Fiscal policy, the current account, and the twin deficits hypothesis

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Oviedo, January 24, 2019

- The twin deficits hypothesis

Outline

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- Some simple national accounts identities

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- Conclusions

The twin deficits hypothesis

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- Abell, 1990; Enders and Lee, 1990; Chinn and Prasad, 2003: support of the "twin deficits" hypothesis.

- Ahmed (1987), Evans, 1988, Erceg, Guierrieri and Gust (2005), Kim and Roubini (2008), and Bussière, Fratzscher and Müller (2010): budget deficit is not related to the current account deficit.

- GDP can be defined as the sum of total consumption, C, total investment, I, plus export, X, minus imports, M:

$$Y_t = C_t + I_t + X_t - M_t \tag{1}$$

Some simple national account identities

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$$Y_t = C_t + I_t + X_t - M_t \tag{1}$$

- Alternatively, GDP can be defined as the sum of total consumption, private saving, S, taxes, T, less government spending, G, these last two components reflecting public saving:

$$Y_t = C_t + S_t + T_t - G_t \tag{2}$$

Some simple national account identities

- Combining equations (1) and (2), we obtain that:

$$C_t + I_t + X_t - M_t = C_t + S_t + T_t - G_t \qquad (3)$$

or equivalently:

$$(I_t - S_t) + (G_t - T_t) + (X_t - M_t) = 0 \qquad (4)$$

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- The above expression indicates that the budget deficit is equal to the trade balance surplus plus the excess of investment over private saving. With equilibrium in the public accounts, the excess of investment over private saving is just equal to the trade balance.

Some simple national account identities

- Intertemporal dimension of the problem. The current account is equivalent to the change in the net external debt, including the trade deficit and the payments to abroad. Government debt, B_t, can be purchases either by domestic agents, B_t^H, or foreign agents, B_t^F:

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- Under the assumption that all government bonds are held by the domestic sector, the current account, CA_t, is defined as:

$$CA_t = F_t - F_{t-1} = Y_t - C_t - I_t + R_{t-1}^F F_{t-1} \tag{5}$$

where R_t^F, is the interest rate of foreign bonds.

Some simple national account identities

- In the case in which public debt are also hold by international investors, then expression (1) must be defined as:

$$Y_t = C_t + I_t + X_t - M_t - R^F_{t-1}F_{t-1} - B^F_t + (1 + R^B_{t-1})B^F_{t-1} \quad (6)$$

where R^B_t, is the interest rate of public debt, and the current account would be defined as the sum of private and public foreign financing:

$$
\begin{aligned}
CA_t &= (F_t - F_{t-1}) - (B^F_t - B^F_{t-1}) = \\
&\quad Y_t - C_t - I_t + R^F_{t-1}F_{t-1} - R^B_{t-1}B^H_{t-1}
\end{aligned}
$$

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$$Y_t = C_t + I_t + X_t - M_t - R_{t-1}^F F_{t-1} - B_t^F + (1 + R_{t-1}^B)B_{t-1}^F \quad (6)$$

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$$\begin{aligned} CA_t &= (F_t - F_{t-1}) - (B_t^F - B_{t-1}^F) = \\ &\quad Y_t - C_t - I_t + R_{t-1}^F F_{t-1} - R_{t-1}^B B_{t-1}^H \end{aligned}$$

- Importantly, notice that the amount of public debt purchased by foreign investors enters now in the definition of the current account. In this context, the relationship between the variables can be written, by combining (6) with (2), as follows:

$$(I_t - S_t) + (G_t - T_t) + CA_t - R_{t-1}^F F_{t-1} + R_{t-1}^B B_{t-1}^F = 0 \quad (7)$$

The model: Households

- In our model economy, the decisions made by households are represented by a stand-in consumer with a period utility as a function of consumption and leisure:

$$U(C_t, L_t) = U(C_t, L_t) \tag{8}$$

where C_t is total consumption defined as:

$$C_t = C_{p,t}^{\theta} C_{g,t}^{1-\theta} \tag{9}$$

where $C_{p,t}$ denotes private consumption and $C_{g,t}$ denotes consumption of goods provided by the government, and L_t is working time.

