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

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Abstract

This paper recalls the tensions that have existed between the Fundamentalist Post Keynesians and the Cambridge post-Keynesians, with the former being concerned mostly with financial relations while the latter were mostly studying real magnitudes. The paper surveys the various efforts that have been made to integrate the two views since the middle of the 1980s, in particular the efforts made to model Minsky's financial fragility hypothesis. The last section of the paper shows how financial assets and liabilities as well as financial commitments are best being formalized by using a stock-flow consistent approach. It is also shown how some of the concerns that have arisen as a result of the recent subprime financial crisis can be modelled, by adding residential capital, household debt, or mortgage-based securities.

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

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 American Post Keynesians, also known as the Fundamentalist post-Keynesians, have had as their most famous representatives Paul Davidson and Hyman Minsky. By contrast the Cambridge Keynesians can are associated with the Kaleckian and Kaldorian strands of post-Keynesianism, along with the neo-Ricardian (or Sraffian) Keynesians. Several observers have pointed out in the past that they could see little homogeneity in the economic views and methods of these two main groups of heterodox Keynesians. The American Post Keynesians seemed to be mainly concerned with money, debt, liquidity, interest rates, and cash flow issues that characterized an uncertain world dominated by financial markets. This also came to be known as Wall Street Keynesianism or Financial Keynesianism. On the other hand, the Cambridge Keynesians focussed on real issues, mainly through growth models, being concerned with technical choice, income distribution, rates of capacity utilization, pricing, normal and realized profit rates.

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 effectively link the Cambridge and the Wall Street views. In other circles, this has been known as the problem of the integration of money (in real models). 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. These stock-flow consistent models also allow a rapprochement with the concerns of the monetary post-Keynesian economists, such as Tom Palley, who have taken a Structuralist view in their debates with Horizontalist authors such as Basil Moore. But this should surprise no one, as both Godley and Palley ultimately rely on a post-Keynesian interpretation of James Tobin's (1982) apparatus that deals with portfolio choice among multiple

assets. This particular topic will not be developed further however.

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 some exogenous growth rate and differentiated propensities to save. The Cambridge growth models had been created as the long-run extension of Keynes's *General Theory on Employment, Interest and Money*, and their inspiration was also drawn from the fundamental equations of Keynes's earlier *Treatise on Money*. Yet, as pointed out by Jan Kregel (1985, p. 133), "money plays no more than a perfunctory role in the Cambridge theories of growth, capital and distribution developed after Keynes". The same could be said about the absence of any explicit role for expectations and fundamental uncertainty in these models, although the same Jan Kregel (1976) had attempted in an earlier article to provide a methodological framework to justify this absence in Cambridge growth models, as well as to justify the absence of a truly dynamic analysis that should have replaced the standard tool of comparative dynamic analysis that then plagued the Cambridge growth models. Thus, it seemed, as Mark Blaug (1974, p. 3) had previously argued in his assessment of the Cambridge revolution, that Cambridge authors had not been any more successful than mainstream authors in evading static analysis, despite Kregel's methodological admonition.

Kregel's (1976) defense of Cambridge macroeconomics without money was that the 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 the propensities to save and liquidity preference, presumably along with interest rates, could be kept as part of the given datum. It was best to truly understand growth and distribution while keeping monetary factors given, and only later shift these monetary factors. By 1985, however, Kregel was losing patience. At that time, it was not yet at all obvious how monetary factors could be introduced appropriately into the Cambridge growth model or in other heterodox Keynesian analyses, such as that of the French monetary circuit. Having been a student of Davidson, Kregel

(1986) was well aware that some room had to be found for interest rates, liquidity preference analysis, and the banking sector. His impatience with the current situation 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.

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, Pasinetti (1974) had considered distinguishing the rate of return on the assets held by workers from that held by capitalists. He considered the interest rate to be the rate of return on the assets held by workers, assuming as a simplifying assumption that workers's financial assets would all be held in money deposits or bonds, while capitalists would hold mostly 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 interesting financial factor in Cambridge growth models had its origins in Kaldor's (1966) neo-Pasinetti model, which explicitly 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 (1973, 1975), who transformed the rate of accumulation from an exogenous to an endogenous variable, making it a function of Kaldor's valuation ratio or what is better known as 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 growth of the economy.

