Working Paper No. 337

Can Countries under A Common Currency Conduct Their Own Fiscal Policies?

by
Alex Izurieta
The Jerome Levy Institute of Bard College

August 2001

The author has greatly benefited from the modeling work done by Wynne Godley on this subject, and from his original insights, which informed the debate over the EMU more than a decade ago. His support and interest over the period of drafting this paper were crucial. Possible errors in this document remain the responsibility of the author.

The debate about balance of payment problems is generally linked with adjustments in the fiscal sector, especially since the views of Bretton Woods institutions became predominant (Polak 1957, 1995; Izurieta 2000). For the most of theoretical models which currently inform policy (Hinkle and Montiel 1999, Dominguez and Frankel 1993, Pilbeam 1992, Dornbusch 1987), it is becoming common ground that in a world of free trade and free capital movements, a floating rate of exchange may clear the market in financial assets. In these models, the persistence of balance of payment problems is attributed to either rigidities in the fiscal sector (inability of the public sector to balance the budget), or in the labour market (trade union pressures and welfare protective measures leading to uncompetitive salaries).(1)

This approach, which makes the fiscal stance culprit of macroeconomic imbalances in countries with floating exchange rates, is also applied to countries that have adopted other, more rigid forms of exchange rate policy, such as currency boards, dollarization, and common currency agreements.(2) It seems to be overlooked that systems of common currency pose problems of an entirely different kind because two major mechanisms of macroeconomic adjustmentexchange rate flexibility and money issuingare obviously removed. Thus, theoretical and policy-oriented propositions need to take into account this new set of restrictions.

In the early 1990s, when EC countries opened up the discussion about monetary union, Godley (1991, 1992) made efforts to bring the debate to macroeconomic-consistent propositions capable of informing policy. The main arguments are as follows:

- Monetary union and supra-national management of the currency could only be unproblematic if it is believed "that economies are self-righting organisms which never under any circumstances need management at all." But if this view is incorrect (and the experience tends to confirm that this is the case), then a monetary union leaves a country with fewer handles than before to sort out macroeconomic problems.

- A common currency setting not only inhibits exchange rate flexibility and money issuing, it also brings to an end the possibility for a single nation to run fiscal deficits since the major sources of finance are either removed or subject to supra-national entities. In sum, exchange rate, monetary and fiscal policies for individual countries are all removed at once. Considering the role of government in public provision, income distribution, employment, demand, and ultimately growth, "the incredible lacuna in the Maastricht program is that there is no blueprint whatever of the analogue, in Community terms, of a central government."

- A common currency, far from promoting *convergence* among countries (claimed to be result of the enhancement of free trade), it rather permits the concentration of successful industries in some areas and inhibits the growth of such activities in others. In consequence, it could bring about polarization.(3)

Unfortunately, the path opened up by the aforementioned arguments was concealed by uncritical adherence to pro-market economics, if not by partisan views and vested interests influencing policymakers of the various European countries, actually leading to an impoverishment of discussions around the EMU.

Admittedly, more serious discussion recently has taken place after increasing evidence that the Pact for Stability and Growthapplicable to the EMU, and IMF-designed programmes endorsing dollarization in developing countries severely undermine the fiscal maneuver of individual countries. There are reservations about a supranational entity influencing politically sensitive domestic affaires such as taxation, social welfare, and military expenditure (e.g., Moss and Michie 1998, Kenen 1995, Waelbroeck 1987). Other critics emphasize that unique rules may not be equally successful in countries with different economic structures (Arestis and Sawyer 2001, Arestis, Mariscal, Brown, and Sawyer 2001). Other authors have questioned the arbitrariness of parameters ruling a common currency setting (Pasinetti 1998). Recent studies on *dollarization,* after comparing it with flexible exchange rate systems, conclude that the benefits of the former remain ambiguous (particularly if the effects of trade shocks on welfare, unemployment, and problems of governance are brought into the picture). (See Vos 2000, Berg and Borenzstein 2000, Hausmann et al. 2000, Schmitt-Grohe and Uribe 2000, Dancourt 1999).

Encouraged by these studies, the purpose of this paper is to take stock by bringing to the fore the more fundamental questions raised by Godley in earlier work.(4) The focus of this study is whether country-specific fiscal policies could operate at all within the boundaries of a common currency setting.

A macroeconomic model will be delineated that shows, in a consistent way, why attempts of fiscal independence lead to inherently unstable common currency systems. If indeed money issuing and fiscal maneuver are ruled-out, it is likely that individual countries facing external shocks would be induced to stagnation if the causes of the shock persist. Therefore, the only sensible choice for a country wishing to preserve its ability to exercise active policies would be to stay away from a monetary union or dollarization.

The model, axiomatic and simplified to the limit that it encompasses the minimum denominator of common currency scenarios, is outlined in section 2. As shown in section 3, it generates a steady-state baseline solution. However, if one of the countries is hit by an external shock or implements fiscal policies of its own, there is no stable solution. The instability of the system is explained by explosive interest rates in the country in deficit. These results are compared, in section 4, with a variation of the same model in which a fiscal constraint is imposed. Shocks would be absorbed by curtailing expenditures. In this case the result is a permanent deterioration of output and employment, with no recourse for fiscal expansionary policies. Finally, section 5 concludes the paper and suggests to either stay away from a common currency or to create a common fiscal entity, such as a federal government, that would take care of regions and sectors in disadvantage via transfers, subsidies and local policies.

AN AXIOMATIC MODEL BASED ON A CONSISTENT SYSTEM OF ACCOUNTS

The analytical framework encompasses the main stylized facts that are relevant to economic adjustment in common currency scenarios. It is inspired in the tradition of empirical models that link money with aggregate demand, the generation of income and the allocation of wealth (Kaldor 1957, Lavoie 1984, Minsky 1989, Godley 1999). The model is based on the principles of national accounts (Meade and Stone 1941; Denizet 1967, Roe 1973, SNA 1968, 1993), wherein transactions, constraints and balances are consistently incorporated in the solution.(5) Furthermore, this framework integrates flows and stocks in a dynamic process, as portrayed by Godley and Cripps (1983), and more recently in Lavoie and Godley (2000) and Lavoie (2001).

The model proposed here is noticeably parsimonious: it represents the minimum set of behavioral relations and institutional structure that tackles the question of macroeconomic stability resulting from shocks and fiscal responses under common currency.(6) Its most critical restrictive assumptions are:

(i) The model represents two countries (North and South), although the common system within each is considered a closed economy. It could be argued that a common system (or economic block) could turn into a win-win situation for all of its members by improving its performance vis-à-vis the rest of the world. Yet this would not invalidate the proposition that one single country could be permanently affected by external shocks and policy changes if it remains locked to a common currency. The simplified model structure rather helps to isolate the core problems.

(ii) Rates of interest and the price of bonds are the only endogenous prices. The analysis focuses on the macroeconomics of deficit financing in reaction to exogenous or policy changes. Variations in model outcomes resulting from endogenous changes in domestic or external prices might offer a more

realistic picture of adjustments in the real world, but would not invalidate the conclusions obtained here.

(iii) Commercial banks are absent, so that financing takes place directly between households, firms, governments, and the common central bank. Institutions in. As indicated below, by omitting banks the stock-flow process was merely simplified and made more transparent.

(iv) The baseline steady-state is a system with a flat rate of growth in real terms. When positive growth dynamics are allowed, results did not change qualitatively (the only difference being that trends were more sharply divergent than those obtained departing from a horizontal growth rate). On the other hand, the model with positive growth became unnecessarily more complex and volatile.

The economic structure is shown first by the accounting of institutions (Table 1). The form used was proposed by Tobin (1969) and further developed by Godley (1996, 1999) and Lavoie (2001) in their analyses of endogenous money and stock-flow adjustments.

The notation for the institutional split is HH for households, ENT for enterprises, and GOV for government. A peculiarity of this set-up is the full specification of institutions in the *rest-of-the-world* (the North is the domestic economy, the South being the *rest-of-the-world*). There is only one central bank (CB) issuing the common currency, which can be held at the North (Hn) or at the South (Hs).