The model: Households

- In this economy, households consume three types of goods; a private domestically produced good, $C_{H,t}$, a private foreign or imported good, $C_{F,t}$, and the goods provided by the government. We assume that total private consumption is a composite of domestic goods consumption and foreign good consumption:

$$C_{p,t} = \left[\mu^{1/\eta} C_{H,t}^{1-1/\eta} + (1-\mu)^{1/\eta} C_{F,t}^{1-1/\eta} \right]^{\eta/(\eta-1)} \tag{10}$$

where μ is the share of domestic produced good in total consumption representing the degree of home bias in preferences and $\eta > 0$ measures the intra-temporal elasticity of substitution between home and foreign goods.

The model: Households

- Given the CES aggregator, the demand for domestically produced goods and imports is:

$$C_{H,t} = \mu \left(\frac{P_{H,t}}{P_t} \right)^{-\eta} C_{p,t} \tag{11}$$

and

$$C_{F,t} = (1 - \mu) \left(\frac{S_t P_{F,t}}{P_t} \right)^{-\eta} C_{p,t} \tag{12}$$

where

$$P_t = \left[\mu P_{H,t}^{1-\eta} + (1 - \mu) S_t P_{F,t}^{1-\eta} \right]^{1/(1-\eta)}$$

where S_t is the nominal exchange rate, defined as the domestic currency per unit of foreign currency.

- Households' preferences are given by the following instantaneous utility function:

$$U(C_t, N_t \overline{H} - L_t) = \gamma \frac{\left(C_{p,t}^{\theta} C_{g,t}^{1-\theta} \right)^{\sigma}}{\sigma} + (1 - \gamma) \log(1 - L_t) \quad (13)$$

where σ is a parameter measuring the degree of relative risk aversion. Leisure is defined as $1 - L_t$, where total time endowment has been normalized to one. The parameter γ $(0 < \gamma < 1)$ is the fraction of total consumption on total private income.

The model: Households

- The budget constraint faced by the stand-in consumer is:

$$(1 + \tau_t^c)C_{p,t} + I_{p,t} + B_t^H + S_t F_t \tag{14}$$
$$= (1 - \tau_t^l)W_t L_t + (1 - \tau_t^k)(R_t - \delta_{K_p})K_{p,t-1} \tag{15}$$
$$+ (1 + R_{t-1}^B)B + (1 + R_{t-1}^F)S_{t-1}F_{t-1} + Z_t + (1 - \tau_t^k)\pi_t \tag{16}$$

where $I_{p,t}$ is private investment, B_t^H are (public) domestic bonds, F_t are foreign bonds, $K_{p,t}$ is private physical capital stock, W_t is compensation per employee, R_t is the rental rate of capital, δ_{K_p} is the capital depreciation rate which is modeled as tax deductible, R_t^B is the interest rate on domestic bonds, R_t^F is the interest rate on foreign bonds, Z_t denotes lump-sum transfers from the government, and π_t are profits. The budget constraint includes three taxes: a consumption tax, τ_t^c, a labor income tax, τ_t^l, and a capital and profits tax, τ_t^k.

The model: Households

- To close the model we assume the existence of a foreign debt-elastic premia. Following Schmitt-Grohé and Uribe (2003), we use the following functional form for the risk premium:

$$\Phi_t(F_t) = \phi(\exp(F_t - \overline{F}) - 1) \qquad (17)$$

where $\phi > 0$, and $\overline{F}$ is the steady state value for foreign bonds. This implies that domestic households are charged a premium over the exogenous foreign interest rate, R_t^F, if the domestic economy is net borrower ($F_t < 0$), and receive a lower remuneration on their saving if the domestic economy is a net lender ($F_t > 0$).

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- Finally, private physical capital holdings evolve according to:

$$K_{p,t} = (1 - \delta_K)K_{p,t-1} + I_{p,t} \tag{18}$$

where $I_{p,t}$ is household's gross investment.

