Foreign debt, distribution, inflation and growth in a SFC model

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Abstract[1]

We present an open economy growth model, using the Stock-Flow Consistent (SFC) methodology. Our contribution is to add the possibility of one country issuing debt denominated in the other country's currency, as well as allowing its firms to borrow from foreign banks. We investigate the effects and interactions that these features have on trade and financial flows, income distribution, foreign debt, fiscal and monetary policy, and try to draw some policy conclusions feasible for current economic problems such as the imbalances in the Eurozone.

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I. Introduction

This paper presents an amendment and extension of Bortz and Storm (2010, B&S from now on), in which we developed a Stock-Flow Consistent (SFC) approach to a two-countries model. SFC models draw on the tradition of Wynne Godley and Marc Lavoie (2007, G&L from now on) in which the income accounting has no "black holes" (Taylor:2008, p. 639). An income or financial inflow to an institutional sector (household, government, banks, and the rest of the world) is made up of outflow(s) from other sectors. The flows are cumulated over time so that the model is "stock-flow consistent". The effects on wealth of gains or losses in asset prices are carefully accounted for, and so are differential inflation rates in prices for goods and services.

In this paper we extend the model of chapter 12 of G&L, adding some other features presented in Daigle & Lavoie (2011), related to exchange rate expectations. We add an investment function based on the accelerator principle; a Phillips curve with a flat middle segment; a productivity growth function based on the change of real wages; and mark-up pricing rules that take into account the behavior of the exchange rate, among other characteristics. We also keep, from B&S, the possibility of one country issuing debt denominated in both currencies, a typical feature of developing economies, therefore the name we assign to the countries in our model: "USA" and "Argentina". Not only that: we include as well foreign lending to firms in a foreign currency.

This type of modeling and these types of assumption seem quite fit in a period in which financial assets represent an increasing multiple of the world GDP (Palma: 2009, p. 834). While most of financial flows are concentrated between industrialized countries, the share that goes and comes from developing countries have a substantial effect in these economies, due to their relative small size, their immature financial development and the important financial liberalization process they have been through in the last decades.

It is also relevant, in our view, to have a neat view of the implications, constrains and misconceived arguments about different exchange rate regimes, in an international context where "currency wars" coexist with a monetary union such as the Eurozone, for example. It is the purpose of this paper to shed a little bit of light on this discussion and to propose measures that improve the wellbeing of the population without disregarding the budget constraints and stock-flow norms that need to be respected.

The focus of this model will be on what happens to the developing country, Argentina (and at times, Greece), leaving aside the effects on USA (or Germany) as long as they are not necessary for the presentation of the argument. The rest of the paper is as follows. Section II outlines the model. Section III presents and interprets the results from our simulation experiments. Section IV draws out the main conclusions, both with a theoretical and a policy view of current developments in the world economy.

II. The model

A. Accounting structure

The model is model is very similar to B&S, but we have added a number of features that deserves a more detailed explanation, so we present it here again. There are two countries ("USA" and "Argentina"), with five sectors in each: Households, firms (which are vertically integrated, so that their inputs are wages and imports), banks, government and the central bank. Even though the later is a public institution, for exposition purposes we prefer to present them separately. Each country produces one good, apt for consumption, investment and export purposes. They trade that good, and also financial assets. The next table presents the balance sheet of each sector in each country.

[INSERT TABLE 1 HERE]

Households allocate their wealth in deposits (*M*), cash (*H*) and short-term bills. There are three types of these bills: the American[2] government issues bills denominated in dollars (B^u); the Argentinean government issues bills denominated in pesos ($B^{\$a}$), that can be acquired by households of both countries, *and* it also issues bills denominated in dollars ($B^{\$u}$), that can only be acquired by residents in the US. All holdings are expressed in the domestic currency, so for instance $B_{hu}^{\$a}.xru$ represents the holdings of Argentinean bills denominated in pesos (the upper-script *$a*) by American households (the lower script *hu*), translated into dollars by multiplying it by the American exchange rate. The same happens with the investment of Argentinean households in US bills ($B_{ha}^{u}.xra$).

[2] In this paper, by "American" we refer to the residents of the USA, which in Spanish are called "estadounidenses", literally "from the United States". Some Mexican friends have told me that even that word is incorrect, but we want to avoid further nationalistic susceptibilities.

The sole asset of firms is their capital stock; their sole liability, the loans they take from banks (Argentinean firms can borrow from Argentinean banks in pesos and from American banks in dollars; loans have a one-period lifespan), and the difference is their net wealth. Banks, in turn, lend to firms, take deposits, invest in bills and take advances from the central bank, according to their circumstances. Their profits accumulate to make their net wealth (this is one of the differences between this paper and B&S). Neither banks nor firms have equity on which they should pay dividends.

The central bank, in turn, issues cash (its liability), grants advances to banks, and buys government bills. In the case of the Argentinean central bank, it also holds American bills ($B^{u}_{cba}.xra$), which constitute its reserves, and a sort of net wealth.

[INSERT TABLE 2 HERE]

Table 2 tracks all the flows that occur in the period. A plus sign represents an income or a source of funds, and a minus sign represents an expenditure or an use of funds. For instance, investment of net wealth in bills is represented by –*B*, while the proceeds of that sale is noted as +*B*, and so forth. We also split the columns of firms and banks in order to highlight the difference between current transactions (which do not affect the capital of the firm) and capital transactions (which do).

The first five rows represent the components of the GDP: consumption, investment, government expenditure, exports and imports. Investment is recorded with a plus sign in the current column (tracing the sale of the capital good) and a minus sign in the capital column (recording the use of funds for patrimonial increase). The following rows register wages payments, tax payments and depreciation allowance, which from the point of view of the firm is a source of funds coming from its own capital, therefore the positive sign. Then come interest payments on bills (to domestic and foreign residents, banks and central banks); on deposits, on loans and on advances. Taking all these movements into account, we can compute profits of firms, banks and central banks. The latter are transferred to their respective government, while banks' and firms' profits are a source of funds for increasing their net wealth.

We can also compute household net wealth but we just present, in the latest rows, the net increment in their holdings of the mentioned financial assets, which from their point of view is a use of their money and thus is recorded with a minus. From the

receiver point of view, it is a source, and we compute it with a plus sign. The same logic holds for banks' and central banks' holdings of bills. We also record the increase in firms' borrowing and banks' lending.

B. List of equations

1. Identities and national accounts

Box 1 presents the equations related to national account and identities. Upper-case variables represent nominal values, lower-case represents real values.

Box 1			
1u)	$s_u =$	$c_u + i_u + g_u + x_u$	Real sales in USA
1a)	$s_a =$	$c_a + i_a + g_a + x_a$	Real sales in Argentina
2u)	$S_u =$	$s_u . p_{su}$	Nominal sales in USA
2a)	$S_a =$	$s_a . p_{sa}$	Nominal sales in Argentina
3u)	$y_u =$	$s_u - im_u$	Real GDP in USA
3a)	$y_a =$	$s_a - im_a$	Real GDP in Argentina
4u)	$Y_u =$	$S_u - IM_u$	Nominal GDP in USA
4a)	$Y_a =$	$S_a - IM_a$	Nominal GDP in Argentina
5u)	$p_{yu} =$	$\frac{Y_u}{y_u}$	GDP price deflator in USA
5a)	$p_{ya} =$	$\frac{Y_a}{y_a}$	GDP price deflator in Argentina
6u)	$p_{mu} =$	$ps_a . xr_u$	Real exports in USA
6a)	$p_{ma} =$	$ps_u . xr_a$	Real exports in Argentina
7u)	$IM_u =$	$im_u . p_{mu}$	Nominal imports in USA
7a)	$IM_a =$	$im_a . p_{ma}$	Nominal imports in Argentina
8u)	$X_u =$	$x_u . p_{su}$	Nominal exports in USA
8a)	$X_a =$	$x_a . p_{sa}$	Nominal exports in Argentina
9u)	$C_u =$	$c_u . p_{su}$	Nominal consumption in USA
9a)	$C_a =$	$c_a . p_{sa}$	Nominal consumption in Argentina
10u)	$I_u =$	$i_u . p_{su}$	Nominal investment in USA
10a)	$I_a =$	$i_a . p_{sa}$	Nominal investment in Argentina
11u)	$G_u =$	$g_u . p_{su}$	Nominal public expenditure in USA
11a)	$G_a =$	$g_a . p_{sa}$	Nominal public expenditure in Argentina

There are not many remarkable features in these equations; perhaps the most important is to note that the price of exports is determined in the export country (eq. 2). Quantities will be determined in the import country, as we will show. Other alternatives that might be possible are: that one country determines the prices of *both* products (by exercising monopsony power or having a lot of influence as a buyer in one market, a not so stretched argument; or some rule that equalizes prices.

2. Firms: prices, inflation and production

Firms price their products based on a mark-up rule on unitary cost including interest payments on loans borrowed last year, as shown in equation 12. The mark up is exogenous, but it can vary according to a change in the exchange rate to reflect international competition. A higher coefficient π_{1u}, in equation 13, would mean that the country is more exposed to international competition, so in case of an appreciation of the exchange rate (a *negative* change in the exchange rate) the mark up absorbs part of the impact and prices do not rise by the extent they should[3]. On the other hand, the only inputs firms use are labor and imports. How are these determined? In box 2 we propose a method.

Box 2			
12u)	$p_{su} =$	$\dfrac{(1+\pi_u).\left(W_u.N_u + IM_u + rl_{u(-1)}.L^u_{us(-1)}\right)}{s_u}$	Sales prices in USA
12a)	$p_{sa} =$	$\dfrac{(1+\pi_a).\begin{pmatrix} W_a.N_a + IM_a + rl_{a(-1)}.L^a_{as(-1)} \\ + rl_{u(-1)}.L^u_{as(-1)}.xra \end{pmatrix}}{s_a}$	Sales prices in Argentina
13u)	$\pi_u =$	$\pi_{0u} + \pi_{1u}.\left(\dfrac{\Delta\left(xr_{u(-1)}\right)}{xr_{u(-1)}}\right)$	Mark up in USA prices
13a)	$\pi_a =$	$\pi_{0a} + \pi_{1a}.\left(\dfrac{\Delta\left(xr_{a(-1)}\right)}{xr_{a(-1)}}\right)$	Mark up in Argentinean prices
14u)	$W_u =$	$W_{u(-1)} + \omega_{0u}.\left(w^T_{u(-1)}.p_{su} - W_{u(-1)}\right)$	Nominal wages in USA
14a)	$W_a =$	$W_{a(-1)} + \omega_{0a}.\left(w^T_{a(-1)}.p_{sa} - W_{a(-1)}\right)$	Nominal wages in Argentina
15u)	$w^T_u =$	$\omega_{1u} + \omega_{2u}.\left(EMP_u + z_{1u}.[EMP^{\#}_u - EMP_u] - z_{2u}.bandb_u + z_{3u}.bandt_u\right)$	Real wage target of workers in USA
15a)	$w^T_a =$	$\omega_{1a} + \omega_{2a}.\left(EMP_a + z_{1a}.[EMP^{\#}_a - EMP_a] - z_{2a}.bandb_a + z_{3u}.bandt_a\right)$	Real wage target of workers in Argentina

[3] This is consistent with stylized facts that show that the pass-through from devaluations top rises is smaller than one, so that the real exchange rate moves together with the nominal, and that usually it is the latter that has the most decisive influence in the former. See Taylor & Talor (2004).

16ui)	$z_{1u} =$	1 if $bandb_u < EMP_u < bandt_u$	
16uii)	$z_{2u} =$	1 if $bandb_u > EMP_u$	
16uiii)	$z_{3u} =$	1 if $EMP_u > bandt_u$	
16ai)	$z_{1a} =$	1 if $bandb_a < EMP_a < bandt_a$	
16aii)	$z_{2a} =$	1 if $bandb_a > EMP_a$	
16aiii)	$z_{3a} =$	1 if $EMP_a > bandt_a$	
17u)	$EMP_u =$	$\Delta(N_{u(-1)}) / N_{u(-1)}$	Rate of change in the employment volume in USA
17a)	$EMP_a =$	$\Delta(N_{a(-1)}) / N_{a(-1)}$	Rate of change in the employment volume in Argentina
18u)	$w_u =$	W_u / p_{su}	Real wages in USA
18a)	$w_a =$	W_a / p_{sa}	Real wages in Argentina
19u)	$N_u =$	y_u / pr_u	Employment volume in USA
19a)	$N_a =$	y_a / pr_a	Employment volume in Argentina
20u)	$pr_u =$	$pr_u . (1 + g_{pru})$	Productivity level in USA
20a)	$pr_a =$	$pr_a . (1 + g_{pra})$	Productivity level in Argentina
21u)	$g_{pru} =$	$q_u . \left(\Delta(w_{u(-1)}) / w_{u(-1)} \right)$	Productivity growth in USA
21a)	$g_{pra} =$	$q_a . \left(\Delta(w_{a(-1)}) / w_{a(-1)} \right)$	Productivity growth in Argentina
22u)	$im_u =$	$\varepsilon_o . \left(\frac{p_{yu(-1)}}{p_{mu(-1)}} \right)^{e_1} . {y_u}^{e_2}$	Real imports in USA
22a)	$im_a =$	$\mu_o . \left(\frac{p_{ya(-1)}}{p_{ma(-1)}} \right)^{\mu_1} . {y_a}^{\mu_2}$	Real imports in Argentina
23u)	$x_u =$	im_a	Import prices in USA
23a)	$x_a =$	im_u	Import prices in Argentina

In our model, workers target a real wage when they demand for nominal wages, which are set at the beginning of the period, so that firms know what their costs are at the moment of setting prices. Wage demands are backward-looking, and workers adjust a portion of the discrepancy between the nominal wage implied in the target (of last period) and the actual nominal wage. What real wage do they target?

