Business cycles in a balance-of-payments constrained growth framework☆

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ARTICLE INFO

ABSTRACT

The main goal of this work is to analyze the potential implications of the balance-of-payments constraint theory for business cycles. Although this theory is oriented towards long-run growth, it implicitly predicts the existence of cycles in any open economy. As we try to show, according to this theory, business cycles are generated by two factors: capital flows and trade shocks. Yet the standard model can overestimate cycles due to its specification of trade equations. In the paper we first develop the implications of the balance-of-payments constraint theory with regard to business cycles, then build an augmented model that can correct the potential over-estimation of cycles: Finally we use that model to analyze the sources of business cycles in Portugal and Spain and to show that the standard model does indeed overestimate cycles, at least in these two cases.

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1. Introduction

The balance-of-payments (BoP) constrained growth theory, as originally developed by Thirlwall (1979), basically states that since relative prices do not play an important role in international trade and the BoP must be in equilibrium in the long run, then growth is BoP constrained. Despite empirical support for it, this model has come in for criticism due to its basic assumptions: the irrelevance of relative prices and the absence of capital flows in the model. However, these criticisms have been useful in developing further extensions of the model that, broadly speaking, have provided new support to the theory.

On the other hand, although this theory is addressed at investigating long-run growth it has profound implications for short-run dynamics. Yet papers devoted to analyzing how deviations from long-run paths are generated and corrected are scarce. In our opinion, such an analysis is necessary for a deeper understanding of the implications of the theory and for economic policy. The main goal of this work is precisely to study the sources of business cycles in a BoP constraint framework. As we attempt to show in Section Two, in a BoP constrained economy business cycles are generated by two factors: capital flows and trade shocks. However, the standard BoP constrained growth model is prone to overestimate cycles due to the specification of trade equations. For this reason, we develop a modified BoP constraint model in the same section

that seeks to correct this potential overestimation of cycles. Section Three extends the ideas developed in this stylized model to the case when the trade equations are cointegration relationships. By using the extended model we analyze in Section Four business cycles and their sources in Portugal and Spain. To that end, we first try to show by using integration and cointegration techniques that both economies are BoP constrained. Then we estimate the short and long-run dynamics of income and trade in both countries and analyze the sources of business cycles in both cases; finally we show how the standard model, due to the specification of trade equations, does indeed overestimate cycles in both these countries. Our main conclusions are considered in Section Five.

2. External constraint in the short and long run: temporary imbalances

The BoP constraint theory, as developed by Thirlwall, is built upon the following set of equations:

$$XP = MP^* \tag{1}$$

$$X = A\left(\frac{P}{P^*}\right)^{\gamma} Y^{*\varepsilon} \tag{2}$$

$$M = B\left(\frac{P^*}{P}\right)^{\eta} Y^{\pi} \tag{3}$$

where X and M stand for export and import volumes; P and P^* represent the domestic and foreign price levels (in a common currency); Y^* and Y

are world and domestic incomes; A and B are positive constants; $\eta < 0$ and $\gamma < 0$ are import and export price elasticities; and $\pi > 0$ and $\varepsilon > 0$ are import and export income elasticities, respectively. Taking logs and time derivatives and plugging the dynamic version of (2) and (3) into (1) we obtain the income growth rate consistent with trade balance equilibrium[1]:

$$\dot{y} = \frac{(1 + \gamma + \eta)(\dot{p} - \dot{p}^*) + \varepsilon \dot{y}^*}{\pi} \tag{4}$$

If relative prices do not matter, that is, if $(1 + \gamma + \eta)(\dot{p} - \dot{p}^*)$ is zero, then

$$\dot{y} = \frac{\varepsilon \dot{y}^*}{\pi}. \tag{5}$$

This expression is known as Thirlwall's Law. It states that long-run growth depends only on external income growth multiplied by the ratio of export to import income elasticities.