Table 1: The Flow-Stock Transaction and Balance Matrix

	NORTH			**SOUTH**			**CB**	**Row**
	HHn	**ENTn**	**GOVn**	**HHs**	**ENTs**	**GOVs**		**Sum**
Consumption	$-Cn$	$+Cn$		$-Cs$	$+Cs$			0
Govt. expenditure		$+Gn$	$-Gn$		$+Gs$	$-Gs$		0
External Trade		$+Xn$ $(=Ms)$			$-Ms$ $(=-Xn)$			0
		$-Mn$ $(=-Xs)$			Xs $(=Mn)$			0
Output / Income	$+Yn$ $(=Wn)$	$-Yn$		$+Ys$ $(=Ws)$	$-Ys$			0
Tax	$-Tn$		$+Tn$	$-Ts$		$+Ts$		0
Interest on Government Bonds	$+Bnn_{-1}$		$-Bnn_{-1}$					0
	$+Bns_{-1}$					$-Bns_{-1}$		0
			$-Bsn_{-1}$	$+Bsn_{-1}$				0
				$+Bss_{-1}$		$-Bss_{-1}$		0
Flow balances	$+FAn$	0	$-PSBRn$	$+\Delta FAs$	0	$-PSBRs$		
Flow-of-Funds: financial allocations of institutions	$-\Delta Bnn.p_{bn}$		$+\Delta Bnn.p_{bn}$					0
	$-\Delta Bns.p_{bs}$					$+\Delta Bns.p_{bs}$		0
			$+\Delta Bsn.p_{bn}$	$-\Delta Bsn.p_{bn}$				0
				$-\Delta Bss.p_{bs}$		$+\Delta Bss.p_{bs}$		0
			$+\Delta Bcn$				$-Bcn$	0
						$+\Delta Bcs$	$-Bcs$	0
	$-\Delta Hn$						$+Hn$	0
				$-\Delta Hs$			$+Hs$	0
			$-\Delta ORn$				$+ORn$	0
						$-\Delta ORs$	$+ORs$	0
Sum of Transactions	0	0	0	0	0	0	0	
	$+\Delta p_{bn} Bnn_{-1}$		$-\Delta p_{bn} Bnn_{-1}$	$+\Delta p_{bs} Bss_{-1}$		$-\Delta p_{bs} Bss_{-1}$		0

Holding gains	$+\Delta p_{bs}\ Bns_{-1}$		$-\Delta p_{bn}\ Bsn_{-1}$	$+\Delta p_{bn}\ Bsn_{-1}$		$-\Delta p_{bs}\ Bns_{-1}$		0
Balance sheets								
Stock of Bonds	$+Bnn.p_{bn}$		$-Bnn.p_{bn}$					0
	$+Bns.p_{bs}$					$-Bns.p_{bs}$		0
			$-Bsn.p_{bn}$	$+Bsn.p_{bn}$				0
				$+Bss.p_{bs}$		$-Bss.p_{bs}$		0
Stock of Money	$+Hn$						$-Hn$	0
				$+Hs$			$-Hs$	0
Government Bills			$-Bcn$				$+Bcn$	0
						$-Bcs$	$+Bcs$	0
Gov. Gold Reserves			$+ORn$				$-ORn$	0
						$+ORs$	$-ORs$	0
Stock balances	***Vn***		***DebtGn***	***Vs***		***DebtGs***	0	

The upper block of the double-entry table reproduces the transactions that determine output, aggregate demand and disposable income of the North (indicated by the suffix *n*) and the South (suffix *s*). These are represented by the following equations.

[1] $$Yn = Cn + Gn + Xn - Mn$$

[2] $$Ys = Cs + Gs + Xs - Ms$$

[3] $$Mn = \mu_n Yn$$

[4] $$Ms = \mu_s Ys$$

[5] $$Xn = Ms$$

[6] $$Xs = Mn$$

[7] $$YDn = Yn + Bns_{-1}^{d} + Bnn_{-1}^{d} - Tn$$

[8] $$YDs = Ys + Bsn_{-1}^{d} + Bss_{-1}^{d} - Ts$$

[9] $$Cn = \alpha_{1n} YDn + \alpha_{2n} Vn_{-1}$$

[10] $$Cs = \alpha_{1s} YDs + \alpha_{2s} Vs_{-1}$$

Equations [1] and [2] explain income and demand of the two countries. Factor payments are simplified so that value-added is equal to wages (Yn=Wn ; Ys=Ws) due to households. ***C*** *and* ***G*** *represent private and public consumption respectively (including investment, for sake of simplicity);* ***X*** *and* ***M*** *for exports and imports. Imports of both countries are a proportion of their income (equations [3] and [4]), while these are in turn the exports of the partner country (equations [5] and [6]).*

Equations [7] and [8] determine household disposable income: income after taxes *T* , including financial revenues. *B* stands for government bonds, and the suffices represent, respectively, the holder of the

asset and the holder of the liability (i.e, Bns are bonds held in the North and issued by the South). Households receive flows of payments on the bonds they hold equal to the interest rate times the price of bonds times the opening stock ($rb.pb.B_{-1}$, where $rb = 1/pb$). Bonds were chosen as a means for governments to raise funds from households because of the similarities with equities, thus enabling a proper estimation of real balance effects. More importantly, if bills or other interest-bearing asset were used, a (contractionary) rise of interest rates would go hand in hand with an (otherwise expansionary) increase of PSBR. Even if the model would still work out fiscal and interest rate disturbances, the interpretation of a mixed outcome rests ambiguous.

Equations [9] and [10] are the critical behavioural relations that set the dynamics of aggregate demand and income, as well as that of wealth accumulation. It should be emphasized that the inclusion of wealth in the consumption function(s) involves substantive propositions. One, it allows for real balance effects because wealth, defined below, incorporates holding gains and losses. Macroeconomic analyses of modern economies are misleading if unable to take into account the change in the net worth position of agents, as much as their cash flows. Two, the (Keynesian) multiplier is revised, since there is now a stabilizing force in the form of wealth that has a steady-state relation with income. Three, the effect of wealth on demand explains a dynamic aspect of the theory of "endogenous money" that is generally overlooked in the literature (Godley 1999a, Godley and Lavoie 2000, Lavoie 2001).(7)

Financial wealth of the private sector, V, is defined by equations [11] to [14]. The accumulation of wealth results from net saving (the gap between income and spending, including investment), which is equal, by rules of accounting, to net lending (ΔFA, net acquisition of financial assets; see UN et al. 1993; Izurieta 2000) plus holding gains (equal to the change of price of bonds, Δp, times the opening stock). This is particularly relevant to the study of financial instability under common currency scenarios, since the holding gains/losses experienced by private owners resulting from changes in interest rates/price of bonds would be at the same time holding losses/gains for the government.

[11] $$Vn = Vn_{-1} + \Delta FAn + \Delta p_{bn} \cdot Bnn^{d}_{-1} + \Delta p_{bs} \cdot Bns^{d}_{-1}$$

[12] $$Vs = Vs_{-1} + \Delta FAs + \Delta p_{bs} \cdot Bss^{d}_{-1} + \Delta p_{bn} \cdot Bsn^{d}_{-1}$$

[13] $$\Delta FAn = YDn - Cn$$

[14] $$\Delta FAs = YDs - Cs$$

The finances of the public sector, defined in the form of public sector borrowing requirements, are set out below. Tax collection is a fixed proportion of national income (or its equivalent in terms of disposable income, which takes account interest payments):

[15] $$PSBRn = Gn - Tn + Bnn^{s}_{-1} + Bsn^{s}_{-1}$$

[16] $$Tn = \frac{\theta_n}{(1-\theta_n)} \cdot YDn$$

[17] $$PSBRs = Gs - Ts + Bss^{s}_{-1} + Bns^{s}_{-1}$$

[18] $$Ts = \frac{\theta_s}{(1-\theta_s)} \cdot YDs$$

In this initial set-up, the exogenous component of the fiscal stance is government expenditure (deficits are not ruled out). This makes it possible to simulate the impact of a fiscal expansion. Subsequently a restriction is imposed on the fiscal deficit, thus making government expenditure an endogenous variable for given levels of deficit.

Interest payments on bonds will increase the fiscal deficit. As shown below, the burden of the debt is

at the root of a systemic instability when an economy cannot respond to exogenous shocks with exchange rate fluctuations and the only financing instrument available is borrowing from the private sector. By the same token, the flow of interest payments on bonds enter in the determination of the external balance (BP):

[19] $$BPn = Xn - Mn + Bns^{s}_{-1} - Bsn^{s}_{-1}$$

[20] $$BPs = Xs - Ms + Bsn^{s}_{-1} - Bns^{s}_{-1}$$

The system of demand and supply of financial assets is determined in a way coherent to the accounting structure laid down in Table 1. The demand for government bonds is:

[21] $$\frac{Bsn^{d} \cdot p_{bn}}{Vs} = \gamma_0 + \gamma_1 r_{bn} - \gamma_1 r_{bs}$$

[22] $$\frac{Bss^{d} \cdot p_{bs}}{Vs} = \gamma_0 + \gamma_1 r_{bs} - \gamma_1 r_{bn}$$

[23] $$\frac{Bns^{d} \cdot p_{bs}}{Vn} = \gamma_0 + \gamma_1 r_{bs} - \gamma_1 r_{bn}$$

[24] $$\frac{Bnn^{d} \cdot p_{bn}}{Vn} = \gamma_0 + \gamma_1 r_{bn} - \gamma_1 r_{bs}$$

Coefficients for both countries and financial instruments are assumed to be the same. This choice is intentional so as to emphasize that the instability of a common currency system is not due, as argued elsewhere, to differences of economic structures and behavior within the system. Further, the prices of bonds are the inverse of their interest rates:

[25] $$r_{bn} = \frac{1}{p_{bn}}$$

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

Crucial to the money demand equations is the notion that the only source of liquidity is the hard currency issued by the common central bank. The proposed notation (subscripts "n" and "s") denote a single currency that can be demanded in one country or the other (in proportion to each country's private wealth). In this two-country world, money is a "foreign exchange reserve" for the private sector. Similarly, we would call 'gold' the international reserve held by governments.

