

# Towards a post-Keynesian consensus in macroeconomics: Reconciling the Cambridge and Wall Street views

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## *1. Introduction*

The current financial crisis, which started to unfold in August 2007, is a reminder that macroeconomics cannot ignore financial relations, otherwise financial crises cannot be explained.

Several authors have underlined the apparent tensions that have existed between the so-called American Post Keynesians and the Cambridge Keynesians. The former, also known as the Fundamentalist post-Keynesians, are mainly concerned with money, debt, liquidity, interest rates, and cash flow issues that characterised an uncertain world dominated by financial markets. This also came to be known as Wall Street Keynesianism or Financial Keynesianism. By contrast the Cambridge Keynesians are associated with the Kaleckian and Kaldorian strands of post-Keynesianism, along with the neo-Ricardian (or Sraffian) Keynesians. The Cambridge Keynesians focussed on real issues, mainly through growth models, being concerned with technical choice, income distribution, rates of capacity utilisation, pricing, normal and realised profit rates. Several observers have pointed out that they could see little homogeneity in the economic views and methods of these two broad groups of heterodox Keynesians.

The purpose of the present paper is to show that while these differences have certainly existed in the past, the potential for some reconciliation between these two main views of the economy has always existed, and that some large efforts have been made over the last two decades to

**Kommentar [TN1]:** Author: If I understand your differentiation between the American Post Keynesians and the British post-Keynesians right, and if you normally use "post-Keynesian", this should read either "fundamentalist post-Keynesians" or -- as a name -- "Fundamentalist Post Keynesians" or maybe -- as in the conclusions -- "fundamentalist Post Keynesians". Could you please check?

effectively link the Cambridge and the Wall Street views. It will be argued that stock-flow consistent models, inspired in particular by the work of Wynne Godley, are an appealing way to move forward in search of a post-Keynesian consensus in macroeconomics, as it allows to entertain both monetary and real issues within a single model.

## 2. *At the origins*

### 2.1 *Cambridge macroeconomics without money*

For a long time Cambridge macroeconomics was associated with the Cambridge capital controversies and with the Cambridge models of growth, based on differentiated propensities to save. These models were created as the long-run extension of Keynes's *General Theory on Employment, Interest and Money*. They were also based on the fundamental equations of Keynes's earlier *Treatise on Money*. Yet, as pointed out by Jan Kregel (1985: 133), "money plays no more than a perfunctory role in the Cambridge theories of growth, capital and distribution developed after Keynes". Expectations and fundamental uncertainty also hardly played any role.

Kregel's (1976) earlier defence of Cambridge macroeconomics without money was that Cambridge economists were following on the steps of Keynes, setting some variables as given to allow the construction of a model that could be understood, leaving for a later stage the task of shifting the values taken by these given variables. In the case of Cambridge growth models, Kregel argued that liquidity preference and interest rates could be kept as part of the given datum. By 1985, however, Kregel was losing patience. Then, it was not yet obvious how liquidity preference could be introduced appropriately into the Cambridge growth model or in other heterodox Keynesian analyses, such as that of the French monetary circuit. His impatience led him to compare Cambridge macroeconomic without money to Hamlet without the Prince, and to call for the introduction of Bulls and Bears into heterodox Keynesian analysis (Kregel 1986).

At the time, as far as I know, only two means of introducing financial factors into Cambridge growth models had been found. On the one hand, Luigi Pasinetti (1974) had considered distinguishing the rate of return on the assets held by workers from that obtained by capitalists. He assumed workers only held money deposits or bonds, while capitalists held stock

market shares. This allowed him to distinguish the overall profit rate of the economy, the interest rate, and the rate of return of capitalists.

The other Cambridge growth model with finance was Nicholas Kaldor's (1966) neo-Pasinetti model. Kaldor introduced corporate retained earnings as well as capital gains on stock market shares. The model gave rise to various extensions, notably those from Basil Moore (1975), who transformed the rate of accumulation from an exogenous to an endogenous variable, making it a function of Kaldor's valuation ratio (similar to Tobin's  $q$  ratio), based on the difference between the supply and demand prices of capital, or more precisely between the production price of new investment goods and the price of a stock market share representing one unit of such capital goods. As a consequence, fluctuations in the propensity to save of households would have a feedback effect on the rate of accumulation.

The problem with Kaldor's model, as was pointed out by Paul Davidson (1972), was that the neo-Pasinetti model and its various extensions assume that all saving is done in the form of share purchases. There is no money in the model, and hence no portfolio choice on the part of investors. Indeed, the same criticism could be levelled against all Cambridge models of growth and distribution at the time. Davidson's (1968) solution to this drawback, however, was no more satisfactory.

