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Revisiting "New Cambridge": The Three Financial Balances in a General Stock-flow Consistent Applied Modeling Strategy

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Abstract

This paper argues that modified versions of the so-called "New Cambridge" approach to macroeconomic modeling are both quite useful for modeling real capitalist economies in historical time and perfectly compatible with the "vision" underlying modern Post-Keynesian stock-flow consistent macroeconomic models. As such, New Cambridge–type models appear to us as an important contribution to the tool kit available to applied macroeconomists in general. and to heterodox applied macroeconomists in particular.

Keywords: Stock-flow Consistent Models; New Cambridge; Aggregate Financial Balances; Heterodox Applied Macroeconomics

JEL Classifications: B50, C82, E12

Our main contention in this paper is that modified versions of the so-called "New Cambridge" approach to macroeconomic modeling – e.g. Cripps et al. (1976), Godley and Fetherston (1978), Godley and Cripps (1983), Godley (1999a), Izurieta (2005), and Zezza (2009), *inter alia* – are both quite useful for modeling real capitalist economies in historical time, and perfectly compatible with the "vision" underlying modern Post-Keynesian stock-flow consistent (SFC) models (as discussed, for example, in Godley, 1999b, Lavoie and Godley, 2001-2002; Dos Santos, 2005 and 2006; Godley and Lavoie, 2007a; and Macedo e Silva and Dos Santos, forthcoming).

Both claims may appear trivial at first. For one thing, it is now beyond doubt that the work done by New Cambridge economists at the Levy Economics Institute clearly anticipated the problems now facing the U.S and world economies.[4] Moreover, one does find mentions to the three balances model in the modern SFC literature (e.g. Godley and Lavoie, 2005-2006 and 2007b). However, these mentions are invariably made in the context of simplified stationary models without private investment, the inclusion of which can change things considerably (as acknowledged by Godley and Lavoie themselves).[5] And there still appears to be considerable doubt – even among heterodox economists potentially friendly to the approach – about *why exactly* the New Cambridge three balances approach (which many consider too aggregated and/or simple and/or based on implausible behavioral assumptions) is useful for applied macroeconomic modeling.

More to the point, we see the "New Cambridge" approach as an elegant and parsimonious applied macroeconomic modeling strategy which can and should be dissociated from its "trademark" behavioral assumption according to which the private sector as a whole behaves in such a way as to keep the ratio of private financial assets (net of financial liabilities) to private disposable income relatively constant over time – and, more generally, from any particular behavioral hypothesis adopted by its practitioners in any given historical context. The details of our argument – which does not necessarily represent the (complex, nuanced, and ever-changing) views of the original "New Cambridge" economists[6] – are presented in the fourth section of this

[4] See, for example, Godley (1999), Godley and Izurieta (2002), Shaikh, Papadimitriou, Dos Santos and Zezza (2002), Godley, Papadimitriou, Dos Santos, and Zezza (2005) and Godley, Papadimitriou, Hannsgen, and Zezza (2007).

[5] See, for example, Godley and Lavoie (2005-2006, p.252, footnote 15).

[6] All New Cambridge economists have deeply inspired us. Some of them we are proud to call friends. And none of them will probably agree with us on everything we have to say. But which group of gifted economists ever reaches a consensus about anything complex, after all?

paper. Before we can get to those, we need first to remind readers of the exact meaning of the "three financial balances" that appear so prominently in New Cambridge papers (in section 1), of the large macroeconomic literature dealing with these balances (in section 2), and of the general characteristics of (and the Schumpeterian "vision" underlying) the modern Post-Keynesian "stock-flow consistent" literature (in section 3). Brief concluding remarks are presented in section 5.

1 – A primer on (Private, Public, and External) Financial Balances

We all know from basic national accounting that:

$Y \equiv Cp + Ip + Cg + Ig + X - M$ (Identity 1).

In words, "GDP" (Y) is identical to "total expenditure in final goods and services", i.e. the sum of private consumption and investment (Cp + Ip), government consumption and investment (Cg + Ig), and exports of goods and services minus imports of goods and services.

Implicit in the identity above is, of course, the assumption that the economic agents can be meaningfully aggregated in three "institutional sectors", i.e. the private, government, and external sectors. Evidently, agents of each of these three sectors continuously make unilateral transfers and pay property incomes to agents of the other two sectors. Let us, then, define:

T = taxes paid by private sector agents to the government minus the net unilateral financial transfers made by the government to private sector agents minus the net property income paid by the government to private sector agents;

Tr_{ge} = net unilateral transfers made by the government to the external sector plus net property income paid by the government to the external sector;

Tr_{pe} = net unilateral transfers made by the private sector to the external sector plus net property income paid by the private sector to the external sector.

We can, therefore, rewrite the basic national accounting identity above as:

$Y - T - Tr_{pe} \equiv Cp + Ip + Cg + Ig + Tr_{ge} - T + X - M - Tr_{pe} - Tr_{ge}$.

This, in turn, implies that:

$Y - T - Tr_{pe} - Cp - Ip \equiv (Cg + Ig + Tr_{ge} - T) + (X - M - Tr_{pe} - Tr_{ge})$ (Identity 2).

Or equivalently:

PFB (Private Financial Balance) ≡ – GFB (Government Financial Balance) + CAB (Current Account Balance),

where PFB ≡ Y– T– Tr_{pe}–Cp–Ip; GFB ≡ T–Cg–Ig–Tr_{ge}; and CAB ≡ X – M – Tr_{pe} – Tr_{ge}.

Obviously, private (government) financial balance equals private (government) saving minus private (government) investment. Identity 2 can then be trivially rearranged to show that:

SAVp – Ip ≡ - (SAVg - Ig) + CAB (Identity 3), where

SAVp (private saving) ≡ Y-T-Tr_{pe}-Cp; and SAVg (government saving) ≡ T - Cg - Tr_{ge},

which expresses the well known national accounting fact that, *ex-post*, it is always true that total saving equals total investment in any given economy.

Though the algebra of identity 2 – much less common than the third one – is trivial to anyone familiar with basic national accounting, the exact meaning of its first term, the private financial balance (which is a proxy for the "net lending by the private sector" to use modern national accounts terminology),[7] is often non-trivial to many economists.[8] We need, therefore, to clarify this specific concept before we proceed.

In order to understand the various possible meanings of the private financial balance it is crucial to think of the private sector in disaggregated terms. Following both modern Post-Keynesian SFC models and national accounts, we find it useful to disaggregate the private sector in three smaller institutional sectors, i.e. the "households," "firms," and "banking" (or "financial") sectors. In other words, it is often useful to think of total PFB as the sum of households' FB, firms' FB, and bank's (or financial sector's) FB.

Consider a situation in which the private financial balance (net lending) is, say, $500. What does this imply for the financial balance of, say, the households' (or firms' or banks') sector? The answer, in principle, is nothing at all. All it implies is that the sum of the financial balances of households, firms, and banks (all taken as "a whole") is $500. And, of course, there are countless combinations of households', firms' and banks' financial balances that add up to $500. This will be the case, for example, if the

[7] See, for example, Lequiller and Blade (2006, chapter 8). The same concept used to be called "net accumulation of financial assets" (or "NAFA") in the 1970s. We stick here to modern terminology, among other reasons because the term "net accumulation of financial assets" is now used in the national accounts to designate a completely different concept (see section 2).