It is important to highlight the basic assumptions of Thirlwall's model and the criticism received due to the use of these assumptions, since that criticism has been useful in developing further extensions of the model. The first crucial assumption is contained in Eq. (1), which states that the BoP must be in equilibrium. This is a plausible hypothesis in the long run but not in the short run. In practice, however, there is no objective way to distinguish between the short and long runs, and the two concepts may also vary across countries. Indeed, three years later Thirlwall himself presented an extended version of his original model (Thirlwall and Hussain, 1982). In that extended version, capital inflows are incorporated into the model by adding a new term to Eq. (1). It must be noted that the BoP constraint theory is not invalidated by the incorporation of temporary disequilibria, since capital inflows are not endogenous to potential growth. It simply means that the external constraint can be relaxed for an economy during a certain period of time. Other extended versions along the same lines are those presented by Atesoglu (1993–94), Elliot and Rhodd (1999), Britto and McCombie (2009), Hussain (2006), Moreno-Brid (1998, 1998–89, 2003), Jayme (2003), Bertola et al. (2002) and Hussain (1999). Regarding sustainable deficits and debt, one of the weaknesses of the Thirlwall's model, however, is that it places no limit on the level of current account deficits financed by capital inflows and therefore on the level of a country's foreign debt-to-GDP (Gross Domestic Product) ratio. McCombie and Thirlwall (1997), Barbosa-Filho (2001), Elliot and Rhodd (1999), Ferreira and Canuto (2003), Moreno-Brid (2003), Vera (2006), Alleyne and Francis (2008), and Meyrelles Filho et al. (2013) have all addressed this issue. However, it must be remarked that, as pointed out by Thirlwall (2012), the incorporation of capital flows into the model makes little difference to predicted growth rates; export growth dominates.

The second crucial assumption of Thirlwall's model is related to the assumption that relative prices do not play a role in long-run growth. Thirlwall provides two reasons for this assumption: 1) relative prices are stable in the long run, i.e. the PPP theory holds; and 2) price elasticities are small in absolute terms, so the expression $(1 + \gamma + \eta)$ is close to zero. Yet, as Alonso and Garcimartín (1998) note, to assume that relative prices do not play any role is a very strong assumption and, furthermore, it is not necessary for the validity of the model. Relative prices may play a role and yet the economy can still be BoP constrained. What is relevant to the model is not whether relative prices have an impact on growth but whether or not they are endogenous to BoP disequilibria. Using different techniques some papers have tested for the long-run adjustment of actual income to BoP constrained income

and, generally speaking, the findings support the BoP constrained growth theory.[2]

Finally, it must be noted that in Thirlwall's model elasticities are uniform across sectors, export destination, and import origin. Some works have developed further extensions of the original model by differentiating multiple sectors (Araujo and Lima, 2007; Chena, 2014; Rocha Gouvêa and Tadeu Lima, 2013; Romero and McCombie, 2016) and/or multiple export destinations and/or import origins (Nell, 2003; Bagnai et al., 2012).

As stated above, some works have incorporated capital flows into Thirlwall's model. In some of them capital flows have an impact on long-run growth (as in Thirlwall and Hussain, 1982), in others on short-run deviations (as in Meyrelles Filho et al., 2013), and in others on the speed of adjustment to long-run growth (as in Garcimartín et al., 2011). However, although deviations from long-run growth rates are implicitly considered in most of these works, business cycles are not explicitly investigated. This is the main goal of this paper, to analyze business cycles in a balance-of-payments constraint framework.

At this aim, let us start by defining long-run growth rates. Keeping the assumption that prices are irrelevant in the long run and following Alonso and Garcimartín (1998), unrequited transfers (T) can be incorporated into the model by adding a new variable to the BoP equilibrium equation:

$$PX + T = MP^*. \tag{6}$$

Defining $Z = (PX + T)/PX$, the long-run growth rate becomes:

$$\dot{y}_{lr} = \frac{\dot{z} + \varepsilon \dot{y}^*}{\pi} \tag{7}$$

With regard to short-run dynamics, the model needs to be reformulated by means of the following set of equations:

$$XPZ + K = MP^* \tag{8}$$

$$X = A\left(\frac{P}{P^*}\right)^{\gamma} Y^{*\varepsilon} D_x \tag{9}$$

$$M = B\left(\frac{P^*}{P}\right)^{\eta} Y^{\pi} D_m \tag{10}$$

where K denotes net capital inflows and D_x and D_m stand for short-run deviations for exports and imports, respectively. Eq. (8) can be expressed in growth rates as:

$$s_x(\dot{p} + \dot{x} + \dot{z}) + s_k \dot{k} = \dot{m} + \dot{p}^*, \tag{11}$$

where

$$s_x = \frac{PXZ}{PXZ + K}; s_k = \frac{K}{PXZ + K}.$$

Thus, the short-run rate of growth is

$$\dot{y}_{sr} = \frac{(s_x \dot{p} - \dot{p}^*) + (s_x \gamma + \eta)(\dot{p} - \dot{p}^*) + s_x \varepsilon \dot{y}^* + s_x \dot{d}_x + s_x \dot{z} + s_k \dot{k} - \dot{d}_m}{\pi} \tag{12}$$

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[1] Lower-case letters stand for the log of variables, while a dot on top of them stands for their time derivative.

[2] See Thirlwall (2012) or Aricioglu et al. (2013) for a review of empirical techniques and results.