At about the same time, Hyman Minsky (1976) was busily developing his financial fragility hypothesis, arguing that economists had omitted the role of debt, leverage and interest payments in macroeconomics, thus ignoring the possible deflationary impact of falling asset prices. His alternative view, based on the fundamental role of financial relationships on the real economy, was also an implicit criticism of the models developed by Cambridge Keynesians, and indeed, because of this, Minsky and Davidson were engaged in a rather tense relationship with both the Kaldorians and the Sraffians during the ten years or so of the Trieste Post-Keynesian Summer school (Arena 1987).

## 2.2 *Odd bits here and there*

Still, there has always been some commonalities between the two major strands of post-Keynesian economics. The magnum opus of Cambridge Keynesian economics, the *Accumulation of Capital* of Joan Robinson

(1956), contains several chapters devoted to financial issues. But these chapters appear after about twenty technically demanding chapters, so that very few readers overcame their exhaustion and proceeded to these latter chapters. There Robinson (1956: 231 and 244) points out that the amounts lent to households and firms depend on the interest coverage ratio, that is, the ratio of (profit) income to due interest payments. Robinson was thus introducing elements of credit rationing in her macroeconomics, in a way remindful of Wall Street Keynesian economics. Indeed, she points out that the borrowing power of entrepreneurs depends on “the strictness of the banks’ standards of creditworthiness” and the state of mind of individual investors, as well as “the subjective attitude of potential lenders” (Robinson 1956: 244).

All this is clearly reminiscent of Robinson’s (1952: 81) discussion of finance as a possible bottleneck to expansion, where she claims that a shortage of finance may limit investment plans.

“It shows itself in a high risk premium on industrial securities and in difficulty in arranging new loans, and it may be caused by a general lack of confidence on the part of owners of wealth, or by the fact that too small a part of total wealth is owned by actual or potential entrepreneurs.”

Such a statement could well have been written during the current subprime financial crisis.

Robinson (1952: 83) also refers to the rising risk that higher interest rates generate. At some point borrowers become unable to borrow, even if they offer to pay very high interest rates – a feature of credit markets underlined earlier by Kalecki (1937), who introduced the notion of borrower’s risk as a limit to the expansion of firms. This idea was developed by Minsky (1976) in his famous 2-price diagram – the two prices alluded to when discussing Kaldor’s valuation ratio.

Kalecki’s follower, Joseph Steindl (1952: chapter 9), was also much concerned with financial issues. He devotes an entire chapter to what he calls the gearing ratio of firms, which is a variant of their debt ratio. In particular he emphasises a problem which was left in the dark by Minsky: How do the decisions of entrepreneurs regarding the relative size of the debt that they are willing to take on can be reconciled with the decisions of households regarding their desired wealth? For instance, when there is an economic slowdown and when profit rates decline, how do

firms manage to reduce their gearing ratio? Steindl's answer is that this may not be so easy, especially if household saving is less responsive than investment to changes in profits.

In this case, says Steindl, the realised gearing ratio is likely to rise, so that

“the entrepreneurs, even apart from their desire to reduce the initial gearing ratio, will soon be inclined to check this relative growth of their indebtedness, and their only possible reaction against it will be to reduce investment. This however will not put matters right.” (Steindl 1952: 114)

Thus Steindl describes an economy which is likely to be faced with cyclical growth, ever booming and then falling into a recession. Steindl's book fell into oblivion until 1976 when his book was reprinted, and it gave rise to an interesting attempt from Amitava Dutt (1995) to deal with financial and leverage issues within an otherwise Kaleckian model.

### 2.3 *The Sraffian contribution to monetary economics*

For a long time it was argued that Sraffians, with their multi-sector pricing models based on a uniform profit rate, had little to say about monetary economics. I always found this hard to swallow, since, until the late 1980s, I could not really find any model that would formalise the working of a monetary production economy as described by American Post Keynesians. While everyone was talking about the relevance of liquidity preference and interest rates, not much was being offered that differed from the standard IS/LM model of the time.

By contrast, the Sraffians were arguing that higher interest rates have an impact on income distribution, and hence on effective demand. Pivetti (1985) and Panico (1988), building on an insight of Sraffa first underlined in 1964 by Garegnani (1979: 81), claimed that higher real interest rates induce entrepreneurs to increase the normal profit rate on capital, to keep intact their entrepreneurial rate of return (net of interest charges). All Sraffians did not necessarily agree with this mechanism – Joan Robinson (1979: 180) wrote that it was “excessively fanciful”, without realising that she had herself proposed a similar mechanism more than 25 years earlier (Robinson 1952: 96). Sceptics argued that higher real inter-

est rates could also lead to a decrease in the entrepreneurial rate of return instead of an increase in the normal profit rate. But at least the Sraffians were introducing monetary matters within the realm of income distribution.