[27] $$\frac{Hn^{d}}{Vn} = 1 - \frac{p_{bs} \cdot Bns^{d}}{Vn} - \frac{p_{bn} \cdot Bnn^{d}}{Vn}$$

[28] $$\frac{Hs^d}{Vs} = 1 - \frac{p_{bn} \cdot Bsn^d}{Vs} - \frac{p_{bs} \cdot Bss^d}{Vs}$$

The demand for money in its final form, after taking account of other portfolio assets (thus simplifying the system [21] to [28]), is contained in the following expressions(8):

[29] $$\frac{Hn^d}{Vn} = 1 - 2\gamma_0$$

[30] $$\frac{Hs^d}{Vs} = 1 - 2\gamma_0$$

The central bank (CB) would be willing to take bills issued by governments in accordance with its financial structure (see Table 1, "Balance Sheets"). Here, government bills are the only CB assets, while "gold" represents *government* assets deposited at the bank. The other liability is hard currency (its supply is specified below). If the CB increases the holding of bills issued by one government (equation) and households have expressed their demand for money, the demand for bills to the other government will be endogenously determined (equation).

[31] $$\frac{Hn^d}{Vn} = 1 - 2\gamma_0$$

[32] $$\frac{Hs^d}{Vs} = 1 - 2\gamma_0$$

In turn, "gold" reserves held in each country (whose total is fixed in this two-country world) is the closure rule for the external account(s). The dynamics of accumulation/des-accumulation of gold are symmetrical. Moreover, "gold held" in each country cannot be "negative." Such adjustment is represented in equations [33] to [36] (the variables Zon and Zos are logical expressions, defined in [34] and [35]). It is clear that neither country can increase its amount of gold if the other has exhausted its reserves.

[33] $$ORn = Zon \cdot Zos \cdot \left(ORn_{-1} + BPn - \Delta Hn^s + \Delta Bcn^s + p_{bn}\Delta Bsn^s - p_{bs}\Delta Bns^s \right) + (1 - Zon \cdot Zos) \cdot ORn_{-1}$$

[34] $$Zon = \langle 1 \,|\, ORn_{-1} > 0 \,; \quad \langle 0 \,|\, ORn_{-1} \leq 0$$

[35] $$Zos = \langle 1 \,|\, ORs_{-1} > 0 \,; \quad \langle 0 \,|\, ORs_{-1} \leq 0$$

[36] $$ORs = ORs_{-1} - \Delta ORn$$

Thus, governments need to finance their deficit or the accumulation of financial assets ("gold") and

they can do so either by emission of bills (exchanged at the CB) or bonds (sold to the public at a price, inverse to the interest rate). Assuming that the one country can effectively place its bills at the CB (according to equation [31]), their supply is determined by the following rule (with the constraint, specified in [38] that there cannot be "negative" bills)(9):

[37] $$Bcs^{s} = Zc \cdot \left(Bcs^{s}_{-1} + PSBRs + \Delta ORs - p_{bs} \cdot \left(\Delta Bss^{s} + \Delta Bns^{s} \right) \right) + (1 - Zc) \cdot Bcs^{s}_{-1}$$

[38] $$Zc = \begin{cases} 1 \left| \left(Bcs^{s}_{-1} \cdot Bcn^{s}_{-1} \right) > 0 ; \\ 0 \left| \left(Bcs^{s}_{-1} \cdot Bcn^{s}_{-1} \right) \leq 0 \end{cases}$$

The symmetry of the model structure is achieved by implying, through equations [37] and [33] to [36] (as applied to "s" instead of "n") that the capacity of the government to borrow from the CB is constrained by the accumulation of gold reserves (which is the typical way in which currency board systems work).

It is therefore clear that *the last resort for a government to finance its deficit is placing new bonds, at market-determined interest rates* . Equation [39] works through the symmetry of the system equally for both the North and the South. The remaining bond supply functions close by imposing equilibrium conditions. Among these, one equation (in this case equation) will be redundant so as to determine the interest rate of equilibrium.

[39] $$Bsn^{s} = \frac{1}{p_{bn}} \left(p_{bn} \cdot Bsn^{s}_{-1} + PSBRn + \Delta ORn - \Delta Bcn^{s} - p_{bn} \cdot \Delta Bnn^{s} \right)$$

[40] $$Bcn^{s} = Bcn^{d}$$

[41] $$Bnn^{s} = Bnn^{d}$$

[42] $$Bns^{s} = Bns^{d}$$

[43] $$Bss^{s} = Bss^{d}$$

[44] $$Bsn^{d} = Bsn^{s}$$

Considering that there are two interest rates on bonds (*rbn* and *rbs*), it is possible to fix one of the interest rates and the model will find a solution that generates endogenous changes in the other interest rate.

Finally, the CB cannot issue new money. It would supply to one country in response to demand (equation [45]), and to the other country only to the extent that the former has decreased its demand (or other components of the CB balance change at the margin, as proposed in equation).

[45] $$Hs^{s} = Hs^{d}$$

[46] $$Hn^{s} = Hn^{s}_{-1} - \Delta Hs^{d} - \Delta ORn - \Delta ORs + \Delta Bcn^{d} + \Delta Bcs^{d}$$

A non-trivial characteristic of the model solution is that the total money supply, specified by combining the former two equations, is found identical to the amount of money that agents wish to hold, *without imposing an exogenous equilibrium condition* . As emphasised in Godley (1999a), "this finding is inimical, possibly in the end lethal, to the way macroeconomics is currently thought as well as to the neoclassical paradigm itself" (pp. 393). In order to emphasize this point, the results of supply and demand of money after each model simulation, which ought to be equal, are plotted below.

Another relevant aspect of the adjustments in this model is derived from the way the stock-flow accounting is incorporated into the model's solution. Essential to the solution is the role of the CB in financing both governments by accepting bills. Yet, it could not take more bills than the stock of its liabilities (on whose *totals* the CB cannot decide). These liabilities result from the liquidity preferences expressed in each country (and thus from their private wealth) and from the portfolio of governments (gold, which cannot be created, only exchanged). Shifts of position in each country depend on the demand and supply functions expressed above, and must comply with the balance constraints of institutions. Among mentioned financial liabilities, only bonds can be seen as an endless source of financing against a cost (which, in turn, has a feedback in the (financial) income/expenditure outlays, as indicated in Table 1).

Further, standard assumptions relating to employment are incorporated, in order to gain a (preliminary) idea of the impact of model solutions on job creation and destruction. By the same token that the baseline assumes flat growth rate in real terms, the simplifying assumption of nil population (labor force) growth is made. Therefore, the hypothetical ratio of employment varies according to output growth, assuming standard elasticities ($\varepsilon n = \varepsilon s = 0.5$; i.e., a two-point increase of output generates a one-point increase in employment)[(10)]:

[47] $$En = En_{-1} + \varepsilon_n \cdot \Delta \ln(Yn)$$

[48] $$Es = Es_{-1} + \varepsilon_s \cdot \Delta \log(Ys)$$

POLICY SCENARIOS: INSTABILITY WITH FISCAL SELF-DETERMINATION

The reader will be spared the presentation of main variables of the baseline (steady-state) solution. Without exogenous disturbances the financial balances of the three sectors ($PSBR$, ΔFA and BP) in each country are zero, extending over time. Similarly, government expenditure, the (endogenous) adjustment of money supply to demand (levels and differences), and employment ratios are all horizontal. 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)* the baseline allows a quick convergence to the steady- state solution.[(11)] Interpretation of results requires considering that the unit of measure is such that GDP of each country is around 115, the balance of the Central Bank is around 65, and financial net worth of the private sectors are around 120.[(12)]

Subsequently, we inflict an external shock to the North in 1960 (a reduction of the import propensity of the South, therefore creating a trade imbalance in the North), and the system loses stability. The following charts show the divergences created in the main balances of the North, the implications of the shock for the fiscal balance (i.e., the generation of rising financial payments) and the movements of employment in both countries. Also shown is the endogenous adjustment of money supply and demand, which is an important feature of the conception of this model.

