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## Dollarization: a dead end

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**Dollarization: A Dead End**

by  
Alex Izurieta

March 2002

W. Godley's theoretical insights and economic modelling features are part and parcel of this paper. The author has also benefited from fruitful discussions with M. Lavoie, J. Bibow, and A. Zacharias. F. Spring's suggestions and R. Moore's editorial improvements are very much appreciated. The usual disclaimers apply.

**INTRODUCTION**

In a dollarization regime both exchange rate and monetary policies are removed at once, the same thing that happens under other common currency settings such as the European Monetary Union (EMU) and currency board systems. The question is whether other policy options remain once the dollarization path is taken. In other words, can an economy divert from the dollarization path at a later date or, alternatively, can economic constraints or shocks be circumvented by the implementation of policies other than the exchange rate and monetary policies already discarded?

Is it possible to divert from the dollarization path once on this road? In practice, unfortunately not. What makes this regime crucially different to that of a currency board is precisely its irreversibility. Admittedly, a currency board system bases its credibility (and thus its presumed stability) on the confidence shared by all agents in the fixed parity/convertibility with a foreign currency. But, *in extremis*, such parity could be revised, or the system as such can be eradicated as was recently the case in Argentina.

Once the dollarization path is taken, are there other options, such as fiscal policy, available for macroeconomic management? If this option was available, it could probably set up a distinction between a dollarized regime and that of the EMU. Indeed, EMU members have constrained their ability to run fiscal deficits and limited their interstate transfers, subsidies, grants, etc., according to commonly agreed, but eventually binding, rules.

Seemingly, dollarized regimes could exercise a degree of macroeconomic management that is not the case with EMU countries bound by the "Growth and Stability Pact." As we will see, however, this unfortunately is not the case. Hence, if dollarization is, by conception, irreversible, and it is also the case that it is necessary to give up the otherwise effective option of fiscal policy in order to circumvent shocks and constraints, then the path to dollarization would be no more than a "dead end."

In this paper the ability of a dollarized economy to undertake fiscal policies of its own is explored. A point of departure is a pioneering insight by Godley (1991, 1992, 1997b,c), applicable originally to the EMU. Namely, in a system of common currency there would be no room for independent fiscal policy by one country because there is no mechanism of deficit financing other than borrowing, at market-determined interest rates, from domestic and foreign agents. Servicing the debt would increase borrowing requirements, apart from aggravating the balance of payments, likely unsustainable in the long run. At a certain point, rather soon than late, the only viable option would be renouncing fiscal policy altogether. Or, as suggested by Godley, the alternative would be a "central government" enabled to enact transfers and fiscal stimuli that would compensate for inter-state disparities or help recovery after exogenous shocks.<sup>1</sup> But in a dollarized regime, even the latter alternative, hypothetical as it may be, is not at hand.

This paper proceeds by devising an analytical framework in order to emulate, with the smallest number of assumptions and in the simplest way possible, the workings of a dollarized economy in an inherently consistent accounting framework.<sup>2</sup> In such a framework it is possible to inflict an exogenous shock to this hypothetical economy and investigate whether and to what extent fiscal policy remains an available option. The conclusion would confirm Godley's original insight. Fiscal policy in a dollarized setting is not only inadequate, but also leaves policymakers with fewer financial sources to operate. The alternative, namely, tightening the fiscal stance along with the financial constraints, would exacerbate the adverse effects of the initial shock on income and employment.

The next section explains the model. Care is taken to emphasize the flow/stock balance consistency and the assumptions made before going into the technical description of macroeconomic relations and adjustment. The main results (baseline and two alternative scenarios), on which basis we draw our conclusions, are explained in the last section.

**DESCRIPTION OF THE MODEL**

**Economic Structure and Underlying Flow/Stock Accounting Framework**

The underlying accounting structure of the model is presented in Table 1.<sup>3</sup> There are no "black holes"; all flows are accounted for and generate, sequentially, the financial balances of each sector. These ex post balances reflect macroeconomic constraints and how sectors adjust vis-à-vis one another. They are, therefore, incorporated in the behavioral relations of the model (as in Godley 1997a, 1999; Lavoie and Godley 2000; and Lavoie 2001).