This Sraffian feature fits within standard post-Keynesian pricing theories, such as full-cost pricing or target return pricing, where interest payments are a cost that must be incorporated within the markup or the target rate of return. Indeed, several heterodox economists have endorsed the relevance of this Sraffian mechanism, from Nicholas Kaldor to Lance Taylor (2004), pointing to the possible cost-side inflationary effects of higher real interest rates.

A few authors have attempted to model the effects of this Sraffian mechanism within an otherwise Kaleckian framework. This was first done by Dutt (1992) and Lavoie (1993). As long as there is a Kaldorian saving function, with a propensity to save out of wages which is lower than the propensity to save out of profit income, the Sraffian mechanism reinforces the standard negative Keynesian effect of the interest rate on investment and economic activity. However, a most intriguing result is that an increase in interest rates may lead to an increase in the rate of accumulation. The logic behind such a counter-intuitive result is that the higher interest rates may lead to a redistribution of income away from firms and towards households. The former have a propensity to save on retained earnings equal to one, while the latter have a propensity to save much below unity, so that the overall propensity to save is reduced.

A series of models, which can be found in the book of Hein (2008), extend these counter-intuitive results to the long-run. These models, following Lavoie (1995), take into account the leverage ratio of firms and assume that rentiers save a given proportion of their interest or dividend income. Depending on the parameters of the investment and saving functions, an increase in the rate of interest may lead to a decrease in the rate of accumulation in the short run – the normal case; but it may also lead to an increase in the rate of accumulation – the puzzling case. The long run model is dynamically stable in the puzzling case only. In other words, when higher interest rates induce faster accumulation, the leverage ratio, which is endogenous in the long run, tends towards a fixed value, and faster growth will be associated with higher leverage ratios, as is often believed. By contrast, when higher interest rates induce slower accumula-

tion, this is accompanied by dynamic instability and an ever-rising leverage ratio.

The main drawback of these models is that long-run balanced growth depends only on the propensity to save on bonds times the rate of interest, as these models do not take into consideration equity prices and the stock market. In that sense they are thus rudimentary. However, they clearly show that the leverage ratio may (Minsky's financial fragility hypothesis) or may not (as pointed out by Steindl) move pro-cyclically with the growth rate of economic activity.

### 3. *First attempts at a synthesis*

#### 3.1 *Portfolio choice*

The seminal effort in tying together Cambridge or Kaleckian growth models to Minsky's concerns about finance was the paper by Lance Taylor and Stephen O'Donnel (1985). They had investment as a function of the discrepancy between the expected profit rate of firms and the interest rate, with this expected profit rate being the sum of the actual profit rate and some confidence indicator. This was an interesting innovation, akin to introducing Keynes's marginal efficiency of capital – an expectational concept – into the Kaleckian model.

The real innovation of the Taylor and O'Donnel (1985) models, however, is the introduction of portfolio choice. Households have the choice between holding cash money, interest-paying bills, or stock market equities, and this choice is influenced by the values taken by the interest rate and the expected profit rate of firms (the fundamentals, rather than the rate of return on equities!). A third innovation of the Taylor and O'Donnel (1985) model is the introduction of cyclical dynamics by adding a differential equation, which says that the confidence indicator rises as long as the interest rate is below some normal interest rate.

Franke and Semmler (1991) construct a somewhat similar model, with similar portfolio choice. Investment also depends on the expected profit rate relative to the interest rate, with the former being dependent on 'the state of confidence'. They also introduce a differential equation, where confidence rises as long as the entrepreneur's profit rate (the profit rate net of interest payments) is above the interest rate and as long as the lev-

erage ratio of firms is lower than some normal rate. Taking the leverage ratio into explicit account is their main contribution.

Despite their originality, the Taylor and O'Donnell and the Franke and Semmler models have some drawbacks.<sup>1</sup> First, the supply of money is not truly endogenous. It is given by some fixed-growth rule in Taylor-O'Donnell, so that the interest rate is endogenous, but this may be seen by some as an advantage. In the Franke-Semmler model, the money supply is endogenous, but supply-led, since the authors assume that bank reserves are being provided as a fixed ratio to the government deficit. Second, both models take the price of equities as determined by fundamentals, rather than demand and supply on the stock market. Third, while the portfolio equations have all the Tobinesque requirements, the balance sheets of both models are incomplete, the government sector being both present through bank reserves, but absent otherwise.<sup>2</sup>

### 3.2 *Minsky-endorsed attempts at synthesis*

While Hyman Minsky had a tumultuous relationship with Italian members of the Sraffian school, his views were very well received by many other Italian economists. In particular, he had a close relationship with Domenico Delli Gatti and Mauro Gallegati, and even wrote a working paper with them. Delli Gatti and Gallegati, sometimes with a colleague, published numerous articles in the 1990s in an attempt to integrate the financial fragility hypothesis into a full-blown post-Keynesian short-run model.

