semi-small open economy. As in

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¹ Related studies also include Corsetti and Müller (2006) and Müller (2008) who consider two-country business cycle models and investigate how their predictions relate to time-series evidence on the fiscal transmission mechanism. In contrast to these studies we consider a semi-small open economy model and a continuous-time framework which allows us to establish a number of analytical results.

² Studies based on the Blanchard–Perotti identification scheme typically report a positive consumption response to an exogenous increase in government spending. More recent evidence based on this approach, however, suggests a decline in the consumption response, see Perotti (2005). Studies based on alternative identification schemes report a small decline of consumption or no significant response, see Ramey (2011) and Mountford and Uhlig (2009), respectively. Regarding the response of the current account, several other studies find that government spending reduces the current account, e.g., Corsetti and Müller (2006), Beetsma et al. (2008), Monacelli and Perotti (2010). Kim and Roubini (2008) instead find a positive effect for the US.

³ These findings are broadly in line with evidence documented by Corsetti and Müller (2006), Beetsma et al. (2008).

Buiter (1987), the economy is small in world capital markets so that the world interest rate is given, but large enough in the world good market to influence the relative price of the domestic good, that is, the terms of trade. Importantly, we also allow for the possibility that preferences are not time separable but characterized by habit forming behavior, as in, e. g., Campbell and Cochrane (1999) and Carroll et al. (2000).

Both endogenous terms of trade and habit persistence in consumption play a crucial role for the fiscal transmission mechanism in open economies. To see this, consider an exogenous, but temporary increase of government spending. It induces households to reduce savings, as they try to avoid a large reduction in consumption and/or a large increase in labor supply. Reduced savings imply a decline of investment or the current account, or both. The decline of total savings, that is, the sum of investment and the current account, is larger, if preferences are characterized by habits, because in this case households' desire to smooth consumption is more pronounced.

If the terms of trade are exogenous, the current account declines, but investment increases, because the increased labor supply raises the return to domestic capital. Investment and the current account may both decline, however, if increased government spending temporarily appreciates the terms of trade. In this case the return on foreign bonds increases because the terms of trade deteriorate in the long-run to clear the home good market. This, all else equal, makes borrowing from abroad relatively more expensive and induces a decline of domestic investment. We thus find that the model can account for a simultaneous decline of investment and the current account only if we assume habits and consider an endogenous adjustment of the terms of trade, that is, a semi-small open economy.⁴

Regarding our second set of findings, which concerns the role of trade openness, we also find the performance of the model increased, once we allow for habits. It is only in this case that we find current accounts deficits to increase in openness. We show, however, that the output effects of spending shocks decline in openness under time-separable preferences as well as under habits. This finding seems particularly noteworthy, because Perotti (2005) documents smaller output effects of spending shocks in a post-1980 sample relative to results for the pre-1980 period. Since the countries in his sample have become more open over time, this trend may be partly responsible for the reduced output effects of government spending.

Two papers are particularly closely related to our analysis. Karayalçin (1999) simulates a small open economy model and finds that a temporary fiscal impulse stimulates investment and induces a current account deficit, as higher labor supply raises the marginal product of capital above the world interest rate. Karayalçin (2003) investigates the effects of a permanent public spending shock in a small open economy model with time non separable preferences. His framework differs in two major respects from ours: (i) the terms of trade are exogenous, and (ii) the stock of habits is introduced into the subjective time discount rate. The first assumption implies that the return on bonds remains fixed and investment decisions are determined by labor supply which alters the return on capital. In addition, as Karayalçin assumes that consumption and leisure are non-separable, he finds that labor supply, and hence output, falls on impact. The resulting decline in the return of capital triggers a fall in investment and a current account surplus. The second assumption implies that the marginal utility of wealth reacts more strongly to the fiscal shock in the short-run. Numerically, Karayalçin finds that labor overshoots on impact which in turn amplifies the current account surplus.⁵

⁴ For an earlier analytical study of long-lived temporary fiscal expansion, see Turnovsky and Sen (1991) who consider a semi-small open economy model with time-separable preferences.