Here is where we introduce a rather strange Phillips curve. In our model, the demand of workers reflects the demand pressure from the labor market, exemplified by the rate of change of the employment volume, but in a non-linear way. That's why we use the dummy variables of equations 16. If the aforementioned rate is within certain

bands, whatever its actual value, workers will demand a certain real wage, determined by what they judged a "reasonable" increase in the employment volume (or whatever the reader wants to call it), $EMP^{\#}$, equal to a beautiful 3%. If it is below, then the relationship between real wage demand and employment change is lineal, and the same if it is above the top band. Our Phillips curve has a flat middle segment[4]. Its bands are determined by institutional factors, with scope for the influence of political actors.

The wage bill that enters in the price function is composed by the nominal wage times the employment volume. This is determined by the ratio of real GDP to labor productivity. The latter factor reacts to changes in the real wage, weighted by a coefficient q[5]. The other input in the production process is imports. Equation 22 shows a typical import function, in which the independent variables are the ratio of domestic prices to import prices and real GDP, with ε_1 and μ_1 being the prices elasticities and ε_2 and μ_2 the income elasticities of imports. ε_0 and μ_0, in turn represents the proportion of imports in domestic output, a coefficient liable to change due to development or industrial policies, such as import-substitution industrialization (we will make simulations trying to depict the latter). Like we said, exported quantities are set by the import countries, as shown in equation 23.

3. Firms: Investment, borrowing and profits

Box 3 presents the equations relative to the capital stock, investment decisions, depreciation allowance, borrowing and profits. The capital stock depreciates at a constant rate δ, but it is always covered by investment. The rate of growth of the capital stock is determined by an accelerator effect, plus an exogenous term, as shown in equation 28. Equation 29 presents the capacity utilization rate, and equation 30 firms' net wealth. This is the difference between the nominal capital stock and loans.

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[4] Our equations draw heavily on G&L(2007), specially chapter 11 (p. 386-388), even though in their model labor market pressure is captured by the employment rate. Empirical evidence about the existence of flat segments is found in Barnes & Olivei (2003), Lye & McDonald (2008) and Stock & Watson (2010), among others.

[5] This author is a firm believer in the relevance of the Kaldor-Verdoorn effect, by which aggregate demand has a substantive influence in the productivity growth rate. I can only offer a clumsy excuse for its omission in this model. The Kaldor-Verdoorn effect sets in motion a cumulative growth process, in demand-led growth models such as this one, by incorporating increasing returns to scale. In our model, that implies an unstable, explosive behavior, which deprives it from a steady state. Rowthorn (1981) already noted that the introduction of such feature severely restricts the stability conditions of Kaleckian models, and the same argument applies this time.

Box 3			
24u)	$K_u =$	$k_u . p_{su}$	Nominal capital stock in USA
24a)	$K_a =$	$k_a . p_{sa}$	Nominal capital stock in Argentina
25u)	$k_u =$	$k_{u(-1)} . (1 - \delta_u + gk_u)$	Real capital stock in USA
25a)	$k_a =$	$k_{a(-1)} . (1 - \delta_a + gk_a)$	Real capital stock in Argentina
26u)	$i_u =$	$k_{u(-1)} . (gk_u + \delta_u)$	Real investment in USA
26a)	$i_a =$	$k_{a(-1)} . (gk_a + \delta_a)$	Real investment in Argentina
27u)	$DA_u =$	$\delta_u . K_{u(-1)}$	Depreciation allowance in USA
27a)	$DA_a =$	$\delta_a . K_{a(-1)}$	Depreciation allowance in Argentina
28u)	$gk_u =$	$\gamma_{0u} + \gamma_{1u} . \left(\Delta y_{u(-1)} / y_{u(-1)} \right)$	Growth rate of capital stock in USA
28a)	$gk_a =$	$\gamma_{0a} + \gamma_{1a} . \left(\Delta y_{a(-1)} / y_{a(-1)} \right)$	Growth rate of capital stock in Argentina
29u)	$z_u =$	$\frac{y_u}{k_{u(-1)}}$	Capacity utilization rate in USA
29a)	$z_a =$	$\frac{y_a}{k_{a(-1)}}$	Capacity utilization rate in Argentina
30u)	$V_{fu} =$	$K_u - L^u_{us}$	Net wealth of USA firms
30a)	$V_{fa} =$	$K_a - L^a_{as} - L^u_{as} . xra$	Net wealth of firms in Argentina
31u)	$L^u_{ud} =$	$L^u_{us(-1)} . \left(1 + rl_{u(-1)}\right) + I_u - DA_u - F_{fu(-1)}$	Demand of loans by firms in USA
31ai)	$L_{ad} =$	$L^a_{as(-1)} . \left(1 + rl_{a(-1)}\right) + L^u_{as(-1)} . \left(1 + rl_{u(-1)}\right) . xra + I_a - DA_a - F_{fa}$	Total demand of loans by firms in Argentina
31aii)	$L^a_{ad} =$	$\nu . L_{ad}$	Demand of loans by Argentinean firms to Argentinean banks
31aiii)	$L^u_{ad} =$	$L_{ad} - L^a_{ad}$	Demand of loans by Argentinean firms to USA banks
32u)	$F_{fu} =$	$Y_u - W_u . N_u - rl_{u(-1)} . L^u_{us(-1)} - DA_u$	Profits of firms in USA
32a)	$F_{fa} =$	$Y_a - W_a . N_a - rl_{a(-1)} . L^a_{as(-1)} - rl_{u(-1)} . L^u_{as(-1)} . xra - DA_a$	Profits of firms in Argentina

In turn, firms demand loans to cover their financial requirements (principal and interest of past loans, investments) not covered by the depreciation allowance and their past profits. A distinguished feature of this model is that Argentinean firms can borrow in the Argentinean *and* in the American banking system, in different currencies, as shown in equations (31aii) and (31aiii). Profits are the remnant of the GDP computing the wage bill, interest payments on loans, and the depreciation allowance. Loans borrowed to USA banks (and the interest payments on them) are always registered at the supplied value (i.e. in dollars) and translated into pesos at the current exchange rate.

4. Households: income and consumption

Box 4 presents the equation showing households' regular income, households' disposable income (actual and expected) and consumption decisions. These are taken on real terms, based on some expectation about disposable income and "real" wealth. However, these expectations also have an effect in their allocation of their wealth between different alternatives.

Box 4			
33u)	$Yr_u =$	$W_u.N_u + r_{mu(-1)}.M_{us(-1)} + rb_{u(-1)}.B^{u}_{hus(-1)} + rb_{a(-1)}.B^{\$a}_{hus(-1)}.xru + rb_{u(-1)}.B^{\$u}_{hus(-1)}$	Regular income in USA
33a)	$Yr_a =$	$W_a.N_a + r_{ma(-1)}.M_{as(-1)} + rb_{a(-1)}.B^{a}_{has(-1)} + rb_{u(-1)}.B^{u}_{has(-1)}.xra$	Regular income in Argentina
34u)	$T_u =$	$\theta_u.Yr_u$	Tax payments in USA
34a)	$T_a =$	$\theta_a.Yr_a$	Tax payments in Argentina
35u)	$YD_u =$	$Yr_u + \Delta xru.B^{\$a}_{hus(-1)} - T_u$	Nominal disposable income in USA
35a)	$YD_a =$	$Yr_a + \Delta xra.B^{u}_{has(-1)} - T_a$	Nominal disposable income in Argentina
36u)	$yd_u =$	$\frac{YD_u}{p_{su}}$	Real disposable income in USA
36a)	$yd_a =$	$\frac{YD_a}{p_{sa}}$	Real disposable income in Argentina
37u)	$yd^e_u =$	$yd_{u(-1)} + \beta_u.\left(yd_{u(-1)} - yd^e_{u(-1)}\right)$	Expected real disposable income in USA
37a)	$yd^e_a =$	$yd_{a(-1)} + \beta_a.\left(yd_{a(-1)} - yd^e_{a(-1)}\right)$	Expected real disposable income in Argentina
38u)	$YD^e_u =$	$yd^e_u.p_{su(-1)}$	Expected nominal disposable income in USA
38a)	$YD^e_a =$	$yd^e_a.p_{sa(-1)}$	Expected nominal disposable income in Argentina
39u)	$V_{hu} =$	$V_{hu(-1)} + YD_u - C_u$	Nominal household wealth in USA
39a)	$V_{ha} =$	$V_{ha(-1)} + YD_a - C_a$	Nominal household wealth in Argentina
40u)	$v_{hu} =$	$\frac{V_{hu}}{p_{su}}$	Real household wealth in USA
40a)	$v_{ha} =$	$\frac{V_{ha}}{p_{sa}}$	Real household wealth in Argentina
41u)	$V^e_{hu} =$	$V_{hu(-1)} + YD^e_u - C_u$	Expected nominal household wealth in USA
41a)	$V^e_{ha} =$	$V_{ha(-1)} + YD^e_a - C_a$	Expected nominal household wealth in Argentina
42u)	$c_u =$	$\alpha_{1u}.yd^e_u + \alpha_{2u}.v_{hu(-1)}$	Real consumption in USA
42a)	$c_a =$	$\alpha_{1a}.yd^e_a + \alpha_{2a}.v_{ha(-1)}$	Real consumption in Argentina

Taxes are levied on regular income, and once deducted (and adding the capital gains due to exchange rate movements), we get the nominal disposable income. Notice that the holdings of Argentinean bills denominated in dollars do *not* generate a capital gain to American holders by exchange rate movements. Dividing it by sales price, we get real disposable income[6]. However, households do not base their consumption decisions directly (and entirely) on it, but rather on the *expected* real disposable income. This is formed by the actual past value and a term that corrects (with a certain speed of adjustment β past mistakes. They also consume a proportion (rather low) of their past real wealth. With expected disposable income and consumption, we can have an estimate of households' *expected wealth*, that they will invest in different assets. But before that we want to highlight an important factor. In the steady state, with no mistaken expectations, there is a stable relation between wealth and disposable income, equal to: $V_h^* = \alpha_3 . YD^*$, with $\alpha_3 = \frac{(1-\alpha_1)}{[1-\left(\frac{1}{1+gr}\right)+\left(\frac{\alpha_2}{1+gr}\right)]}$, where gr is the growth rate of disposable income and consumption. This long-run *norm* will have a substantial effect on *government debt*, as we will show later in the simulations. A detailed analysis is found in G&L (2007), appendix 3.4.

5. Households: investment, expectations, risk

Having decided how much they will consume, and how much they will save, it's time now for households to invest their wealth. Since all financial assets last one period, there is no impediment for them to reallocate their whole wealth, not just new savings. Portfolio allocation is done according to Tobinesque rules, in which agents compare different rates of return plus the relevant risk of the specific asset. In this case, there are two: currency risk, which can cause capital gains or losses according to exchange rate movements; and sovereign risk, which questions directly the repayment capacity of the debtor, the government. However, a government that borrows in the currency it issues does not have any sovereign risk: it just has currency risk. Sovereign risk is relevant for countries that have debt denominated in another currency. In our model, sovereign risk is relevant only relative to Argentinean bills denominated in dollars. But we do not only

[6] For simplicity we omit the effect of past inflation on real wealth.

distinguish different types of risk, we also distinguish different types of traders, following a growing literature on actual exchange market behavior[7]. Box 5 summarizes.

Box 5			
43ui)	$M_{ud}^{n} =$	$V_{hu}^{e}.(\lambda_{10} + \lambda_{11}.rm_u + \lambda_{12}.rb_u + \lambda_{13}.[rb_a + dxru^e] + \lambda_{14}.[rb_u - \varphi])$	
43uii)	$B_{hud}^{u} =$	$V_{hu}^{e}.(\lambda_{20} + \lambda_{21}.rm_u + \lambda_{22}.rb_u + \lambda_{23}.[rb_a + dxru^e] + \lambda_{24}.[rb_u - \varphi])$	
43uiii)	$B_{hud}^{\$a} =$	$V_{hu}^{e}.(\lambda_{30} + \lambda_{31}.rm_u + \lambda_{32}.rb_u + \lambda_{33}.[rb_a + dxru^e] + \lambda_{34}.[rb_u - \varphi])$	
43uiv)	$B_{hud}^{\$u} =$	$V_{hu}^{e}.(\lambda_{40} + \lambda_{41}.rm_u + \lambda_{42}.rb_u + \lambda_{43}.[rb_a + dxru^e] + \lambda_{44}.[rb_u - \varphi])$	
43uv)	$H_{ud}^{n} =$	$V_{hu} - M_{ud}^{n} - B_{hud}^{u} - B_{hud}^{\$a} - B_{hud}^{\$u}$	
43ai)	$M_{ad}^{n} =$	$V_{ha}^{e}.(\lambda_{50} + \lambda_{51}.rm_a + \lambda_{52}.rb_a + \lambda_{53}.[rb_u + dxra^e])$	
43aii)	$B_{had}^{a} =$	$V_{ha}^{e}.(\lambda_{60} + \lambda_{61}.rm_a + \lambda_{62}.rb_a + \lambda_{63}.[rb_a + dxru^e])$	
43aiii)	$B_{had}^{u} =$	$V_{ha}^{e}.(\lambda_{70} + \lambda_{71}.rm_a + \lambda_{72}.rb_a + \lambda_{73}.[rb_a + dxru^e])$	
43aiv)	$H_{ad}^{n} =$	$V_{ha} - M_{ad}^{n} - B_{had}^{u} - B_{had}^{a}$	
44u)	$H_{ud} =$	$H_{ud}^{n}.z_{4u}$	Actual demand of cash in USA
44a)	$H_{ad} =$	$H_{ad}^{n}.z_{4a}$	Actual demand of cash in Argentina
45u)	$z_{4u} =$	1 if $H_{ud}^{n} > 0$	
45a)	$z_{4a} =$	1 if $H_{ad}^{n} > 0$	
46u)	$M_{ud} =$	$M_{ud}^{n}.z_{4u} + \left(V_{hu} - B_{hud}^{u} - B_{hud}^{\$a} - B_{hud}^{\$u}\right).z_{5u}$	Actual demand of deposits in USA
46a)	$M_{ad} =$	$M_{ad}^{n}.z_{4a} + (V_{ha} - B_{had}^{u} - B_{had}^{a}).z_{5a}$	Actual demand of deposits in Argentina
47u)	$z_{5u} =$	1 if $H_{ud}^{n} < 0$	
47a)	$z_{5a} =$	1 if $H_{ad}^{n} < 0$	
48u)	$dxru^e =$	$-dxra^e$	Expected change in USA ER
48ai)	$dxra^e =$	$\chi^f.dxra^{ef} + \chi^c.dxra^{ec}$	Expected change in Argentinean ER
48aii)	$dxra^{ef} =$	$\zeta.\left(\frac{xra^{\#} - xra_{(-1)}}{xra_{(-1)}}\right)$	Expected change in the ER by "fundamentalist" traders
48aiii	$dxra^{ec} =$	$\xi.\left(\Delta(xra_{(-1)}) / xra_{(-1)}\right)$	Expected change in the ER by "chartist" traders
49)	$\rho =$	$\left(B_{hud(-1)}^{\$u} / Y_{a(-1)}.xru_{(-1)}\right)$	Debt in dollars to GDP in dollars ratio in Argentina
50)	$\phi =$	$\kappa.\left(\Delta(\rho) / \rho\right)$	Change in ρ