At the core of their model is the investment function, which says that investment is a positive function of Tobin's  $q$  ratio, and a multiple of the amount of retained earnings, with the multiplier effect being associated with leverage over retained earnings.<sup>3</sup> Fluctuations in the value of this multiple, usually assumed to be pro-cyclical, can transform a stable model into an unstable one, meaning that when firms have a higher re-

<sup>1</sup> Claudio Dos Santos (2005) studies and underlines the main drawbacks of the Minskyan models of this time period.

<sup>2</sup> A quite complete model in this tradition, with credit rationing based on the  $q$  ratio, has been built by Marc Radke (2005: chapter 4).

<sup>3</sup> A similar process is found in the finance frontier of the firm, as described in Lavoie (1992: 111).



course to external finance, the stability conditions get violated, and financial instability can arise, even without an increase in interest rates.

Despite being no doubt faithful to Minsky, assuming either an endogenous money supply or a supply that rises with higher interest rates, these models run into some difficulties. The most obvious one is their short-run nature, in contrast to the models mentioned earlier. Their model moves through time, until it reaches an eventual stationary state, but then capital must be growing at a decelerating rate as investment reaches its steady value.

Also, there are black holes in some of the models. For instance, in Delli Gatti, Gallegati and Gardini (1990: 105 – 107), firms must make interest payments on their past debt, but these interest payments appear nowhere in the consumption function. Another instance of inconsistency is found in the sectoral balance sheets of Delli Gatti and Gallegati (1992: 136). Banks have reserves, but in contrast to the other financial assets, these reserves have no counterpart. It is interesting to note that the Delli Gatti, Gallegati and Minsky (1994) paper does have a complete and coherent matrix of balance sheets, but this balance sheet is not put to use in the equations of the model of that paper.

### *3.3 An earlier forgotten effort at synthesis*

Strangely enough the first successful effort at putting together the financial and the real sectors in a post-Keynesian model of growth has been essentially forgotten. This synthesis model is based on an extension of Kaldor's neo-Pasinetti model, proposed by Peter Skott (1981). He introduces a budget constraint on firms, whereby firms can finance investment either by retained earnings, stock issues, or new loans. Households's consumption depends on their wealth, and they make a portfolio choice by deciding to hold fixed proportions of their wealth in equities and money.

The model was further developed and modified in an article (Skott 1988) and a book (Skott 1989). Still, the model did not seem to attract much interest. In contrast to the models of Franke-Semmler and Taylor-O'Donnell, the money supply is endogenous and demand-led in the main variant of Skott's model, and the interest rate on bank deposits is exogenous, as most post-Keynesians would argue. The price of equities de-

depends on demand and supply, with the former itself depending on the level of net profits of firms.

Two features of the model may have reduced its popularity. First, in the book at least, there is a complicated story about Harrodian instability in investment, tamed down by a Goodwin-like Marxist reserve army mechanism. Skott (1989) assumes that the model is unstable in the medium run, but that it eventually gets slowed down by a lack of labour, which will reduce the rate of growth of production. The second disturbing feature of the model is its short-run adjustment mechanism. Skott (1988 and 1989) assumes that output is given and that demand adjusts to supply through stabilising changes in prices. Only at a later stage does the rate of utilisation change. Although many post-Keynesians have argued that this was precisely what Keynes had in mind when he wrote the *General Theory*, it is somewhat difficult to accept as a description of a modern economy with sticky prices. Finally, the Skott models do not explicitly consider leverage ratios, and so could not be tied to the burgeoning literature on Minsky debt models.

### 3.4 *The debt of households*

Several models have developed the relationship between the corporate debt ratio and the growth rate of the economy, in particular the models inspired by the seminal work of Marc Jarsulic (1989), who introduced non-linearities and chaotic behaviour into an otherwise simple effective demand growth model based on the interaction between saving and investment. Jarsulic's model has inspired a series of authors, in particular Charles (2008), who built models attempting to mix Minskyan and Kaldorian insights.