Figure 1: Simulation #1 : External Shock; Effect on the Three Balances of the North

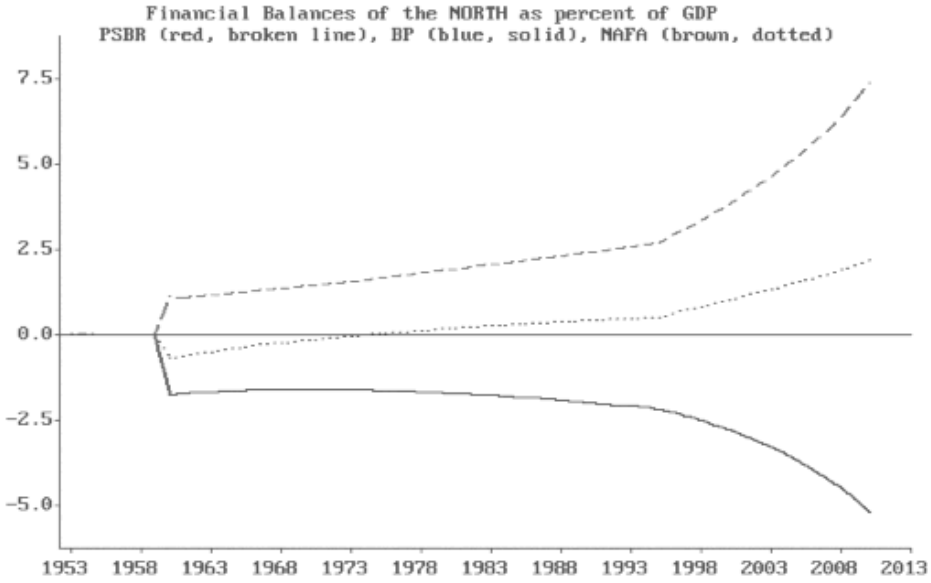


Figure 2: Simulation #1 : External Shock; Effect on the Composition of Government Spending

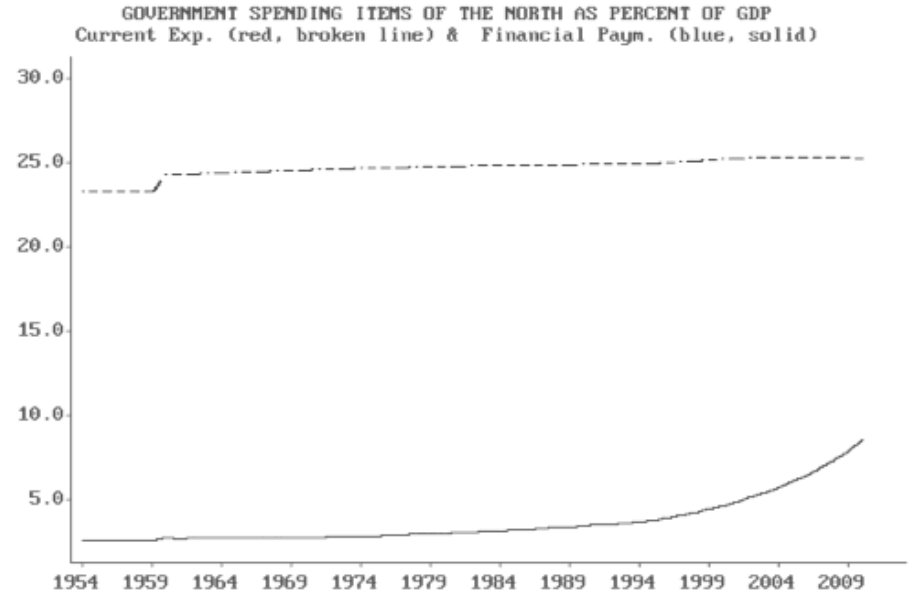


Figure 3: Simulation #1 : External Shock; Effect on the Money Balances in the North

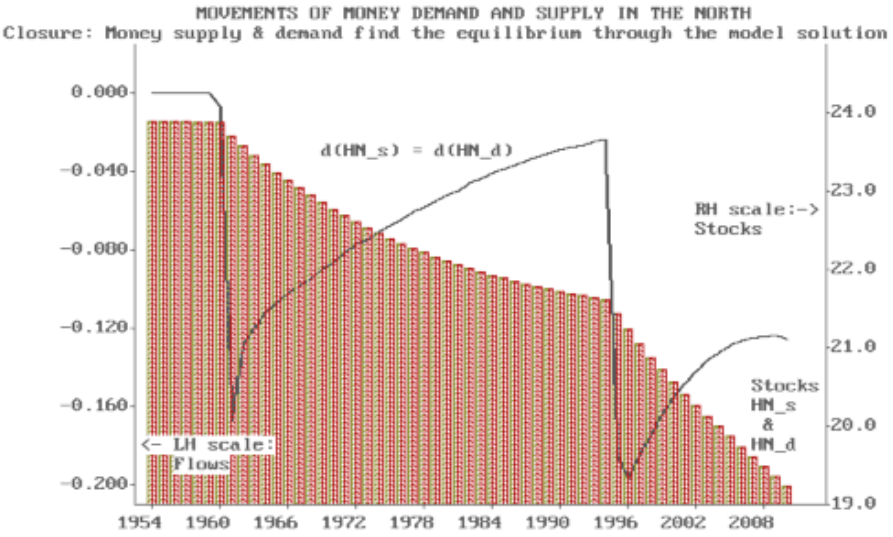
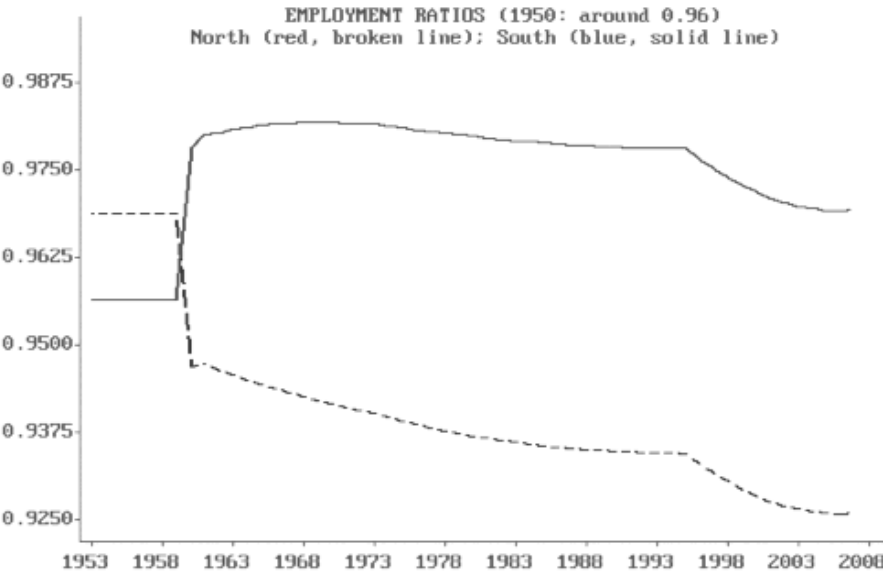


Figure 4: Simulation #1 : External Shock; Effect on Employment Ratios



The externalshock leads to explosive imbalances of the three sectors in the North, as shown in Figure 1.[(13)] The most obvious one is the external sector, since the shock directly affects exports of the North. Imports of the North also decrease, due to an economic slowdown (see Eqs. [1] and [3]), but the net effect (by our standard assumptions) turns out to be negative. Another factor affecting the external balance (worsening it as from the mid 1990s) is interest payments on debt.

The public sector imbalance is triggered, first, by reductions of tax receipts due to the slowdown (equations [15] and [16]). Next, when the government cannot finance its deficit by central bank bills (the point where the accumulation of balance of payment deficits exhausts the gold reserves of the North), it issues new bonds, placed to the public at a cost, thus further worsening the deficit.

If the two deficits (BP and PSBR) were equal, the private sector balance would be unaffected. The results show, however, that for a number of years the external imbalance is greater than PSBR, indicating higher (import) expenditures relative to disposable income. Thus the private sector balance is also negative. Over time, financial payments between public and private agents bring the private sector to positive area while worsening the public deficit (see Figure 2). A shift occurs in the mid 1990s, when private agents increase their income flow by earnings on the North's government bonds.

