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Exchange Rate, Cross Elasticities Between Exports and Imports and Current Account Sustainability: The Spanish Case

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Abstract: This paper presents an analytical reformulation of the traditional approach to current account sustainability. We adopt a perspective according to which the independence of GDP and exchange rates cannot be postulated in very open economies, hence, the Marshall-Lerner condition cannot be met. Therefore, we analyze four different propositions based on different cross elasticities between exports and imports. Those propositions have theoretical implications about sustainability of the current account and the external debt . We use a dynamic stochastic general equilibrium (DGSE) macroeconomic model to simulate the impact of variations in exchange rates, cross elasticity between imports and exports, and consumption tax rate on the Spanish economy and, particularly, on its current account sustainability.

Keywords: Marshall-Lerner condition; Current account sustainability; Macroeconomic model of dynamic stochastic general equilibrium; Cross elasticities export-import

JEL Classifications: F41, F44, F30, F11

1. Introduction

Economic globalization has been the underlying characteristic of the evolution of the world economic system over the last few decades. This phenomenon has been analyzed in depth from a financial perspective. However, there is a notable dearth of studies on its implications for the real economy and the foreign sector of national economies, in particular. Traditionally, economic theory has been analyzing foreign sectors in relation to fulfillment of the Marshall-Lerner condition, according to which "for a currency devaluation to have a positive impact on trade balance, the sum of price elasticity of exports and imports (in absolute value) must be greater than 1".

Whether or not the current account deficit is sustainable has important policy implications. If a nation's current account deficits are sustainable, the government should have no incentive to default on its international debt. International capital flows allow players in the domestic economy to obtain capital from foreign borrowers as well as hold foreign assets (1). Thus, it is generally accepted that an open economy ought to be able to attain a higher level of economic welfare than a closed one.

The present work has two distinct purposes. On the one hand, we set to reformulate the theoretical analysis on sustainability of the current account. We start off from a perspective, according to which, in very open economies, the independence of GDP and exchange rates cannot be postulated, and therefore the Marshall-Lerner condition could not be maintained.

On the other hand, we employ a dynamic stochastic general equilibrium (DSGE) macro-economic model in order to simulate the impact of variations in the exchange rate, cross elasticity

between exports and imports and consumption tax rate over the Spanish economy, specifically on its current account sustainability.

The economic literature abounds with theoretical and empirical studies on the impact of exchange rate variations on the balance of trade, taking the Marshall-Lerner condition and the current account sustainability for granted.

Cucuru, Stephania (2008) has analyzed the sustainability of large and persistent U.S. current account deficits and raised questions about potential inconsistencies in international accounts.

Cuñado, Juncal, et al.(2008) have examined whether or not current account deficits of OECD countries can be characterized by a unit root process with regime switching. The econometric methodology they employ has allowed them to distinguish periods that are associated with unsustainable outcomes from those in which the intertemporal national long-run budget constraint (LRBC) holds.

Holmes, Mark J. et al. (2011) have carried out research on the sustainability of India's current account, using data from 1950 onward. A necessary condition for current account sustainability is that exports and imports be cointegrated, for which they have used parametric tests for cointegration. After using these procedures recursively, two distinct regimes are identified, based on whether or not imports and exports are cointegrated: the non-cointegration regime which runs until the late 1990s, and the cointegration regime that is manifest subsequently. This latter regime chronologically coincides with the liberalization of the Indian economy.

By using multivariate cointegration tests and error-correcting models to obtain the determining factors of the Argentinean balance of payments, Matesanz and Fugarolas (2009), find no empirical evidence that the Marshall-Lerner condition held nor that there was a J-curve effect in the short run.

Chen, Shyh-Wei (2011) examines whether or not current account deficits of OECD countries can be characterized by a unit root process with regime switching. The econometric methodology also allows him to distinguish periods that are associated with unsustainable outcomes from those in which the intertemporal national long-run budget constraint (LRBC) holds. Among other major findings of the study, he points out that LRBC will very likely not hold for Australia, the Czech Republic, Finland, Hungary, New Zealand, Portugal, and Spain. Thus, the paper raises a red flag that the current account deficits observed in the studied period and countries may not be on a sustainable path.

Welfens (2011) considers the impact of FDI inflows and FDI outflows, showing that the presence of (cumulative) FDI requires higher import elasticities in absolute terms than the ones postulated by the standard Marshall-Lerner condition.

Sastre, L. (2012) presents an analytical reformulation of the Marshall-Lerner condition under the assumption that the independence of GDP from the exchange rate cannot be posited in open economies, where the foreign trade flow/GDP ratio is high.

If $r < g$ (the interest rate is lower than the growth rate), the current account sustainability does not depend solely on the Balance of Trade.

If $r > g$ (the interest rate is higher than the growth rate), to analyze the sustainability of the current account, it will be necessary to determine if future deficits and surpluses would be sufficient to repay the net debt, if the country happens to be a net borrower. Should the country be a net creditor, we will need to analyze if future deficits and surpluses would be enough for it to run down its accumulated assets.

2. Inter-temporal Approach to the Current Account

The net trade is expressed as:

$$X_T - tcr_T * M_T \qquad (1)$$

If B_T is the amount of Net Foreign Assets held, assuming zero inflation and perfect mobility of capital, the rates of return would be equal to real interest rates, therefore:

$$X_T - tcr_T * M_T + r * B_{T-1} = \Delta B_T \qquad (2)$$

where $r * B_{T-1}$ denotes payments on net foreign capital holdings and ΔB_T the net foreign asset position, while X_T, M_T, and *tcr* are exports, imports, and exchange rate, respectively, all variables expressed in real prices.