**Table 1: The Flow-Stock Transaction and Balance Sheet Matrices**

	NORTH			SOUTH			CB	Row Sum
	HHn	ENTn	GOVn	HHs	ENTs	GOVs		
Consumption	-Cn	+Cn		-Cs	+Cs			0
Govt. expenditure		+Gn	-Gn		+Gs	-Gs		0
External trade		+Xn (=Ms ) -Mn (=Xs )			-Ms (=Xn ) Xs (=Mn )			0
Output/Income	+Yn (=Wn )	-Yn		+Ys (=Ws )	-Ys			0
Tax	-Tn		+Tn	-Ts		+Ts		0
Interest on	+Bnn -I		-Bnn -I					0
Government	+Bns -I					-Bns -I		0
Bonds			-Bsn -I	+Bsn -I				0
				+Bss -I		-Bss -I		0
Flow balances	+ $\Delta FA_n$	0	-PSBRn	+ $\Delta FA_s$	0	-PSBRs		
	- $\Delta Bnn.p_{bn}$		+ $\Delta Bnn.p_{bn}$					0
<b>Flow-of-Funds:</b>	- $\Delta Bns.p_{bs}$					+ $\Delta Bns.p_{bs}$		0
Financial			+ $\Delta Bsn.p_{bn}$	- $\Delta Bsn.p_{bn}$				0
allocations				- $\Delta Bss.p_{bs}$		+ $\Delta Bss.p_{bs}$		0
of			+ $\Delta Bcn$				- $\Delta Bcn$	0
institutions	- $\Delta Hn$					+ $\Delta Bcs$	- $\Delta Bcs$	0
				- $\Delta Hs$			+ $\Delta Hs$	0
Sum of Transactions	0	0	0	0	0	0	0	0
<b>Holding Gains</b>	+ $\Delta p_{bn} Bnn -I$		- $\Delta p_{bn} Bnn -I$	+ $\Delta p_{bs} Bss -I$		- $\Delta p_{bs} Bss -I$		0
	+ $\Delta p_{bs} Bns -I$		- $\Delta p_{bn} Bsn -I$	+ $\Delta p_{bn} Bsn -I$		- $\Delta p_{bs} Bns -I$		0
			<b>Balance sheets</b>					
	+Bnn.p <sub>bn</sub>		-Bnn.p <sub>bn</sub>					0
Stock of bonds	+Bns.p <sub>bs</sub>					-Bns.p <sub>bs</sub>		0
			-Bsn.p <sub>bn</sub>	+Bsn.p <sub>bn</sub>				0
				+Bss.p <sub>bs</sub>		-Bss.p <sub>bs</sub>		0
Stock of money	+Hn			+Hs			-Hn	0
							-Hs	0
Govt. Treasury bills			-Bcn				+Bcn	0
						-Bcs	+Bcs	0
Stock balances	Vn		DebtGn	Vs		DebtGs	0	

The "world" consists of two countries ("North" and "South," denoted by suffixes  $n$  and  $s$ ), sharing the "dollar" issued by the sole central bank (CB).<sup>4</sup> Households (HH) in each country earn the national income ( $Y$ ), generated by each country's enterprise sector (ENT). The national product is either consumed by governments ( $G$ ), by households ( $C$ ), or traded (exports,  $X$ , and imports,  $M$ ). There are interest payments on bonds ( $B$ ) issued by both countries, but there are no other transfers.<sup>2</sup> Each government's source of revenue consists of taxes ( $T$ ), paid out by households, which, in turn, earn interest on government bonds.

Net saving of each sector is allocated into financial assets as shown in the flow-of-funds system. By assumption, the central bank does not earn operating surpluses, and enterprises spend all their receipts from sales. Thus, changes of assets/liabilities take place only between households and governments. A government deficit (PSBR) creates wealth ( $\Delta FA$ ) for households while surpluses bleed the circular flow of income and destroy wealth.

According to this simplified flow-of-funds, financial choices open to households of each country are changes in dollar balances, and net acquisitions of perpetuity bonds (of both North and South). Governments' financial needs are satisfied by issuing these bonds at a market-determined price (inverse of the interest rate), and Treasury bills that are exchanged at the central bank at no cost, but subject to a balance constraint. Namely, total changes of bills (CB assets, government debts) will match total changes of money held by households (Central Bank liability against households wealth).

Financial balance sheets represent the stock accumulation of flows, plus holding gains due to changes in the price of government bonds outstanding at the beginning of the period. Thus, households' wealth comprises of the stock of money and governments' bonds at current prices, while governments debt is equal to the stock of bonds and Treasury bills. The balance of the central bank assures the consistency of the system by equalling money with bills.

### Working Assumptions

Since this discussion is within the context of a "theoretical model" it is particularly critical to make explicit the assumptions and restrictions that are being imposed. This will help to verify that any conclusions are not vitiated by the methodological flaw of prefabricating results in hidden assumptions.

First, only two countries are considered, with no "rest-of-the-world" outside this block. It could perhaps be argued that with a larger pool of countries sharing the "dollar," and, moreover, if there exist countries outside the pool that are trading with the dollarized economies, external constraints faced by a single economy may be smoothed and, perhaps, not binding. In aggregate this may be right, but experience shows that there are some countries that are more prone to external constraints, or more vulnerable to shocks than others. These are generally the countries that face the dilemma of whether or not to dollarize. Besides, if imbalances arise between the two countries in our model, a positive performance of the "pool of dollarized economies" vis-à-vis the rest-of-the-world does not invalidate the proposition that disparities internal to the dollarized pool would tend to be perpetuated.

Commercial banks are absent, so financing takes place directly between households, firms, governments, and the common central bank. In the real world, institutions in financial distress may have direct recourse to banks, leading to the creation of "inside money." This would have been an unnecessary complication in this model, since the purpose of this study is to explain the consequences of fiscal imbalances (vis-à-vis private and rest-of-the world agents). Besides, it is assumed that private firms are

balanced and that households enjoy net saving positions.<sup>9</sup> Thus, omitting banks not only makes more transparent the stock-flow process, it avoids other possible (if not likely) sources of instability, such as those originating in money banks and from non-performing private agents.