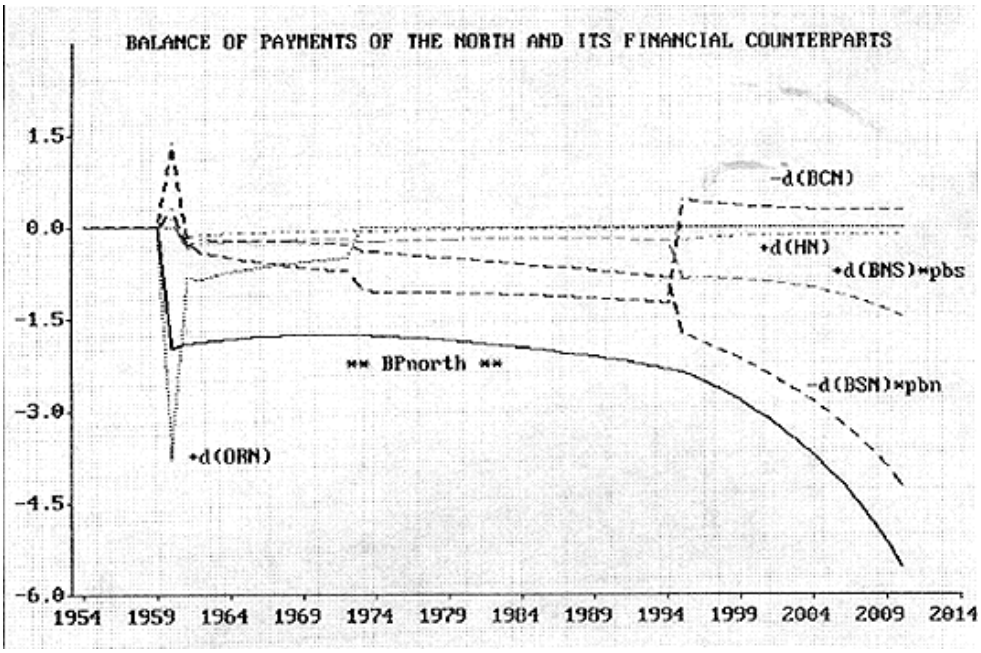
Figure 3 confirms that money demand and supply are equal while both being endogenous. It also shows the very peculiar pattern resulting from the external shock. Reductions in money holdings take two different slopes, and both are related to the deterioration of private wealth in the North. In a first instance the erosion of wealth is almost fully explained by a negative ΔFAn (net saving by the North drops due to the deterioration of private disposable income). In a second instance, the drop in wealth, which would affect money demand even more dramatically, is related to the loss of value of financial assets held by households in the North. This counts, in particular, for the holding losses represented by $\Delta pbn.Bnn$ from the moment the government of the North increases its supply of bonds in order to finance the deficit that can no longer be financed with Central Bank bills.

Figure 4 gives an indication of the shifts in employment between the North and the South due to the slowdown in the former and the growth experienced in the later.

Crucial to the model's solution is the way the components of the balance of payments evolve after the shock (shown in Figure 5). The trade deficit is first compensated by a loss of reserves ("gold": ORn), until reserves are exhausted (early 1970s). This is sharper in the initial period because of the drop of central bank bills (a raise of $-d(Bcn)$), due to the simultaneous increase of Bcs (see eq.[32]), which is, in turn, the result of a sudden rise of reserves in the South (ORs), (see eq.[37]). This movement is quickly reversed because the South, instead of running a fiscal deficit, runs a surplus and consequently releases central bank bills (as implied by eq.[37]). This process goes on up to the point where the South has no more central bank bills to release (mid 1990s).

From the moment the government of the North can no longer finance its deficit with central bank bills, its sole source of foreign assets is net acquisitions of bonds by the South (i.e., $[\Delta(BSN)*pbn - \Delta(BNS)*pbs]$), which indeed is shown by a drastic shift of these trends (Figure 5.) The pressure to sell more bonds would lead to lower prices (higher interest rates), whose service would worsen the balance of payments.

Figure 5: Simulation #1 : External Shock; Effect on the Three Balances of the North



POLICY SCENARIOS: SLUGGISHNESS WITH FISCAL CONSTRAINT

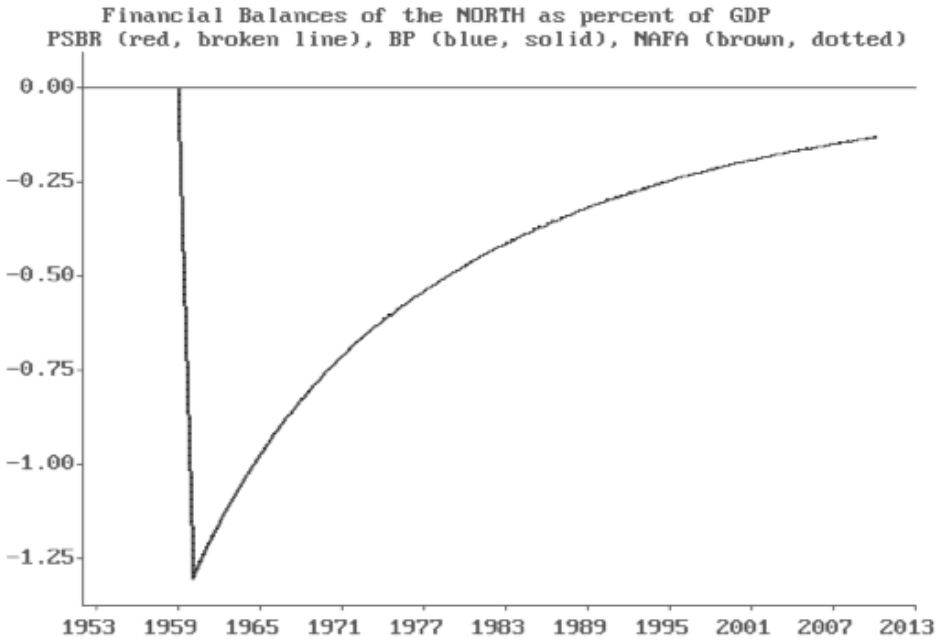
In the following simulation the same external shock is inflicted on the North as in the previous simulation (a one-time reduction of the import propensity of the South). The difference now is that a fiscal rule is imposed on the North. In particular, fiscal deficits are not allowed. Analytically, it requires substituting Eq.[15] for the following expression:

[49] $$Gn = PSBRn + Tn - \left(Bnn^{s}_{-1} + Bsn^{s}_{-1} \right)$$

In short, the public sector would adjust expenditure for given levels of deficit (in this case, to the baseline situation in which the public sector deficit is zero). The main difference with respect to the scenarios depicted above is that the government does not face financial constraints (it will spend only its cash flows) and thus it would not be necessary to issue more bonds. Even if the North's economy is affected by a shock, further reductions of expenditure and of imports will bring the private and the external accounts into balance. The long-term solution would be stationary. The downside, as we will see, is that output, wealth, and employment will deteriorate sharply.

Figure 6 shows the evolution of the three balances in the North after the shock in 1960. Since *PSBRn* is zero by construction, private and external balances are identical. The adjustment takes place by reductions of expenditure, income, wealth, and imports.

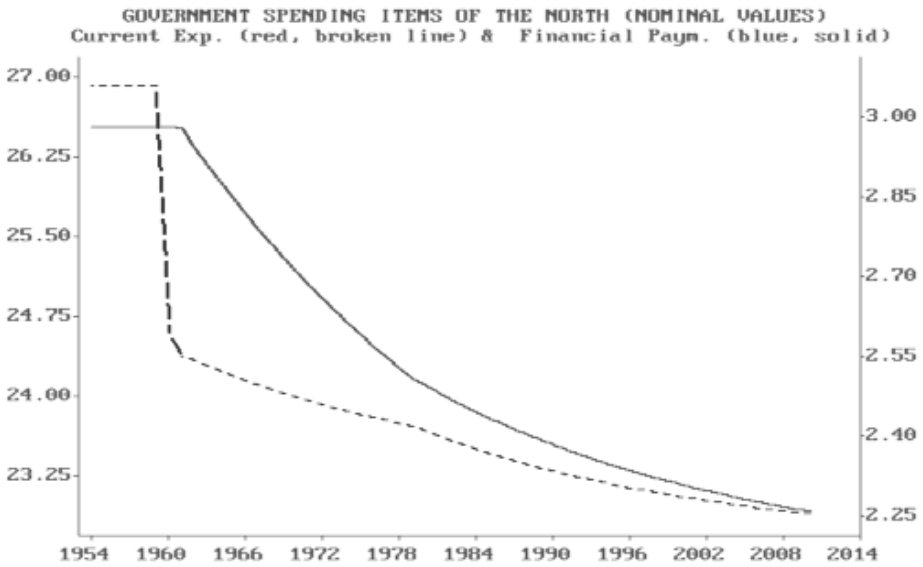
Figure 6: Simulation #1 : External Shock; Effect on the Three Balances of the North



It seems more convenient to now show the evolution of the composition of public expenditures in nominal values rather than as proportions of GDP (since GDP also experiences a dramatic downturn). Figure 7 (broken line) shows that current expenditure is cut simultaneously with the shock (the cut in exports leads to a cut in national income and thus in taxes, which directly reflects on expenditure, according to Eq.[49]). Further on, while the decreasing trend of GDP continues, financial payments of the public sector slide down (solid line of Figure 7), which works, by means of Eq.[49], by partially compensating the need to drop current expenditures at the same rate.