The numerous equations 43 describe portfolio allocation. All the values of the λ coefficients must respect the adding-up constraints set in G&L (2007), p. 328-329. And just like them (p. 325-328), we also have an implicit demand for money which has a

[7] Just to mention a few, we recommend the work of Harvey (1993), Moosa (2003, chapter 8), De Grauwe & Grimaldi (2006, chapter 2), and Rossi (2010).

negative rate of return equal to the inflation rate, incorporated in the values assigned to the λ. But there are other features that require explanations.

First, a clarification regarding the notation is due. The variable $B_{hud}^{\$a}$ represents the demand of Argentinean bills denominated in pesos ("*$a*") by American households ("*hud*"), while variable $B_{hud}^{\$u}$ represents the demand, by the same households, of Argentinean bills denominated in dollars ("$\$u$"). It's just unfortunate that dollars and pesos share the same symbol. Second, equations (43ui), (43uv), (43ai) and (43aiv) show *notional* demands for cash and deposits; that's why they have an upper-script "*n*". Why do we split between *notional* and *actual* demands for these two assets in particular? The explanation lies in the first term in the portfolio equations: households allocate their *expected* wealth, with cash demand being the buffer stock that absorbs mistaken expectations between actual and expected wealth. But at times these divergences can be so huge that the notional demand for cash becomes *negative*. For that case, equations (44) to (47) assure that families decrease their deposits to cover the difference. The second term in equation (46) would be smaller than the value resulting from equations (43ui) and (43ai).

Third, expectations and risk. Our modeling of expectation formation regarding the future movement of the exchange rate follows Lavoie & Daigle (2011). In the exchange markets there is a proportion of "fundamentalist" traders that act according to some rule and a proportion of chartists traders, who follow past movements trying to predict future ones. In the case of the former, they expect the exchange rate to move according to the divergence between its past value and some benchmark, $xra^{\#}$. We do not believe this value to arise from an equilibrium process; instead we think it is a market convention. This separation, between fundamentalists and chartists, is likely to create some cyclical behavior, together with the special Phillips curve we use.

The last two equations represent risk associated to the holding of Argentinean bills denominated in dollars, a currency that the government does not print. In a simple fashion, we say that that risk moves in line (at a given proportion) with the rate of change in the ratio of (past) Argentina's foreign debt denominated in dollars to its nominal GDP also expressed in dollars. We believe this is a fairly realistic argument, that explains better than others some facts of the European crisis: countries with lower debt may be more risky than others with higher, if their position is speedily deteriorating.

6. Commercial banks

The behavior of commercial banks in this model is pretty simple. They grant all the loans that firms demand them, and accept all the deposits households make, charging a mark up on the former and thus making a profit. The difference between deposits plus accumulated profits (their net wealth) and loans is invested in bills, in case it is positive, or is cover with advances from the central bank, in case it is negative. In this case, the distinction between notional and actual demands is also relevant. This institutional framework is more similar to the Anglo-Saxon banking system than to the European. All this is shown in Box 6.

Box 6			
51u)	$M_{us} =$	M_{ud}	Supply of deposits by banks in USA
51a)	$M_{as} =$	M_{ad}	Supply of deposits by banks in Argentina
52ui)	$L^u_{us} =$	L^u_{ud}	Supply of loans to American firms
52uii)	$L^u_{as} =$	$L^u_{ad}.xru$	Supply of loans by American banks to Argentinean firms
52a)	$L^a_{as} =$	L^a_{ad}	Supply of loans by Argentinean banks to Argentinean firms
53u)	$B^{nu}_{bud} =$	$M_{us} + V_{bu} - L^u_{as} - L^u_{us}$	Notional demand of bills by banks in USA
53a)	$B^{na}_{bad} =$	$M_{as} + V_{ba} - L^a_{as}$	Notional demand of bills by banks in Argentina
54u)	$B^u_{bud} =$	$B^{nu}_{bud}.z_{6u}$	Actual demand of bills by banks in USA
54a)	$B^a_{bad} =$	$B^{na}_{bad}.z_{6a}$	Actual demand of bills by banks in Argentina
55u)	$z_{6u} =$	$1 \text{ if } B^{nu}_{bud} > 0$	
55a)	$z_{6a} =$	$1 \text{ if } B^{na}_{bad} > 0$	
56u)	$A_{ud} =$	$(L^u_{as} + L^u_{us} - M_{us} - V_{bu}).z_{7u}$	Demand of advances to the Central Bank in USA
56a)	$A_{ad} =$	$(L^a_{as} - M_{as} - V_{ba}).z_{7a}$	Demand of advances to the Central Bank in Argentina
57u)	$z_{7u} =$	$1 \text{ if } B^{nu}_{bud} < 0$	
57a)	$z_{7a} =$	$1 \text{ if } B^{na}_{bad} < 0$	
58u)	$F_{bu} =$	$rl_{u(-1)}.L^u_{us(-1)} + rl_{u(-1)}.L^u_{as(-1)} + rb_{u(-1)}.B^u_{bus(-1)} - rm_{u(-1)}.M_{us(-1)} - ra_{u(-1)}.A_{us(-1)}$	Banks' profits in USA
58a)	$F_{ba} =$	$rl_{a(-1)}.L^a_{as(-1)} + rb_{a(-1)}.B^a_{has(-1)} - rm_{a(-1)}.M_{as(-1)} - ra_{a(-1)}.A_{as(-1)}$	Banks' profits in Argentina
59u)	$V_{bu} =$	$V_{bu(-1)} + F_{bu}$	Banks' net wealth in USA
59a)	$V_{ba} =$	$V_{ba(-1)} + F_{ba}$	Banks' net wealth in Argentina

7. Interest rates

This is as good moment as any to present the different interest rates that take part in this model. The base rate, on government bills, is set by the central bank. Banks applied a mark up over it to set the loans interest rate. The advances interest rate carries a penalty, though lower than banks' mark up. The deposit rate is equal to the bill rate. This is all shown in Box 7.

Box 7			
60u)	$rl_u =$	$rb_u.(1 + \iota_u)$	Nominal interest rate on loans in dollars
60a)	$r_{la} =$	$rb_a.(1 + \iota_a)$	Nominal interest rate on loans in pesos
61u)	$r_{mu} =$	r_{bu}	Interest rates on deposits in dollars
61a)	$r_{ma} =$	r_{ba}	Interest rates on deposits in pesos
62u)	$ra_u =$	$r_{bu}.(1 + \upsilon_u)$	Interest rates on bills in dollars
62a)	$ra_a =$	$r_{ba}.(1 + \upsilon_a)$	Interest rate on bills in pesos

8. Governments and bill supplies

In box 1, we have already mentioned nominal government expenditure. Real government expenditure grows at a fixed rate σ. Central banks' profits are distributed back to their respective governments. Next table, box 8, presents the equations showing this and bills supplies to households and banks. Equation (66u) has a special mark (FX) since it will be one of the equations defining a fixed exchange rate closure. When we talk about flexible exchange rates and the central bank, they will adapt another form.

Box 8			
63u)	$g_u =$	$g_{u(-1)}.(1 + \sigma_u)$	Real government expenditure in USA
63a)	$g_a =$	$g_{a(-1)}.(1 + \sigma_a)$	Real government expenditure in Argentina
64u)	$B_s^u =$	$B_{s(-1)}^u + G_u - T_u + r_{bu(-1)}.B_{s(-1)}^u - F_{cbu}$	Supply of bills of the USA government
64ai)	$B_s^a =$	$B_{s(-1)}^{\$a}.\left(1 + r_{ba(-1)}\right) + B_{hud(-1)}^{\$u}.\left(1 + r_{bu(-1)}\right).xra + G_a - T_a - F_{cba}$	Total supply of bills of the Argentinean government
64aii)	$B_s^{\$a} =$	$B_{has}^a + B_{hus}^{\$a} + B_{bas}^a + B_{cbas}^{\$a}$	Supply of bills in pesos
65u)	$B_{hus}^u =$	B_{hud}^u	Supply of USA bills to USA residents
65a)	$B_{has}^a =$	B_{had}^a	Supply of Argentinean bills in pesos to Argentinean residents
66uFX)	$B_{has}^u =$	$B_{had}^u.xru$	Supply of USA bills to Argentinean residents

66ai)	$B^{\$a}_{hus} =$	$B^{\$a}_{hud}.xra$	Supply of Argentinean bills in pesos to USA residents
66aii)	$B^{\$u}_{hus} =$	$B^{\$u}_{hud}.xra$	Supply of Argentinean bills in dollars to USA residents
67u)	$B^{u}_{bus} =$	B^{u}_{bud}	Supply of USA bills to USA banks
67a)	$B^{a}_{bas} =$	B^{a}_{bad}	Supply of Argentinean bills to Argentinean banks

9. Central banks and exchange rates

The following equations present the demand and supply functions related to the central bank. We follow the presentation of G&L (2007), chapter 12.

Box 9			
68u)	$H_{us} =$	H_{ud}	Supply of cash in USA
68a)	$H_{as} =$	H_{ad}	Supply of cash in Argentina
69u)	$A_{us} =$	A_{us}	Supply of advances in USA
69a)	$A_{ad} =$	A_{ad}	Supply of advances in Argentina
70u)	$B^{u}_{cbud} =$	$H_{us} - A_{us}$	Demand of bills by the USA central bank
70a)	$B^{a}_{cbad} =$	$B^{a}_{cbad(-1)} + \Delta(H_{as}) - \Delta(B^{u}_{cbas}).xra$	Demand of bills in pesos by the Argentinean central bank
71u)	$B^{u}_{cbus} =$	B^{u}_{cbud}	Demand of bills by the USA central bank
71a)	$B^{a}_{cbas} =$	B^{a}_{cbad}	Demand of bills by the Argentinean central bank
72uFX)	$B^{u}_{cbas} =$	$B^{u}_{s} - B^{u}_{hus} - B^{u}_{bus} - B^{u}_{cbus} - B^{u}_{has}$	Supply of bills in dollars to the Argentinean central bank
72a)	$B^{u}_{cbad} =$	$B^{u}_{cbas}.xra$	Demand of bills in dollars by the Argentinean central bank
73a)	$xra =$	xru	Argentinean exchange rate
73uFX)	$xru =$	$constant$	USA exchange rate
74u)	$F_{cbu} =$	$rb_{u(-1)}.B^{u}_{cbus(-1)} + ra_{u(-1)}.A_{us(-1)}$	Profits of the American central bank
74a)	$F_{cba} =$	$r_{ba(-1)}.B^{a}_{cbas(-1)} + ra_{a(-1)}.A_{as(-1)} + rb_{u(-1)}.B^{u}_{cbas(-1)}.xra$	Profits of the Argentinean central bank

Equations to notice: in equation (70a), the demand of bills is presented in differences, instead of levels, because there exists the possibility of capital gains due to exchange rate movement (G&L: 461). Equation (72u) shows the essence of a fixed exchange rate: the Argentinean central bank must buy all the American bills left in the market if it wants to sustain a given exchange rate. That's why its demand is determined by its supply. There is a redundant equation, however: the Argentinean government supplies the residual bills in pesos (those not bought by banks or households) to the

central bank. But there is already one such equation: equation (71a). Since the same variable cannot appear twice in the LHS of the equation, it becomes redundant in the model, but its fulfillment is assured by the tight accounting that we went through: there is no other way. But these equations do not remain the same if we want to model a flexible exchange rate. For that, we need the following closure:

Box 9FL			
66uFL)	$B^u_{has} =$	$B^u_s - B^u_{hus} - B^u_{bus} - B^u_{cbus} - B^u_{cbas}$	Supply of bills in dollars to the Argentinean central bank
72uFL)	$B^u_{cbas} =$	$constant$	Demand of bills in dollars by the Argentinean central bank
73uFL)	$xru =$	B^u_{has} / B^u_{had}	Exchange rate in USA

In this closure, demand and supply of American bills to Argentinean households are determined independently, and it is the role of the exchange rate to adjust in order to equalize them. We have inverted equation (66uFX). However, this does not mean that these two are the sole factor in the determination of the exchange rate: all the variables play a role here. Imports and exports that affect income, GDP growth that affect investment and loans, interest rate payments. That's the beauty of stock-flow models: it is a macroeconomic structural model, with no account holes, and with a simultaneous and consistent determination of flows, stocks and prices. The disadvantage is that in models this large stability analysis becomes almost impossible, and one can only infer about it by reading actual tendencies and not by looking at mathematical conditions. To sum up, we present the current account and the capital account of the balance of payments, which includes foreign reserve movements (what G&L call "KABOSA", a capital account that includes the Official Settlement Account). A word of caution is required here: since in the flexible exchange rate regime there are possibilities of capital gains on Argentinean foreign reserves (a constant stock of US bills in dollars) due to exchange rate movements, the balance of payments is not equal to zero by definition (G&L: 453).