[8] A fact that, according to Cuthbertson (1979, p. 53), did not help New Cambridge economists to make themselves clearly understood when first presenting their ideas in the middle of the 1970s. Years later, Pasinetti (1984, p. 111) made a similar point: "the macroeconomic magnitudes or the behavioral relationships about these magnitudes that we are offered [by New Cambridge economists] are not coincidental with those to which we have been accustomed by current macroeconomic theory (…). But are these to be intended as alternative or complementary to the more traditional or better known ones? In the former case, it is not clear on which criteria one should choose, or which of them should be taken as the most important; in the latter case, we are not told how they should be merged together."

financial balances of households, firms, and banks are, respectively, $180, $170, and $150. But it will also happen if the numbers are (again, respectively) $10,000, minus $9,500, and $0; or minus $20,000, $5,000, and $15,500. So, in principle, one can never be sure.

Some quick comments on the financial balances of these three private institutional sectors are in order. The brief discussion will make clear why identity 2 illuminates the Minskyan theme of financial fragility,[9] for financial balances can be interpreted as *proxies* of changes in the liquidity (and in the financial fragility) of sectors.

1.1 – Firms' Financial Balance (or Net Lending/Borrowing)

Firms' financial balance (FFB) – usually a negative figure, for firms' investment tends to be larger than their saving (i.e. retained earnings) – is probably the most familiar of all private financial balances, so we will begin with it. It is, indeed, well known that firms have four possible ways to finance their investment, i.e. (i) with their own accumulated capital; (ii) with (retained) current profits; (iii) with bank loans; or (iv) by issuing new shares or bonds and selling them to the public. A negative FFB therefore implies that firms will have to finance it either with their accumulated financial reserves (which implies a reduction in their financial assets) and/or by getting loans from banks and/or by selling new bonds (both of which imply an increase in their financial liabilities) and/or by selling new shares (which national accountants consider an increase in firms' net worth)[10].

Table 1 below illustrates what we just said with a numerical example. Part A depicts the balance sheet of one firm, which has accumulated financial assets (FA=$300) and physical capital (pK=$600). Moreover, its financial liabilities reach $400 ($250 in bank loans and $150 in bonds) and the value of the shares it sold to the general public is $450. Part B, in turn, depicts the balance sheet of the same firm after financing $400 in new physical capital with a combination of $ 90 in retained earnings, $ 150 in new bank loans, $ 50 in new bonds, $ 40 in new shares, and $70 in previously accumulated financial assets; we assume there has been no change in the value of the

[9] See, for instance, Minsky (1982: 5).
[10] See Lequiller and Blade (2006, chapter 8). Most modern Post-Keynesian models adopt a different accounting convention, though, treating shares sold to the public as part of firms' financial liabilities.

shares. The FB of this particular firm in this particular period was then minus $310 (i.e. the result of $90 in retained profits minus $ 400 in the acquisition of new physical capital); this negative FB implied a reduction of $70 in firms' accumulated financial assets, an increase of $200 in its accumulated financial liabilities and an increase of $40 in its shares.

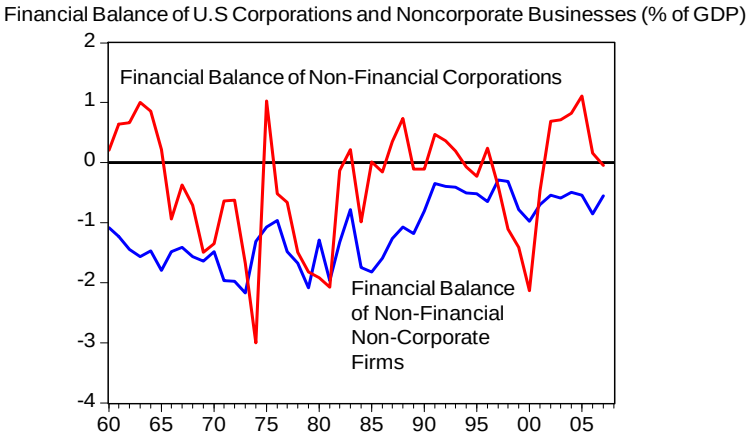
Table 1: Theoretical Balance Sheet of one given firm	
A. In the beginning of a given period	
Assets	Liabilities and Net Worth
Financial Assets = $300	Bank Loans = $ 250
	Bonds Issues = $ 150
Physical Capital = $600	Value of its shares sold to the general public = $450
	Net Worth = $500=$50+$450=($900–$400)
Memo: Financial Assets – Financial Liabilities – Shares = -$550 (=$300 – $400 – $450)	
B. In the end of the period	
Assets	Liabilities and Net Worth
Financial Assets = $230	Bank Loans = $400
	Bonds = $200
Physical Capital = $1000	Value of its shares sold to the general public = $490
	Net Worth =$630 =$140+$490(=$1230–$600)
Memo: Financial Assets – Financial Liabilities – Shares = -$860 (=$230 - $400 - $200 - $490)	

The example above is meant to illuminate the point that a negative FB (or the fact that the firm was a "net borrower") usually implies a decrease in the ratio of firms' "financial assets" to their financial liabilities (bonds and loans), unless, of course, the whole FB is covered by issuing shares. At any rate, it can be stated that a negative FB increases the claims – either contractual (interest) or contingent (dividends) – on the firms' financial assets. One can therefore say that, *ceteris paribus*, a negative FB reduces the portfolio liquidity (measured as a ratio between financial – hence liquid – assets and cash payment commitments) and increases its financial fragility.[11]

Note also that nothing we said so far prevents firms from having a positive financial balance. It might well be that retained earnings happen to be higher than the acquisition of new physical capital in any given year or quarter in any given firm or for the firms' sector as a whole – which, in turn, usually implies increases in the ratio of total financial assets over total financial liabilities of this given firm/firms' sector as a whole. In the 1960-2007 period, this was never the case for U.S. non-corporate firms, but happened every once in a while with U.S. corporations – often during recession

[11] This ratio must be understood as a proxy of portfolio liquidity. A more accurate measure would take into account the liquidity of each and every asset (financial or not) in the portfolio. Clearly enough, a portfolio can then become more or less liquid even if the financial balance is zero.

times, in which investment falls and the liquidity preference of corporations is likely to increase (see graph).

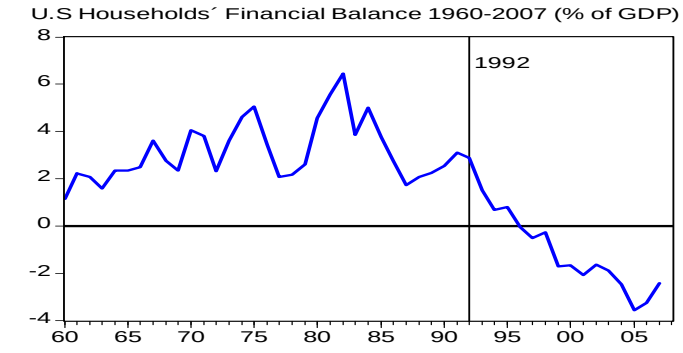


Source: Bureau of Economic Analysis: Integrated Economic Accounts

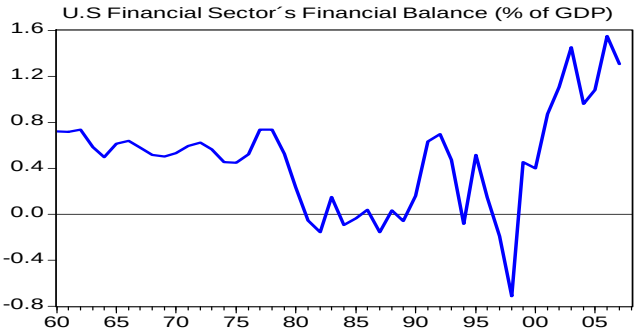
1.2 – The Financial Balances of Households and Banks

And what about the financial balance of households (i.e. the difference between households' saving and investment)? Two important differences are that (i) households cannot finance themselves issuing and selling new shares; and (ii) households' investment (often simplified away in theoretical models, even if it is quite large in actual economies) consists mostly of housing expenditures. Other than that, things are pretty much the same as before, with positive (negative) financial balances being associated with increases (decreases) in the ratio of total financial assets over total financial liabilities of the households' sector as a whole. And even if there is no strong theoretical hypothesis about the sign of the household financial balance in any given year, one would expect it to be positive (or at least neutral) over the years so as to prevent the financial assets to financial liabilities ratio of households from deteriorating indefinitely (as was the case in the U.S. from the late 1990s until 2008, as emphasized by many New Cambridge economists during these years).