Similarly, the available sources of financing current account and fiscal deficits have been narrowed down to that of borrowing from households (domestic or from the country across the border). It could be argued that in the real world there exist other options, such as foreign grants, loans from international institutions, commercial credits, foreign direct investment, or even sales of public-sector enterprises to multinational corporations. It could be disputed whether these sources of finance are "options" capable of alleviating trade shocks (or can be done at no cost); even so, they could not go on forever. At a certain point, grants are stopped, loans from international institutions are made conditional upon politically unfeasible criteria, foreign investment moves out quickly in the pursue of higher profits or more politically stable regimes, and there is no more room for privatizations. Besides, all of these events often occur simultaneously. Thus, the previously contained financial imbalances that these sources may have served to postpone arise more dramatically in one fell swoop. In this view, the simplified set of options used here highlights the underlying structural problem and avoids relying on misleading/temporary solutions.

Other assumptions worth mentioning here are the absence of relative price changes, the existence of excess capacity (which therefore allows the demand multiplier to effectively work), and a stationary steady-state baseline. Price changes could serve to momentarily alleviate trade deficits, but prices would eventually become uniform in a common currency setting. Full capacity utilization is not the usual circumstance in which economies operate. By allowing positively growing steady states, trade imbalances, which are at the core of this analysis, would not have been eradicated.

### How the System Works: Description of the Model

The set of identities resulting from the column sums of the matrix in Table 1 will be found through the model, assuring full stock/flow consistency. The minimum set of behavioral relations have been introduced to emulate the dynamics of adjustment in this particular setting. Variable are defined in Box 1.

The equations below define national income and the balance of payments. Behavioral relations in this block are the import functions relating trade to income. Imports become, by symmetry, exports of the partner country. As noted earlier, there are no factor payments across the border other than net interest payments on perpetuity bonds; i.e. for country  $\hat{n}$  we have  $Bns(-1) - Bsn(-1)$ . The relation between the interest rate and the inverse of the price of bonds (further below), allows, say  $r_{bn}$  [  $p_{bn} \cdot Bns(-1)$  ] to instead be written as  $Bns(-1)$ .

$$[1] Y_n = C_n + G_n + X_n - M_n$$

$$[2] Y_s = C_s + G_s + X_s - M_s$$

$$[3] M_n = \mu_n Y_n$$

$$[4] M_s = \mu_s Y_s$$

$$[5] X_n = M_s$$

$$[6] X_s = M_n$$

$$[7] BFN = X_n - M_n + Bns_{-1}^b - Bsn_{-1}^b$$

$$[8] BFs = X_s - M_s + Bsn_{-1}^b - Bns_{-1}^b$$

**Box 1: Definitions**

$C_n, C_s$	Consumption
$G_n, G_s$	Government expenditure
$M_n, M_s$	Imports
$X_n, X_s$	Exports
$Y_n, Y_s$	National income
$W_n, W_s$	Wage bill
$T_n, T_s$	Tax income
$B_{ij}$	Bonds issued by country $j$ , held by households in country $i$
$rb_j$	Rate of interest on bonds issued by country $j$
$pb_j$	Price of bonds issued by country $j$
$FAn, FAs$	Financial assets owed by households
$PSBR_n, PSBR_s$	Public sector borrowing requirements
$H_n, H_s$	Money, issued by the CB held in either country
$BC_n, BC_s$	Government treasury bills
$V_n, V_s$	Financial wealth of households
$YD_n, YD_s$	Disposable income of households
$\mu_n, \mu_s$	Import propensities
$\alpha_1, \alpha_2$	Propensity to consume out of income and wealth, respectively
$\theta_n, \theta_s$	Tax rates
$\gamma_1, \gamma_2$	Parameters of the demands for financial assets
$Z_c$	Discrete variable denoting conditional constraints
$En, Es$	Employment levels
$\varepsilon_n, \varepsilon_s$	Elasticities of the employment function

Notes: i. Suffix "n" denotes North and "s" South  
 ii. When two suffices are used, the first denotes the country that holds the asset position, and the second, the country that honors the liability.

Balances of the private sector are directly extracted from the column sum of Table 1; in particular, household disposable income would be:

$$[9] \quad YD_n = Y_n + B_{ns}_{-1}^d + B_{nn}_{-1}^d - T_n$$

$$[10] \quad YD_s = Y_s + B_{sn}_{-1}^d + B_{ss}_{-1}^d - T_s$$

Behavioral equations [11] and [12] relate private expenditure with income and wealth (long-term stability in an undisturbed system requires that the sum of the two propensities is smaller than unity). Net saving in each period (eqs. [13] and [14]) is straightforward.

$$[11] \quad C_n = \alpha_{1n} YD_n + \alpha_{2n} V_{n,-1}$$

$$[12] \quad C_s = \alpha_{1s} YD_s + \alpha_{2s} V_{s,-1}$$

$$[13] \quad \Delta FAn = YD_n - C_n$$

$$[14] \quad \Delta FAs = YD_s - C_s$$

Financial wealth is generated after including holding gains due to changes in the of price of the stock of bonds.

$$[15] \quad V_n = V_{n,-1} + \Delta FAn + \Delta p_{bn} \cdot B_{nn}_{-1}^d + \Delta p_{bs} \cdot B_{ns}_{-1}^d$$

$$[16] \quad V_s = V_{s,-1} + \Delta FAs + \Delta p_{bs} \cdot B_{ss}_{-1}^d + \Delta p_{bn} \cdot B_{sn}_{-1}^d$$