Box 10		
74u)	$CA_u = X_u - IM_u + r_{ba(-1)}.B^{\$a}_{hus(-1)}.xru + r_{bu(-1)}.B^{\$u}_{hud(-1)} + r_{lu(-1)}.L^{u}_{as(-1)} - r_{bu(-1)}.B^{u}_{has(-1)} - r_{bu(-1)}.B^{u}_{cbas(-1)})$	Current account of USA
74a)	$CA_a = X_a - IM_a + r_{bu(-1)}.\left(B^{u}_{has(-1)} + B^{u}_{cbas(-1)}\right).xra - r_{ba(-1)}.B^{\$a}_{hus(-1)} - r_{bu(-1)}.B^{\$u}_{hud(-1)}.xra - r_{lu(-1)}.L^{u}_{as(-1)}.xra$	Current account of Argentina
75u)	$KA_u = \Delta B^{u}_{has} + \Delta B^{u}_{cbas} - \Delta B^{\$a}_{hus}.xru - \Delta B^{\$u}_{hud} - \Delta L^{u}_{as}$	Capital Account of USA
75a)	$KA_a = \Delta B^{\$a}_{hus} + \Delta B^{\$u}_{hud}.xra - \Delta B^{u}_{has}.xra - \Delta B^{u}_{cbas}.xra - \Delta L^{u}_{as}.xra$	Capital account of Argentina

III. Simulations

A. Consumption and savings

In the first experiment, we increase 10% the coefficient α_{1a}, that represents the propensity to consume of Argentinean households out of their disposable income. As the graphic shows, and as expected in a model that imposes no constraint on the supply side, we observe that real GDP is higher after the change, the short term impact being higher than in the long run, but still positive. However, we do observe a fall in real and nominal household wealth, which slightly counteracts the increased propensity to consume. In other words, the coefficient α_3 becomes smaller. But that is not the only implication.

[INSERT GRAPH 1 HERE]

Higher consumption and less savings is matched, *ceteris paribus*, by two features: one is a deterioration in the external performance, and we do observe the deterioration in the trade and current account of Argentina, attenuated in the flexible ER regime precisely by the depreciation of the peso (though this not mean that the exchange rate moves necessarily in the same direction as the current account, as we'll show later). The other big important feature is the fall in the public sector borrowing requirements of the Argentinean government, which is basically the issue of new bills. We therefore have a lower ratio of debt to GDP (though foreign debt denominated in dollars are a higher proportion of total debt). This is shown in graph 2.

[INSERT GRAPH 2 HERE]

B. Fiscal policy

We have a good preamble to look at the effects of a higher rate of growth of public expenditures. The model is very sensible to changes in this parameter. We

increased the coefficients σ_a and σ_u (the one that concerns us in this opportunity) 5% in the case of a fixed ER regime and 4% in the case of the flexible regime, and even in the latter case, in what refers to the American coefficient, we did not have values for the last 15 years, though the sample was big enough to draw some conclusions.

Both increases are expansionary for the country that implements them, and for the other as well, due to the stimulus for imports. However, the net impact on the balance of trade depends on the ER regime. Graph 3 shows the movement of real GDP compared to the baseline in the case of a fiscal expansion in Argentina.

[INSERT GRAPH 3 HERE]

The flexible ER regime reflects higher output, due to an improved balance of trade, which in turn is caused by a depreciation of the exchange rate. The rate of growth of capital stock also has the same behavior: in both cases it is positive, but it is greater in the flexible ER regime. Instead, real consumption is slightly higher in the fixed ER than in the other. The reason: sustained depreciation increases the mark up and lower real wages, something ruled out in our fixed ER model. However, given the parameters of our simulations and the magnitude of the changes, the fall in the real wage is very small and the trade balance impact prevails over consumption. The opposite of a depreciation is a run-out of foreign reserves in Argentina, in the fixed ER case. Our model corroborates the positive impact of expansionary fiscal policies, and it also highlights the ancient wisdom of the Chinese government, perhaps ever since the Han dynasty, in *not* letting its exchange rate to float or appreciate, increasing instead its foreign reserves in the necessary amount, however large it might seem (B&S: 20). But there is more to conclude here.

In latter times financial blogs have started to use as a guide to estimate the future movements of corporate profits the "Kaleckian equation", which basically says that profits are equal to corporate investment minus household's savings plus the budget deficit plus the current account surplus (Kalecki: 1971). Can we observe something like that here? Paraphrasing Barack Obama (and many others before), yes, we can. Graph 4 shows the evolution of the loans to firms' net wealth ratio, and the ratio (net of depreciation allowance) profits to net wealth. Compared to the baseline, we observe the expected result: the first ratio goes down, the second goes up. Also, the former ratio falls even more in the flexible ER regime than in the fixed, even though the magnitude

of the change was lower. We attribute this to the increase in the mark up and the higher price level observed when the ER is allowed to float.

[INSERT GRAPH 4 HERE]

C. **Monetary policy: interest rates**

In what refers to monetary policy, we conducted basically three experiments: we raised the interest rate on American bills (and Argentinean bills denominated in dollars), we raised the interest rate on bills denominated in pesos, and we raised both at the same time. In the first stage, we will present the results on the second experiment (an increase of 50 bps in r_{ba} from 3% to 3.5%. The very short run movements are as expected, the medium to longer run not, but they do offer a lot of insight, notwithstanding. A supply and demand story, it is. Let's start with the fixed ER regime. Graph 5a presents selected variables, and their reaction to such an increase, during the first 5 years. We beg the reader to stay with us during the explanation, because it is a difficult graph to read.

[INSERT GRAPH 5a HERE]

Argentinean PSBR escalates, with a small alleviation in the second period, as interest rates take a greater tall in the government budget. The demand for bills in pesos, from American and Argentinean households increases slightly, except for the latter in 1961. The American demand for USA bills decreases also in a low magnitude initially, though latter it will grow together with household wealth. What is steadily declining is the USA PSBR. Greater interest payments to USA households imply greater income, and smaller deficits (this effect is actual small: the American debt is barely 2% lower in the last period of the simulation compared to the baseline). The supply of American bills goes down, and the supply of Argentinean bills goes up. In the first year, with the increase in the demand of Argentinean bills (and the small decline in the demand of American bills) foreign reserves increase, but latter they go down as well. The Argentinean central bank sells the dollars in exchange for pesos, but now there are less pesos in circulation that the required amount to keep the interest rate at the desired level, so the central bank *buys the bills the government is issuing with the pesos required to keep the interest rate*. That is how the increased PSBR is "financed". However implausible this might seem (and it does seem unrealistic to us), there is one good, relevant and important feature: the outflow of foreign reserves, even in a fixed exchange rate regime, *need not go together with a reduction in the domestic money supply*. As

long as Argentina has (enough) foreign reserves, this process can go for ever. Mundell-Fleming does not apply. A can have and sustain a domestic interest rate different from the international one. The key is that there is imperfect substitution between the assets (Lavoie: 2000), that investors do not see them as equal or competing with others. Capital controls might not be theoretically necessary to accomplish this, there are none in our model, but they help, and realistically they are indispensable, in my view.

In a flexible ER regime, in 1961 we have an appreciated ER, just like in the fixed ER closure we had an initial increase in reserves. But in that period the effects are different: this causes a capital gain to the government lowering (in one period) its borrowing requirements, together with the fall in the demand for bills denominated in dollars. In a sense, it actually achieves what it tried to do. But this only lasts for one period, in this simulation. Graph 5b shows it.

[INSERT GRAPH 5b HERE]

The attentive reader may ask what happens with the expectations about the movement of the exchange rate. Well, there are two cases. In the fixed ER closure, given that we chose to set an exchange rate level equal to what fundamentalist traders think it should be, we don't have expectations (do not desperate, be patient, believe in us, we'll show its effects in another simulation). In the flexible exchange rate regime, the values obtained for the baseline are below the "fundamental" ER. As the actual ER depreciates in the simulation, it gets closer to the fundamental value, and expectations about its future movement becomes more optimistic (i.e. the expectation of depreciation is reduced, though in an attenuated way because of the chartist traders).

Some more remarks are important in this paragraph. The impact of an increase in the Argentinean interest rate on output, given our model, is slightly positive, less than 2% higher in the last period compared to the baseline (in the fixed ER closure, it is 1% higher) because interest receipts increase disposable income and with it consumption. In the flexible ER we should also add the impact of a positive trade balance. We did not include a negative check in the investment function; that remains for future work.

Finally, what happens when such increase in the Argentinean interest rate goes hand in hand with an increase in the American interest rate? Sparing the reader more complicated graphics, we can confidently tell her/him that, given the parameters of our

model both PSBR (American and Argentinean) go up. The Argentinean government even has to pay more for its bills denominated in dollars. The behavior we observed previously is attenuated: depreciation is more nuanced, and Argentina even has a gain in its foreign reserves. Due to the cost effect of interest payments on loans (that also raise together with the base rate) the real wage is somewhat decreased along the way. This counteracts the effect of interest receipts for a long time, specially the fixed ER closure.

D. **Portfolio decisions**

What happens when we shock the portfolio decisions of households, the proportion in which they allocate their wealth among different assets? For example, what happens when American households fear about the evolution of the Argentinean economy and increase their holdings of domestic bills at the expense of the others? And what if on top of this they have doubts on its solvency in dollars and the coefficient κ rises? In the fixed ER regime, private financial flows to Argentina fall, and so do foreign reserves. However, like we mentioned before, the "rules of the game" of a gold standard do not apply: nobody plays by the rules. Domestic credit is increased by the central bank, as long as it has foreign reserves to defend the exchange rate. We'll show later what happens when it does *not* defend the exchange rate. So far, the situation is not good. But what about in a flexible ER?

Several things are noticeable here. First, yes, the exchange rate depreciates. Does the story end there? No. Depreciation has certain effects on Argentina, and it is interesting to track them. In this simulation, depreciation increases prices in Argentina and decreases them in USA, via two effects: increasing (decreasing) the cost of imports (and in the Argentinean case, the burden of interest payments on foreign loans); and it increases (decreases) the mark up. Profits in Argentina increase, in USA disappear. Still, having decided in real terms how much to invest, price increase force Argentinean firms to borrow more, and American firm to borrow less, which means that Argentinean banks demand less bills, and American banks demand more. Real consumption also stays the same, but nominal consumption increases (even though the real wage falls). Looking at equations 39 and 41, one would assume that *both* expected and actual nominal wealth fall in tandem (remember, expectations about disposable income are backward-looking in this model, and so they do not change initially). But that doesn't happen. Expected nominal wealth does fall, and with it the Argentinean demand for

bills and deposits. But depreciation also causes a capital gain on their holdings of foreign bills (and the opposite goes for USA households), which increases their *actual* disposable income. In the first period, therefore, they increase their cash holdings, the central bank buying the bills that foreigners, locals and banks do not. This is how the interest rate is kept at its target. In the USA, on the contrary, the central bank sells the bills the agents demand. The money supply is determined by the preference of the agents, not set by the central bank[8].

The capital account surplus is reduced as well as the current account deficit. PSBR in Argentina rely more on domestic financing rather than foreign. The Argentinean real wage takes a big hit initially, which impacts on real consumption, but as the exchange rate stabilize, it returns to normality, though at a higher price level. What happens with the expectations about the exchange rate? Well, keeping in mind that a positive $dxra^e$ implies that the Argentinean ER is expected to depreciate, that variable *diminishes*. Initially, chartist traders increase substantially their expectations of a depreciation, but the opposite happens with the fundamentalists: now the exchange rate is at a higher level, close to (or above of) the value they judge as appropriate. A similar story happens when there is a capital flight from Argentina households.

But it is also interesting to see what happens when *firms* change their funding decisions. Suppose Argentinean firms start to borrow more in USA. In the simulation with the flexible ER regime, we increased that proportion from 20% to 30% of their total borrowing requirements, while in the fixed ER closure we raised it to a 50%. Let's start with the latter. Spoiler: yes, the current account of Argentina deteriorates. No, demand does not deteriorate and prices do not change. Remember, the ER does not move. But what happens to the banking sector and private debt is quite revealing. Graph 6 shows selected variables of the balance sheet of American banks. The green and the light blue line, corresponding to banks' profits and banks' net wealth, should be read in the secondary axis (RHS). The others, in the RHS axis.

[INSERT GRAPH 6 HERE]

The increase in borrowing from Argentinean firms force US banks to sell all their holdings of bills. They would sell even more of what they have (the red line,

[8] Lavoie (2001). For a study of the gold standard period previous to the First World War, look Bloomfield: 1959.

representing *notional* demand of bills, goes into negativity)! But since they cannot do that, they are forced to ask for advances from the central bank to fund their lending (the pink line that goes up initially, and then returns to zero). The central bank accepts that, but in order to keep its balance sheet it's forced to sell the bills it holds. Who buys them? The *Argentinean* central bank, of course. It must. Foreign reserves increase substantially, and their rhythm only is reduced when banks start to invest their increased profits in bills, the equivalent of parking it in the central bank, as we see nowadays. That's why banks' profit and net wealth increase: lending goes up. The opposite happens in Argentina. Lending goes down, pulling profits and net wealth. They invest what they don't lend in bills, which are sold by the central bank to sterilize its purchase of foreign reserves. I believe that this situation represents quite appropriately the run up to the Asian crisis, as told by Kregel (1998): an explosion of foreign borrowing in a context of stable ER and increased reserves, triggered by financial liberalization in those countries and increased reserves. When something went wrong, those reserves weren't enough, because private debt had also escalated.