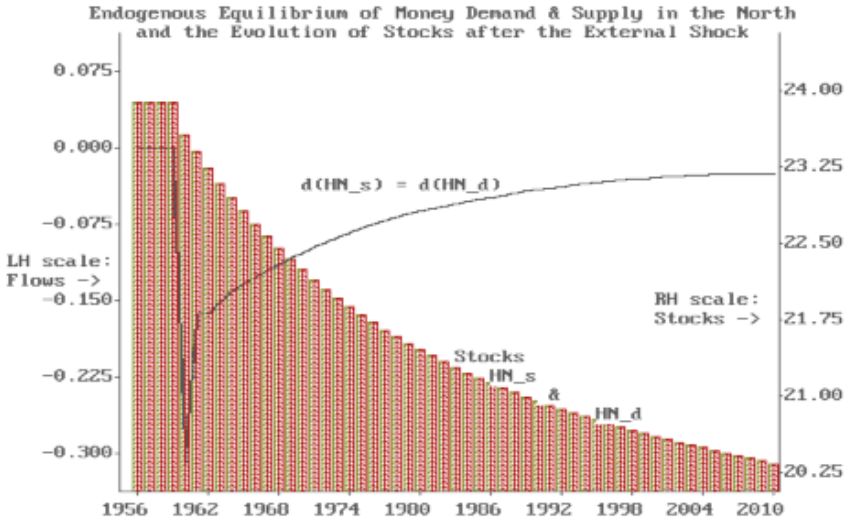
It needs to be understood that in this new setting both the supply and the demand for government bonds decrease over time. On the supply side, the government has no deficit to finance; on the demand side the private sector experiences a reduction of financial wealth (more sharply in the North than in the South). Since both supply and demand for bonds shift downward, interest rates are lowered (or the price of bonds rises), and thus financial payments pull back.

Figure 7: Simulation #2 : Effect on the Composition of Government Spending



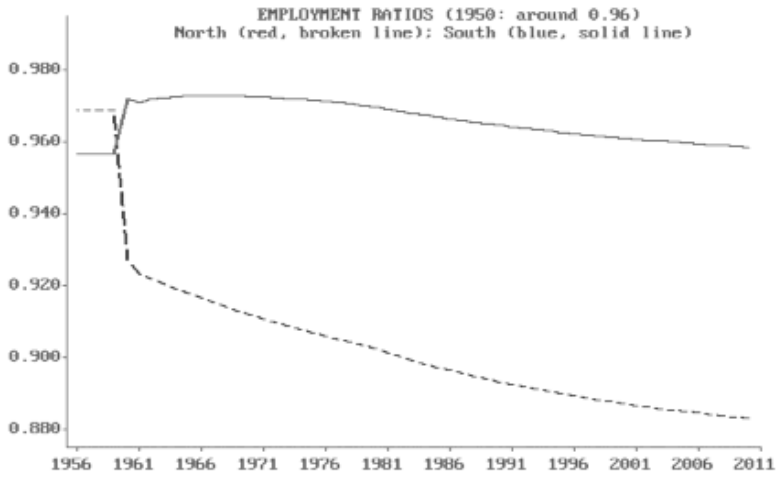
The evolution of money stocks held in the North (Figure 8, below) shows a less peculiar pattern. After the shock and its (one-period-lagged) correction, the demand for money keeps decreasing at a lower speed, following the pattern determined by the smooth reduction of wealth (both income and financial gains), approaching a stationary solution.

Figure 8: Simulation #2: Effect on Money Balances in the North



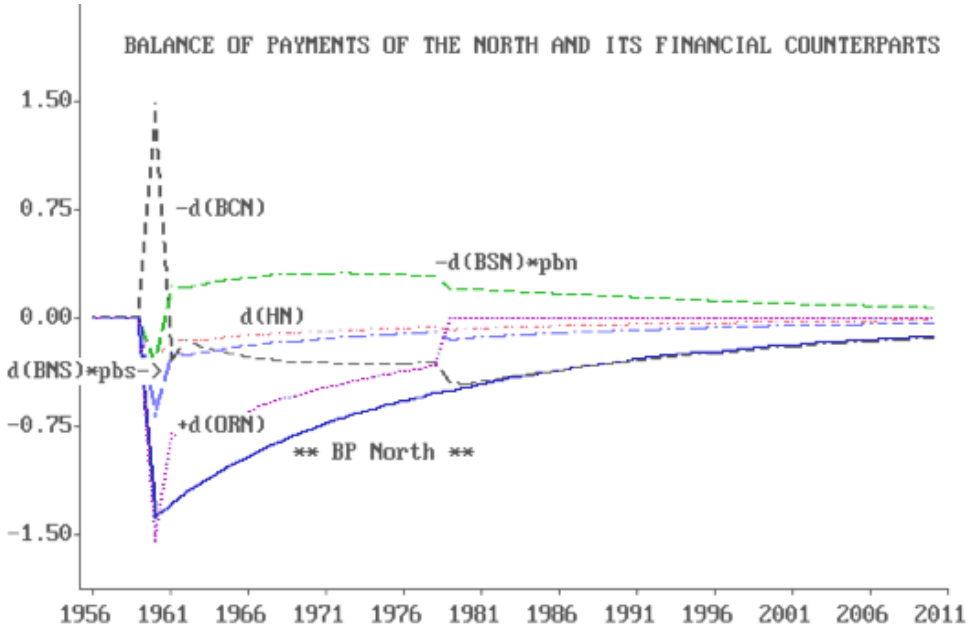
The (potentially stabilizing) patterns of adjustment shown above would have been good news, if it were not for the effect on income and employment. Figure 9, indeed, confirms that the strict fiscal rule (imposed as a necessity of the stability of the economy subject to the shock) forces an endless drop of income, wealth, expenditure and employment. A drop which is, moreover, not fully compensated by the (comparatively smaller) increase in the partner country.

Figure 9: Simulation #2: External Shock; Effect on Employment Ratios



Finally, for the sake of completeness, the adjustment of the components of the balance of payments is shown below. In this case the trade balance tends to self adjust and thus the exhaustion of foreign reserves ("gold": ORn) is slower. Besides, the emission of bonds for government finance purposes approaches zero over time, consistent with the fact that balance of payment needs decrease as well.

Figure 10: Simulation #2: Effect on Components of the Balance of Payments of the South



CONCLUSION

This paper proposes an analytical framework that allows an assessment of the implications derived from common-currency scenarios separate from passionate political discussions that seemed to have obscured the main issues in this type of debate. The model proposed is highly stylized in order to encompass both the cases of supranational central banks (EMU) and the cases of currency boards or dollarization (Argentina, Ecuador, Panama, El Salvador, etc.). The model is simplified so as to show how such a "stylized" economy faces an external shock. Such an approach does not preclude more work being done to make this analysis more applicable to a particular reality.

The main results could be summarized as follows:

Under common currency arrangements, a disequilibrium in the trade balance will be transmitted to the

fiscal and private sectors, leading to unstable financial markets. A country in financial distress and losing reserves would need to raise its interest rates to attract financing from the other end. Even if a central bank or similar entity is prepared to bail out the country in difficulty, it cannot do so unless other agents in the system (the other government or the private sector) are prepared to generate funds via liquidity demand or movements of gold. Since there is a limit to which this can be done the implication is a continuous shift upward of the supply of bonds and, thus, an explosive trend of interest rates. The system would not reach a stationary solution.

A fiscal rule (a fully-financed budget or tolerance of a fiscal deficit up to a fixed percentage of GDP) becomes a necessity of the common-currency system in order to avoid explosive interest rates. Such fiscal rules can only be sustained by a continuous deterioration of spending or by increasing tax rates. On the other hand, either reductions in government expenditure or increases in taxes would lead to lower national income; primarily in the deficit country, with implications in the surplus country as well. The above-described scenario will be accompanied by increasing unemployment in the deficit country. Unemployment in the surplus country cannot be unambiguously ruled out.