The case of "banks" (or more generally, of the financial sector as a whole) is more complex. To be sure, they also save (i.e. retain profits) and acquire new physical capital, so their financial balance can be calculated as the financial balance of any other sector. Contrarily to a common (merely simplifying, we must add) assumption in theoretical SFC models, the financial balance of the financial sector is often quite different from zero, as the case of the United States in this century demonstrates.



Source: Bureau of Economic Analysis - Integrated National Accounts



Source: Bureau of Economic Analysis: Integrated National Accounts

On the other hand, banks (and the financial sector as a whole) hold enormous amounts of private and public debt and may or may not hold enormous amounts of external financial assets as well (depending on the precise institutional arrangement and degree of capital account liberalization at hand).

1.3 – In sum: Financial balances as incomplete but useful guides to balance sheet dynamics

As seen above, the financial balance of any given sector conveys useful information about how the balance sheet of this given sector is changing. But it is important to reiterate that it is far from a complete description of all the sector's balance sheet changes. In particular, it tells us nothing about the *capital gains/losses* incurred by the sector and cannot inform us of the precise changes in the composition of the sector's balance sheet. The numerical example below attempts to make these points clearer.

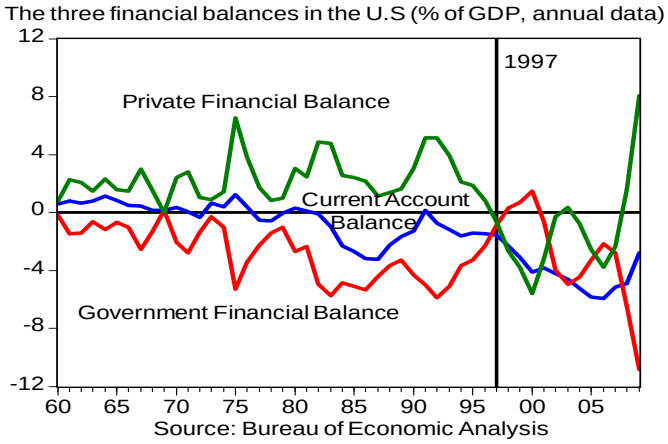
Table 2. Theoretical balance sheet of a household	
A – Household H's Balance Sheet in Beginning of the Accounting Period	
A.1 - Total Assets = $140,000	A.2 - Total Liabilities = $50,000
A.1.a - House: $100,000	*A.2.a - Bank Loans: $ 50,000*
A.1.b - 1000 Equities of "Company X": $30,000	
A.1.c - Bank Deposits: $10,000	A.3 - Net Worth = (A.1) – (A.2) = $ 90,000
B – Relevant Flows During the Accounting Period	
Saving = $ 2000	Investment = $ 10,000
Financial Balance = - $8000	
C – Total Capital Gains During the Accounting Period = $ 30,000	
C.1 – From an increase in the price of 1 equity of "Company X" from $3 to $ 4: $10,000; C.2 – From an increase in the price of the house (before the new investment): $ 20,000	
D – Household H's Balance Sheet in the End of the Accounting Period	
D.1 – Total Assets = $175,000	D.2 - Total Liabilities = $53,000
D.1.a - House: $130,000	*D.2.a - Bank Loans: $ 53,000*
D.1.b - 1000 Equities of "Company X": $40,000	
D.1.c - Bank Deposits: $5,000	D.3 - Net Worth = (D.1) – (D.2) = $122,000
E – Household H's Balance Sheet in the End of the Accounting Period Without Capital Gains	
E.1 – Total Assets = $145,000	D.2 - Total Liabilities = $53,000
D.1.a - House: $110,000	*D.2.a - Bank Loans: $ 53,000*
D.1.b - 1000 Equities of "Company X": $30,000	
D.1.c - Bank Deposits: $5,000	D.3 - Net Worth = (D.1) – (D.2) = $92,000

In the example, most changes in the net worth of "household H" (see parts A and D) are due to capital gains (in her house and in her equities of "Company X" – see part C). Note that if she had had no capital gains at all, her net worth would have increased only by the amount of her saving (i.e. $2000 – see parts A, B, and E). The actual change in the net worth (i.e $32,000, see part D) is given by the saving ($ 2000) plus the capital gains ($30,000 – see part C), though.

The fact that households' H financial balance is negative – for her saving ($2000) was not enough to finance all her investment ($10,000, in improvements in her house) – means only that the ratio of her financial assets to her financial liabilities has decreased (from 10,000/50,000 to 5,000/53,000) or, in other words, that she has become *cet. par.* less liquid (even if she got richer). This is only to be expected, since the financial balance is given by her saving (assumed to be liquid) minus her investment in physical capital (which is illiquid by definition). Note also that the fact that we know that household H's financial balance was minus $8000 says nothing about how the precise composition of her financial assets and liabilities has changed. She could conceivably have financed her negative financial balance reducing only her bank deposits (which would then have fallen from $10,000 to $2,000). She chose instead to increase her bank loans by $3,000, reducing her bank deposits only by $ 5,000.

To reiterate: a negative (positive) financial balance means only that (cet. par.) the agent/sector is getting less (more) liquid and more (less) fragile. It does not imply that it is getting poorer, nor does it convey any information about how the composition of its balance sheet has changed precisely.[12]

This is precisely why the Levy Strategic Analyses put so much emphasis in the negative U.S. private financial balance from 1997 onwards. The point was that this continuous reduction in liquidity meant a continuous increase in private (in particular households', as information from disaggregated data made clear) financial fragility that would prove detrimental if and when capital gains in the real estate markets turned into capital losses. At this point, one would have to count on a massive "Big Government" intervention to help private balance sheets (as happened in 2009, when the government financial balance reached minus 11% of GDP, the largest deficit in the last 50 years), given the fact that (as Minsky well knew) to increase the public deficit is probably the easiest way to produce a positive private financial balance.



[12]According to Zezza (2009: 19), "a positive balance implies that, for that sector, injections exceed leakages, so that that sector is a net contributor to aggregate demand." While this statement is generally true, it is important to notice that it holds strictly only in the case of the external "sector"; if net exports are zero, there is no impact on GDP. But if government (or firms' or households') expenditures increase at a higher rate, even with a balanced budget, this will represent (unless the extra expenditure "leaks" as imports) a bigger contribution to aggregate demand. Therefore, we would rather stick to customary national accounting practices, which say that the contribution to aggregate demand of any "sector" (and/or of any final demand component) depends on its relative size and on its relative growth rate. But by saying this we do not mean to deny that if any sector' expenditure grows quicker than its earnings, its deficit will in general be expansionary, besides implying a surplus and an accumulation of assets by some other sectors, which are bound to have further (and not trivial) effects on effective demand.

2 – The three balances and open economy macroeconomics

Aggregate financial balances have been among economists for a long time. Some traditions have been aware of their presence, and have tried to cope with them in a more straightforward manner, while others (whether consciously or not) have neglected them. At their own peril, we might add, and will try to show, taking as an example the case of Mundell-Fleming models, still an important part of the "trained intuition" of a large part of the macroeconomics profession.