⁵ In contrast to Karayalçin (2003), we introduce the stock of habits into the felicity function while the time discount rate is fixed. This implies that the time discount rate must be equalized to the world interest rate which provides a strong incentive for households to reduce savings when the disposable income falls. This mechanism plays a major role in driving the current account into deficit after a rise in public spending.

The remainder of the paper is organized as follows. In Section 2, we discuss VAR evidence on the macroeconomic effects of government spending shocks. In Section 3, we develop an open economy version of the neoclassical model with habit formation. Section 4 provides an analytical exploration on the role of habits for the transmission of fiscal shocks. In Section 5, we report results from numerical simulations and discuss the role of trade openness. We also conduct a sensitivity analysis with respect to the shock duration and the financing scheme. Section 6 summarizes our main results and concludes.

2. Time-series evidence on the effects of fiscal shocks

Recently, several studies have explored open economy aspects of the fiscal transmission mechanism on the basis of an estimated vector autoregression (VAR) models. In this section we briefly revisit the time-series evidence on the effects of government spending shocks in order to guide our theoretical analysis below.

We estimate a VAR model on quarterly time-series data for Australia, Canada, the UK and the US.⁶ We consider the sample period 1980Q1–2007Q4, as Perotti (2005) shows that there has been a change in the fiscal transmission mechanism after 1980. Our benchmark VAR specification includes the following variables in logs and real terms: government consumption, taxes net of transfers, GDP, private non-residential investment as well as the current account in percent of GDP and short-term nominal interest rate. We also estimate a second model where we replace investment with private consumption expenditures in order to economize on the degrees of freedom. Our model allows for four lags of the vector of endogenous variables and a linear time trend.⁷ All data are obtained from the OECD Economic outlook database.⁸

In order to identify exogenous innovations in government spending, we follow Blanchard and Perotti (2002) and assume that government spending is predetermined relative to the other variables included in the VAR model. This assumption appears not too restrictive, as government spending does not include transfers (such as unemployment benefits) and is therefore unlikely to respond automatically to the other variables. In addition, decision lags are likely to prevent policy makers to respond within the quarter in a discretionary and systematic manner to the state of the economy.

Fig. 1 displays the estimated effects of a government spending shock, that is, an exogenous increase in government spending by one percent of GDP. While the response of taxes is left unrestricted in the VAR model, we find that tax revenues do not rise sufficiently to balance the budget in any of the four countries. The spending shock is thus debt financed.⁹

Each column reports the results for one country. They are ordered according to the degree of openness, measured by the share of imports (imports of goods and services value, national accounts basis) in GDP. In our sample period imports account for 12, 18, 27 and 29

⁶ In line with earlier studies, we focus on countries for which non-interpolated quarterly data for the general government have been available.

⁷ For further details on the specification and the data see Cardi and Müller (2010).

⁸ Government spending is government final consumption expenditure (value, appropriation account) deflated with the GDP deflator. Taxes net of transfers are receipts (Current receipts, general government value) less subsidies (value) and social security benefits paid by general government (value), deflated with the GDP deflator. For private consumption and investment, we directly consider the volumes reported by the OECD. Data for the current account are expressed as a fraction of GDP, while the short-term nominal interest rate is measured in percent (annualized).

⁹ See Cardi and Müller (2010) for details on the responses of tax revenues and interest rates. Afonso and Sousa (2009) explicitly account for debt dynamics within a VAR model which is used to identify fiscal policy shocks. Regarding the effects of government spending shocks, they report findings similar to ours, notably for output, consumption and investment. They do not report results for the current account. Mountford and Uhlig (2009) identify government spending shocks using sign restrictions and consider explicitly the possibility of a balanced-budget spending shock. They find that the response of investment is almost unchanged, while the response of GDP is more muted than after a debt-financed spending shock.

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