Public sector balances are obtained after the standard assumption of tax receipts as a proportion of national income (which could be further expressed, as below, in relation to disposable income in the private sector). Needless to say, interest payments on bonds add to public sector borrowing requirements (PSBR). Note that in this case government spending is assumed to be exogenous, which is consistent with the hypothesized case in which the public sector is allowed to run deficits when it is affected by exogenous shocks.

$$[17] \quad T_n = \frac{\theta_n}{(1 - \theta_n)} \cdot YD_n$$

$$[18] \quad PSBR_N = G_N - T_N + B_{NN}^d_{-1} + B_{SN}^d_{-1}$$

$$[19] \quad T_S = \frac{\theta_s}{(1-\theta_s)} YD_S$$

$$[20] \quad PSBR_S = G_S - T_S + B_{SS}^d_{-1} + B_{NS}^d_{-1}$$

The alternative would allow the public sector *balance* to be a policy determined, a priori, variable (typically equal to zero in dollarized economies). Assuming, as in the next section, that the South is forced to adjust to an external shock, the analytical representation of the alternative to equation would be:

$$[21] \quad G_S = PSBR_S + T_S - (B_{SS}^d_{-1} + B_{NS}^d_{-1})$$

In passing, note that the link between a current account shock and the public sector balance is implicit through equations [2], [19] and [20] or [21]. The feedback, from fiscal imbalances to the balance of payments, can be traced after bringing the demand and supply of bonds into equivalence (below), noticing that debt services across the border are incorporated by equation [8].

The demand for financial assets expressed by households follows that proposed in Godley (1999), extended below to the case in which households in each country are allowed to choose between bonds of either government and the dollar issued by the single CB:<sup>2</sup>

$$[22] \quad \frac{B_{NN}^d \cdot P_{NN}}{V_N} = \gamma_0 + \gamma_1 r_{NN} - \gamma_1 r_{NS}$$

$$[23] \quad \frac{B_{SS}^d \cdot P_{SS}}{V_S} = \gamma_0 + \gamma_1 r_{SS} - \gamma_1 r_{SN}$$

$$[24] \quad \frac{B_{NS}^d \cdot P_{NS}}{V_N} = \gamma_0 + \gamma_1 r_{NS} - \gamma_1 r_{NN}$$

$$[25] \quad \frac{B_{SN}^d \cdot P_{SN}}{V_S} = \gamma_0 + \gamma_1 r_{SN} - \gamma_1 r_{SS}$$

$$[26] \quad r_{NN} = \frac{1}{P_{NN}}$$

$$[27] \quad Z_C = \{1\} \left( B_{NN}^d_{-1} \cdot B_{SS}^d_{-1} \right) > 0; \quad \{0\} \left( B_{NS}^d_{-1} \cdot B_{SN}^d_{-1} \right) \leq 0$$

$$[28] \quad H_S^d = V_S - p_{NN} \cdot B_{NN}^d - p_{SS} \cdot B_{SS}^d$$

$$\text{in practice} \quad \frac{H_S^d}{V_S} = 1 - 2\gamma_0$$

$$[29] \quad H_N^d = V_N - p_{SS} \cdot B_{SS}^d - p_{NN} \cdot B_{NN}^d$$

$$\text{in practice} \quad \frac{H_N^d}{V_N} = 1 - 2\gamma_0$$

By using perpetuity bonds (with prices being the inverse of the interest rate), demand for money can be expressed as a residual after wealth is allocated to bonds, or as fixed proportion of wealth. Either way, the conditions that the sum of the constants must equal unity and the sum of the propensities for each financial asset must equal zero are satisfied.

Critical to the model's solution is the determination of the amount of government bills that can be accepted by the CB. Intuitively, equation [30] says that the government of the North (not affected by a shock) would issue bills in order to satisfy public sector borrowing requirements after households have expressed their demand for bonds at the market price. There is a restriction, defined in [31], denoting that government treasury bills cannot be negative (a negative government bill would mean that a loan was being made by the government to the central bank). Obviously, there is no point for a government to lend to the central bank (and not expecting to earn interest from such loan) when at the same time it still holds debt vis-à-vis households for which it has to pay interest. Unless the CB forces a government do it, it would not be reasonable for a government to lend to the CB without earning interest.

$$[30] \quad B_{NN}^d = Z_C \cdot \left( B_{NN}^d_{-1} + PSBR_N - p_{NN} \cdot \left( \Delta B_{NN}^d + \Delta B_{SN}^d \right) \right) + (1-Z_C) \cdot B_{NN}^d_{-1}$$

$$[31] \quad r_{bs} = \frac{1}{p_{bs}}$$

$$[32] \quad Bcs^s = Bcs^d$$

The model's structure as a whole would assure the symmetry of allocations of bills between both governments and the CB. In practice, however, the amount supplied by the South could straightforwardly be written as a constraint imposed by the amount that the CB is willing to take, as in equation [32].

The above becomes clearer after defining the demand functions and noticing that the CB is constrained by the accounting balance derived from Table 1, wherein the sum of the last column is zero. That is, by allowing the CB to satisfy the supply of government bills expressed by, say, the North (equation [33]), the other demand becomes a residual after demand for money has been expressed (equation [34]). This constraint is, in turn, imposed on the supply of bills expressed by the South (equation [32], above).

$$[33] \quad Bcn^d = Bcn^s$$

$$[34] \quad Bcs^d = Hn^d + Hs^d - Bcn^d$$

In a dollarized regime, the CB will not lend to governments beyond what households are prepared to hold as money (which is proportional to wealth). From an accounting point of view, this restriction cannot be overcome, but could be made more binding if the CB imposed "politically-determined" quotas for each country, or held a reserve of high-powered money.