So far we have only discussed the debt ratio of firms. But what about the debt of households? Dorene Isenberg (1988: 1051) has concluded from her historical analysis of the Great Depression that Minsky's financial instability hypothesis did not really fit the historical record of the period preceding the 1929 crash. She claims that "the production sector, non-financial firms, which is at the centre of the financial fragility hypothesis, did not exhibit a rising debt-equity ratio". A later study of hers showed that while firms did not suffer from rising leverage ratios before 1929, households did see their debt ratios rise considerably in the 1920s

(Isenberg 1994), something that is not unlike what has been observed over the last few years, as a run up to the recent subprime financial crisis.

There is one author, however, who has gone beyond Minsky, incorporating the debt of households into an effective demand framework. This is Tom Palley (1994 and 1996), whose work, in retrospect, seems destined to become more fashionable. As Palley (1996: 202) says, we can certainly make the claim that

“the focus on household debt accumulation represents a theoretical innovation that contrasts with, and complements, existing Minskyan models which focus on the corporate debt-investment spending nexus.”

Palley's model is very simple. He assumes that there are two classes of households. One class is made up of borrowers, who must make interest payments. Their consumption depends on their net income, plus the new loans that they get. They have a given debt to gross income ratio that they achieve in each period. The other class is made up of lenders, who receive interest payments, and who make new loans. Their consumption is a function of their overall income, minus the loans that they consent to the borrowers. It is assumed that borrowers have a higher propensity to consume than lenders. Thus initially, the higher debt taken on by borrowers leads to higher economic activity, because borrowed funds are all spent. But then, as more interest payments must be made, this slows down economic activity. Indeed Palley (1996: 206) shows that a higher interest rate or a higher debt to income ratio for borrowers will lead to a lower equilibrium level of GDP in the economy, a point already claimed by Palley (1991 – 92).

This mechanism thus contains clear financial fragility consequences, but from the household side. Palley adds a complication by assuming that the debt to income ratio of borrowers rises when GDP is on the rise, thus introducing Minsky's paradox of tranquillity, according to whom stability contains its own seeds of instability, since “each state nurtures forces that lead to its own destruction” (Minsky 1976: 128). In other words: “Stability breeds instability. The more tranquil the economy, the more entrepreneurs and bankers are ready to indulge in risky ventures” (Lavoie 1984: 790). The main drawback of Palley's little model is that it is not in growth terms, while banks are nowhere to be found.

#### 4. *Stock-flow consistent models*

The main claim of the present chapter is that stock-flow consistent models (SFC models), inspired in particular by the work of Wynne Godley, are the likely locus of some form of post-Keynesian consensus in macroeconomics, as it allows to entertain both monetary and real issues within a single model.<sup>4</sup>

SFC models start with an appropriate balance sheet matrix that insures that economists “analyze how financial commitments affect the economy” (Minsky 1986: 221). A proper balance sheet matrix helps out to design a proper transaction-flow matrix, that will take into consideration all the financial flows associated with the assumed stocks. The same transaction-flow matrix also insures that each sector fulfils its budget constraint.

The stock-flow consistent approach, that tries to integrate the real and the monetary sides of the economy by paying careful attention to balance sheets and financial commitments is certainly in line with what Minsky had in mind, for he was arguing that “the structure of an economic model that is relevant for a capitalist economy needs to include the interrelated balance sheets and income statements of the units of the economy” (Minsky 1996: 77). It is interesting to note that Alan Roe (1973) very early on underlined the links between flow-of-funds analysis and balance sheet accounts on the one hand, and the Minskyan view of Wall Street economics on the other hand.

Still, it must be pointed out that behavioural equations will generate different results even if they are embedded within a common structural framework. While the range of possible results is restricted by the SFC approach, as first claimed by Godley and Cripps (1983), it is not uniquely restricted.

<sup>4</sup> Over the years, another group of researchers, around Carl Chiarella, Peter Flaschel, Reiner Franke and Willi Semmler, have developed a series of stock-flow coherent models based on accounting matrices and budget constraints, using multi-dimensional differential equations, although these models more often than not entertain some typical neoclassical assumption. There are however tight methodological links with the models being described here.

#### 4.1 A simple stock-flow model with equities

An early, simple, SFC growth model is that of Lavoie and Godley (2001 – 2002), inspired by Kaldor's (1966) model, with the addition of Kaleckian behavioural equations. There are only three sectors – households, firms, and banks – and the only assets are fixed capital, equities, bank deposits and loans, as shown in Table 1.