According to Barbosa-Filho et al. (2006) (but see Rada and Taylor, 2006, as well), three main "schools of thought" have discussed aggregate financial balances:[13] the "Ricardian" rational expectations (RE) approach of Barro (1974) and others; the "Twin-Deficit" (TD) approach associated, among others, with Polak (1957); and the heterodox structuralist "external" gap (SG) view.

These three "schools" suggest three different causality structures for the three balances. The TD approach tends to think of the private financial balance as largely independent of the other two. Any attempts by the government to use fiscal policy to expand the economy would therefore imply an increase in the current account deficit (or a reduction in the current account balance). In the RE approach, on the other hand, it is the current account balance that is largely independent of the other two. In particular, any attempts by the government to use fiscal policy to expand the economy would imply a reduction in the private financial balance (in anticipation of future increases in taxation necessary to keep government finances inter-temporally solvent). Finally, the SG story is similar to the RE story in assuming the current account balance as largely independent of the other two, even though for quite different reasons. Structuralists do not assume full employment of the labor force, of course, and are perfectly happy with independent increases in private net lending/borrowing leading (as opposed to responding to) reductions/increases in the government financial balance. The current account independence in SG models has little to do with agents solving inter-temporal maximization problems with full knowledge of future events, and a lot to do with structural factors (such as deteriorating terms of trade and/or lack of competitive advantages in external markets for goods and services, and/or imperfections in

[13] Though normally under conditions in which financial balances collapse into saving (that is, assuming that neither households nor the government invest).

international financial markets) that imply that private and government financial balances must sooner or later adjust so as to reduce too high a current account deficit.

Curiously enough, in light of the aforementioned literature, financial balances are virtually ignored in many strands of short-period open economy macroeconomics. The object, of course, is always there, as a matter of logical necessity. Moreover, even in the framework of short-period models, we can easily show the implications of different shocks to private, government or external FBs. As announced, we will use the Mundell-Fleming (MF) model to illustrate our point.[14]

We begin by appending some simple (and in principle quite harmless) features to an otherwise standard MF model. We will only consider the standard "short-run" case, in which there is involuntary unemployment and prices are given. Three different shocks will be analyzed in some different institutional/behavioral scenarios. The *shocks* are increases in "money supply" (ΔM), in government expenditure (ΔG_0) *and* in private investment (ΔI_0). Though most textbooks only describe government shocks, there is obviously no reason at all to abstract the possibility of an autonomous change in private expenditure, as in investment (given, e.g., a change in animal spirits). The various institutional/behavioral *scenarios* we are interested in depend on the exchange rate regime (fixed or fully flexible) and on the degree of international capital mobility (perfect or none). We will assume, as is customary, that under perfect capital mobility and perfect substitutability between financial assets, internal and external interest rates must be equal.

As most textbook authors, we feel there is no need to write down all the equations of a standard MF model. It is important to notice, however, that, banks play no particular role in the MF models, so that – as correctly emphasized by Godley in many occasions, we may ignore them.

To simplify and to present a rendition which is closer to the usual ones, we use the *trade* account to define the external FB. This only makes sense if we assume that, in the initial situation, international flows related to external assets and liabilities are zero. Note that, without residential investment, households' financial balance (HFB) equals household saving; without *government* investment, the same applies to GFB and the

[14] It is fair to note that, though the canonical depictions of the MF model ignore financial balances, connections between them were occasionally considered. In fact, the first reaction of the profession to the New Cambridge literature – which, as discussed below, did side with Polak´s twin deficit hypothesis (though for quite different reasons) – was to check whether New Cambridge results could be derived in the context of Mundell-Fleming-type models (see, for example, Vines, 1976 ; and Mata, 2006).

budget surplus. As in many standard macro models, households normally have positive FB[15] and are net creditors. In the very simple model thus sketched, households own firms (and we assume they receive a constant share of current profits) and debt, issued by government and firms. When firms have a negative FB, they issue more bonds. We assume the government has a budget deficit and is a net debtor. There is only one internal interest rate.

It is difficult, we think, to define a simpler (and still useful for our purposes) model. Though we are not exactly in the textbook MF world anymore, we believe we did no violence to the model at all. Let us now face some of the "cases" usually described in the MF literature.

It is interesting to begin with a case where pretty nothing is supposed to happen after the initial shock. Every macroeconomics student quickly learns that, with a *fixed exchange rate* and perfect capital mobility, *monetary policy* is "inefficient." The sole final result of a monetary expansion will be a change in the central bank portfolio: foreign reserves are replaced by money, and the contraction of money supply brings the economy back to the initial income and interest rate levels. However, if we assume that the shock did manage to stimulate the economy for a while, there will be some other definite consequences to the distribution of net wealth among institutional sectors.

It is easy to show this (though, for lack of space, we will dispense with the customary graphical apparatus). Firstly, we will describe the *temporary* changes: the increase in income will imply a decrease in CAB (i.e., a fall in net exports), which *must* correspond to a temporary decrease in the aggregate of the remaining balances. Now, GFB must increase, for the increase in income produces an increase in taxes, while G_0 is given.[16] Households available income increases as well, and so does their saving, which is the sector's FB. It follows that firms' financial balances *must* fall, as well as aggregate private FB. The explanation for the fall in FFB is pretty simple: the decrease in trade balance reduces firms' profits (as a Kaleckian approach would clearly demonstrate); besides, if we find it reasonable that the temporary fall in the interest rate increases firms' investment, this will produce a bigger increase in firms' expenditure

[15] That is to say, unless households disposable income is very low *and* the consumption function has an autonomous term.

[16] We abstract here from the possible effect of the temporary fall in r on interest flows paid by government and firms.

than in their retained profits (and, as a matter of fact, in their total profits as well).[17] (Those results are summarized in table 3.)

It is true that the economy will come back to the original coordinates (Y, r). However, in the "final" short-run equilibrium, the net wealth of each institutional sector will have changed. Households' net assets will have increased. The brief reduction in budget deficit means that the public debt will be smaller than otherwise would have happened. International investment position will have worsened. And the sole possible counterpart to all these changes will have been an increase in firms' debt. Those changes in stocks of financial assets and liabilities will implicate changes in internal and international interest flows in the next short run, changing the configuration of the system. Therefore, each short period carries in itself the seeds of the next (and inevitably different) short period. This is all the more true in other cases described below, in which the commonly acknowledged "final" changes are more significant.

Let us describe, in the same institutional scenario, the results of the other two kinds of shocks. Both an increase in private investment and in government consumption will be efficient in obtaining a "permanently" higher income level at the original interest rate. We may then concentrate on "final" results.[18] Both demand shocks will cause a decrease in CAB and an increase in HFB. *An increase in private investment* will bring about an increase in GFB. Once more, a reduction in FFB is the only thing that can, as a matter of logical necessity, "compensate" the other changes; again PFB has to fall. If the shock comes from *fiscal expansion*, though we know that GFB will fall,[19] we cannot be sure about what happens to FFB, for the increase in G_0 and the decrease in net exports have opposite effects on profits.[20] To obtain a definite result, it would be necessary to fully specify the functions and elasticities used in the model.

In the case of flexible exchange rate regime with $r = r^*$, Mundel-Fleming models tell us that monetary policy "works": a reduction in the interest rate does increase income, by way of currency depreciation. We will leave temporary effects aside. There happens, of course, an increase in net exports (CAB rises). With the increase in income, the budget deficit falls (GFB increases) and households saving increases (as does HFB).

[17] Please notice that, in a Kaleckian world, changes in investment and in net exports only affect profits *pro tanto* if workers spend what they earn. In the general case, an increase in investment will produce a smaller increase in profits. This would result in a fall in FFB even if firms did not distribute profits.

[18] We will assume, for instance, that the impact of the transiently higher interest rate on interests flows paid by government and firms is negligible.