- The feasibility condition of the economy is given by (as defined by expression 7):

$$Y_t = C_t + I_t + F_t - (1 + R_{t-1}^F)F_{t-1} - B_t^F + (1 + R_{t-1}^B)B_{t-1}^F$$

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- To close the household sector of the model economy, we assume that exports are determined exogenously, $X_t = \overline{X}$. We assume that they follows an AR(1) process:

$$\log(X_t) = (1 - \rho_X)\overline{X} + \rho_X \log(X_{t-1}) + \varepsilon_t^X \qquad \varepsilon_t^X \sim N(0, \sigma_X^2) \quad (19)$$

- The technology is given by:

$$Y_t = A_t \left[\varphi K_{g,t-1}^{\rho} + (1 - \varphi) \left(K_{p,t-1}^{\alpha} L_t^{1-\alpha} \right)^{\rho} \right]^{1/\rho} \tag{20}$$

- First, we describe the elements present in the government budget constraint:

$$G_t = T_t + B_{t+1}^H + B_{t+1}^F - B_t^H - B_t^F \qquad (21)$$

where B_t^H are the holdings of government bonds by domestic agents and B_t^F are the holdings of government bonds by foreign agents. Equation (21) says that total government spending including interest payments of total government debt (G_t), must be funded by some combination of tax receipts (T_t), and new debt issuance (ΔB_t). Total government spending can be divided between primary government spending, $G_{p,t}$, plus interest payments of total government debt, $R_t^B(B_t^H + B_t^F)$, and hence,

$$G_{p,t} + R_t^B(B_t^H + B_t^F) = T_t + B_{t+1}^H + B_{t+1}^F - B_t^H - B_t^F \qquad (22)$$

The model: Government spending

- Primary government spending is assumed to be exogenously determined. We assume that government spending follows an AR(1) process:

$$\log(G_{p,t}) = (1 - \rho_G)\overline{G_p} + \rho_G \log(G_{p,t-1}) + \varepsilon_t^G \qquad \varepsilon_t^G \sim N(0, \sigma_{Gp}^2)$$

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- Non-interest total government spending is defined as:

$$G_{p,t} = C_{g,t} + I_{g,t} + Z_t \tag{23}$$

where $C_{g,t}$ is public consumption of goods and services, $I_{g,t}$ is public investment, and Z_t are transfer payments to households, such as welfare, social security or unemployment benefit payments.

The model: Government spending

- We assume an exogenous distribution of primary government spending such as:

$$
\begin{aligned}
C_{g,t} &= \omega_1 G_{p,t} \\
I_{g,t} &= \omega_2 G_{p,t} \\
Z_t &= (1 - \omega_1 - \omega_2) G_{p,t}
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\end{aligned}
$$

- Public investments accrue into the public structures stock, $K_{g,t}$. We assume the following accumulation process for the public capital:

$$
K_{g,t} = (1 - \delta_{K_g}) K_{g,t-1} + I_{g,t} \tag{24}
$$

which is analogous to the private capital accumulation process, and where δ_{K_g} is the public physical capital depreciation rate.

- The government obtains resources from the economy by taxing consumption and income from labor, capital and profits, whose effective average tax rates are denoted by τ_t^c, τ_t^l, τ_t^k, respectively. The government budget from fiscal revenues in each period is given by,

$$T_t = \tau_t^c C_t + \tau_t^l W_t L_t + \tau_t^k (R_t - \delta_K) K_{t-1} + \tau_t^k \pi_t$$

where $C_{p,t}$ is private consumption, W_t is wages, L_t is labor, R_t is the rental rate of private capital, δ_{K_p} is the depreciation rate of private capital, $K_{p,t}$ is private capital stock, and π_t are profits.

- The last agent populating our model economy represents the foreign sector. The rest of the world for this economy is modeled as a single international banker whose objective is to maximize the discounted dividend x_t obtained from the asset holdings of government bonds. The discount factor is β, identical to the consumer's discounting parameter. Purchases of government bonds, in equilibrium, are denoted by B_t^F. The maximization problem for international investors can be defined as:

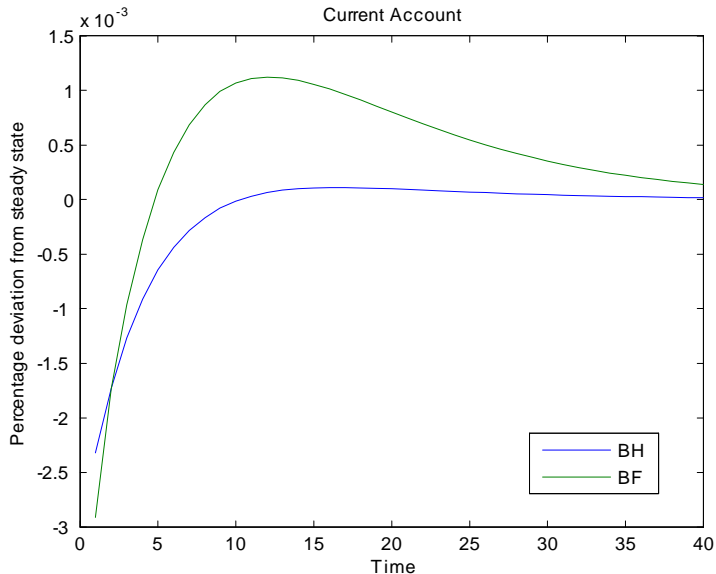$$\max_{x_t} \sum_{t=0}^{\infty} \beta^t x_t \qquad (25)$$