Thus, since there is a limit to the extent governments can borrow from the CB, they have to satisfy additional borrowing requirements by supplying bonds at attractive interest rates, which, in turn, would imply higher costs in the future, leading to instability. This is the core of the adjustment process in this model, which the supply functions below make explicit.

$$[35] \quad Bsn^s = Bsn^d$$

$$[36] \quad Bns^s = Bns^d$$

$$[37] \quad Bss^s = Bss^d$$

$$[38] \quad Bns^d = \frac{1}{p_{bs}} \left( p_{bs} Bns_{-1}^s + PSBRs - \Delta Bcs^s - p_{bs} \Delta Bns^d \right)$$

$$[39] \quad Bns^d = Bns^s$$

Of all the supply functions, which can be taken as being responsive to the demands defined above, there is one that serves to determine the interest rate (or the price of bonds), in a standard manner. Since we have only two prices (bonds of the North and bonds of the South) we could fix one and let the other fluctuate according to expressed demand and supply. Here,  $p_{bn}$  is taken as the anchor, and the system will solve for  $p_{bs}$ . Indeed, this is done by the condition expressed in equation [38] that "forces" the government of the South to assure the resources needed to make up for its deficit.

The final relevant characteristic of this model is the finding, expressed analytically below, that money supply cannot be different than money demand, with no need for an additional equation to bring this equilibrium about. This has been sufficiently discussed in Godley (1999), and is further expanded, in the context of common currency scenarios, in Izurieta (2001), and in Godley and Lavoie (forthcoming).

$$[40] \quad Hn^d = Hn_{-1}^d + \Delta Hn^d$$

$$[41] \quad Hs^d = Hs_{-1}^d - \Delta Hn^d + \Delta Bcs^d + \Delta Bcn^d$$

It may be worth noticing that both equations refer to a single money supply function, of which part is held in the South and part in the North, according to demands expressed above.

We have included employment functions assuming standard elasticities. These hint at likely implications of recessionary outcomes on unemployment. These equations would not have (aggravating) feedback into the model's solution (which would be the case if we were to assign unemployment benefits paid by the governments).

$$[42] \quad En = En_{-1} + \epsilon_n \Delta \ln(Yn)$$

$$[43] \quad Es = Es_{-1} + \epsilon_s \Delta \log(Ys)$$

## BASELINE AND SIMULATIONS AFTER AN EXOGENOUS SHOCK

As usual, the model is first solved to further verify its internal consistency and obtain a steady-state baseline.<sup>8</sup> Data sets of the two economies are hypothetical, and are constructed by matching two conditions: (i) they are consistent with the accounting structure set out in Table 1; and (ii) both economies are relatively similar to each other, with neither showing anomalies such as a high debt burden or noticeable imbalances. Initial conditions are then experimented with until a quick convergence to the steady-state solution is reached.<sup>9</sup> Interpretation of some of the results plotted below requires considering that the unit of measure is such that GDP in each country is around 115, the balance of the central bank is around 65, and private sectors' net worth are around 120. Without exogenous disturbances, the public sector, the private sector, and the external sector of each country would be in balance. Because the system has been simplified to be stationary in real terms, government expenditure, the (endogenous) adjustment of money supply to demand (levels and differences), and employment ratios are horizontal in the baseline.

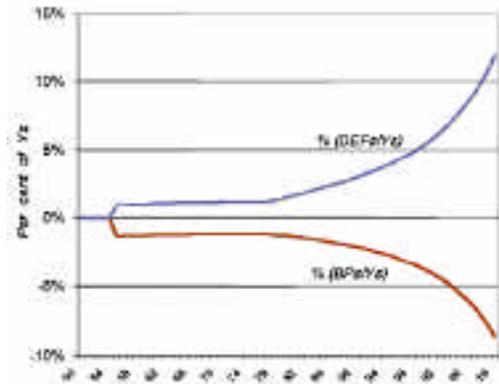
An exogenous shock to the South is inflicted by changing the import propensity of the North. This will produce a trade imbalance in the South, further transmitted into the fiscal balance (lower national income will erode tax receipts), the implications of which are explored under two alternative scenarios. The first scenario assumes fiscal self-determination; government spending and tax rates are fully determined by policymakers, and the model has to solve for the public sector borrowing requirement arising from a lack of tax revenue. Conversely, in the second scenario the fiscal stance will be tightened to ensure public sector balance. The model informs about the pace of convergence toward a current account balance, and the implications on aggregate income and employment.

**Scenario 1: Financial Instability with Fiscal Self-determination**

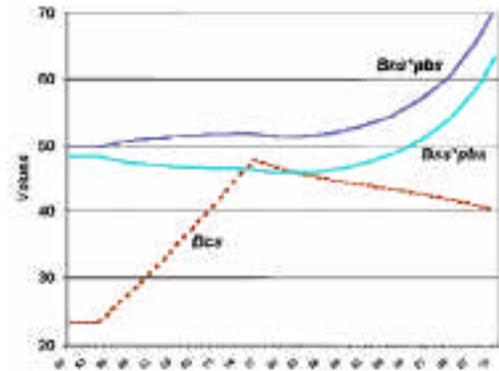
Public spending is taken to be a domestic policy variable, independent of the cycle, short-term fluctuations, and policy decisions in the neighbor country. Considering that tax revenue is proportional to national income, and that interest payments depend on the stock of debt, the *PSBR* would be fully endogenous. Indeed, the *PSBR* of the South will rise once the shock (lower imports of the North) leads to lower aggregate demand and, thus, lower tax revenues in the South. In order to finance the deficit the government will initially draw from CB bills. At a certain point, access by the South to CB bills will reach its limit. The government will attempt to sell bonds in domestic and world markets (to households in the South and the North, respectively), at ever-increasing interest rates.