Table 1: The simple Lavoie and Godley (2001 – 02) balance sheet matrix

	House- holds	Production Firms	Banks	$\Sigma$
Tangible capital		+ Kf		+ K
Deposits	+ Dh		– D	0
Loans		– Lf	+ L	0
Equities	+ pf.efh	– pf.ef		0
Net worth	– NWh	– NWf	0	–K
$\Sigma$	0	0	0	0

This framework has been picked up by Skott and Ryoo (2008), but with different behavioural equations, in particular the consumption function, which they assume to depend on current income and wealth instead of current income and capital gains. Skott and Ryoo show that the differences in the consumption function have little impact, but that those tied to the investment function or the labour market are essential in arriving at different conclusions. Mickaël Clévenot (2006: 298) also adopts the Lavoie and Godley framework, modifying it by assuming that firms hold equities issued by other firms, thus introducing a key characteristic of the financialisation process. He mixes this with various investment regimes.

Till van Treeck (2007) modifies the basic framework by introducing two classes, workers and rentiers, and by adding a highly relevant item in the balance sheet matrix – bank loans to rentier households. Van Treeck is thus able to track the evolution of the debt ratio of firms as well as the debt burden of rentiers, that is the sum of their interest payments and debt repayment relative to their disposable income. Unfortunately, the paper does not say what happens if rentiers decide to speed up the rate at which

they take on loans, which in the model depends positively on expected wealth and negatively on the burden of their debt. Thus within this growth model, we cannot confirm or infirm the findings of Palley (1994) with regards to the positive and then negative effects of higher household borrowing on economic activity. Godley and Lavoie (2007: chapter 11), whose model has household new borrowing depending positively on personal income and negatively on the interest rate, show however that Palley's conjecture is confirmed.

The Lavoie and Godley model (2001 – 02) has been developed in further directions. Kim (2006) has recast the model by splitting productive activity into two consumption and investment producing sectors, each issuing its own shares, and each pursuing target return-pricing. The investment good acts as a Sraffian basic good, with the price of the consumption good depending on the cost of acquiring capital goods. But despite these complications, and by using parameters in the same range, Kim essentially finds results which are similar to those of the original one-sector model.

Lance Taylor (2004: 272 – 8) has built a slightly simplified analytical version of the Lavoie and Godley (2001 – 02) model. Taylor shows that two stable cases are possible. The economy can behave along Minskyan lines, as higher economic activity leads to higher debt ratios for firms; or the economy can behave as described by Steindl, with higher economic activity being possibly associated with higher debt ratios in the short run but lower debt ratios in the long run.

Taylor (2004: 303) further introduces the possibility of a cycle by re-introducing the “state of confidence”, first found in the Taylor-O'Donnell brand of Minsky models. Taylor gets cyclical dynamics of the Minsky type by running the model in a Minsky mode and by adding a differential equation that says that the confidence indicator, here reflected in the constant of the investment function, keeps rising as long as the leverage ratio of firms is not too high. This rising parameter could reflect the animal spirits of both entrepreneurs and bankers. Booms and debt deflations are thus generated. Mouakil (2008) obtains similar cycles by assuming that entrepreneurs move to shorter term financing whenever their cash-flow rates rise – another consequence of the tranquillity paradox – thus being

forced to repay debt faster.<sup>5</sup> Assuming further that lending rates are higher when the debt service coverage ratio (profits over interest payments plus debt repayment) falls, is enough to generate Minskyan booms and busts.

#### 4.2 *Government, banks, and the housing sector*

A major drawback of the Lavoie and Godley (2001 – 02) model is that there is no government sector. Zezza and Santos (2004) have first extended the model to include a central bank and the government, thus taking into account high powered money, central bank advances and Treasury bills in addition to the assets already mentioned (see Table 2 on p. 89). They also take price inflation into account, distinguishing between real and nominal magnitudes. Such additions have also been made in the later chapters of Godley and Lavoie (2007), following the inflation-accounting insights of Godley and Cripps (1983).

The balance-sheet matrix has been extended in another direction. While including the government sector, Le Héron and Mouakil (2008) prefer to pay attention to the portfolio decisions of the banking system, thus focussing on the set of assets of the banking system. In order to be able to do so, they simplify the balance sheet of the household sector, which is assumed only to hold deposits, while they construct a detailed balance sheet for the banking system, as shown in Table 3 on p. 90, assuming that banks hold assets such as corporate paper, equities and bonds, all issued by the private sector, in addition to reserves and Treasury bills. Banks, in this model, make portfolio decisions along Tobinesque lines, based on their expected yields. In this model, as in the Godley and Lavoie (2007: chapter 11) model, the lending and deposit rates are endogenous, dependent on risk measures, while the Treasury bill rate is not, as it is set by the central bank. Another interesting feature of the model is that banks proceed to ration credit if the leverage ratio of firms is too high or if the value of firms on the stock market is too low. The justification for the latter is not very clear, however, since the portfolio

<sup>5</sup> Tymoigne (2006) makes the same distinction in a Minskyan model that has basic stock-flow coherent features, but using a system dynamics approach. His feedback reaction functions are highly complex, and his diagrams are rather difficult to interpret.

behaviour of banks is itself predominantly responsible for the stock market valuation ratio, as households do not hold any equities.