In the flexible exchange rate, the situation is as you should expect by now. The exchange rate appreciates, there is an inflow of capital, and the current account deteriorates, but not as much as in the fixed ER closure. American banks are also forced to borrow from their central bank in order to keep with their lending.

E. **Devaluations: actual and expected**

When Argentina devalues, households face two different effects: on one side, their real wage is diminished. On the other, they enjoy a once-in-a-lifetime capital gain on holdings of foreign bills (not actually true, of course, this Argentinean author is well aware of the repetitiveness of devaluations, but in our little model this episode occurs once in 100 years). In the real world, the people who suffer mostly from the former are not the ones who enjoy the latter. What prevails in the outcome? Graphic 7 shows us.

[INSERT GRAPH 7 HERE]

The graphic shows us that real disposable income spikes first, driving later consumption with it. Remember that expected disposable income is backward looking. But real wealth fell due to the impact of a higher price level on the other assets. In the medium run, disposable income realigns itself with the real wage, albeit in a somewhat

cyclical fashion due to the correction mechanism in the expectations described in equation 37. Real exports increase, foreign reserves increase, bills demands by American households and the Fed decline.

But what if a devaluation is expected but does not occur? Assume that $xra^{\#}$ increases 10%: fundamentalist traders now believe that the Argentinean ER is worth 10% less. The demand for bills denominated in pesos falls, and the demand for bills denominated in dollars, issued *both* by the American and the Argentinean government increases. This is not corrected over time, since neither the exchange rate nor the value judged by the trader change. The impact of the higher demand for American bills is indeed the responsible for the fall in foreign reserves. And in the flexible ER regime? It does translate into a small depreciation of the peso, which slightly *reduces* the PSBR of the American government. Argentineans demand more American bills, but they demand represents less (in marginal terms, admittedly) and so interest payments fall. Argentinean real exports increase a bit, and so firms profits.

F. **Distribution issues**

In our model, does a higher wage demand (say, a higher ω_1) brings higher growth? No. Does a higher mark up (say, a higher π_0) cause higher growth? Neither. Both together? No. The following graphs show Argentinean real GDP and its (real) components, other than real public expenditure, for the first 5 years after the change (in 1960), in the case of higher wage demand and higher mark up. The timing of changes will show that exports are the main driving force in this context.

[INSERT GRAPH 8a HERE]

[INSERT GRAPH 8b HERE]

[INSERT GRAPH 9a HERE]

[INSERT GRAPH 9b HERE]

Graphs 8a and 9a refer to a fixed ER regime, graphs 8b and 9b refer to a flexible ER regime. In graph 8a, in particular, there is actually a very slight increase of real consumption in the year 1962, but the fall in real exports is substantial, dragging first real GDP and afterwards real investment. Notice that the effect of the latter is much more pronounced. Two well established facts are that investment tracks GDP, and that it

follows it with wild fluctuations. That's the essence of the accelerator principle. Why does real consumption fall so hard, even if the real wage increases as it does? Because to the depressing effect of falling real GDP on employment, one has to add precisely the effects of real wages on productivity: a higher real wage stimulates productivity, as stated in equation 20. The real wage bill (real wage times the employment level, which is a good proxy for the real wage rate) actually falls, even though the wage *share* raises because productivity increases only a q_a proportion of the amelioration in the real wage.

We performed experiments moving the flat segment of the Phillips curve for "USA". We didn't find major noticeable changes in the variables. But we didn't want to finish the paper without any finding that might propose some solution, even in this highly sketched model, for a great scourge of our times, which is the situation in the European "periphery", Greece, Spain Ireland, etc. And we do have interesting findings.

G. **Something to say about Europe**

Even though no European country has a central bank and can't print its own currency, at least that's what the treaties say, we can think of a fixed ER as a proxy for a monetary union, and to treat, in our case, as Greece being "Argentina" (the contemporaneous history of these two countries, let's say after WW II, is very similar and has remarkable parallels, but that is way beyond the scope of this paper), and USA as being "Germany". And given what we saw, the high sensitivity our results have to changes in external competitiveness, one might tempted to say that a good and viable solution for Greece would be a German "inflation", meaning by that an increase in its real wage. Even more, let's make German imports even more sensitive to this deterioration in its price-competitiveness by increasing, precisely, its price-elasticity e_1. The results are not as nice as one, me, would like. Graph 10 shows why.

[INSERT GRAPH 10 HERE]

The variables depicted in that graph are Greek GDP, the real wage of Greek workers, exports and consumption. We increased 10% the mentioned e_1 and also ω_{1u} which in this case, making use of our imagination, corresponds to German workers. As expected, Greek exports improve, and GDP follows it, but not that much, because there is another depressing force: consumption. The increase in German wages is translated into imports prices, and even though there is some "substitution" between German and

Greek production, it is of little magnitude for the consumption basket of Greek workers who see their real wages go down. A moderate increase in German wages might solve the trade balance problem, but does not improve the situation of Greek workers. There are some imports which are not easily replaceable, and others which aren't replaceable at all. Something else must change for Greek economy (measured by real GDP) and the situation of Greek workers to improve at the same time. It's not mostly a problem of price competitiveness, it's more a problem of economic structure. Where can we find the solution?

Well, one idea is to invest more in Greece, let's say by rising the coefficient γ_{0a} in our model. And yes, this does have positive effects: employment increases, GDP as well, and PSBR falls. But the trade balance deteriorates together with the current account. Notice that in this case we *do not have twin deficits*: we have a public surplus and external deficit, because the former is not big enough as the private deficit. Twin deficits are not an economic necessity, as the IMF programs want us to believe. So how can we solve them? The ideal world is a Marshall Plan that changes the economic structure of Greece and makes it less dependent of imports. We model this by increasing γ_{0a} and at the same time by increasing e_0 10%, that is, the propensity of the German economy to import from Greece. Graph 11 shows what happens.

[INSERT GRAPH 11 HERE]

Real GDP in Greece increases, employment increases, consumption increases, the current account improves, and public sector borrowing falls, for both factors. Even though Germany experiences a fall in its in GDP, in the long run it is starting to improve due to higher imports of a booming Greece. Our conviction in the necessity, if Greece is going to stay in the Euro (a big *if*), of a Marshall Plan instead of limited changes in relative prices does not comes just from these results, but it's also based in empirical literature, such as Felipe and Kumar (2011). Our simulations, although limited in its characteristics, gives us a little more confidence in advancing these solutions.

IV. Conclusions

This paper presents an extension of Bortz & Storm (2010), which in itself is an extension of chapter 12 of Godley & Lavoie (2007), and we also incorporates elements

present in Daigle & Lavoie (2009), regarding the expectations formation about the movement of the exchange rate. The methodology adopted is a Stock-Flow Consistent approach that assures that there are no "black-holes" in the accounting of the model: everything comes from somewhere and goes somewhere else. In that line of literature, we added a simple investment function drawing on the accelerator principle; the possibility of having foreign debt (both public and private) in a foreign currency; the possibility of having banks borrowing advances from their central bank; a Phillips curve with a flat segment; a productivity growth function; and error correction mechanisms regarding income expectations and portfolio allocation.

Even though the simplistic nature of some of our assumptions, we have been able to extract some conclusions in light of the results of the simulations we performed. In particular:

- The behavior of the exchange rate depends on the financial positions of the different sectors (including the government), the portfolio allocation and exchange rate expectations of traders, and it is not strictly related to the behavior of the current account of the balance of payments. The exchange rate (in a flexible exchange rate regime) or the reserves equilibrate the demand and supply of funding that a country and its agents require and/or demand, according to the currency in which this funding is offered/required. In different simulations, a current account surplus for one country coexisted either with a depreciating exchange rate or an appreciating one. If any causality can be observed, one could say that the movement of the exchange rate influences the trade balance much more than the other way around. However, this does not mean that the exchange rate plays an equilibrating role on the balance of trade or the current account, on the contrary.
- Our results reject the "twin deficit" view sustained since long time ago by the IMF, which blames fiscal deficits for balance of payments problems, by which it is usually meant a structurally negative current account. This view is also behind the economic policies imposed by the "Troika" on the government of the European periphery. Twin deficits do not always happen, and even if they do that does not imply there is

necessarily a fiscal mess, it might well be the other way around (Ocampo, Rada and Taylor: 2009, chapter 6).

- An important result is that, with sufficient foreign reserves, the "rules of the game" of a fixed ER or a gold standard regime *do not apply*. There need not be a direct relation between the balance of payments (which basically shows the extent of foreign lending/borrowing) and domestic credit.
- In what refers to the current situation of the Eurozone (this paper has been written while Greece still belonged in it), our paper supports expansionary measures *in the periphery*, coupled with external support to alleviate further deteriorations in the balance of payments, in order to improve the trade balance and at the same time improving the economic wellbeing of the domestic population. Policies that only focus on price competitiveness to solve the problems are not going to improve the living conditions of countries and people in economic difficulties. An integral approach, such as a "Marshall Plan", is required.
- Our results show that different exchange rate regimes might have each of them positive and negative consequences under different circumstances. We therefore find ourselves in agreement with Palley (2003) in the sense that an active management of both exchange policy and capital mobility can avoid the dangers associated with the passivity of the government in face of the disruptive consequence each extreme case might have. The set of the rules for this management *can (and should)* be designed to achieve different targets in terms of employment, output, inflation and balance of payments performance: it's not easy, but it can be done, even in an open economy context.

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VI. Appendix

Initial values of variables and parameters

$\boldsymbol{s_u} =$	2288.516079	$z_{3u} =$	0	$L_{ud}^{u} =$	5000.00	$\lambda_{23} =$	-0.01
$\boldsymbol{s_a} =$	2288.516079	$z_{1a} =$	1	$L_{ad} =$	5000.00	$\lambda_{24} =$	-0.02
$\boldsymbol{S_u} =$	4577.032158	$z_{2a} =$	0	$L_{ad}^{u} =$	1000.00	$\lambda_{32} =$	-0.01
$\boldsymbol{S_a} =$	4577.032158	$z_{3a} =$	0	$F_{fu} =$	145.631068	$\lambda_{33} =$	0.1
$\boldsymbol{y_u} =$	1830.812863	$EMP_u =$	0.03	$F_{fa} =$	145.631068	$\lambda_{34} =$	-0.05
$\boldsymbol{y_a} =$	1830.812863	$EMP_a =$	0.03	$Yr_u =$	3125	$\lambda_{40} =$	0.125
$\boldsymbol{Y_u} =$	3661.625726	$w_u =$	0.5	$Yr_a =$	3125	$\lambda_{41} =$	-0.02
$\boldsymbol{Y_a} =$	3661.625726	$w_a =$	0.5	$T_u =$	625	$\lambda_{42} =$	-0.02
$\boldsymbol{p_{yu}} =$	2	$N_u =$	2855.800483	$T_a =$	625	$\lambda_{43} =$	-0.05
$\boldsymbol{p_{ya}} =$	2	$N_a =$	2855.800483	$\theta_u =$	0.2	$\lambda_{44} =$	0.1
$\boldsymbol{p_{mu}} =$	2	$pr_u =$	0.641085704	$\theta_a =$	0.2	$M_{ad}^{n} =$	1998.381877
$\boldsymbol{p_{ma}} =$	2	$pr_a =$	0.641085704	$YD_u =$	2500	$B_{had}^{a} =$	4995.954693
$\boldsymbol{IM_u} =$	915.4064316	$g_{pru} =$	0.03	$YD_a =$	2500	$B_{had}^{u} =$	2248.179612
$\boldsymbol{IM_a} =$	915.4064316	$g_{pra} =$	0.03	$yd_u =$	1250	$H_{ad}^{n} =$	757.48
$\boldsymbol{X_u} =$	915.4064316	$q_u =$	0.3	$yd_a =$	1250	$\lambda_{50} =$	0.2
$\boldsymbol{X_a} =$	915.4064316	$q_a =$	0.3	$yd_u^e =$	1245.954693	$\lambda_{51} =$	0.1
$\boldsymbol{C_u} =$	2208.737864	$im_u =$	457.7032158	$yd_a^e =$	1245.954693	$\lambda_{52} =$	-0.05
$\boldsymbol{C_a} =$	2208.737864	$im_a =$	457.7032158	$\beta_u =$	0.2	$\lambda_{53} =$	-0.03
$\boldsymbol{I_u} =$	776.6990291	$\varepsilon_o =$	0.25	$\beta_a =$	0.2	$\lambda_{60} =$	0.5
$\boldsymbol{I_a} =$	776.6990291	$\varepsilon_1 =$	0.7	$YD_u^e =$	2491.909385	$\lambda_{61} =$	-0.05
$\boldsymbol{G_u} =$	676.188833	$\varepsilon_2 =$	1	$YD_a^e =$	2491.909385	$\lambda_{62} =$	0.1
$\boldsymbol{G_a} =$	676.188833	$\mu_o =$	0.25	$V_{hu} =$	10000.00	$\lambda_{63} =$	-0.03
$\boldsymbol{p_{su}} =$	2	$\mu_1 =$	0.7	$V_{ha} =$	10000.00	$\lambda_{70} =$	0.225
$\boldsymbol{p_{sa}} =$	2	$\mu_2 =$	1	$v_{hu} =$	5000	$\lambda_{71} =$	-0.03
$\boldsymbol{\pi_u} =$	0.159927	$x_u =$	457.7032158	$v_{ha} =$	5000	$\lambda_{72} =$	-0.03
$\boldsymbol{\pi_a} =$	0.159927	$x_a =$	457.7032158	$V_{hu}^e =$	9991.909385	$\lambda_{73} =$	0.07
$\boldsymbol{\pi_{0u}} =$	0.159927	$K_u =$	10000.00	$V_{ha}^e =$	9991.909385	$H_{ud} =$	757.48
$\boldsymbol{\pi_{0a}} =$	0.159927	$K_a =$	10000.00	$c_u =$	1104.368932	$H_{ad} =$	757.48
$\boldsymbol{\pi_{1u}} =$	0.2	$k_u =$	5000	$c_a =$	1104.368932	$z_{4u} =$	1
$\boldsymbol{\pi_{1u}} =$	0.2	$k_a =$	5000	$\alpha_{1u} =$	0.75	$z_{4a} =$	1
$\boldsymbol{W_u} =$	1	$i_u =$	388.3495146	$\alpha_{2u} =$	0.75	$M_{ud} =$	1998.381877
$\boldsymbol{W_a} =$	1	$i_a =$	388.3495146	$\alpha_{1a} =$	0.035	$M_{ad} =$	1998.381877
$\boldsymbol{\omega_{0u}} =$	0.2	$DA_u =$	485.4368932	$\alpha_{2a} =$	0.035	$z_{5u} =$	0
$\boldsymbol{\omega_{0u}} =$	0.2	$DA_a =$	485.4368932	$M_{ud}^{n} =$	1998.381877	$z_{5a} =$	0
$\boldsymbol{w_u^T} =$	0.5	$\delta_u =$	0.05	$B_{hud}^{u} =$	4995.954693	$dxru^e =$	0
$\boldsymbol{w_a^T} =$	0.5	$\delta_a =$	0.05	$B_{hud}^{\$a} =$	999.1909385	$dxra^e =$	0
$\boldsymbol{\omega_{1u}} =$	0.5	$gk_u =$	0.03	$B_{hud}^{\$u} =$	1248.988673	$\chi^f =$	0.75
$\boldsymbol{\omega_{1u}} =$	0.5	$gk_a =$	0.03	$H_{ud}^{n} =$	757.48	$\chi^c =$	0.25
$\boldsymbol{\omega_{2u}} =$	0.2	$\gamma_{0u} =$	0.02	$\lambda_{10} =$	0.2	$dxra^{ef} =$	0
$\boldsymbol{\omega_{2u}} =$	0.2	$\gamma_{0a} =$	0.02	$\lambda_{11} =$	0.1	$\zeta =$	0.2
$\boldsymbol{bandb_u} =$	0.003	$\gamma_{1u} =$	0.3	$\lambda_{12} =$	-0.05	$dxra^{ec} =$	0
$\boldsymbol{bandt_u} =$	0.003	$\gamma_{1a} =$	0.3	$\lambda_{13} =$	-0.01	$\xi =$	0.2
$\boldsymbol{bandb_a} =$	0.003	$z_u =$	0.3619304	$\lambda_{14} =$	-0.02	$\rho =$	0.34110224
$\boldsymbol{bandt_a} =$	0.003	$z_a =$	0.3619304	$\lambda_{20} =$	0.5	$\phi =$	-0.00002
$\boldsymbol{z_{1u}} =$	1	$V_{fu} =$	5000.00	$\lambda_{21} =$	-0.05	$M_{us} =$	1998.381877