The left-hand side of the equation is the current account position and the right-hand side − the capital account.

Considering (2), the long-run equilibrium of net foreign assets, when the initial net asset holding is given, must satisfy the following:

$$X_T - tcr_T * M_T + r * B_T = B_{T+1} - B_T$$

$$B_T * (1 + r) = B_{T+1} + tcr_T * M_T - X_T$$

$$B_T = \frac{B_{T+1} + tcrM_T - X_T}{1 + r}$$

If TCR_t , X_T and M_T are constant, in the steady state, net foreign asset holdings satisfy

$$B_T = \frac{tcrM_T - X_T}{r}$$

$$X_T - tcrM_T + rB_T = 0$$

Provided the transversality condition

$$\sum_{S=1}^{\infty} \frac{B_{T+S}}{(1+r)^S} = \sum_{S=1}^{\infty} \frac{X_{T+S} - tcrM_{T+S}}{(1+r)^S} = 0$$

the implication is that the trade deficit is larger than this, and therefore the current account is unsustainable (see Wickens, 2011).

We must distinguish current account sustainability from the intertemporal approach to the current account. In a dynamic general equilibrium model, we must take into consideration the optimality of consumption and savings decisions by combining the BOP with a simple inter-temporal model of consumption (see Obstfeld and Rogoff ,1995a and 1995b).

If we define domestic savings S_T as $S_T = Y_T - I_T - G_T = C_T + X_T - tcrM_T$

$$B_T = -\frac{X_T - tcrM_T}{r}$$

$$B_T = -\frac{X_T - tcrM_T}{r} - \sum_{S=1}^{\infty} \frac{X_{T+S} - tcrM_{T+S}}{(1+r)^S}$$

$$B_T = -\sum_{S=0}^{\infty} \frac{X_{T+S} - tcrM_{T+S}}{(1+r)^{S+1}} = -\sum_{S=0}^{\infty} \frac{S_{T+S} - C_{T+S}}{(1+r)^{S+1}}$$

Deriving consumption from the life cycle theory (see Wickens, 2011)

$$C_T = \frac{r}{1+r} W_T$$

where wealth in the open economy is

$$W_T = \sum_{S=0}^{\infty} \frac{S_{T+S}}{(1+r)^S} + B_T$$

$$C_T = \frac{r}{1+r}\left[\sum_{S=0}^{\infty} \frac{S_{T+S}}{(1+r)^S} + B_T\right]$$

with the current account being

$$CA_T = S_T + rB_T - C_T$$

Substituting C_T in the current account would give:

$$CA_T = -\sum_{S=0}^{\infty} \frac{S_T - S_{T+S}}{(1+r)^S} = -\sum_{S=0}^{\infty} \frac{X_T - tcrM_T + C_T - [X_{T+S} - tcrM_{T+S} + C_{T+S}]}{(1+r)^S}$$
$$= \sum_{S=0}^{\infty} \frac{tcr[M_T - M_{T+S}] - [X_T - X_{T+S}] + C_{T+S} - C_T}{(1+r)^S}$$

Thus, in order to be sustainable, a current account deficit must be offset by the present value of changes in current and future domestic savings.

3. Exchange Rates and Current Account Sustainability

The question that we raise regarding external debt and current account stability, given an interest rate, pertains to the relative growth of imports and exports.

As $$B_T = -\sum_{S=0}^{\infty} \frac{X_{T+S} - tcrM_{T+S}}{(1+r)^{S+1}}$$

and $$CA_T = \sum_{S=0}^{\infty} \frac{tcr[M_T - M_{T+S}] - [X_T - X_{T+S}]}{(1+r)^S} + \sum_{S=0}^{\infty} \frac{C_{T+S} - C_T}{(1+r)^S}$$

the export and import demand for small open economies would be, respectively (see Sastre, 2010)

$$X = \varphi(G^f, M, tcr)$$

where $\partial G^f/\partial tcr = 0$; $\partial X/\partial tcr \neq 0$; and $\partial X/\partial M \neq 0$

$$M = \varphi(G, X, tcr)$$

where $\partial G/\partial tcr = 0$; $\partial M/\partial tcr \neq 0$; and $\partial M/\partial X \neq 0$.

G is the quantity of non-marketable goods produced in a country, whereas G^f is the quantity of non-marketable goods produced abroad, and *tcr* is the real effective exchange rate, or the ratio between foreign and domestic prices.

The Balance of trade (BC) would be:

$$BC = X - M = \varphi\left(G^f, M, tcr\right) - tcr\varphi(G, X, tcr)$$

And then

$$\frac{dBC}{dtcr} = M\left[\epsilon_{X,tcr}\left(1+\epsilon_{M,X}\right)+\epsilon_{M,tcr}\left(1+\epsilon_{X,M}\right)-1\right]=0 \qquad (3)$$

where $\epsilon_{X,tcr}$ = elasticity exports-exchange rate

$\epsilon_{M,X}$ = cross elasticity between imports and exports

$\epsilon_{M,tcr}$ = elasticity import- exchange rate

$\epsilon_{X,M}$ = cross elasticity between exports and imports

Given (3), we can consider the followings four propositions:

Proposition 1. The condition $\epsilon_{M,X} = 0$ and $\epsilon_{X,M} = 0$ characterizes an economy that depends very little on other countries, with zero correlation between imports and exports. Then, we would have :

$$\frac{dBC}{dtcr} > 0 \quad \text{when } \epsilon_{X,tcr} + \epsilon_{M,tcr} > 1$$

In this case, the Marshall-Lerner condition is fulfilled and a current account deficit can indeed be sustainable. It could be offset by a devaluation of the currency, which would make up for the current account deficit. This way, it would not need to be compensated by the present value of changes in current and future domestic savings.