The problem with such a model, as had already been pointed out by Paul Davidson (1972), following his sabbatical visit to the University of Cambridge where he had met Moore, was that the neo-Pasinetti model and its various extensions assume that all saving is done in the form of share purchases. Thus the valuation ratio rises when households's propensities to save rise. There is no money in the model, and hence no portfolio choice on the part of investors. Indeed, the same criticism could be made of all Cambridge models of growth and distribution at the time, a criticism that Davidson (1968) did not fail to make. Davidson's (1972, ch. 12-13) solution to this drawback, however, was no more satisfactory, for despite distinguishing between stocks of capital and flows of investment in the earlier chapters, he introduced a flow parameter to deal with what was

essentially a stock issue, that of the choice between stocks of shares and money, when attempting to add money to the neo-Pasinetti framework.

At about the same time, Hyman Minsky was busily developing his financial fragility hypothesis, arguing that macroeconomists, among which mainstream Keynesian economists, had omitted the role of debt, leverage and interest payments, 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, came to be known as Wall Street Keynesianism. It was also an implicit criticism of the models developed by Cambridge Keynesians, Kaldorians and Sraffians alike, 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).

Odd bits here and there

Still, there has always been some commonalities between the two major strands of post-Keynesian economics. As pointed out on a number of occasions by Louis-Philippe Rochon (2005), the magnum opus of Cambridge Keynesian economics, the *Accumulation of Capital* of Joan Robinson, contains several chapters that deals with monetary and financial issues. But these chapters appeared after about twenty highly demanding chapters, accompanied by technical appendices, so that very few readers ever managed to overcome their exhaustion and proceed to these last chapters. In one of these chapters for instance, Robinson (1956, pp. 231, 244) points out that the loaned amounts depend on the interest covering ratio, that is, the ratio of (profit) income to due interest payments. Firms, or households, will be able to borrow more when this ratio is high. Robinson was thus introducing obvious elements of credit rationing in her macroeconomics, that are remindful of Wall Street Keynesian economics. Indeed, she points out that the borrowing power of entrepreneurs will depend 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, p. 244).

All this is clearly reminiscent of Robinson's (1952) discussion of finance as a possible bottleneck to expansion. In her *Generalisation of the General Theory*, Robinson (1952, p. 81) points

out 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 have well be written in the context of our current subprime financial crisis.

Robinson (1952, p. 83) also refers to the rising risk that higher interest rates generate, so that at some point, borrowers will not be able to borrow, even if they offer to pay very high interest rates – a feature of credit markets underlined by Kalecki. Cambridge Keynesian economics has been heavily influenced by the economics of Kalecki. And Kalecki (1937) is the originator of the idea of borrower’s risk as a limit to the expansion of the firm, an idea which was developed in great detail by Minsky in his famous 2-price diagram.

Kalecki’s follower, Joseph Steindl (1952, ch. 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 emphasizes 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 the amounts that they wish to save? For instance, when there is an economic slowdown and when profit rates decline, how do firms manage to reduce their gearing or leverage ratio? Steindl’s answer is that this may not be so easy, especially if household savings are less responsive than investment to changes in profits. In this case, says Steindl (1952, p. 114), the realized 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”. Thus Steindl describes an economy which is likely to be faced with cyclical growth, ever booming, and then falling into a recession. But Steindl’s book, which dealt with rampant stagnation, felt into oblivion until 1979, when his book was reprinted as economies throughout the world experienced the productivity slowdown. The work of Steindl gave rise to an interesting attempt from Amitava Dutt (1995) to deal with financial and leverage issues within an otherwise Kaleckian model.

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 formalize the working of a monetary production economy as described by American post Keynesians. In other words, 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, I thought, the Sraffians were making an interesting point, arguing that higher interest rates would 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, p. 81), were claiming that higher real interest rates would induce entrepreneurs to increase what was considered to be the normal profit rate on capital, in order to keep intact their entrepreneurial rate of return (net of interest charges). All Sraffians did not necessarily agree with this mechanism – Joan Robinson (1979, p. 180) wrote that it was "excessively fanciful", without realizing that she had herself proposed a similar mechanism more than 25 years earlier (Robinson, 1952, p. 96). Sceptics argued that higher real interest 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, something that the fundamentalist post-Keynesians had not yet accomplished.

The Sraffian mechanism that linked interest rates to income distribution could certainly be understood within the context of 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 inflationary effects from the cost side 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, if improperly fed back into higher normal profit rates, will lead to a redistribution of income from firms, whose propensity to save on retained earnings is one, towards households, who have a propensity to save much below unity.