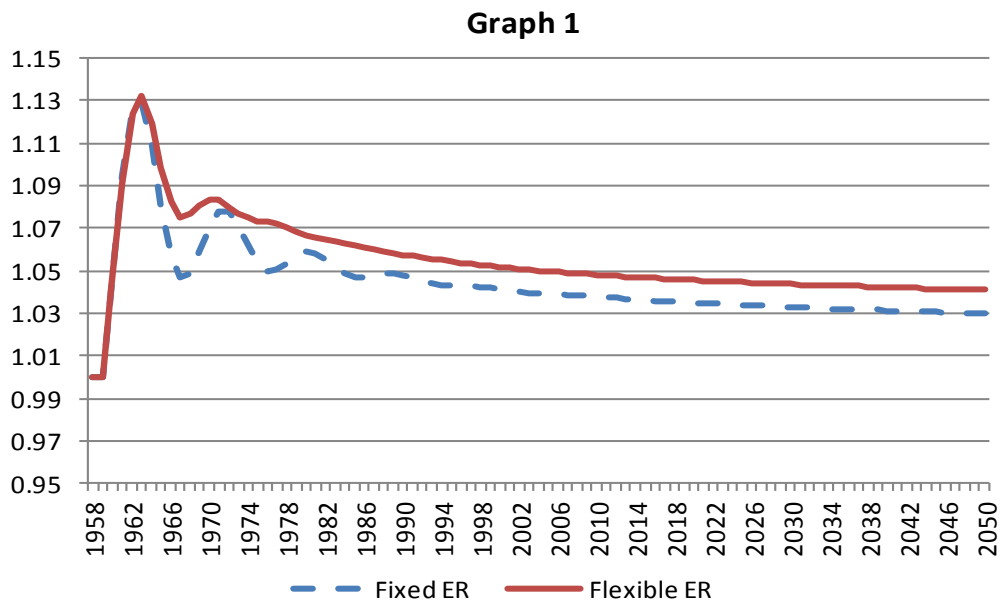
$\boldsymbol{z_{2u}} =$	0	$V_{fa} =$	5000.00	$\lambda_{22} =$	0.1	$M_{as} =$	1998.381877
$\boldsymbol{L_{us}^{u}} =$	5000.00	$L_{ad}^{a} =$	4000	$\lambda_{30} =$	0.1	$L_{as}^{a} =$	4000
$\boldsymbol{L_{as}^{u}} =$	1000.00	$\nu =$	0.8	$\lambda_{31} =$	-0.01	$B_{bud}^{nu} =$	1000
$\boldsymbol{B_{bad}^{na}} =$	1000.00	$r_{la} =$	0.036	$B_{s}^{a} =$	9001.62	$B_{cbad}^{a} =$	757.48
$\boldsymbol{B_{bud}^{u}} =$	1000	$\iota_{u} =$	0.2	$B_{s}^{\$a} =$	7752.63	$B_{cbus}^{u} =$	757.48
$\boldsymbol{B_{bad}^{a}} =$	1000.00	$\iota_{a} =$	0.2	$B_{hus}^{u} =$	4995.954693	$B_{cbas}^{a} =$	757.48
$\boldsymbol{z_{6u}} =$	1	$r_{mu} =$	0.03	$B_{has}^{a} =$	4995.954693	$B_{cbas}^{u} =$	904.57
$\boldsymbol{z_{6a}} =$	1	$r_{ma} =$	0.03	$B_{has}^{u} =$	2248.179612	$B_{cbad}^{u} =$	904.57
$\boldsymbol{A_{ud}} =$	0	$ra_{u} =$	0.033	$B_{hus}^{\$a} =$	999.1909385	$xra =$	1
$\boldsymbol{A_{ad}} =$	0	$ra_{a} =$	0.033	$B_{hus}^{\$u} =$	1248.988673	$xru =$	1
$\boldsymbol{z_{7u}} =$	0	$\upsilon_{u} =$	0.1	$B_{bus}^{u} =$	1000	$xra^{\#} =$	1
$\boldsymbol{z_{7a}} =$	0	$\upsilon_{a} =$	0.1	$B_{bas}^{a} =$	1000	$F_{cbu} =$	22.06261893
$\boldsymbol{F_{bu}} =$	172.1533568	$g_{u} =$	338.0944165	$H_{us} =$	757.48	$F_{cba} =$	49.19967755
$\boldsymbol{F_{ba}} =$	119.2030316	$g_{a} =$	338.0944165	$H_{as} =$	757.48	$CA_{u} =$	0
$\boldsymbol{V_{bu}} =$	4759.10	$\sigma_{u} =$	0.03	$A_{us} =$	0	$CA_{a} =$	0
$\boldsymbol{V_{ba}} =$	2244.13	$\sigma_{a} =$	0.03	$A_{ad} =$	0	$KA_{u} =$	0
$\boldsymbol{rl_{u}} =$	0.036	$B_{s}^{u} =$	9906.19	$B_{cbud}^{u} =$	757.48	$KA_{a} =$	0

TABLE 1

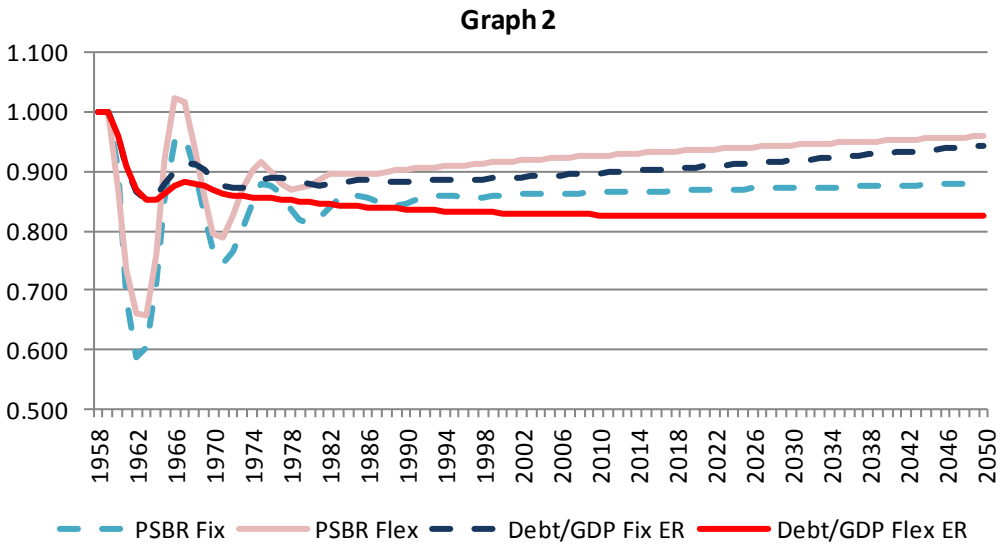
	USA					ARGENTINA				
	Households	Firms	Banks	Gov.	Central Bank	Households	Firms	Banks	Gov.	Central Bank
Capital stock		$+K_u$					$+K_a$			
Cash	$+H_u$				$-H_u$	$+H_a$				$-H_a$
Deposits	$+M_u$		$-M_u$			$+M_a$		$-M_a$		
Advances			$-A_u$		$+A_u$			$-A_a$		$+A_a$
Bills USA	$+B_{hu}^{u}$		$+B_{bu}^{u}$	$-B^{u}$	$+B_{cbu}^{u}$	$+B_{ha}^{u}.xra$				$+B_{cba}^{u}.xra$
Bills Arg. "$a"	$+B_{hu}^{\$a}.xru$					$+B_{ha}^{a}$		$+B_{ba}^{a}$	$-B^{\$a}$	$+B_{cba}^{a}$
Bills Arg. "$u"	$+B_{hu}^{\$u}$								$-B^{\$u}.xra$	
Loans "$a"							$-L_{a}^{a}$	$+L^{a}$		
Loans "$u"		$-L_{u}^{u}$	$+L^{u}$				$-L_{a}^{u}.xra$			
Wealth	$-V_{hu}$	$-V_{fu}$	$-V_{bu}$	$+V_{gu}$	$-V_{cbu}$	$-V_{ha}$	$-V_{fa}$	$-V_{ba}$	$+V_{ga}$	$-V_{cba}$
∑	0	0	0	0	0	0	0	0	0	0