[19] Given our assumptions, budget deficit always increases when government consumption increases (see, for instance, Dornbusch & Fischer, 1978/1990: 92).

[20] O efeito líquido sobre os lucros dependeria do valor (ΔGFB - ΔXFB).

It is obvious that, since investment does not change and profits increase with the improvement in net exports, FFB (and PFB) must rise as well.

Table 3. A summary of the results				
ΔHFB + ΔFFB + ΔGFB = ΔXFB				
1. Fixed exchange rate, perfect mobility, r = r*				
	ΔHFB	ΔFFB	ΔGFB	ΔXFB
a. Monetary expansion*	+	-	+	-
b. Increase in investment	+	-	+	-
c. Fiscal expansion	+	?	-	-
2. Flexible exchange rate, perfect mobility, r = r*				
a. Monetary expansion	+	+	+	+
b. Increase in investment	0	-	0	-
c. Fiscal expansion	0	0	-	-
* Temporary effects.				

In this same context, positive shocks in expenditure variables will not increase income, but will reduce net exports (for the increase in expenditure leads to a temporary increase in the interest rate, that in turn causes capital inflows that will permanently appreciate the currency). An increase in investment will be exactly matched by a decrease in net exports; the same will happen in the case of an increase in government consumption. Other financial balances will not change. In other words, any increase in expenditure will produce the famous twin deficits.[21] However, the internal counterpart of the worsening of international investment position will be a bigger private or public debt depending on which sector was responsible for the initial shock.

Notice that, in most cases – the exceptions being the two twin deficits – the shocks described tend to produce temporary (but not necessarily irrelevant) or enduring changes in *all* balances (though in one case we were unable to define the sign of ΔFFB). It is not at all surprising that no case describes the predictions of the ER and the SG approaches. To obtain ER results, we would have to assume a very different kind of consumption function. SG results, on the other hand, have been assumed away by the very assumptions of perfect mobility and homogeneity between internal and external financial assets.

However, it is pretty easy to depict an SG situation. Just imagine there is *no capital mobility* (which implies that the BP curve is vertical). If we start at a situation in which CAB = 0, it is clear that, with a fixed exchange rate, income cannot grow but for a limited period. Monetary expansion would produce, as before, loss of reserves (and,

[21] Though the expression was originally restricted, of course, to the case in which government is the culprit for the imbalance in external accounts.

eventually, a balance of payments crisis), so that it would have to be reversed, sooner or later. The same would apply to increases in private investment or in government consumption. The fall in reserves[22] would force the government to act. In the case of an original increase in investment, it would have to be reverted with an increase in interest rate or accommodated by means of a reduction in government consumption; FFB and GFB would present compensatory changes, as in Barbosa-Filho et al.'s story. A fiscal stimulus could be either reversed or accommodated by means of an increase in interest rate, in which case, again, we would find compensatory changes in FFB and GFB.[23]

Financial balances are obviously important. To properly analyze then and their implications, however, one has to define more complex models than usual short-period ones, so that interest flows and stocks of debt can play a role. Financial balances show that each short-period implies changes in those stocks and flows. And they do cast a doubt about common assumptions about long-run trajectories. If, for instance, firms' debt is growing rapidly, shouldn't one take this into consideration when analyzing the medium run? But, if we start to connect short-run periods in such a way, can we be sure that we will obtain a trajectory that ends in the long run as described, for instance, in neoclassical growth models? The answer is usually no.

We think, in sum, that macroeconomic models that want to peer beyond the short run while omitting balance sheet implications of the very flows they assume are dangerously incomplete. Looking carefully at financial balances minimizes the potential damage. However, even this may not be enough, for financial balances do not tell the whole story of balance sheet dynamics, as we saw above. Telling the whole story requires, of course, a full-fledged SFC model.

3– Modern Post-Keynesian Stock-flow Consistent Models as the heterodox equivalents to Arrow-Debreu constructs

Most heterodox approaches share, to some extent, a common Schumpeterian vision of capitalist economy. When they look at it, they first discern social classes and institutions and then individual agents. Moreover, they do not believe that markets are able to harmonize agents' decisions. On the contrary: they emphasize that conflicts between

[22] More realistically, the external restriction would be felt as a rise in country risk-premium and/or credit rationing.

[23] Notice that, in the case of flexible exchange rates, similar stories can be told, especially in the case of developing countries for which currency depreciation can have important inflationary impacts and crucial balance-sheet effects, since their external debt is denominated in foreign key currencies.

agents who occupy very asymmetric positions are not only unavoidable but the very engine behind the evolution of the economy.

In such a vision, agents are what they own. Agents who own more have more economic power. Agents who are "rich" try to get richer and richer, and the decisions they make about how to allocate their wealth are crucial for determining the evolution of aggregate income, employment and wealth over time.

In Marxian or Kaleckian contexts, one often finds a somewhat crude (but analytically useful) opposition between "capitalists" and "workers." In some of Keynes' works (mainly in Keynes 1923 and 1930), the social landscape includes firms, banks, rentiers, workers as private agents who play different roles, own different assets (and liabilities) and have different interests (see Macedo e Silva and Dos Santos, 2009).

All these defining features are explicitly emphasized in SFC models. In this sense, SFC models are a direct expression of this heterodox Schumpeterian vision. As a matter of fact, the contemporary SFC literature is mainly Keynesian (and Kaleckian, though not Marxian). However, while doing full justice to Keynes' political economy vision, it introduces critical ruptures with traditional Keynesian modeling strategies, which tend to concentrate on flows (and for this reason are either too partial or quickly become stock-flow *in*consistent) or to treat stocks in too simplified a way.

During the sixties, many Keynesians came to the conclusion that the poverty of Keynesian macroeconomics – however hegemonic it (still) was – was linked to the failure in connecting stocks and flows in an institutionally richer framework (see Dos Santos, 2006). Tobin realized it and started to develop, in a more neoclassical guise, his stock-flow consistent models. Davidson and Minsky founded their seminal contributions on the *Treatise on Money* and on *General Theory's* chapter 17. In those texts, Keynes makes clear that "instrumental goods" are just one specific form of wealth and that investment is just a "trifling" part of the many portfolio decisions that wealth-owners (firms, rentiers, banks…) make during any period of time. In the *Treatise*, the centrality of banks and of their relations with wealth-owners (as other "technical details") do not fall (as in the *General Theory*) "into the background" (Keynes, 1936: vii).

In his models, Tobin was never particularly concerned with the question of traverse. On the other hand, Davidson and Minsky were themselves strongly concerned with the study of dynamic processes which can result in instability or crises. But their

insightful contributions were mainly conveyed in a literary way; at any rate, they never tried to present a formal model connecting periods of time.

But this is precisely what SFC models do. They start from the definition of a social structure which can be as complicated as deemed necessary to the objectives of the analysis. They explicitly show who owns what and how – that is to say, they thoroughly describe assets and liabilities of each "agent" (or rather of each social class, group or institution included in the model). Building upon the Keynesian/Kaleckian tradition, they assume a set of behavioral functions, specific to each type of agent. Structure and behavior defines the physiology of the system. Conditions for short-period equilibrium are clearly specified. The evolution of the system can then be studied. According to the posited initial conditions, one can study how each short-period (in equilibrium or not) connects to the next. One is free to introduce exogenous changes even in notoriously rebel variables such as confidence and liquidity preference or (if one is bold enough) to try to make them endogenous.