subject to the budget constraint given by:

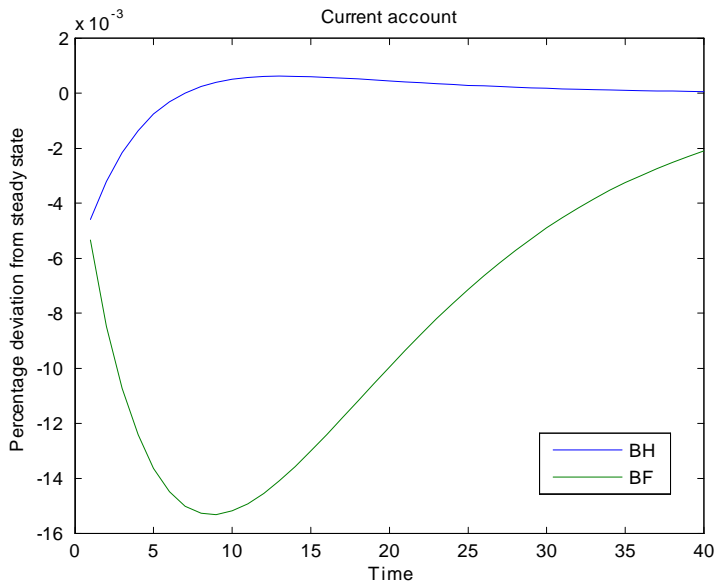$$B_{t+1}^F - B_t^F + x_t = w^I + R_t^B B_t^F \qquad (26)$$

where w^I is a constant endowment. From the above problem we obtain the following steady state condition,
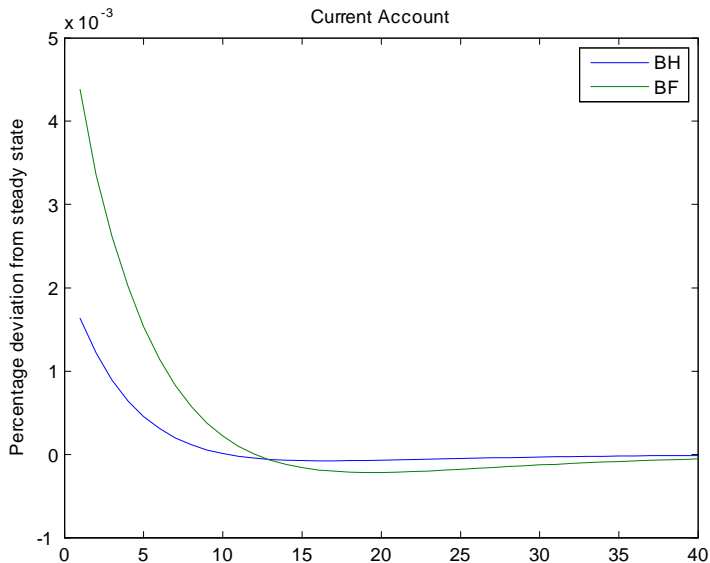
$$\beta(1 + R_t^B) = 1 \qquad (27)$$

Total Factor Productivity shock

Government spending shock

Tax shock

Conclusions

- The relationship between budget deficit and the current account deficit is an open question, both theoretically and empirically. Traditional absorption approach establishes a direct link between both deficits (the so-called twin deficits hypothesis). By contrast, the Ricardian equivalence hypothesis states that changes in fiscal policy are offset by changes in the consumption-saving decision and therefore no relationship between the current account and the budget deficit exits. Empirical literature has not solved this controversy, arriving to contradictory results.

Conclusions

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- This paper shows that the proportion of public debt purchased by foreign investors plays a key role in determining the relationship between fiscal policy and the current account.