*Table 2: The balance sheet matrix of the Zezza and Dos Santos (2004) model*

	<i>Households</i>	<i>Firms</i>	<i>Banks</i>	<i>Govern- ment</i>	<i>Central Bank</i>	$\Sigma$
Tangible capital	+ Kh	+ Kf				+ K
Bills	+ Bh		+ Bb	- B	+ Bcb	0
Cash	+ HPMh		+ HPMb		- HPM	0
Advances			- A		+ A	0
Deposits	+ Dh	+ Df	- D			0
Loans		- Lf	+ L			0
Equities	+ pf.efh	- pf.ef				0
Net worth	- NW <sub>h</sub>	- NW <sub>f</sub>	0	- NW <sub>g</sub>	0	-K
$\Sigma$	0	0	0	0	0	0

*Table 3: The balance sheet matrix of the Le Héron and Mouakil (2008) model*

	<i>Households</i>	<i>Firms</i>	<i>Banks</i>	<i>Govern- ment</i>	<i>Central Bank</i>	$\Sigma$
Tangible capital		+ Kf				+ K
Bills			+ Bb	- B		0
Bonds		- pb.BL	+ pb.BLb			0
Paper		- CP	+ CPb			0
Cash			+ HPMb		- HPM	0
Advances			- A		+ A	0
Deposits	+ Dh		- D			0
Loans		- Lf	+ L			0
Equities		- pf.ef	+ pf.efb			0
Net worth	- NW <sub>h</sub>	- NW <sub>f</sub>	- NW <sub>b</sub>	- NW <sub>g</sub>	0	- K
$\Sigma$	0	0	0	0	0	0



The recent subprime financial crisis has made us all aware that the housing and mortgage markets should not be ignored when describing a macroeconomic system and economic crises. Surprisingly, if we go back to the 1929 crisis, we should have known better, for, as Isenberg argues,

“debt usage trends in the financial, real estate, and public utility sectors conformed more closely to the financial fragility hypothesis [...]. In contrast to the industrial sector, debt in the financial, real estate, and public utilities sectors was steadily and positively related to growth.” (Isenberg 1994: 212 and 214)

Households were going into debt to purchase equity holdings and to acquire mortgages. “Towering over other debt categories in terms of level and rate of growth during the 1920s was nonfarm mortgage debt” (Isenberg 1994: 214). Thus stock-flow consistent models would have much to gain by adding the housing sector.

This is precisely what has been done by Zezza (2008). Starting off from the Zezza and Dos Santos (2004) model, he also splits households into two classes: the workers, who rent houses or purchase them with the help of mortgages, and the rich, who freely purchase houses to get rental income or to make capital gains, and who thus consider residential capital as part of their portfolio decision (see Table 4). The demand for houses is thus driven by demography considerations and by portfolio decisions, while the supply of new houses is said to depend on expected demand and past capital gains. Housing prices, relative to the construction price, rise when the stock of unsold houses decreases. Zezza thus demonstrates how one can introduce housing into the picture, and how housing bubbles may develop.

Table 4: The balance sheet matrix of the Zezza (2008) model

	<i>Rich house- holds</i>	<i>Other house- holds</i>	<i>Firms</i>	<i>Banks</i>	<i>Gov- ern- ment</i>	<i>Central Bank</i>	$\Sigma$
Productive capital			+ pk.kf				+ Kf
Homes	+ ph.hrh	+ ph.hoh					+ Kh
Bills	+ Brh		+ Bf	+ Bb	- B	+ Bcb	0
Cash	+ HPMrh	+ HPMoh		+ HPMb		- HPM	0
Advances				- A		+ A	0
Deposits	+ Drh	+ Doh		- D			0
Loans			- Lf	+ L			0
Mortgages	- Mrh			+ M			
Equities	+ pf.ehrh		- pf.ef				0
Net worth	- NW <sub>h</sub>	- NW <sub>h</sub>	- NW <sub>f</sub>	0	- NW <sub>g</sub>	0	-K
$\Sigma$		0	0	0	0	0	0