This sequence is represented graphically below. Chart 1 shows that, due to the shock inflicted in 1955, the current account of the South falls from zero to a deficit of nearly 1.5 percent of national income. Similarly, the public sector experiences a deficit of less than 1 percent of national income. This situation turns out to be relative stable until the mid 1970s, during which both deficits start to show a tendency to explode.

**Chart 1: Fiscal Deficit and Current Account Balance of the South after the Shock**



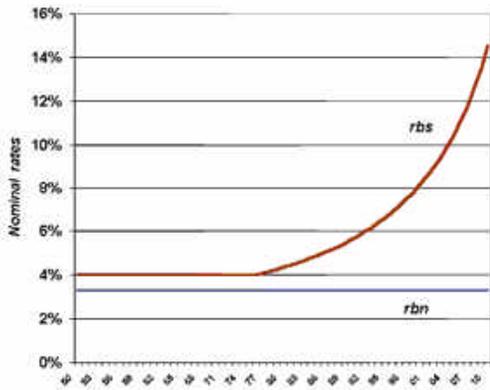
**Chart 2: Financing the Deficit in the South**



The apparent instability is consistent with the patterns observed in Chart 2, which represent the sources of financing for the government in the South. Up to the mid-1970s the government relies on an increasing access to CB bills, until it faces a restriction.<sup>10</sup> From that point on, it places bonds in the market, which are purchased domestically and abroad.<sup>11</sup>

It goes without saying that these bonds carry additional costs for the government of the South in the successive periods, aggravating the deficit and triggering off an ever-increasing need to place bonds in the market. This unleashes the financial instability, which can be represented by an explosion of interest rates of bonds issued by the South (Chart 3) compared to initial values and the interest rate in the North.

**Chart 3: Interest Rates in the South and North**



**Scenario 2: Sluggishness by Tightening the Fiscal Stance**

Given the instability and potential financial crisis yielded by a dollarized system facing a shock, policymakers would be inclined to set automatic controls on the PSBR (curbing the fiscal stance by contracting spending or raising tax rates). We have adopted here the norm of a zero deficit, typically imposed on developing economies stigmatized as lacking fiscal discipline. Yet the tight rein on the public sector would weaken demand and lead to an increasing deterioration of income in the system of two countries as a whole.<sup>12</sup>

The notion of the fiscal stance serves to assess the extent to which government expenditures align with the overall tax rate in a way to assure the structural contribution of the public sector to aggregate demand. As explained in Godley and McCarthy (1998), the "real fiscal stance" (RFS), defined as a ratio of deflated general government outflows to the average rate of taxation, would be, if the fiscal budget is balanced, equal to real GDP.<sup>13</sup> In the framework presented here, the contribution of the fiscal stance to aggregate demand is partially weakened by net interest payments abroad.<sup>14</sup> (This is consistent with the findings above; namely, even if the RFS remains unchanged, national income would deteriorate in the event of an exogenous shock involving larger debt service burdens.) But the direction of the impact, from the fiscal stance to aggregate income, remains the same; thus, the strain on the fiscal stance as a policy response to the external shock will be recessionary.

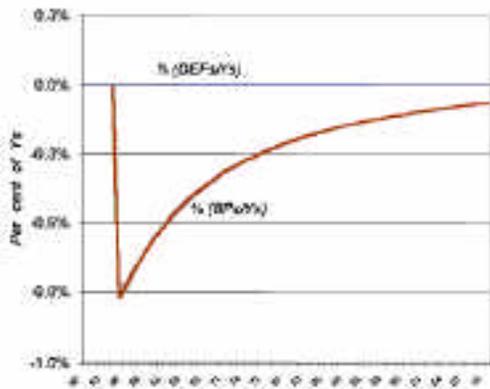
The external shock will, as above, initially affect the balance of payments, leading to lower national income and lower tax revenue. By adjusting spending the forces of the demand multiplier will weaken. Thus, it is expected that the initial drop in exports will be compensated by lower imports. The current account imbalance will, in time, disappear. A new problem arises because the country initially unaffected by the shock will start to experience a similar type of shortage in its external sector; its income will deteriorate and with it, imports from the South. Due to the adjustment from the spending side in both countries, all financial balances will tend toward zero and the system will be, in this respect, stable. Yet, lower aggregate demand and income will affect both countries, feeding each other down the road. The system will generate continuous unemployment.

This sequence is fully reproduced by the simulation obtained after having inflicted the same shock experienced above by the South. As shown in Chart 4, the fiscal sector stays in balance, while the initial balance of payments deficit caused by the shock in 1955 tends to smoothly disappear.