Proposition 2. The condition $\epsilon_{M,X} \neq 0$ and $\epsilon_{X,M} = 0$ characterizes an economy, in which the demand for imports depends on exports but not the other way around, i.e. exports do not depend on imports. Then:

$$\frac{dBC}{dtcr} > 0 \quad \text{when } \left[\epsilon_{X,tcr}\left(1+\epsilon_{M,X}\right)+\epsilon_{M,tcr}\right] > 1$$

In practical terms, this condition describes economies, in which many industries import raw materials or intermediate products and then export finished products (see Krugman, 1995). In this case, an exchange rate devaluation may not restore the balance; rather, it would depend on the cross elasticity between imports and exports.

$$\text{If } \epsilon_{M,X} < 0\,;\ \left[\epsilon_{X,tcr}+\epsilon_{M,tcr}\right] > 1 + \left(\epsilon_{M,X} * \epsilon_{X,tcr}\right)$$

Thus, in order to be sustainable, a current deficit would need to be offset by the present value of changes in current and future domestic savings.

$$\text{If } \epsilon_{M,X} > 0\,;\ \left[\epsilon_{X,tcr}+\epsilon_{M,tcr}+\epsilon_{M,X} * \epsilon_{X,tcr}\right] > 1$$

an exchange rate devaluation could ensure the sustainability of the current account.

Proposition 3. The condition $\epsilon_{M,X} = 0$ and $\epsilon_{X,M} \neq 0$ represents an economy, in which exports depend on imports but imports do not depend on exports. Then:

$$\frac{dBC}{dtcr} > 0 \text{ and } \left[\epsilon_{X,tcr}+\epsilon_{M,tcr}\left(1+\epsilon_{X,M}\right)\right] > 1$$

This condition would correspond to the economies of countries used by multinational corporations as logistic bases for their production. This is backed by the theory of "slicing up the production process" (see Krugman, 1995): in the countries where they operate, multinational corporations do not react to unexpected changes in demand for their products by varying their production costs but rather by re-allocating their international stocks of merchandise (see Sastre, 2012).

$$\text{If } \epsilon_{X,M} < 0\,;\ \left[\epsilon_{X,tcr}+\epsilon_{M,tcr}\right] > 1 + \left(\epsilon_{X,M} * \epsilon_{X,tcr}\right)$$

in order to be sustainable, a current account deficit would have to be offset by the present value of changes in current and future domestic savings.

$$\text{If} \quad \in_{X,M} > 0 \ ; \left[\in_{X,tcr} + \in_{M,tcr} + \in_{X,M} * \in_{X,tcr}\right] > 1$$

an exchange rate devaluation could ensure the sustainability of the current account.

Proposition 4. The conditions $\in_{M,X} \neq 0$ and $\in_{X,M} \neq 0$ would apply to an economy, in which import demand depends on export demand and vice versa. Then $\frac{dBC}{dtcr} > 0$ and Eq (4) would remain unchanged:

$$\left[\in_{X,tcr} \left(1 + \in_{M,X}\right) + \in_{M,tcr} \left(1 + \in_{X,M}\right)\right] > 1 \qquad (4)$$

In such economies, the empirical problem of estimating export and import flow determinants should be considered in view of their simultaneity, as noted by Sastre (2005).

$$\text{If} \quad \left[\in_{X,tcr} \in_{M,X} + \in_{M,tcr} * \in_{X,M}\right] > 0$$

Exchange rate devaluation could ensure sustainability of the current account. Or,

$$\text{If} \quad \left[\in_{X,tcr} \in_{M,X} + \in_{M,tcr} * \in_{X,M}\right] < 0$$

to be sustainable, a current deficit would have to be offset by the present value of changes in current and futures domestic savings.

4. Current Account Sustainability: The Spanish Case

Spain joined the Eurozone with an asymmetrical inflation, relative to the average inflation of other country members. At the time, the countries that were to make up the Eurozone, relinquished their monetary policies to the European Central Bank by sharing a common currency. Hence, nominal exchange and nominal interest rates are exogenous variables to our model. This does not mean, however, that real exchange and real interest rates are exogenous variables, as price levels are not homogeneous. In fact, they differ significantly from country to country within the Eurozone.

Spain's entry into the Eurozone with higher inflation than rest of the countries meant that the real rate of interest in Spain was lower than in other country members. At the same time, the exchange rate – measured by the price differential – reflected a continued deterioration in real terms of trade with the rest of the Eurozone. This situation resulted in growth of domestic demand in Spain, also higher than the average among the Eurozone countries. It was accompanied by a deterioration of the trade balance, with an increasing need for external financing.

In this section, we develop a real three-sector model of a small open economy.[1] The country produces a traded good using capital K and labor L. Since the time horizon is sufficiently long, the model does not consider money and other nominal rigidities. The major innovation in the present model consists of introducing a foreign sector, allowing for with the possibility of the Marshall-Lerner condition not being met. We employ this model to analyze the current account and debt sustainability.