SFC models are, in our opinion, fully compatible both with the Kaleckian view that the long-run is only a sequence of short runs and with Joan Robinson's concern with the need to put forward analyses that happen in historical (and not logical) time. They make clear that, however unstable expectations are, there will be always some things an analyst can rely on: a social structure, a previous pattern of expenditure and income flows (and of deficits and surpluses) and a historically inherited network of assets and liabilities. To know what those structures and patterns *are* is of course a condition to understand how they *can change*.[24]

Heterogeneity has been repeatedly appointed as a reason for the weakness of heterodoxy; this heterogeneity tends to be unfavorably compared to the coherence of the neoclassical paradigm. In fact, one can argue that neoclassical economists do share a Schumpeterian vision *and* a core model, which is, of course, the Arrow-Debreu model. The aim of this model, as we all know, is to describe the (strict) conditions in which the invisible hand does the job it is supposed to do. Most neoclassical economists do not work in the development of their core model, but are pretty content in using it (responsibly or not) as a benchmark.

[24] Models in which there are flows that do not feed into stocks, in which there are interest rates that do not correspond to any asset, in which assets are created without corresponding liabilities are certainly obscure and probably misleading. Heterodox economists (who justifiably despise trivially stock-flow consistent neoclassical models in which there is nobody but the representative agent) must be particularly careful when developing models that describe complex social structures.

We contend it is useful to think of SFC modeling strategy as, *mutatis mutandis*, the heterodox equivalents of the Arrow-Debreu model.[25] The *mutatis mutandis* clause is crucial here. Our somewhat bold claim derives from our perception that SFC modeling strategy is coherent with a broad heterodox vision and can accommodate – potentially at least – the different aspects underlined by different heterodox schools of thought.[26] Moreover, our claim does not mean to contradict in any way the healthy skepticism of heterodox economists – who pay so much attention to both structure and history – towards attempts at general modeling. While understandable, we believe that these concerns are to some extent unwarranted, for SFC models are inherently flexible and therefore can be tailored so as to incorporate the very many structural and institutional realities, behaviors, and historically relevant accumulation regimes.

As a matter of fact, this flexibility has been intensively explored by the fast growing SFC literature. Stationary or growth models now examine themes such as the impact of economic policies, changes in income distribution, technological change, and the nature of finance-led regimes. Open-economy models appear as heterodox counterparts to the usual Mundel-Fleming framework, and start to discuss contemporary (and crucial) issues such as the so-called global imbalances and the global implications of changes in exchange rates regimes by key countries. The scope of the current SFC literature is very broad indeed, and the complexity of the models can be increased at will, given the easiness with which one can program computer simulations nowadays. The practitioner is free to model, for instance, different kinds of disequilibria, in different markets, or to introduce different goods, assets (and their respective volumes and prices), industries (or Kaleckian departments), or types of financial institutions and so on.

The appearance of a myriad of models is clearly understandable and indeed welcome, as practitioners explore the modeling strategy while trying to address the heterodox urge towards "realism." For, in a sense, bigger models (with more sectors, more assets, etc.) undoubtedly *look* more realistic.

We contend, however, that this move towards complexity should *not* be embraced as the *sole* research strategy of SFC practitioners. Every researcher who has ever worked with simulations knows that intuition tends to vanish as the models grow in

[25] Godley and Lavoie (2007) themselves come pretty close to this statement.

[26] We recognize that supply-side and institutional issues have not received the attention that Kaldorians, neo-Schumpeterians, and regulationists think they deserve. But we believe that there is no strong reason for that. The same can be said about the construction of agent-based SFC models.

size. Big models are pretty difficult to tame (even by their own creators), and even more difficult to teach.

Moreover, and maybe more importantly, one has to keep in mind the fact that the appearance of realism can be deceptive. The increase in size multiplies structures and behavioral functions about which we probably do not know much. It can well be that, at least from a certain point on, the bigger is the model, the less *applicable* it will be.

A telling example of such difficulties is provided by Dos Santos and Zezza's (2008) "simplified benchmark" SFC growth model. It is proposed as a benchmark because it supposedly contains just the basic set of sectors and assets Post-Keynesian economists would not dispense with, while being simple enough to allow for an analytical solution. Its social structure displays poor households, rentiers, firms, banks, and the government. The assets are bank deposits and loans, government bills, capital goods and equities. Though simple, the model contains 14 exogenous parameters. This means that to fully master the comparative statics of such a simple artificial economy, the user would have to understand the implications of a very large number of different combinations of exogenous shocks. More realistic models (with more exogenous parameters) can get much more difficult to understand, of course.

But big models are not merely difficult to understand. They are also difficult to use for applied purposes, for doing that requires the estimation or calibration of very many exogenous parameters. In each of these estimates/calibrations errors are bound to occur. The cumulative effect of all of them can distort considerably the conclusions one arrives at.

This is why we favor two other *complementary* modeling strategies. We discussed one of them – the direct investigation of equilibrium conditions and reduced forms – in Dos Santos and Macedo e Silva (2009). For reasons we explained in some detail, the study of steady states may be useful even when one does not believe (we certainly don't) that the economy tends towards them. In a nutshell, a SFC steady state is a situation in which all stocks and flows are growing at the same rate, so the relative sizes and compositions of the balance sheets of all sectors of the economy (and therefore their economic/financial "power" and/or "fragility") are kept constant. It is obviously useful to compare the actual behavior of the economy with such a benchmark – and it is certainly interesting to know whether an economy is getting nearer or farther from such a situation.

In simple models, such as Harrod's or Solow's, a straightforward condition assures that the economy is in steady state: capital and income must grow at the same rate, keeping the capital/product ratio stable. In heterodox SFC models, depending on the number of sectors considered, the steady state requires the simultaneous fulfilling of a greater number of conditions, so as to make sure that *every flow or stock in the system is growing at the same rate*.

Let us briefly examine a very simple case. Assume, in a closed model with firms, households and government (but without banks), that $\Delta K/K = \Delta Y/Y$. This is now only a necessary – but not *sufficient* – condition for the economy to be in steady state. This condition is compatible, for instance, with a situation in which the debt ratios of any sector (relative to its own income or net worth or to aggregate income and capital) are growing, perhaps explosively. Let us absolve the usual culprit, assuming that public deficit/public debt = $\Delta Y/Y$ as well. Assume, however, that retained profits, smaller than investment (so that firms have a negative financial balance which is financed by, say, issuing bonds) are growing at a slower pace than investment (maybe because firms are distributing more and more profits). Now, this configuration has several implications: as firms' financial balance is increasingly negative, households' financial balance (and saving) must be increasingly positive. Moreover, the ratio between firms' liabilities (debt or equity) and variables such as households' total assets, firm's profits, aggregate income and capital must be rising. In other words, firms' financial fragility is rising. If, however, we assume that firms' retained profits grow at the same rate as GDP and capital, *then* (in this model) we may be sure that the economy will be in steady state, for this implies that households' financial balance (and wealth) must too be growing at the same pace. Now, if we inserted another sector in the model (say, the rest of the world), we would need to add up a new steady state condition – for example, even if firms profits are now growing steadily with income, households debt with non-residents may be growing at a quicker pace.

Whatever the size of the model, however, it will always be true that, in the SFC steady state, flows and stocks will grow at the same rate and the ratio of any sector's financial balance and net wealth to such variables as aggregate GDP (or capital) will be constant.

Now, what is interesting is that, even if we are uncertain about the precise sizes of the sectoral balance sheets in any point in time and/or about the determinants of their evolution in time we will be able to say useful things about these if we happen to know

the actual time series of the sectoral financial balances, especially with the help of further information, however fragmented it may be.

Hence our second complementary strategy, which is, of course, the use of modified versions of the New Cambridge three balances model, as we try to explain in the remaining of this paper.