This appreciation is consistent with earlier writings in the particular case of the EMU, which remain valid (Godley 1991, 1992). In sum, when a country accepts giving up policy instruments such as the (real) exchange rate and the issuing of money, it can only *hope* not to be subject to an external shock. If an external shock takes place and persists, a relaxation of the fiscal stance to avoid a recession would lead to an explosive, non-stationary solution; that is, a *non solution* . Thus, a country ceding control of monetary instruments must give up control over fiscal policy as well. But in this case, not only the country subject to the shock, but the system of countries under common-currency agreement will experience losses to wealth, income, and employment. Therefore, staying away from a common currency regime is recommended.

APPENDIX

The stock-flow table based on double-entry introduced above is reproduced here in the format of a social accounting matrix, SAM (Pyatt and Round 1977, Alarcon et al. 1991). Its basic structure has been adapted to a detailed specification of the institutions of the external sector (the South).

The double-entry presentation, anchored in the tradition put forward in Tobin's Nobel Lecture (1969) has been characteristic of the work of Godley (2000, 1999, 1996, etc.). The SAM has become the conventional tool of analysis in many countries, and was incorporated in the 1993 SNA. It should be emphasized that both presentations are equally robust since they follow the same accounting principles, and both allow for the same flow-stock analysis that is central to the endogenous monetary theory of Godley.

The SAM's basic structure represents flows and can be adapted to a variety of research needs.

Of particular interest is the set of adjustments that take place in the flow of funds system, which is represented in the SE block of the SAM. The flow of funds can be further extended to the representation of holding gains and the accumulation of stocks. Thus, it is possible to draw, using the same matrix structure, an accounting structure in which each cell embodies, in a double-entry fashion, not only the flows but the holding of assets (and thus liabilities) from institution to institution. Thus, by addition of matrices the balance identity could be estimated:

Fin. Stocks (t) = Fin. Stocks (t-1) + NetΔ Fin.Assets (t) + Holding Gains (t)

In complex model structures (and in empirical research, where the number of institutions and assets is generally large) such a matrix structure is an ideal tool to locate sources and uses of funds, and similarly assets and liabilities, from institution to institution.

Table 2: The Social Accounting Matrix Underlying the "Common Currency" Model

	NORTH: *inc. / expend.*			SOUTH:*inc. / expend. outlays*			NORTH: *capital account*			SOUTH:*capital account*			C
	HHn	**ENTn**	**GOVn**	**HHs**	**ENTs**	**GOVs**	**HHn**	**ENT**	**GOVn**	**HHs**	**ENT**	**GOVs**	
HHn		Yn(=Wn)	Bnn_{-1}			Bns_{-1}							
ENTn	Cn		Gn		Xn(=Ms)								
GOVn	Tn												
HHs			Bsn_{-1}		Ys(=Ws)	Bss_{-1}							
ENTs		Mn(=Xs)		Cs		Gs							
GOVs				Ts									
HHn	SavHn												
ENTn		SavEn($\rightarrow$0)											
GOVn			-DEFn				**Pbn.ΔBnn**			**pbn.ΔBsn**			**B**
HHs				SavHs									
ENTs					SavEs($\rightarrow$0)								
GOVs						-DEFs	**Pbs.ΔBns**			**pbs.ΔBss**			**B**
CB							**ΔHn**		**ΔORn**	**ΔHn**		**ORs**	
Expenditure & Lending	**Exp.Hn**	**Exp.En**	**Exp.Gn**	**Exp.Hs**	**Exp.Es**	**Exp.Gs**	**NAFAn**		**ΔAs.Gn**	**NAFAs**		**As.Gs**	**As**

Notes: The structure of the SAM is simple and straightforward and assures the consistency of conventional *T* accounts of Income/Outlay tables organized by rows (Godley 1999). Each cell represents a monetary flow to the institution in the row, and an expenditure item or lending for the institution in the column. The SE block of the SAM is the flow-of-funds system. By adding these flows to holding gains (revaluation) and the stocks of the past the matrices of financial stocks can be obtained (Izurieta 2000).

REFERENCES

Arestis, P. and M. Sawyer. 2001. "Will the Euro Bring Economic Crisis to Europe?" Working Paper no. 322. Annandale-on-Hudson, N.Y.: The Levy Economics Institute.

Arestis, P., I. Mariscal, A. Brown, and M. Sawyer. 2001. "The Causes of Euro Instability." Working Paper no. 324. Annandale-on-Hudson, N.Y.: The Levy Economics Institute.

Arestis, P., K. McCauley, and M. Sawyer. 2001. "The Future of the Euro: Is There an Alternative to the Stability and Growth Pact?" Public Policy Brief No. 63. Annandale-on-Hudson, N.Y.: The Levy Economics Institute.

Backus, D., W. Brainard, G. Smith, and J. Tobin. 1980. "A Model of U.S. Financial and Nonfinancial Economic Behavior." *Journal of Money, Credit and Banking* 12, 2, Part 2 ("Financial Market Behaviour, Capital Formation, and Economic Performance) (May): 259-293.

Brainard, W., and J. Tobin. 1968. "Econometric Models: Their Problems and Usefulness. Pitfalls in Financial Model Building." *American Economic Review* 58, 2 (May): 99-122.

Chinn, M., and M. Dooley. 1999. "International Monetary Arrangements in the Asia-Pacific Before and After." *Journal of Asian Economics* 10: 3 (Fall): 361-384.

Denizet, J. 1967. *Monnaie et Financement. Essai de Théorie dans un Cadre de Comptabilité Économique* m. Paris: Dunod.

Dominguez, K., and J. Frankel. 1993. *Does Foreign Exchange Intervention Work?* Washington, D.C.: Institute for International Economics.

Dornbusch, R. 1987. "Open Economy Macroeconomics: New Directions." National Bureau of Economic Research Working Paper No. 2372.

Fanelli, J. M., and R. Medhora. 1997. "Financial Reform in Developing Countries: An Overview." In Fanelli, J. M., and R. Medhora, eds. *Financial Reform in Developing Countries.* London: MacMillan and IRDC.

Fatas, A. 1998. "Redistribution vs Insurance: Does Europe Need a Fiscal Federation?" In Begg, D., J. von Hagen, C. Wyplosz, and K. Zimmermann, eds. *EMU: Prospects and Challenges for the Euro.* Oxford: Blackwell Publishers.

Godley, W. 2001a. "Wynne Godley." In Arestis, P., and M. Sawyer, eds. *A Biographical Dictionary of Dissenting Economists.* (Second Edition). Cheltenham: Edward Elgar.

---------. 2001b. "Bush Should Triple His Tax Cuts." Comment & Analysis, *Financial Times* . January 22: 15.

---------. 2001c. *Fiscal Policy To The Rescue* . Policy Note 2001/1. Annandale-on-Hudson, N.Y.: The Levy Economics Institute.

---------. 2000. *Drowning in Debt.* Policy Note 2000/6. Annandale-on-Hudson, N.Y. The Levy Economics Institute.

---------. 1999a. "Money and Credit in a Keynesian Model of Income Determination." *Cambridge Journal of Economics* 23: 4 (July).

---------. 1999b. *Seven Unsustainable Processes. Medium-Term Prospects and Policies for the United States and the World* . Special Report. Annandale-on-Hudson, N.Y.: The Levy Economics Institute.

---------. 1996. "Money, Finance and Income Determination: An Integrated Approach." Working Paper no. 167. Annandale-on-Hudson, N.Y.: The Levy Economics Institute.

---------. 1992. "Maastricht and All That." *London Review of Books* 14: 19.

---------. 1991. "Britain and the Danger of EMU." Cambridge DAE Working Paper no. 911.

---------. 1988. "Manufacturing and the Future of the British Economy." In Baker, T., and P. Dunne, eds. *The British Economy After Oil: Manufacturing or Services?* London, New York, and Sydney: Croom Helm and Methuen.

Godley, W., and N. Christodoulakis. 1987. "Macroeconomic Consequences of Alternative Trade Policy Options." *Journal of Policy Modelling* 9, 3 (Fall): 405-436.

Godley, W., and K. J. Coutts. 1990. "Prosperity and Foreign Trade in the 1990s: Britain's Strategic Problem." *Oxford Review of Economic Policy* 6, 3 (Autumn): 82-92.

Godley, W., and F. Cripps. 1983. *Macroeconomics.* Oxford: Oxford University Press.

---------. 1978. "Control of Imports as a Means to Full Employment and the Expansion of World Trade: The UK's Case: Comment." *Cambridge Journal of Economics* 2, 3 (September): 327-334.