We lay out the model in stages, starting with notes and specifications about the respective economic agents, i.e., households, firms, government, and foreign sector, specified as follows:

[1] The model is based in Torres ,J.L.(2009) , Buriel, et al. (2010) and Tervala, J. (2012)

4.1 Households

In the economy, it is assumed that there is a large number of consumers with identical preferences, represented by the following utility function:

$$\varphi(C_t, 1 - L_t) = \alpha \ln C_t + (1 - \alpha) \ln(1 - L_t)$$

C_t representing private consumption, while leisure is defined as 1-L . The percentage α ($0 < \alpha < 1$) indicates the proportion of consumption off total income.

The overall consumption index takes the following form:

$$C_t = \left[n^{1/p}(C_t^h)^{\frac{p-1}{p}} + (1-n)^{\frac{1}{p}}(C_t^f)^{\frac{p-1}{p}}\right]^{\frac{p}{p-1}}$$

where C_t^h and C_t^f are indices of domestic and foreign goods, and p>0 measures the elasticity of substitution between domestic and foreign goods. P_t^h and P_t^f are, respectively, the price indices corresponding to domestic and foreign consumption baskets C_t^h and C_t^f, while P_t (defined below) is the consumer price index.

$$P_t = \left[n(P_t^h)^{1-p} + (1-n)(P_t^f)^{1-p}\right]^{\frac{1}{1-p}}$$

where *tc* is the nominal exchange rate, then the purchasing power parity (PPP) holds:

$$P_t = tc_t * P_t^f$$

with P_t^f being the foreign consumer price index.

Since *tc* is equal for all countries of the Eurozone, sharing a common currency, there would be the prices P_t and P_t^f. These prices would be the variables determining competitiveness among countries of the region and, hence, the flows of exports and imports.

The problem of households is maximizing their utility:

$$\text{Max } U_t = \sum_{t=0}^{\infty} B^t(\alpha \ln C_t + (1-\alpha)\ln(1 - L_t))$$

subject to the budgetary restriction of a representative consumer

$$B_t + PC_t = (1 + R_t)B_{t-1} + \left(1 - \tau_t^l\right)W_t L_t + (1 - \tau_t^\pi)\pi_t + G_t$$

Here B_t denotes bonds that pay one unit of domestic currency within period t+1, and held at the beginning of period t; R_t is the nominal interest rate on bonds at t-1; *w* is the nominal wage paid to a household in a competitive labour market, while π denotes the household's share of the nominal profits of domestic firms, under the assumption that all domestic households own an equal share of all domestic firms. *B* is the consumers discount factor, whereas G_t denotes transfers from the Government to households; finally, τ_t^c , τ_t^l , τ_t^π are the tax rates on consumption, wages and nominal profits of domestic firms, respectively.

4.2 Firms

All markets are assumed to be perfectly competitive. The goal of every firm is to maximize profits, assuming given prices of capital and labor. The problem before firms would consist of maximizing the profits from one given period to the next:

$$\text{Max } \pi_t = A_t K_t^\alpha L_t^{1-\alpha} - R_t K_t - W_t L_t$$

The capital stock is defined as

$$K_{t+1} = (1-\delta)K_t + I_t$$

where K_t is the stock of private capital; K_0 i −initial capital stock, and I_t − private investment.

4.3 The government

The role of the Government is to raise revenue through taxes in order to fund transfers to families. The budget constraint is, therefore, to be defined as:

$$(\tau_t^c)C_t + (\tau_t^l)W_tL_t + (\tau_t^\pi)(\pi_t) = G_t$$

4.4 The foreign sector

Regarding the Spanish economy in particular, we study the long-term equilibrium relation between volume of imports and its determining factors, on the one hand, and the volume of exports and its determining factors, on the other. To that end, we assume that the import and export demand equations take the following forms (see Sastre, 2005):

$$X_t = Y_t^{\in_y} * it_t^{\in_{it}} * M_t^{\in_{x,m}}$$

The import function, expressed in national production units, would be:

$$M_t = I_t^{\in_I} * pr_t^{\in_{pr}} * X_t^{\in_{m,x}}$$

where X is the volume of exports of goods and services; M is the volume of imports of goods and services; Y is the GDP of OECD countries ; it and pr are the export and import price competitiveness indicators, respectively; and finally $\in_y$, $\in_{it}$, $\in_I$, $\in_{pr}$, $\in_{x,m}$, $\in_{m,x}$ are elasticities export-income of OECD countries, export-competitiveness, import-investment, as well as the cross elasticities export-import and import-export.

The balance of trade (BC) would be:

$$\text{BC}= X_t - M_t = Y_t^{\in_y} * it_t^{\in_{it}} * M_t^{\in_{x,m}} - I_t^{\in_I} * pr_t^{\in_{pr}} * X_t^{\in_{m,x}}$$

The conditions of sustainability of external debt and the current account balance are:

$$B_T = -\sum_{S=0}^{\infty} \frac{X_{T+S} - tcM_{T+S}}{(1+r)^{S+1}}$$

$$CA_T = \sum_{S=0}^{\infty} \frac{tc[M_T - M_{T+S}] - [X_T - X_{T+S}]}{(1+r)^S} + \sum_{S=0}^{\infty} \frac{C_{T+S} - C_T}{(1+r)^S}$$

Finally, the economy must fulfill the following condition of feasibility:

$$Y_T = C_T + I_T + G_T + X_T - tc_T * M_T \quad (5)$$

4.5 Calibration

In order to calibrate the model, we need to assign values to the parameters. We set the parameters as shown in the following table 1.