4 – Behavioral Minimalism and Stock-Flow Norms: Revisiting the "New Cambridge Modeling Approach"

The so-called "New Cambridge School" is unique in many ways. Having appeared in the Department of Applied Economics of the University of Cambridge, it articulated one of the few – if not the only – comprehensive empirical modeling strategy(ies) associated with the theoretical views of the Cambridge post-Keynesians.[27] In so doing, it played an important role in the British macroeconomic policy debate in the 1970s,[28] but lost virtually all its influence in a matter of years, due to its inability to convince an increasingly orthodox and technical profession of the validity of its theoretical hypotheses and of the methods it used to obtain its empirical results.[29] In this section we argue that the merits of the "New Cambridge School" were many and can and should be dissociated from its flaws.

4.1 – From "New Cambridge" to Godley and Cripps (1983)

The "New Cambridge" view is associated with the work of a group of macroeconomists of the Department of Applied Economics (DAE) of the University of Cambridge-UK in the 1970s and 1980s. Led by Wynne Godley, who was brought to Cambridge by Nicholas Kaldor in 1970, New Cambridge economists were vocal advocates of Polak's twin deficits hypothesis (even though for different reasons). They called attention (as early as in 1972, in policy-making circles)[30] to the fact that the private financial balance of the British economy had been relatively small and stable for many years – so that any

[27] Nicholas Kaldor, in particular. Targetti (1992, p. 318 and p. 322) and Mata (2006) go as far as identifying New Cambridge views with Kaldor's own.
[28] See Cripps et al. (1976), Higgins (1976), and Cuthbertson (1979), *inter alia*, for details.
[29] As noted by Godley (1992, pp. 195-196), one of the "aspects (in particular) of the work of the (…) [New Cambridge group] which put its members into a category which may be termed "dissenting (…) was the unconventional view we took about how to construct and use an econometric model." See also Blinder (1978, p. 83).
[30] See Budd (1998), for example.

(conventional Keynesian) attempts to increase effective demand by means of a relaxation of fiscal policy would only worsen the British current account balance. In early 1974 Wynne Godley and Francis Cripps (a macroeconomist working at the DAE) felt confident enough to state their position in the pages of the London *Times*,[31] which then prompted a response by "old-school" Keynesians Richard Kahn and Michael Posner, who basically argued that Mundell-Fleming type constructs admit New Cambridge results as special – though unlikely – cases.[32]

New Cambridge economists did not want to enter theoretical debates, though (Matta, 2006, p.10). Their point was that – no matter what Kahn and Posner thought about it in theoretical terms – their position was empirically solid. Indeed, a year later they would claim that "there exists a functional relationship which can be estimated with a reasonable degree of accuracy between total private expenditure (including investment) on the one hand and total private income (including taxes and certain kinds of borrowing) on the other" (CEPG, 1975, quoted in Cripps et al., 1976, p.46). In 1974 this functional relationship was estimated (for the period 1954-1972, and using annual data) to be the following[33]:

$PX = .533YD + .416\ YD_{-1} + .899HP + .790BA + .962S$ (Cripps et al. 1976, p.46);

where *PX* stands for the "total private expenditure (including stockbuilding and net intra-company investment abroad)," *YD* is the "private disposable income after tax and transfers," *HP* is the "net increase in consumer hire purchase debt," *BA* stands for the "net increase in bank advances to the personal sector," and *S* stands for "changes in the book value of stocks and work in progress in the private sector" (ibid), all in real terms.

New Cambridge economists attached great importance to the fact that the sum of the coefficients of current and lagged disposable income in the private expenditure equation (*.533+.416*) was close to one. This result was interpreted to mean that "virtually all the disposable income of the private sector as a whole will be spent on

[31] Godley and Cripps published two articles in *The Times* in January 22 and 23, 1974. The first "set a stage of impending catastrophe" (Mata, 2006, p. 6) – i.e argued that a relaxation of the fiscal policy would likely generate an exchange rate crisis. The second argued that export subsidies and import restrictions were better alternatives than the use of fiscal policy to increase effective demand and employment in Britain in a sustainable way.

[32] The term "New Cambridge" was actually coined by Kahn and Posner to designate the views of Godley and Cripps and differentiate them from conventional ("old Cambridge") Keynesian orthodoxy.

[33] Needless to say, current econometric knowledge does not favor estimations with so few degrees of freedom and – in the case of linear models with constant parameters, at least - stresses the need to differentiate non-stationary time series from stationary ones.

goods and services with a very short lag [i.e. one year]," an empirical finding which Godley and Fetherston (1978, p.34) called the "explicit hypothesis associated with New Cambridge," Indeed, this result implied that "the chief determinant of (…) [the private financial balance] is the change in disposable income" (ibid); so that it would be generally small and stable when measured relative to income, which in turn implied that the use of fiscal policy to fine tune the economy would necessarily increase both the government and current account deficits (relative to GDP), as denounced by Godley and Cripps in their first New Cambridge manifesto in *The Times*.

Macroeconometric estimates are notoriously unreliable, though.[34] So New Cambridge economists sought to provide solid theoretical foundations for their case. The highly innovative – but poorly contextualized and therefore unappreciated – book by Godley and Cripps (1983) was meant precisely to do that.[35]

4.2 – Revisiting Godley and Cripps (1983)

Godley and Cripps' basic hypothesis [or "behavioural axiom"] is that agents [i.e. households and businesses] have a desired financial assets/income "norm." Different agents are assumed to have different norms, but aggregation problems are assumed away so that the economy behaves *as if* "the private sector as a whole" had a fixed financial assets/income "norm" (Godley and Cripps, 1983, p.60).[36]

Indeed, Godley and Cripps state clearly that "the main results [they present] are conditional on the behavioral axiom that stock variables will not change indefinitely as ratios to related flow variables" (ibid, pp.41-42). Moreover, they "(…) admit without reservation that if stock-flow norms were to move about too wildly most of the theory set out in this book would be rendered useless, though the stability of *norms* is

[34] The New Cambridge equation did not perform well (or "broke down massively," in the words of a critic) when the sample period was increased from 1954-1972 to 1954-1974. New Cambridge economists later attributed this failure to the fact that they did not (in 1975) account for the rising inflation when calculating BA, HP, and S.

[35] "(…) the New Cambridge hypothesis originally published in 1974 (…) attracted some attention at the time but never gained acceptance, being too crudely conceived and expressed to carry conviction as a realistic representation of the central driving mechanism of a complex modern economy. Yet the New Cambridge hypothesis is the grandfather of the theory presented in the first half of this book" (Godley and Cripps, 1983, p.16). It is telling in particular, that Godley and Cripps felt they should make clear that they did "*not* believe it is possible to establish precise [economic] behavioural relationships comparable with the natural laws of physical sciences by techniques of statistical inference" (ibid, p.44, emphasis in the original).

[36] Later in the book (in chapter 13) it is argued that agents might have other "norms" as well – for example, a total wealth (including real estate)/income norm. The applied macroeconomist should therefore pick the norm that s/he found empirically more constant (Godley and Cripps, 1983, p.267).

consistent with fluctuations in *actual* stock-flow ratios" (ibid, p.42). The authors then presented two contentions. According to the first one, "stock-flow norms which are crucial to determining how actual economic systems work do, as a matter of fact, exhibit a fair degree of stability" (ibid, p. 43).

In light of modern SFC constructs (but not, of course, at the time the book was published), it is easy to see that Godley and Cripps' assumption is roughly correct when the economy is near a SFC steady-state – a situation in which not only the private financial assets (net of liabilities) to disposable income ratio is fixed, but in which all stock-flow and stock-stock ratios are fixed as well. But it is fair to say that Godley and Cripps put much more emphasis on the stability of the private financial assets (liquid of liabilities) to private disposable income ratio than on the stability of other stock-flow ratios – the hypothesis being that the other relevant stock-flow ratios in a three sector model (i.e. the government debt to GDP ratio and the economy´s net international investment position to GDP ratio) would adjust to fiscal and trade parameters/policy and to the relative constancy of the private stock-flow ratio (or "norm") and therefore could deteriorate/improve for a while (a situation they called a "quasi-steady-state").