Godley, W., and A. Izurieta. 2001. *As the Implosion Begins...? Prospects and Policies for the U.S. Economy: A Strategic View* . Strategic Analysis. Annandale-on-Hudson, N.Y.: The Levy Economics Institute.

Godley, W., and R. May. 1977. "The Macroeconomic Implications of Devaluation and Import Restriction." *Economic Policy Review* 3, 1 (March): 32-42.

Hinkle, L., and P. Montiel. 1999. *Exchange Rate Misalignment: Concepts and Measurement for Developing Countries* . New York & Oxford: Oxford University Press (World Bank Research Publication).

Izurieta, A. 2000. "Crowding-out or Bailing-out? Fiscal Deficits and Private Wealth in Ecuador, 1971-99." Ph.D. thesis. Institute of Social Studies.

Kaldor, N. 1957. "A Model of Economic Growth." *Economic Journal* 67 (December): 591-624.

---------. 1980. "The Foundations of Free Trade and Recent Experiences." In Malinvaud, E., and J. P. Fitoussi, eds. *Unemployment in Western Countries: Proceedings of a Conference Held by the*

International Economic Association at Bischenberg. London: MacMillan.

Kenen, P. 1995. *Economic and Monetary Union in Europe: Moving Beyond Maastricht* Cambridge, New York, and Melbourne: Cambridge University Press.

Lavoie, M. 2001. "Endogenous Money in a Coherent Stock-Flow Framework." Working Paper no. 325. Annandale-on-Hudson, N.Y.: The Levy Economics Institute.

---------. 1984. "The Endogenous Flow of Credit and the Post Keynesian Theory of Money." *Journal-of-Economic-Issues* 18, 3 (September): 771-797.

Lavoie, M., and W. Godley. 2000. "Kaleckian Models of Growth in a Stock-Flow Monetary Framework: A Neo-Kaldorian Model." Working Paper No. 302. Annandale-on-Hudson, N.Y.: The Levy Economics Institute.

Meade J., and R. Stone. 1941. "The Construction of Tables of National Income, Expenditure, Savings and Investment." *Economic Journal* 51, 202/203 (Jun.-Sep.): 216-233.

Minsky, H. 1992. "Profits, Deficits and Instability: A Policy Discussion." In Papadimitriou, D., ed., *Profits, Deficits and Instability.* London: Macmillan.

---------. 1989. "Financial Structures: Indebtedness and Credit." In Barrere, A., ed. *Money, Credit and Prices in Keynesian Perspective.* New York: St. Martin's Press.

Moss, B., and J. Michie, eds. 1998. *The Single European Currency in National Perspective: A Community in Crisis?* New York: St. Martin's Press.

Papadimitriou, D., and L. R. Wray. 2001. *Fiscal Policy For the Coming Recession: Large Tax Cuts are Needed to Prevent a Hard Landing* . Policy Note 2001/2. Annandale-on-Hudson, N.Y.: The Levy Economics Institute.

Pasinetti, L. 1998. "The Myth (or Folly) of the 3 Percent Deficit/GDP Maastricht Parameter." *Cambridge Journal of Economics* 22, 1 (January): 103-116.

Patterson, K., and M. Stephenson. 1988. "Stock-Flow Consistent Accounting: A Macroeconomic Perspective." *Economic Journal* 98, 392 (September): 787-800.

Pilbeam, K. 1992. *International Finance.* London: MacMillan.

Polak, J. 1995. "Fifty Years of Exchange Rate Research and Policy at the International Monetary Fund." *IMF Staff Papers* 42, 4 (December): 734-761.

---------. 1957. "Monetary Analysis of Income Formation and Payment Problems." *IMF Staff Papers* 6, 1.

Pyatt, G., and J. Round. 1977. "Social Accounting Matrices for Development Planning." *Review of Income and Wealth* 23, 4 (December): p.339-363.

Roe, A. 1973. "The Case for Flow of Funds and National Balance Sheet Accounts." *Economic Journal* 83, 330 (June): 399-420.

Tobin, J. 1969. "A General Equilibrium Approach to Monetary Theory." *Journal of Money, Credit and Banking* 1, 1 (February): p.15-29.

United Nations. 1968. *A System of National Accounts.* New York: United Nations.

United Nations, OCDE, International Monetary Fund, World Bank, CE. 1993. *System of National Accounts* . Brussels/Luxemburg; New York; Paris; Washington, D.C.

Waelbroeck, J. 1987. "Ability to Adjust and the Problems of European Market Economies." In Pasinetti, L., and P. Lloyd, eds. *Structural Change, Economic Interdependence and World*

Development: Proceedings of the Seventh World Congress of the International Economic Association, Madrid, Spain . Volume 3: Structural Change and Adjustment in the World Economy. New York: St. Martin's Press.

Weddepohl, C. 1990. "Overlapping Generations Models." In van der Ploeg, F., ed. *Advanced Lectures in Quantitative Economics.* London and New York: Academic Press.

NOTES

1. The standard way of linking balance of payments problems with budget deficits leads to the inevitable proposition that fiscal policy is impotent in a free-trade world, and is even harmful when it tries to protect domestic production and employment with reflation. Such view has been questioned by a large number of authors from different perspectives. Yet, a most obvious criticism (and perhaps for this reason the most powerful one) is raised by Godley (1999b, 2000), Fanelli and Medhora (1997), Minsky (1992), and other authors, by pointing to the often-observable fact that unsustainable trade imbalances walk hand in hand with private sector imbalances rather than public sector deficits. What is more, recent work done at the Jerome Levy Economics Institute (Godley 2001a, b; Godley and Izurieta 2001; Papadimitriou and Wray 2001), argue that the *adjustment* of the private sector financial balance in the US has become inevitable, leading to a long period of stagnation unless fiscal policy is relaxed.

2. W. Duisenberg, president of the European Central Bank, declared that in order to face macroeconomic imbalances and sluggish growth in the EMU region "Europe must change the way it works, with more flexible work rules, greater competition and less government spending" (*The New York Times* , June 14 2001, Section W, pp. 1, Column 3). Similar propositions by D. Cavallo, finance minister of Argentina, are found elsewhere (e.g. *The New York Times* , May 5 2001, Section C, pp. 1, Col. 5).

3. This proposition, which labeled Godley and his colleagues at the Cambridge Economic Policy Group as "dissident," is elaborated elsewhere (Godley 2001, 1988; Godley and Christodoulakis 1987; Godley and Coutts, 1990; Godley and Cripps, 1978, 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 is misleadingly assuming perfect competition and aggregate production functions with constant returns to scale. In reality, however, dynamically increasing returns to scale, and far from perfect 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 propostion towards nonselective, non-discriminatory and coordinated import controls to raise output between partners.

4. The question of whether common currency and free trade lead to polarization due to increasing returns to scale of the aggregate production function involves a much more demanding modelling work, which would be left to subsequent publications.

5. Although Meade and Stone (1941) developed the national accounts methodology that was (arguably) ascribed to the Keynesian theoretical framework, it were Denizet (1963) and Roe (1973) who actually pioneered the incorporation of financial accounts (both flows and stocks) into a consistent system of national accounts.

6. Such a simplified model will be enlarged in a subsequent work (Godley 2001, forthcoming), which includes a "rest of the world" sector, allows for domestic and external price formation, and portfolio allocations that are greatly diversified.

7. The central notion could be summarized as follows: wealth influences future consumption, while it is also derived from saving (income generated in production but not spent in purchasing the output produced). Saving, in turn, *equates* loans necessary for producers in order to hold the inventories resulting from their ex-ante investment decisions, until they are sold in the future.

8. The demand for money is constrained by the balance equation, and thus incorporates the fact that the demand for other financial assets (bonds) is expressed as a function of their prices. For model solution purposes the equations used were:

$$Hn^d = Vn - p_{bs} \cdot Bns^d - p_{bn} \cdot Bnn^d$$

$$Hs^d = Vs - p_{bn} \cdot Bsn^d - p_{bs} \cdot Bss^d$$

It is straightforward to note that by replacing bonds for their behavioral equations [21] to [24] the expressions in [29] and [30] result into [29] and [30].

9. Note that since ORs are constrained to be positive, and Hs are non-negative, both BCs cannot be simultaneously negative.

10. In order to keep the model at its minimum expression, employment creation does not have a feedback into the system.

11. Notionally, the model would eventually reach a steady-state solution independent 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 is too far from a steady state.

12. Thus, numbers of a decimal degree are considered numerical errors of negligible importance.

13. The three balances in the South, not shown here for sake of brevity, are slightly symmetrical to those of the North. In passing, it should be emphasized that the only full symmetry is that of the balance of payments. The private sector and the public sector balances of both countries would likely show opposite trends, but they do not need to be numerically the same, since each country would resolve private/public sector financial interactions independently.