Fiscal Policy and the Terms of Trade in an Analytical Two-Country Dynamic Model

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Abstract

This paper presents a two-country dynamic perfect foresight Ricardian model with wealth effects to study the relationship between government spending financed by alternative taxation, the terms of trade and welfare. An increase in domestic government spending financed by a distortionary capital income tax leads the real exchange rate initially to appreciate (a pure demand effect). But along the transitional path an intertemporal terms of trade effect (a supply side effect) operates and the real exchange rate depreciates to a steady state value ultimately higher relative to the initial equilibrium. The welfare of the domestic resident increases due to a reversed immiserizing growth effect.

Keywords: government spending, taxes, terms of trade

JEL Code: F4, H87, C6

1. Introduction

This paper presents an analytical two-country dynamic model with perfectly integrated capital markets to study movements in the terms of trade, capital accumulation, current account and welfare given an increase in government spending financed by alternative forms of taxation.

There has been intense empirical research trying to identify determinants of the terms of trade. Chinn and Johnston (1996) present a brief review of the literature and Chinn (1999, 2000) provide empirical evidence that government spending shocks lead to a deterioration of the terms of trade in the short to medium run, see also Froot and Rogoff (1991). This paper shows that the theoretical dynamic pattern of the terms of trade is consistent with these empirical results when an increase in government spending is financed by a distortionary capital income tax. However, we provide analytical support for the importance of the form of finance of government spending. In particular, when financed by capital income taxation, the pattern of the terms of trade exhibits a mixture of demand and supply effects. The current empirical evidence is not directed to identifying the effects of government spending under alternative forms of finance, but our analytical results suggest that some effort in this direction is warranted. Other authors such as Backus, Kehoe and Kydland (1994) find that government spending alone cannot reproduce the cross-correlation pattern of the terms of trade and the trade balance using a calibration approach. However, when coupled with technology shocks, theoretically comparable to distortionary capital income taxation,
their model produces a much better match consistent with the analytical results of this paper.

We find that an increase in domestic government spending financed by a distortionary capital income tax induces important intertemporal trade-offs. In a benchmark symmetric initial equilibrium, the real exchange rate initially appreciates (the pure demand effect), but along the transitional path the intertemporal terms of trade effect (the supply side effect) operates and the real exchange rate depreciates to a stationary value which is ultimately higher relative to the initial equilibrium (the real exchange rate depreciates across steady states). In this case, the trade balance deteriorates and the net asset position increases across steady states.

The government spending in our model does not provide direct utility for agents in the economy. However, we show that its ultimate welfare effect is positive when financed by capital income taxation. This is a surprising result, but the reason is simple. Under capital income tax finance, an increase in government spending induces a contraction of the domestic production possibility frontier, but the terms of trade effect allows the domestic resident to achieve a higher level of consumption in present discounted value terms, and welfare increases. Hence, we show that distortionary capital income taxation can have a positive welfare effect for reasons similar to a reverse immiserizing growth effect. In the case government spending is financed by a lump sum tax or domestic debt, by a tax on the consumption of the domestically produced good, or by a tax (tariff) on the consumption of the foreign good, the results above vanish.

The results obtained in this paper are in contrast to the one-good models of Turnovsky and Bianconi (1992), Bianconi (1995), and Bianconi and Turnovsky (1997). This is because, in this paper, there are initial wealth effects associated with real exchange rate responses to disturbances and capital does not relocate instantaneously. In the one-good case there are no wealth effects and capital reshuffles instantaneously.

The paper is organized as follows. Section 2 presents the dynamic macroeconomic framework and Section 3 gives the general equilibrium, dynamics and stationary state. Section 4 presents the analytics of government spending financed by capital income taxation and its effect on the real exchange rate, capital accumulation, current account and welfare while Section 5 concludes. An appendix presents the dynamical systems.

2. Two-Country Macroeconomic Structure

The framework is founded on the optimization principles of a representative agent of the domestic and foreign country, a competitive framework for firms, and governments. Each country is assumed to specialize in the production of a distinct commodity. There are two goods: $x$ ($y$) is the good produced in the domestic (foreign) economy. A starred variable, $x^*$ denotes the consumption of the domestic good by a foreign resident whereas an unstarred variable denotes domestic consumption. In this context, $\sigma$ denotes the relative price of the good produced in the foreign country, $y$, in terms of the good produced in the domestic country, $x$. Hence an increase (decrease) in $\sigma$ denotes deterioration (improvement) of the domestic terms of trade or depreciation (appreciation) of the real exchange rate. $\alpha$ denotes the marginal utility of wealth of the domestic resident in terms of the domestic good.