Naturally enough, the assumption that the private sector as a whole acts as to keep its private financial assets (net of liabilities) to disposable income ratio fixed sounds much less plausible in the first decade of the 21st century (well after the emergence of post-1980s financial-led capitalism) than it did in the United Kingdom in the 1970s. But no serious author in the modern SFC tradition would disagree with Godley and Cripps' second contention, i.e. that "even when the norms change, the consideration of stock-flow and flow-flow relationships and an understanding of the logical connection between them provide important diagnostics; it gives a systematic technique for analyzing actual data" (ibid, p.43).

It would be unfair, however, to characterize Godley and Cripps (1983) only as an important precursor of the modern SFC tradition. Quite on the contrary, it is important to notice that they propose an *original* and *minimalist* approach to macroeconomic modeling that is quite different in spirit from the direction the modern SFC literature has taken in the last few years. Indeed, they state explicitly that "since human behavior is so varied, (…) [their] objective will be to establish principles of analysis which capitalize on adding-up constraints so as to confine the behavioral processes to a relatively small number of variables, each of which can then be the object of empirical study. The smaller the number of behavioral variables which govern how

the system *must* function in view of the logical constraints, the more powerful will be our theory as a model for organizing and interpreting data" (Godley and Cripps, 1983, p.18). They felt, in particular, that the fact that "the ratio of purely logical propositions to those which are contingent on behavioral assumptions is higher [in their book] than is normal in a book on macroeconomics" was a virtue, not a vice (ibid, p.44) – for "few [behavioral] laws of economics will hold good across decades or between countries" and "the evolution of whole economies, like that of their political system is a highly contingent historical process" (ibid).

4.3 – A Different – and Inclusive –View of New Cambridge: Some Notes on the "Free" Estimation of the 3 (or more) Financial Balances

As discussed in section 2, one needs 10 variables in order to arrive at the three New Cambridge financial balances, which are Y, T, Tr_{pe}, Cp, Ip, Cg, Ig, Tr_{ge}, X, and M (all measured in "real" terms). These are not, by any means, unfamiliar variables. Keynesian economists have, for decades, estimated private consumption and investment functions, as well as import and export functions for goods and services. Hypotheses about the fiscal variables are also present in each and every textbook of macroeconomics. And the transfers among sectors are only slightly less familiar.

We contend that any Keynesian (i.e effective demand) model that theorizes about all these 10 variables – and interprets the dynamic behavior of the implied three sectoral financial balances along the lines discussed in the first section of this paper – should be seen as a New Cambridge model. And if our definition sounds too inclusive[37], this is on purpose. As Godley and Cripps (1983, p.44) we do not believe one can be sure of the precise determinants of any of these variables (or of any other variable which results of the aggregate behavior of millions of people transacting in historical time) in any point in time, let alone of how it will evolve over time. Naturally enough, in any given point in time one can and should look for "good" econometric specifications for all of them, and chances are that one will find them. But these estimates – and virtually all macroeconomic empirical regularities for that matter – are bound to vary over time and in different countries. So it makes sense to give "freedom" to econometricians to exploit as far as they can country-specific and historically-specific empirical regularities.

[37] It includes, for instance, the so-called "Goldman-Sachs" approach (see, for instance, Casadio and Paradiso, 2009).

To be sure, all 10 variables above are flow variables. And there are very good reasons to believe that their dynamics are influenced by their stock counterparts[38]. Moreover, New Cambridge authors are well known for their penchant for estimating "private expenditure functions" (i.e. a behavioral equation for the sum of private consumption with private investment) and for using the stock of private financial assets (net of liabilities) and/or asset prices (as proxies of capital gains or losses of the owners of these assets) and/or credit availability as explanatory variables. We contend, however, that these are only empirical/econometric matters and that nothing in the (broad, dynamic SFC) interpretation of the three financial balances depend crucially on the precise determinants of private expenditure (i.e private consumption plus private investment) assumed in one´s model. As discussed earlier in this paper, what one gains from looking closely at the balances is an understanding of how the liquidity of the underlying sectoral balance sheets is evolving. And, naturally enough, all one needs to get a sense of how the liquidity levels of the various underlying sectoral balance sheets are likely to evolve in time is a good (Keynesian, of course) sense of how the sectoral financial balances will evolve in time (and, as Barbosa-Filho et al. 2006 have made clear, several patterns are possible). If one can project these balances with satisfactory ("out of sample") degrees of precision using separate consumption and investment functions, so be it. If private expenditure functions happen to be more precise, so be it too. To make the same point differently, if the economy is close to a SFC steady-state, then the use of the original New Cambridge "private expenditure function" is probably the most elegant and parsimonious alternative. But if the experience of the 1990´s "financial-led" capitalist growth has taught us anything it is that economies can get significantly far from their full SFC steady-state.

Note also that being able to estimate the disaggregated components of the private financial balances would also be quite useful. The problem is that high frequency data on intra-private sector transfers and property income paid is not easy to find or simply does not exist in many countries. The usual procedure, then, is to estimate the three aggregated financial balances and complement these estimates (and projections) with extra-model information on the disaggregated components of the

[38] There is considerable empirical evidence, for instance, that T, Cg, and Ig (or, at least, the "primary government surplus" implied by the latter) depend(s) – in a cointegration sense – on the stock of government debt.

private financial balance – which, as discussed in section 1, do not change erratically over time.

5 – Concluding Remarks: Towards a General Post-Keynesian SFC Applied Macroeconomic Modeling Strategy?

Anyone who has tried to read through a modern Post-Keynesian SFC model knows that these constructs tend to assume very many behavioral assumptions. Some of the assumed behavioral parameters (such as for example, the wealth-elasticity of consumption or the interest-elasticity of investment) are less difficult to estimate than others (such as the animal spirits of firms or the liquidity preference of rentiers). All of them result from billions of interactions by dozens of millions of people in historical time – so only by chance would a few of them be relatively fixed in any, say, decade. Moreover, changes in only a few of them can change significantly the results of the SFC model simulations. In this particular sense, the emphases of the modern SFC literature are quite different from the original New Cambridge authors.

As mentioned before, we believe this is hardly surprising. Modern SFC models are crucially important from a theoretical point of view – in the sense that they can "prove" that certain configurations of effective demand are (un)sustainable, and illuminate the details of what happens when the economy is far from the steady-state (i.e. they go well beyond "steady-state analyses") . New Cambridge type models are considerably simpler – for they were meant to shed light on the medium-term trends of actual capitalist economies in historical time, so as to guide real time policy-making decisions.

We believe that the *direct* usefulness of modern SFC models for applied purposes is at least doubtful, for the "mapping" of the theoretical model variables to existing data series is very difficult at best, while the very size of the models would likely make the combined effect of the various estimation/calibration errors too much to bear. We therefore believe that modern SFC models should be used as an auxiliary tool, to help the analyst understand which precise types of (plausible) behavior would generate the financial balances, stock-flow and stock-stock-ratios directly verified in practice.

Moreover, we strongly believe that direct estimation of the financial balances is an useful enterprise – as the work of the macroeconomic modeling team of the Levy

Institute has made clear. We emphasize, however, that the estimation of these balances does not depend on any specific hypothesis about the constancy of any given SFC ratio. In fact, we vote in favor of an applied modeling strategy that combines direct estimates of the three "New Cambridge" financial balances with (i) non-model information about the households, firms', and banks' financial balances and balance sheets; and (ii) a stylized (but detailed) theoretical SFC model of the economy at hand. Naturally enough, something very close to this strategy has actually been adopted by the macroeconomic modeling team working at the Levy Economics Institute.

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