The values of the parameters α, β, and γ are taken from previous studies, outlined in the literature review above. The relevant tax rates τ_t^c, τ_t^l , τ_t^π correspond to estimated effective average rates for the Spanish economy according to Boscá, et al. (2008). The sundry elasticities of export and import flows for the Spanish economy $\in_y$, $\in_{it}$, $\in_{x,m}$, $\in_I$, $\in_{pr}$,$\in_{m,x}$ have been estimated by Sastre (2012) .

Table 1. Parameters and their assigned values for calibration

Parameter	Definition	Assigned value
α	Technological parameter	0.35
β	Discount factor	0.97
γ	Parameter preferences	0.450
τ_t^c	Consumption tax	0.116
τ_t^l	Tax on labor income	0.348
τ_t^π	Tax on capital income	0.225
$\in_y$	Export Elasticity OECD GDP	1.20
$\in_{it}$	Elasticity Export – competitiveness	-1.80
$\in_{x,m}$	Cross elasticity export-import	0.64
$\in_I$	Elasticity Import-Investment	0.84
$\in_{pr}$	Elasticity - competitive imports	-0.35
$\in_{m,x}$	Cross elasticity import-export	0.51

4.6 Stochastic simulation

In the present simulation we assume that the real effective exchange rate vis-a-vis countries outside the Eurozone, i.e. their price differentials relative to the Eurozone countries, follow an autoregressive order-one process, such that:

$$\log tc_t = (1-\rho_{tc})\log \overline{tc} + \rho_{tc}\log tc_{t-1} + \varepsilon_t^{tc}; \text{ and } \varepsilon_t^{tc} \sim \mathrm{N}(0, \sigma_{tc}^2)$$

In this case, we suppose that ρ_{tc} = 0.95, σ_{tc}=0.01 and $\overline{tc}$=1 .

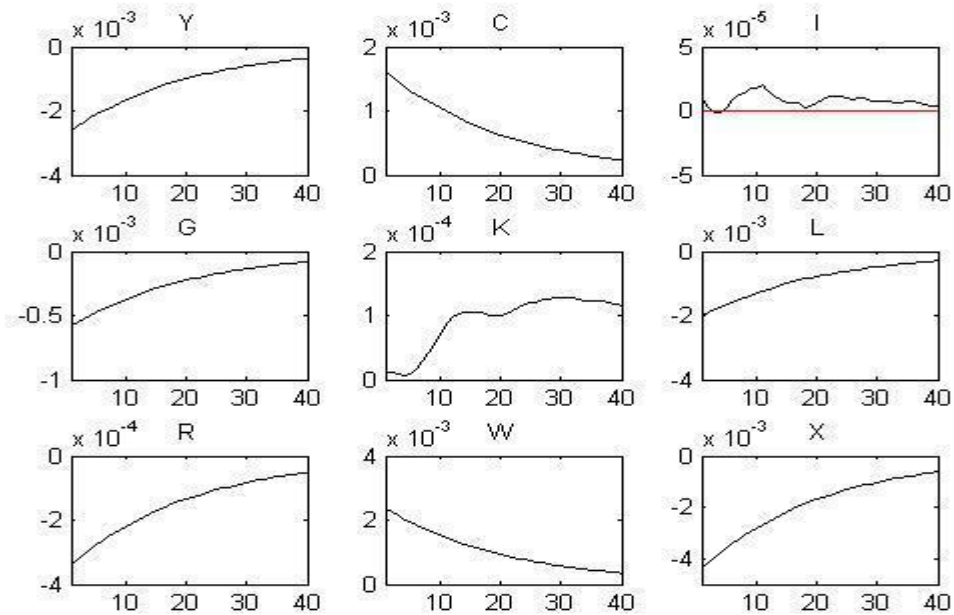

Figure 1. The effects of the shock over forty periods

From the model, we can calculate the deviations of variables with respect to their steady-state value, allowing us to graphically represent the so-called impulse-response functions.

Figure 1 shows the effects of the shock over forty periods. We observe an increase in the level of production, investment, hours worked and the interest rate. Consumption, capital stock and wages decrease.

Regarding the Foreign Sector, Figure 2 shows how exports increase and, as a result of the increase in production and due to the exports-induced effect, imports increase as well.

External debt is reduced and the current account improves until it reaches a steady state.

In Spain, a devaluation of the exchange rate would improve the current account: the Marshall-Lerner condition is upheld.