TABLE 2

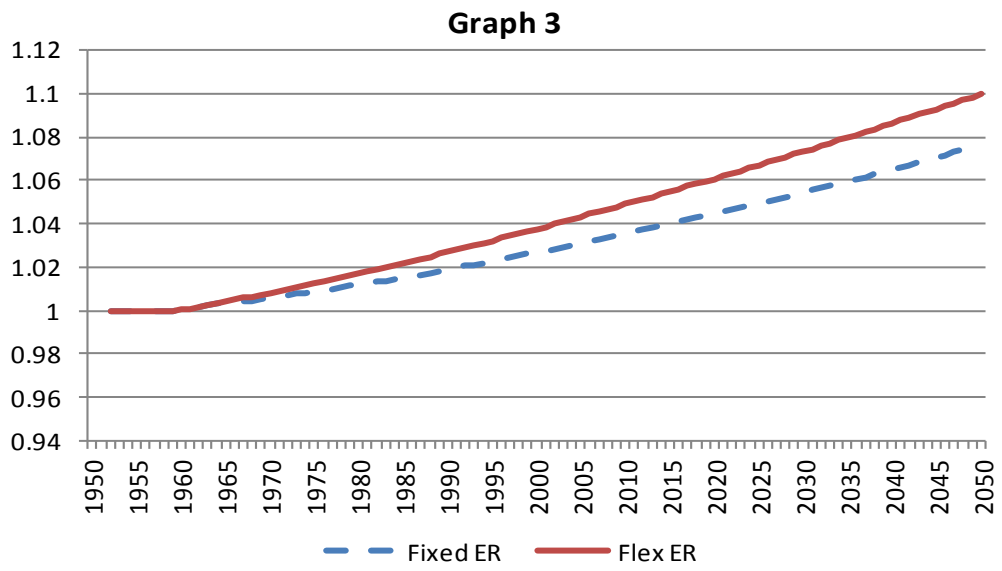
USA							Argentina						
House	Firms		Banks		Gov.	CB	House	Firms		Banks		Gov	CB
	C	K	C	K				C	K	C	K		
$-C_u$	$+C_u$						$-C_a$	$+C_a$					
	$+G_u$				$-G_u$			$+G_a$				$-G_a$	
	$+I_u$	$-I_u$						$+I_a$	$-I_a$				
	$+X_u$							$-IM_a$					
	$-IM_u$							$+X_a$					
	$[Y_u]$							$[Y_a]$					
$+W_u.N_u$	$-W_u.N_u$						$+W_a.N_a$	$-W_a.N_a$					
$-T_u$					$+T_u$		$-T_a$					$+T_a$	
	$-DA_u$	$+DA_u$						$+DA_a$	$+DA_a$				
$+r_{mu(-1)}.M_{us(-1)}$			$-r_{mu(-1)}.M_{us(-1)}$				$+r_{ma(-1)}.M_{as(-1)}$			$-r_{ma(-1)}.M_{as(-1)}$			
$+rb_{u(-1)}.B^u_{hus(-1)}$			$+rb_{u(-1)}.B^u_{bus(-1)}$		$-r_{bu(-1)}.B^u_{s(-1)}$	$+rb_{u(-1)}.B^u_{cbus(-1)}$	$+rb_{u(-1)}.B^u_{has(-1)}.xra$						$+rb_{u(-1)}.B^u_{cbas(-1)}.xra$
$+rb_{a(-1)}.B^{\$a}_{hus(-1)}.xru$							$+rb_{a(-1)}.B^a_{has(-1)}$			$+rb_{a(-1)}.B^a_{bas(-1)}$		$-r_{ba(-1)}.B^{\$a}_{s(-1)}$	$+rb_{a(-1)}.B^a_{cbas(-1)}$
$+rb_{u(-1)}.B^{\$u}_{hud(-1)}$												$-B^{\$u}_{hud(-1)}.r_{bu(-1)}.xra$	
			$-ra_{u(-1)}.A_{us(-1)}$			$+ra_{u(-1)}.A_{us(-1)}$				$-ra_{a(-1)}.A_{as(-1)}$			$+ra_{a(-1)}.A_{as(-1)}$
								$-rl_{a(-1)}.L^a_{as(-1)}$		$+rl_{a(-1)}.L^a_{as(-1)}$	$+rl_{a(-1)}.L^a_{s(-1)}$		
	$-rl_{u(-1)}.L^u_{us(-1)}$		$+rl_{u(-1)}.L^u_{us(-1)}$					$-rl_{u(-1)}.L^u_{as(-1)}.xra$					
	$-F_{fu}$	$+F_{fu}$						$-F_{fa}$	$+F_{fa}$				
					$+F_{cbu}$	$-F_{cbu}$						$+F_{cba}$	$-F_{cba}$
			$-F_{bu}$	$+F_{bu}$						$-F_{ba}$	$+F_{ba}$		
$-\Delta H_u$						$+\Delta H_u$	$-\Delta H_a$						$+\Delta H_a$
$-\Delta M_u$				$+\Delta M_u$			$-\Delta M_a$				$+\Delta M_a$		
$-\Delta B^u_{hus}$				$-\Delta B^u_{bus}$	$+\Delta B^u$	$-\Delta B^u_{cbus}$	$-\Delta B^u_{has}.xra$						$-\Delta B^u_{cbas}.xra$
$-\Delta B^{\$a}_{hus(-1)}.xru$							$-\Delta B^a_{has}$				$-\Delta B^a_{bas}$	$+\Delta B^{\$a}$	$-\Delta B^a_{cbas}$
$-\Delta B^{\$u}_{hud}$												$+\Delta B^{\$u}_{hud}.xra$	
				$+\Delta A_{us}$		$-\Delta A_{us}$					$+\Delta A_{as}$		$-\Delta A_{as}$
									$+\Delta L^a_a$		$-\Delta L^a$		
		$+\Delta L^u_u$		$-\Delta L^u$					$+\Delta L^a_{us}.xra$				



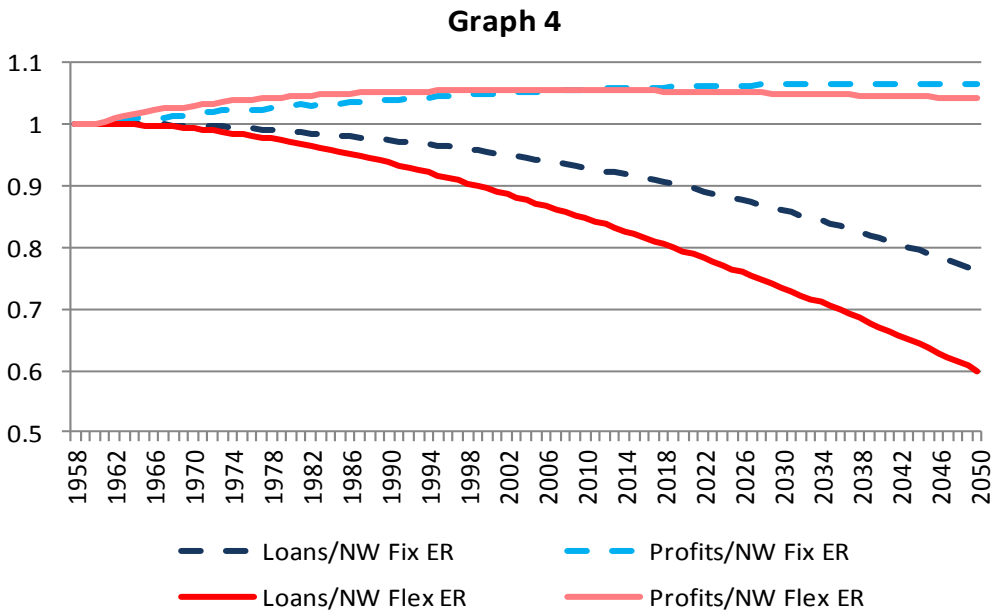
Real GDP in Argentina after a 10% increase in the propensity to consume out of disposable income



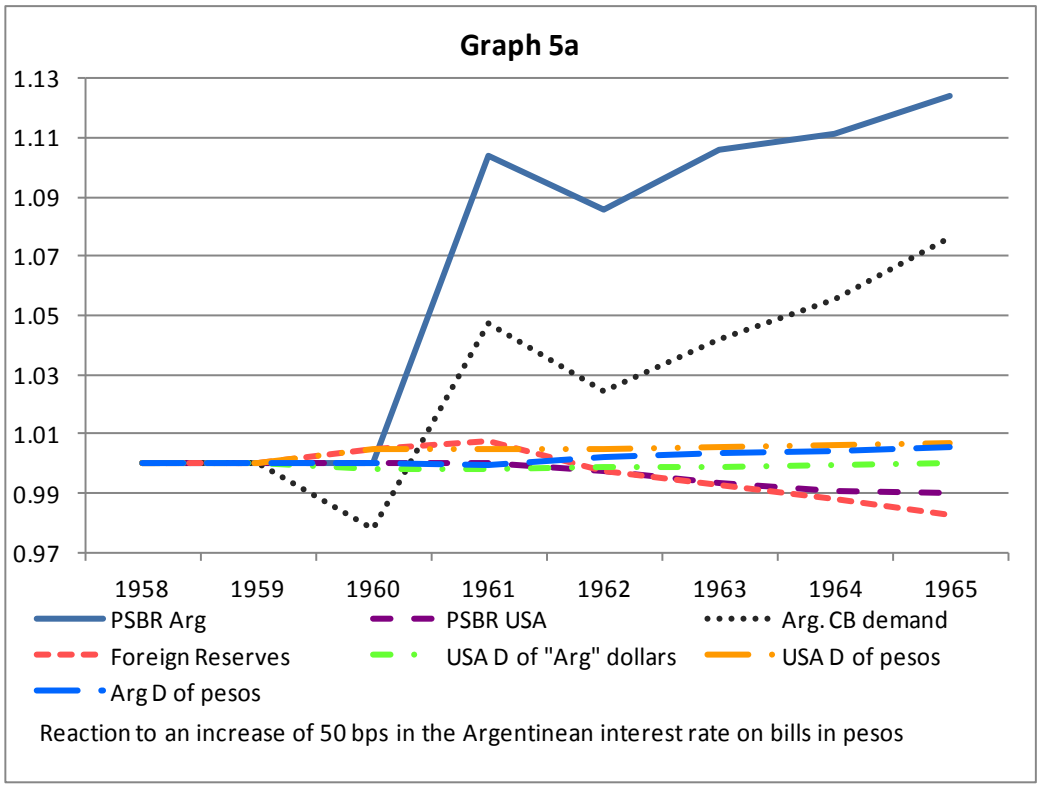
Public Sector Borrowing Requirements and Debt/Nominal GDP ratio in Argentina after an increase in the propensity to consume out of disposable income

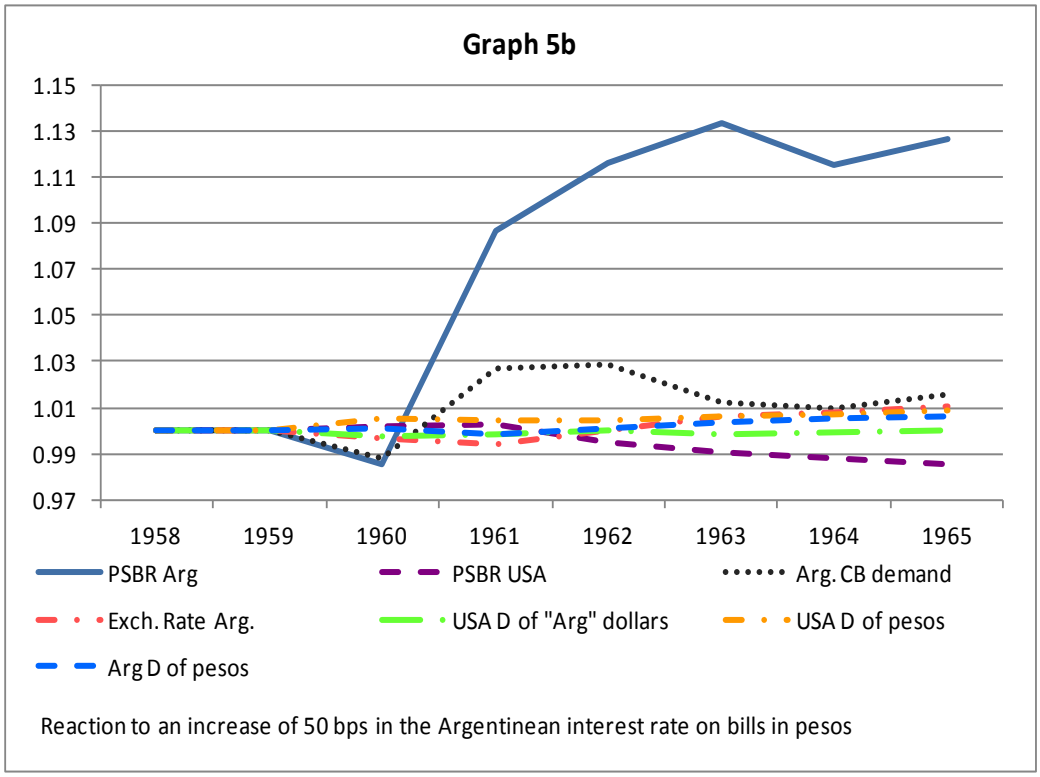


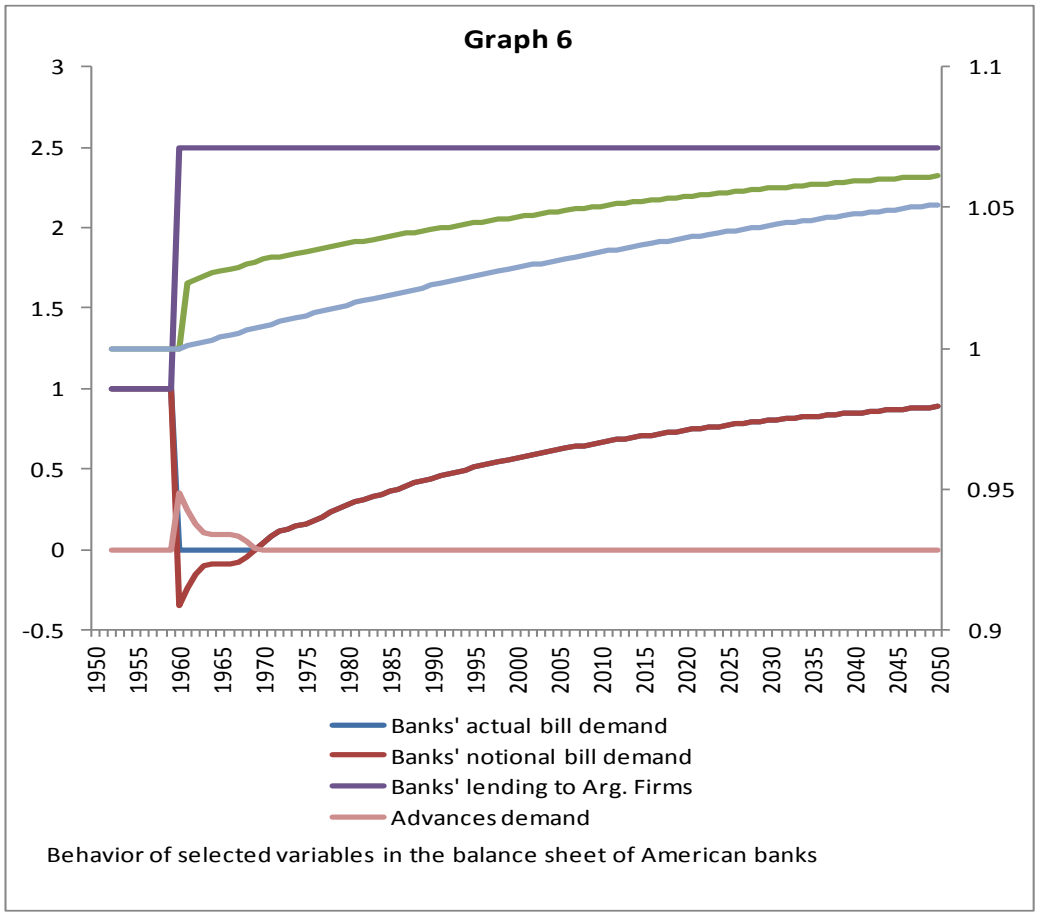
Real GDP in Argentina after an increase in the rate of growth of public expenditure in that country