The public sector was required to maintain its balance by reducing spending at par with lower tax revenue. The contraction is relatively drastic in the initial period, but the decline continues, though at a different pace. Chart 5 provides a plot corresponding to public sector tax income and current spending<sup>15</sup> (left-hand side scale). The other line, using the right-hand side scale, is our RFS ( $G_s / \theta s$ ). This trend would be proportional to that of government spending since the tax rate is unchanged. Moreover, it hints at the expected shape of aggregate demand and income, as explained above.

Chart 6 conveys clearly the notion that by tightening the fiscal stance in one country, aggregate income of the system as a whole deteriorate dramatically. The dotted line is the RFS of the South as a ratio to "full-employment national income" (the level before the shock). Both its initial sharp decline and the decreasing trend thereafter are matched by a "global" recession at a similar pace.

**Chart 4: Fiscal and Current Account Balances of the South Resulting from Fiscal Tightening**



**Chart 5: The Fiscal Stance and Current Expenditure and Tax Revenue**

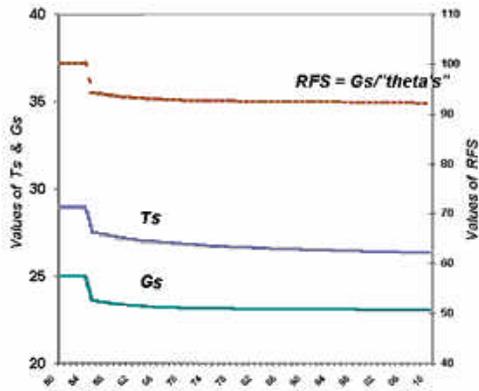
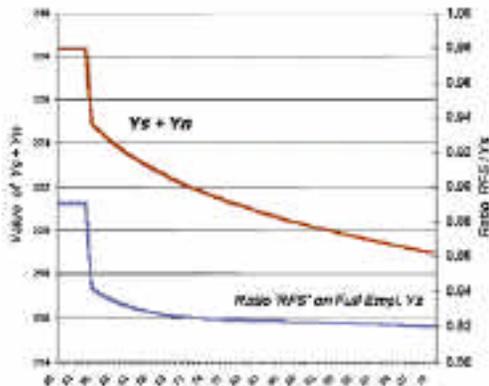


Chart 6: Fiscal Tightening and Global Recession



Of both countries, the South experiences a more drastic recession since it is the import *propensity* of the North that affected its revenue in the first place. The impact on the North, and its feedback onto the neighbor country, depend on the size of the multiplier as much as on the application of restrictive fiscal policies. By standard assumptions about employment elasticities, it seems self evident that the system expels an increasing amount of workers from their economies in both countries.

## CONCLUSION

By dismantling exchange rate and monetary policy, a dollarized economy is left with only two options after an exogenous shock. It could stick to the previously determined priorities that have structured the patterns of demand, employment, income, and distribution, while leaving to supply and demand for bonds the task of financial consolidation. The alternative is adjusting to the shock by tightening the fiscal stance, thus achieving by contraction financial consolidation, disregarding whether the structural patterns of demand would be altered, perhaps irreversibly.

In order to explore these alternatives, an axiomatic flow-stock model is constructed. The model is based on the accounting principle that all flows have a counterpart and accumulate over time, feeding into the balance sheets of the system. It can therefore be determined, for given macroeconomic relations, how exogenously generated imbalances are absorbed by each sector. Indeed, by provoking a fall of export demand affecting the South, two clearly distinguished scenarios result.

Under the first scenario the fiscal stance is exogenous, which could be seen as a desirable characteristic of economic policy. However, the lack of export demand from the North affects net foreign earnings and, thus, national income in the South, which translates into meager tax revenue. The result is deficits in both external and fiscal accounts. To a limited extent, either reserves or some form of direct financing from the central bank may help. Yet, at a certain point the government in distress requires additional financing; that is, debt. In order to sell bonds, the interest rate must rise. Debt services mount, aggravating the fiscal burden, thus necessitating more bonds to be issued, etc. The model yields an inherently unstable solution, since the interest rate rises indefinitely.

The second scenario does not allow fiscal deficits. The policy goal is no longer a fiscal stance consistent with the structure of demand, but that of fiscal balance that adjusts spending automatically. By achieving fiscal stability via contraction, domestic income is affected. The trade imbalance tends to correct itself due to fewer imports. Now the initially unaffected country experiences a slowdown because of a lack of export demand. Though stable from a finance point of view, this scenario is recessionary, generating unemployment.

The model presented simplifies the complex process of economic adjustment by real-world countries facing real shocks. More comprehensive analytical frameworks, which allow the inclusion of a third block representing the rest-of-the-world, define production functions constrained by imports, or specify relative price changes, etc., may shed additional light on the problems typically faced by dollarized countries. We would not expect, however, that more complex analytical frameworks would reverse the conclusions reached in this paper. Rather, by streamlining the analytics, the link between the external balance, the financial system, and the fiscal sector in a formally dollarized regime has been unveiled.

The framework set out above, even if purely axiomatic, yields results sufficiently informative for policy. In a nutshell, by dismantling the exchange rate and monetary policy, fiscal policy is no longer a policy tool if the financial stability of the system is to be guarded. But then, policymakers are fully deprived of available policies to generate income and protect employment. If none of these is a sensible option, an irreversible dollarization turns out to be a dead end.