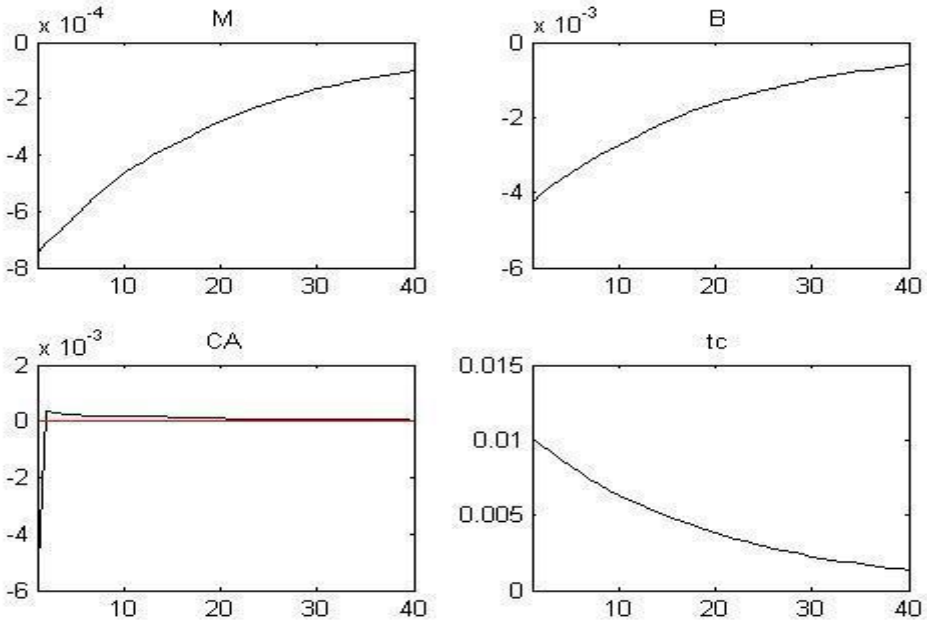

Figure 2. Increase in both imports and bonds

4.7 Deterministic simulation

In this case, we consider a 5% devaluation of the nominal exchange rate, similar in effect to a 5% drop in domestic prices, relative to prices in other countries in the Eurozone.

Figure 3 represents the effects of devaluation in terms of production, consumption, hours worked and external debt. Production drastically increases after an instant shock, only to level off afterward. The same occurs with External Debt and Hours Worked. The consumption indicator goes down significantly and then begins to slowly grow, approaching a new steady state.

In the foreign sector, as shown on Figure 4, exports grow along with imports due to an effect induced by the former upon the latter as well as through the increase of production output. The external debt and current account balance improve and the Marshall-Lerner condition is met.

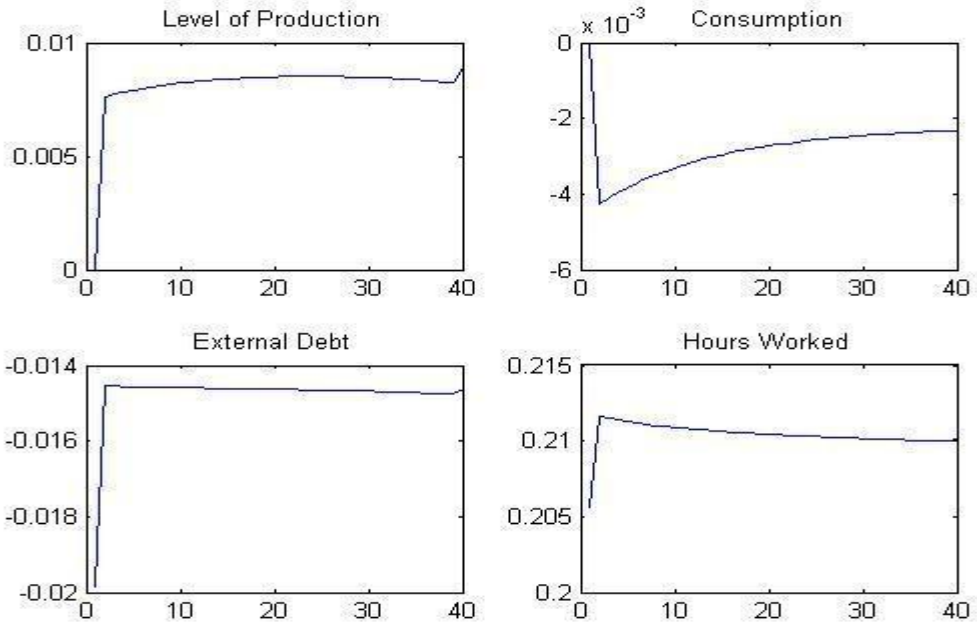

Figure 3. Effects of devaluation on production, consumption, external debt, and hours worked

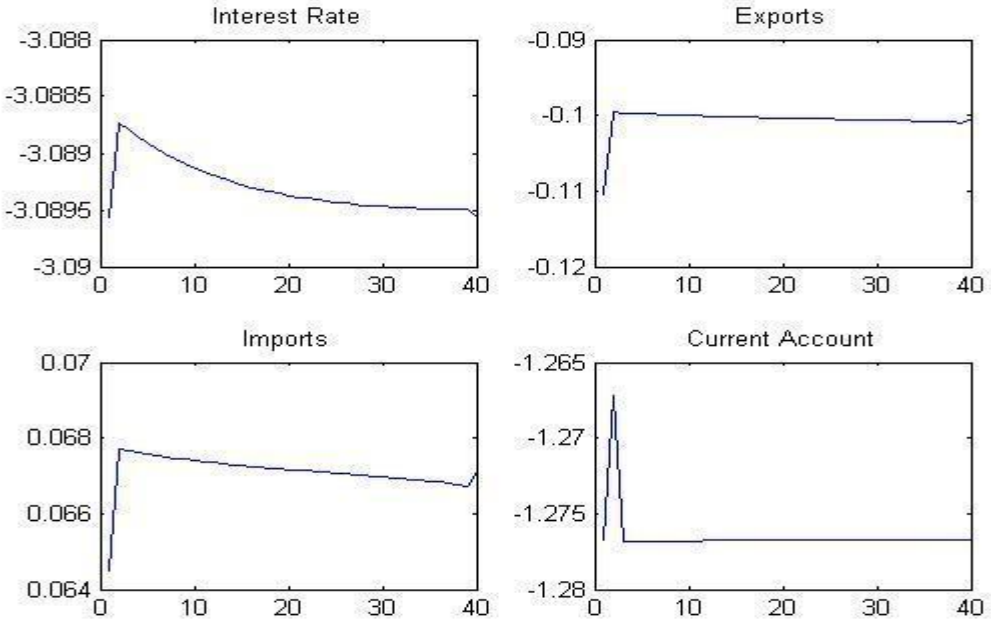

Figure 4. Effects of devaluation on interest rate, exports, imports, and current account

4.8 Cross-elasticity export-import simulation

In this case, we consider a reduction in the cross-elasticity exports-imports, i.e. the quantity of imports for a given volume of exports. With this simulation, we attempt to check if a reduction of this structural parameter would have a similar effect as a devaluation of the exchange rate: in other

words, increasing production, reducing consumption and improving the external debt and current account situation. See Figures 5 and 6.