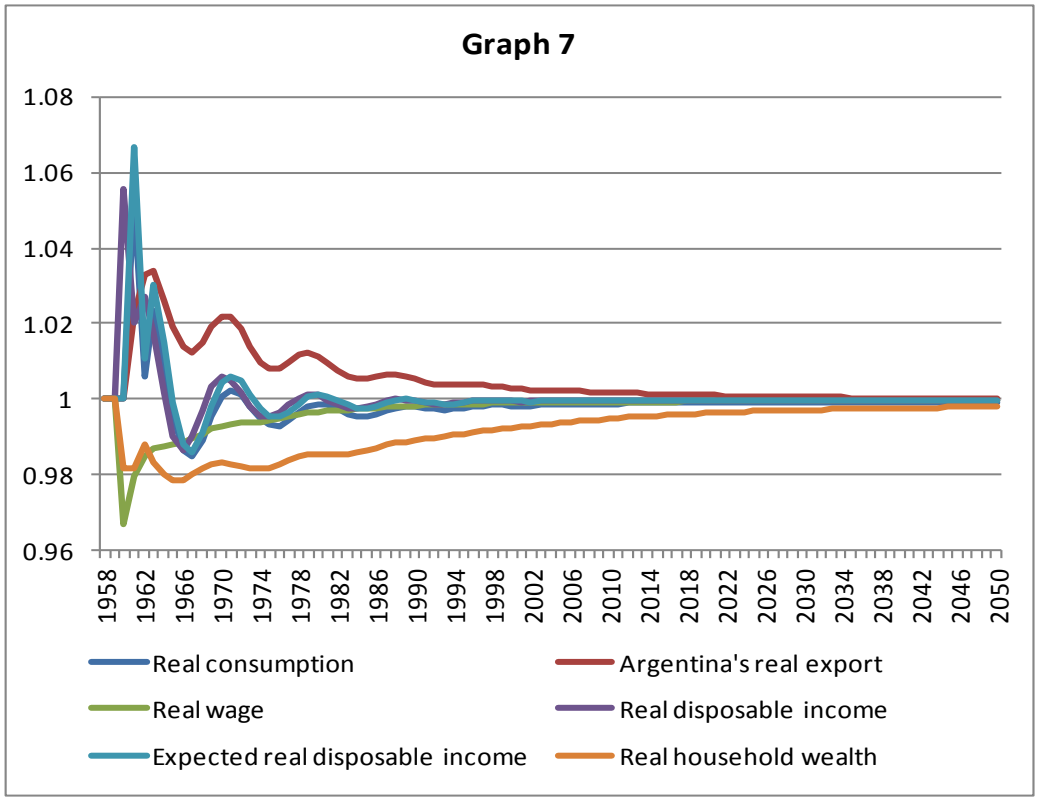


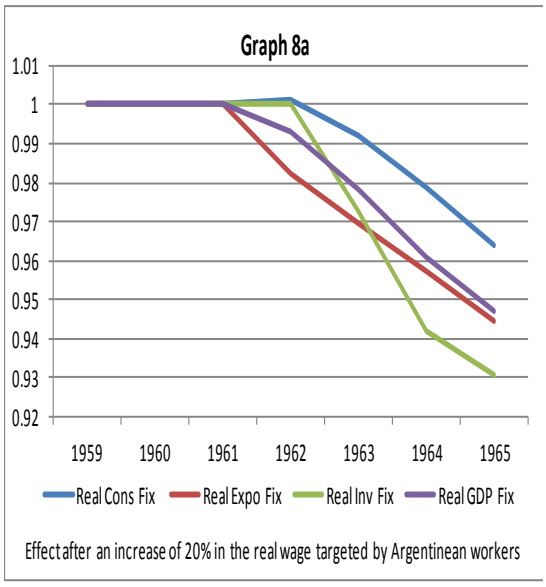
Loans to net wealth and profits to net wealth ratios of Argentinean firms after an increase in the rate of growth of public expenditures

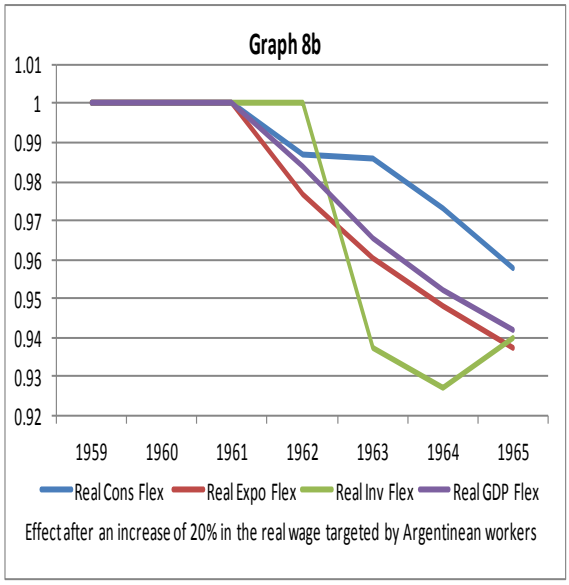

Graph 5a
1.13
1.11
1.09
1.07
1.05
1.03
1.01
0.99
0.97
1958
1959
1960
1961
1962
1963
1964
1965
PSBR Arg
PSBR USA
Arg. CB demand
Foreign Reserves
USA D of "Arg" dollars
USA D of pesos
Arg D of pesos
Reaction to an increase of 50 bps in the Argentinean interest rate on bills in pesos

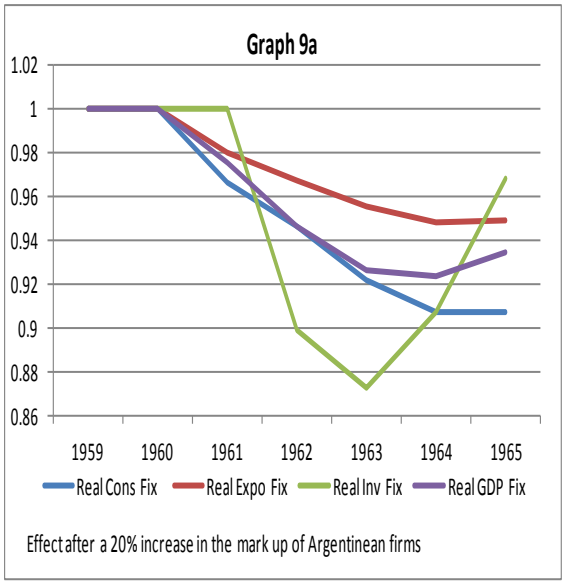

Graph 5b
1.15
1.13
1.11
1.09
1.07
1.05
1.03
1.01
0.99
0.97
1958
1959
1960
1961
1962
1963
1964
1965
PSBR Arg
PSBR USA
Arg. CB demand
Exch. Rate Arg.
USA D of "Arg" dollars
USA D of pesos
Arg D of pesos
Reaction to an increase of 50 bps in the Argentinean interest rate on bills in pesos

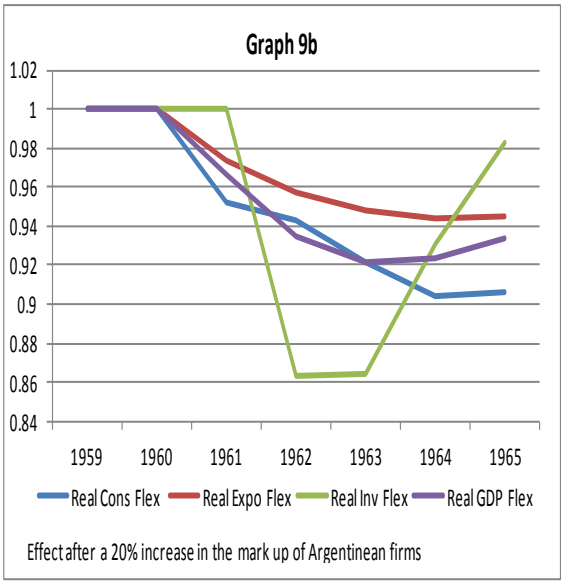

Graph 6
3
2.5
2
1.5
1
0.5
0
-0.5
1.1
1.05
1
0.95
0.9
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
2030
2035
2040
2045
2050
Banks' actual bill demand
Banks' notional bill demand
Banks' lending to Arg. Firms
Advances demand
Behavior of selected variables in the balance sheet of American banks

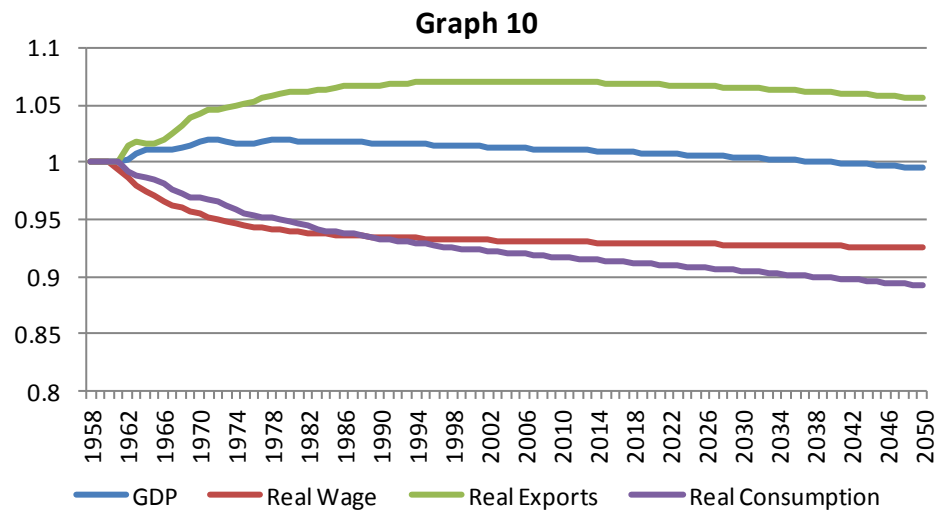

Graph 7
1.08
1.06
1.04
1.02
1
0.98
0.96
1958
1962
1966
1970
1974
1978
1982
1986
1990
1994
1998
2002
2006
2010
2014
2018
2022
2026
2030
2034
2038
2042
2046
2050
Real consumption
Argentina's real export
Real wage
Real disposable income
Expected real disposable income
Real household wealth


Graph 8a
1.01
1
0.99
0.98
0.97
0.96
0.95
0.94
0.93
0.92
1959
1960
1961
1962
1963
1964
1965
Real Cons Fix
Real Expo Fix
Real Inv Fix
Real GDP Fix
Effect after an increase of 20% in the real wage targeted by Argentinean workers

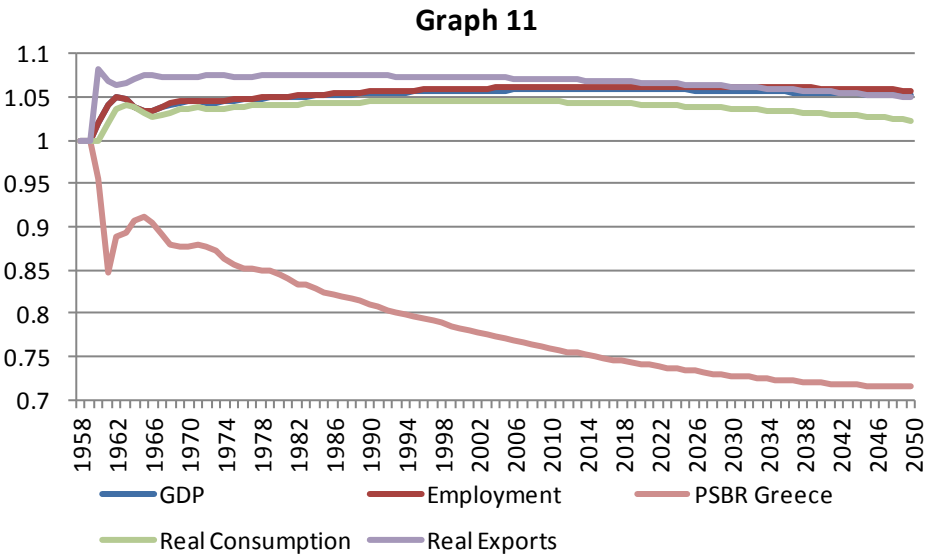

Graph 8b
1.01
1
0.99
0.98
0.97
0.96
0.95
0.94
0.93
0.92
1959
1960
1961
1962
1963
1964
1965
Real Cons Flex
Real Expo Flex
Real Inv Flex
Real GDP Flex
Effect after an increase of 20% in the real wage targeted by Argentinean workers


Graph 9a
1.02
1
0.98
0.96
0.94
0.92
0.9
0.88
0.86
1959
1960
1961
1962
1963
1964
1965
Real Cons Fix
Real Expo Fix
Real Inv Fix
Real GDP Fix
Effect after a 20% increase in the mark up of Argentinean firms


Graph 9b
1.02
1
0.98
0.96
0.94
0.92
0.9
0.88
0.86
0.84
1959
1960
1961
1962
1963
1964
1965
Real Cons Flex
Real Expo Flex
Real Inv Flex
Real GDP Flex
Effect after a 20% increase in the mark up of Argentinean firms



Effect in "Greece" after an increase of 10% in the real wage targeted by "German" workers and a 10% increase in the price-elasticity of German imports



Effect after an increase in autonomous investment in Greece and German propensity to import from Greece