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## NOTES

<sup>1</sup> Godley's critique of a "common currency without common government" was also based on the hypothesis that these regimes would lead to "polarization rather than convergence" (Godley 2001, 1988; Godley and Christodoulakis 1987; Godley and Coutts 1990; Godley and Cripps 1978; and Godley and May 1977). The core argument is consistent with that of Kaldor (1980), who points to the fact that the modern theory of international trade misleadingly assumes perfect competition and aggregate production functions with constant returns to scale. In reality, however, dynamically increasing returns to scale, and far-from-perfectly competitive markets lead to "a process of polarization in which success in competitive performance feeds into itself and losers become immiserated by trade." Godley and Cripps (1978) advance a proposition toward nonselective, non-discriminatory, and coordinated import controls to raise output between partners.

<sup>2</sup> This model is a variation of the one presented in Izurrieta (2001), which was, in turn, a special case of the more general analytical framework proposed in Godley (1999). The present version is enriched by fruitful discussions with, notably, M. Lavoie and J. Bibow. In particular, it was noticed that because that model intended to tackle all cases of "common currency" (i.e., the EMU, currency board systems, and dollarization) it required an underlying accounting structure that was too artificial and, thus, of little practical use.

<sup>3</sup> The emphasis on accounting consistency and, specially, the incorporation of financial accounts (both flows and stocks) into the system of production and distribution accounts (à la Meade and Stone 1941) is owed to Denizet (1963), Tobin (1969), and Roe (1973). Notable developments of this methodology can be found in the traditions of the "Cambridge Economic Policy Group Models" (see Godley and Cripps 1976) and models based on "Social Accounting Matrices" (Pyatt and Round 1977).

<sup>4</sup> Properly speaking, the "dollar" should be issued by, say, the "Treasury" of the North country, rather than by a "neutral" central bank. The latter was chosen to emphasize that the results are symmetrical, i.e., independent of which country holds the central bank prerogative.

<sup>5</sup> The exclusion of transfers across the border is not only a simplifying assumption; it is meant to emphasize the main difference with respect to a Federal System. If it existed an automatic compensatory mechanism from surplus states to deficit states then sharing a common currency and a central bank would not lead to the trap of fiscal repression or instability hypothesized here because, in some ways at least, governments would compensate each other via those types of transfers.

<sup>6</sup> It may not be sufficiently emphasized that, according to the conventional wisdom, macroeconomic imbalances result from public sector financial failures, while at the same time it is assumed that the private sector is balanced. Such a misconception has led, more often than not, to catastrophic financial and systemic crises around the globe. Moreover, it was also the case (for example, in Ecuador and elsewhere (Izurieta 2000)) that it was private sector financial failures that first unleashed crises leading to dollarization or currency boards systems. Thus, assuming that the entrepreneurial sector is in balance and that there is no banking sector (or that it exists but that its role is purely intermediary, thus balanced), leads to the (generous) omission of one or more possible causes of economic instability.

<sup>7</sup> The same values of the coefficients have been chosen for both countries in order to rule out the argument, made in other studies, that the inherent instability of common currency settings is due to differences in economic structures and portfolio behavior within the common currency block.

<sup>8</sup> The software used is Modler, from Alphametrics ([www.modler.com](http://www.modler.com)).

<sup>9</sup> Notionally, the model would eventually reach a steady-state solution independently of the baseline used. In practice, however, convergence to the steady state would depend on numerical algorithms, and would, in any case, involve a longer period if the baseline was too far from a steady state.

<sup>10</sup> In passing, it can be noticed that the total amount of government treasury bills available to the South tends to slide down, moderately. This is because the total amount of bills that can be issued are assumed to be equal to the total amount of money demanded by the system of the two countries. Since money demand in each country is proportional to wealth, and wealth declines when income declines, then total money demand decreases.

<sup>11</sup> Notice that there are fewer bonds sold domestically than sold abroad despite their propensities being equal and the interest rates the same. This is because income in the South is less than in the North due to the shock itself.

<sup>12</sup> It perhaps should be emphasized that such a solution, which implies financial stability with stagnation, is not an issue of the level of desired PSBR chosen (as put forward by those economists who question the specific parameters of the Maastricht treaty), but of the nature of the adjustment *per se*.

<sup>13</sup> Assuming that there are no factor payments across the border, the following can be derived from [21]:

$$G_s = PSBR_s + T_s, \text{ where now } PSBR_s \rightarrow 0$$

Considering that  $T_s = \theta_s \cdot GDP_s$  in the standard macro model, replacing and rearranging the above yields:

$$\frac{G_s}{\theta_s} = GDP_s$$

<sup>14</sup> Using the full expression in [21], and considering that the relation between tax revenue and *national* income can be rewritten as  $T_s = \theta_s \cdot (Y_s + B_{ss_{-1}} + B_{ee_{-1}})$ , and after rearranging:

$$\frac{G_s}{\theta_s} = Y_s - \left[ \frac{1}{\theta_s} B_{ns_{-1}} + \frac{1 - \theta_s}{\theta_s} B_{es_{-1}} - B_{en_{-1}} \right]$$

<sup>15</sup> Current government spending is systematically lower than tax revenue due to debt payments (at the baseline level). The novelty of this scenario is that, since the public sector deficit is contained, there are no additional financing requirements and, thus, neither the debt stock nor the interest rate need to rise. Thus, debt service payments are stable through the entire period.