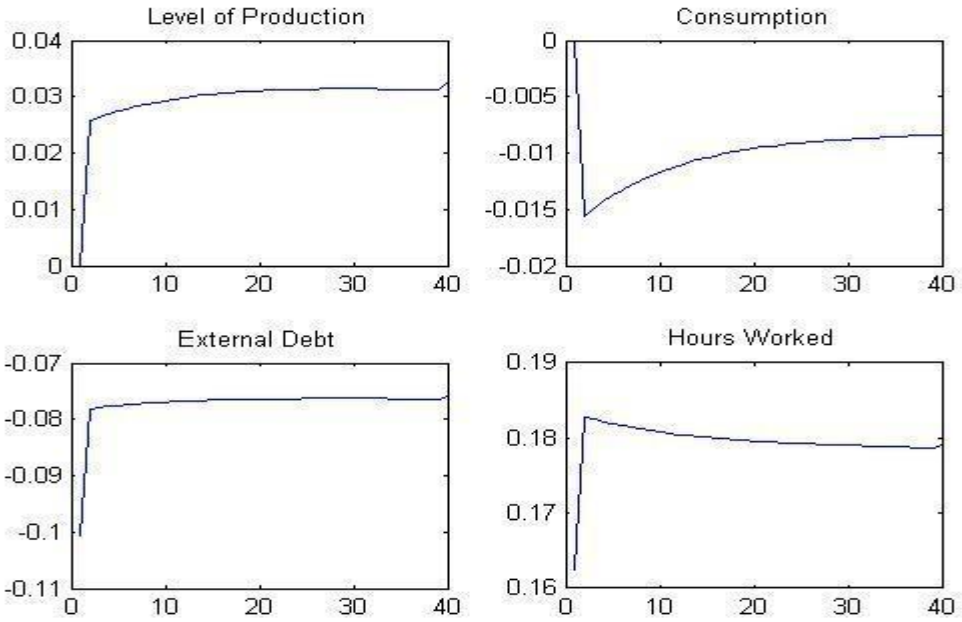

Figure 5. Effects of a reduction in cross-elasticity exports-imports on production, consumption, external debt, and hours worked

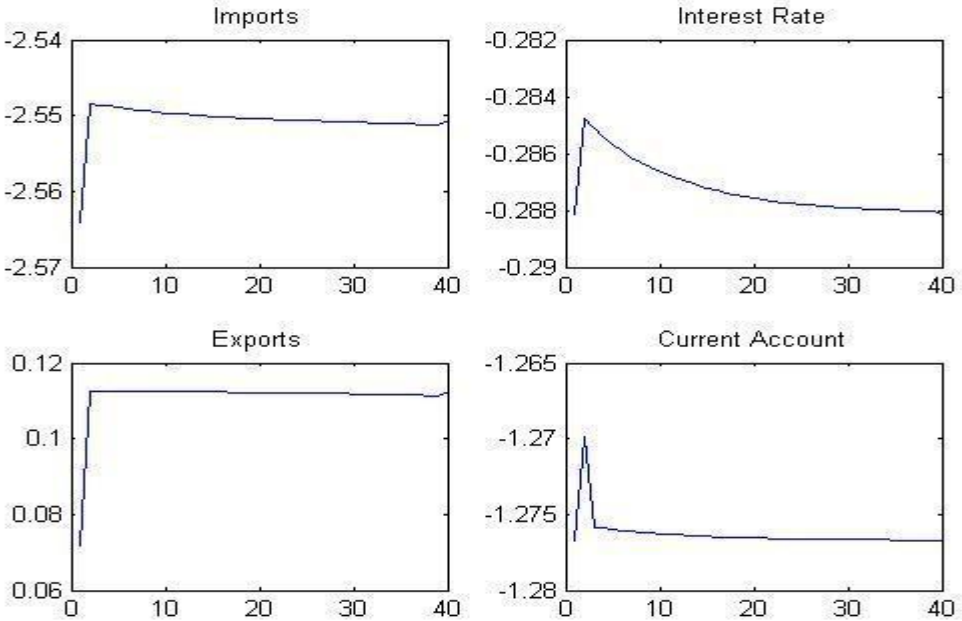

Figure 6. Effects of a reduction in cross-elasticity exports-imports on imports, exports, interest rate, and current account

4.9 Consumption tax simulation

Figures 7 and 8 represent the impact of a consumption tax hike on the foreign sector of the economy – a drop in consumption, wages and hours worked. This is attributable to the presence of an intertemporal work-for-leisure substitution effect. The tax increase reduces the purchasing power of wages, which at first is offset by an increase in hours worked that significantly go down afterward.

The external debt and current account balance improve as a result of the decline in domestic consumption.