### 4.3 Securitisation and other financial innovations

In his review of Godley and Lavoie (2007), Taylor (2008: 643 – 4) wonders whether the stock-flow consistent approach will ever be able to handle the complexity and the innovations that now characterise the financial system and the recent subprime financial crisis. Godley and Lavoie (2007: chapter 11) did include the possibility of loan default in their model, showing that an increase in loan defaults would slow down the economy, because of its consequences for the net worth of banks (Lavoie 2008), but default was limited to loans taken by firms, with no default on household debt. The Godley and Lavoie (2007) models, along with other stock-flow consistent models at the time, also assumed a single financial sector. If one wishes to model what happened when financial markets seized, starting in 2007 and 2008, then one needs at least two financial sectors, perhaps made up of banks and non-banks, or commercial banks

and investment banks, with some refusing to lend to the others when need arises. But leaving away this peculiar problem, can one build an appropriate stock-flow consistent matrix that will take into account securitisation, asset-backed commercial paper or mortgage-backed securities, collateralised debt obligations, special purpose vehicles or special investment entities, repos, and other financial innovations?

Eatwell, Mouakil and Taylor (2008) have recently taken up the challenge. They start by adding a housing market. The demand for housing depends negatively on the price of houses, but positively on the rate of change of housing prices (the capital gains). It also depends negatively on the mortgage rate, the leverage ratio of households (their debt to net worth ratio), and the leverage ratio of banks, with the last two elements illustrating credit rationing due to borrower's and lender's risk respectively. In their model, as in that of Zezza (2008), the supply of new residential units speeds up when house prices rise relative to cost, and these housing prices in turn fall when the inventory of unsold houses rises.

Eatwell et al. (2008) split the financial sector into two sectors – the banks as such, and their special purpose vehicles (SPV). The SPVs are assumed to grant and acquire residential mortgages, transforming them into mortgage-backed securities (MBS) that have a variable price that depends on the mortgage interest payments that flow back to the SPVs and hence ultimately to the banks. The dynamics, which can generate Minskyan cycles that look like those already described by Taylor (2004) and Mouakil (2008), depend on the net worth of the banks, which can fall when the price of mortgage-backed securities falls.

One may quarrel with the chosen financial structure and propose something different. For instance, one could split the banking system into two components. The first component – commercial banks – grants mortgages and issues mortgage-backed securities, and has direct access to central bank advances. The second component – investment banks and non-bank financial institutions – buys these securities. The investment banks finance these purchases by borrowing from the commercial banks, and by collecting long-term deposits from households (see Table 5). The leverage ratio of the investment banks may then rise either because they need to borrow more funds, as depositors lose trust in the investment banks, or because the price of the securities is falling. The dynamics of this structure remain to be thought of.

Table 5: A revised balance sheet matrix with mortgage-based securities

	<i>House- holds</i>	<i>Firms</i>	<i>Commer- cial banks</i>	<i>Invest- ment banks</i>	<i>Central Bank</i>	$\Sigma$
Productive capital		+ Kf				+ Kf
Homes	+ ph.hh					+ Kh
Cash			+ HPMb		- HPM	0
Advances			- A		+ A	0
Deposits	+ Dh		- D			0
Term de- posits	+ TDh			- TD		
Loans		- Lf	+ L			0
Repos			+ R	- R		
Mortgages	- Mh		+ M			0
Mortgage- based secu- rities			- ps.s	+ ps.s		0
Net worth	- NW <sub>h</sub>	- NW <sub>f</sub>	- NW <sub>b</sub>	- NW <sub>g</sub>	0	-Kh -Kf
$\Sigma$	0	0	0	0	0	0

### 5. Conclusion

This tour should dispel the notion that Cambridge economics was impervious to the challenge posed by the earlier fundamentalist Post Keynesians, who were very much concerned with a monetary production economy. It is true that monetary factors and interest rates were hardly to be found in the earlier Cambridge models of growth, but this situation started to change in the mid or late 1980s – about 20 years ago – with contributions from all strands of the post-Keynesian school. We may thus say that there is now some consensus between those that liked to model the real economy – the Cambridge Keynesians – and those that were more reluctant to formalise their ideas about financial liquidity and fragility – the fundamentalist Post Keynesians.

**Kommentar [TN2]:** Author: Here and at the end of the paragraph: cf. comment #1.

With the advent of the SFC approach, I believe that it is possible to tackle the Keynesian Wall Street view within a fully coherent framework that can be modified at will to entertain existing institutions or changing historical circumstances. The SFC approach is far superior to the New consensus approach, which however extended, cannot take into account the financial commitments of banks and other agents of the economy – a constraint that has turned up to be so important for our banking and financial system during the recent financial crisis.

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