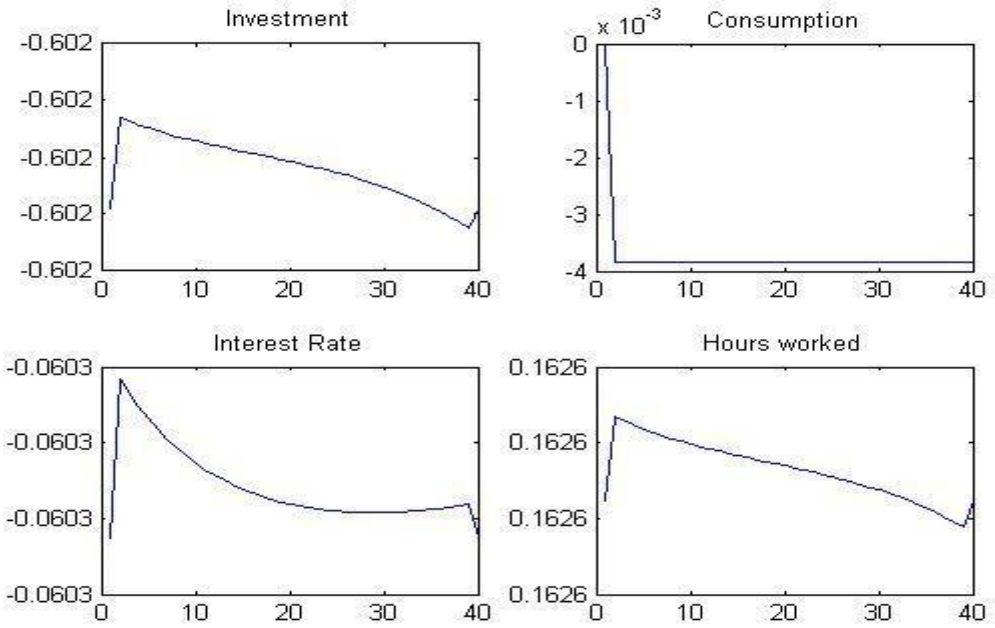

Figure 7. Effects of a consumption tax hike on investment, consumption, interest rate, and hours worked

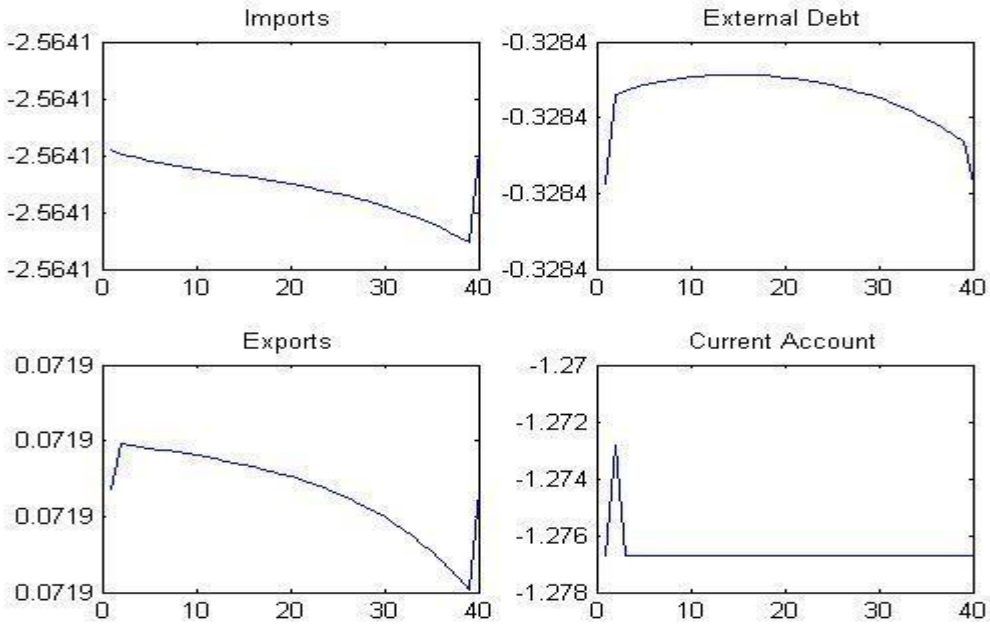

Figure 8. Effects of a consumption tax hike on imports, exports, external debt, and current account

5. Conclusions

In this paper, a reformulation of the theoretical analysis of sustainability of the current account balance is presented from a perspective in which the Marshall-Lerner condition is not necessarily satisfied. We outline four different propositions vis-a-vis the traditional approach that assumes the Marshall-Lerner condition, regarding the positive impact of currency devaluation on the balance of trade. Those propositions have theoretical implications about sustainability of the current account and the external debt. We also make a clear distinction between sustainability of the current account and the intertemporal approach to sustainability of the current account.

To study the sustainability of external debt and current account of the Spanish economy, we use a stochastic dynamic macroeconomic model (DSGE). We have simulated the impact of variations in the exchange rate, cross elasticity between exports and imports and consumption taxation upon a set of macroeconomic variables for the Spanish economy. We have considered fulfillment of the Marshall-Lerner condition. The simulation results indicate that a devaluation of the exchange rate or an increase in consumption taxation would improve the sustainability of external debt and the current account balance. Furthermore, a decrease in cross-elasticity exports-imports would have a similar effect to that of a devaluation of the exchange rate. In the Spanish economy, the Marshall-Lerner condition is met.

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