Interest and money within Kaleckian frameworks

The long-run implications of the counter-intuitive impact of interest rates on the saving function have been explored in a series of relatively recent post-Keynesian models. Lavoie (1995) assumes a Robinsonian investment function in growth terms, where investment depends positively on the profit rate (tranquillity) and negatively on the inverse of the interest coverage ratio (fragility), that is, negatively on the ratio of interest payments to profits. It thus depends negatively on the product of the interest rate and the debt to capital leverage ratio. Lavoie assumes that there are two kinds of rentiers. The first kind of rentiers hold and purchase shares, while the second kind of rentiers hold debt by purchasing bonds. Firms make interest payments on their stock of bonds, and they distribute part of the net profits under the form of dividends. The stock market is not explicitly dealt with. The propensities to save of the bond rentiers and that of the share rentiers are different. This is called a Minsky-Steindl model, for reasons that will be soon clearer.

Depending on their values, and depending on the parameters of the investment function, in the short run, an increase in the rate of interest may lead to a decrease in the rate of accumulation – the normal case; or it may lead to an increase in the rate of accumulation – the puzzling case. Lavoie (1995) shows further that in the long run the model is dynamically stable in the puzzling case only, whereas it is dynamically unstable in the normal case. 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 accumulation, this is accompanied by

instability and an ever-rising leverage ratio.

Eckhard Hein (2006), in a book that summarizes his main findings, comes to the same conclusion although he is using a different model. He assumes that firms are entirely financed by bond issues and retained earnings, and thus defines a similar debt to capital leverage ratio. Hein starts out from a Kaleckian investment function where firms react to rates of capacity utilization and the net profit rate. Saving depends on the retained earnings of firms and the propensity to save of bond holders. Once again, the model is only dynamically stable in the puzzling case. Thus when higher interest rates lead to higher rates of capital accumulation, the model tends towards a higher stable leverage ratio. By contrast, in the normal case, when higher interest rates lead to lower rates of capital accumulation, the model is unstable, with ever falling accumulation rates accompanied by ever rising debt to capital ratios (Hein 2006, p. 113). As a result, restrictive monetary policy may generate unexpected and undesirable consequences, a result which is not innocuous given the heavy reliance of modern governments on monetary policy and interest-rate changes to stabilize the economy, as exemplified by the so-called New consensus on monetary policy.

The main drawback of these models is that they 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.

First attempts at formalizing the financial fragility hypothesis within a Cambridgian framework

Still, by 1986, when I first attempted to formalized Minsky's financial fragility hypothesis within a simple macroeconomic growth model (Lavoie 1986-87), very little in post-Keynesian economics had yet been written to tie together Cambridge or Kaleckian growth models to Minsky's concerns about finance. The seminal effort in that direction was the paper by Lance Taylor and Stephen O'Donnel (1985), which was a variant of another paper of Taylor (1985), based on the Kaleckian model of growth and distribution. This Kaleckian model, which seems to have replaced the standard Cambridge growth model among those concerned with the real economy, was first developed by

Rowthorn (1981) and Dutt (1984). The Kaleckian model is essentially made up of three equations: a pricing function, a saving function and an investment function. Taylor and O'Donnel modelled investment as a function of the discrepancy between 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 (1985) and Taylor and O'Donnel (1985) models, however, is the introduction of a portfolio choice. In the second of these two models, 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.

Despite its originality, the Taylor and O'Donnel model has some drawbacks, which are perhaps more obvious today than they were then.[1] First, the supply of money is not endogenous; it is given by some fixed-growth rule. As a consequence, the interest rate is endogenous, but this may be seen by some as an advantage. Secondly, the model is not quite stock-flow consistent. While the portfolio equations have all the Tobinesque requirements, the balance sheets are incomplete. For instance, the authors refer to a government debt, but this debt is entirely exogenous and remains unexplained, except to say that the debt to GDP ratio is assumed to remain constant, or that the amount of base money grows with the government deficit. Thirdly, as already pointed out, the price of equities is determined by fundamentals, rather than demand and supply on the stock market. Fourthly, the banking sector plays no explicit role, and is only added as an after-thought. Fifthly, while the model is essentially driven by the evolution of the expected profit rate, the leverage ratio of firms plays no role at all in the model.

Franke and Semmler (1991) construct a somewhat similar model. They also omit the effect of the rate of capacity utilization and assume that investment is a function of the discrepancy

[1] Claudio Dos Santos (2005) studies and underlines the main drawback of the Minskyan models of this time period.

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, "the state of confidence". They also consider that the state of confidence is determined by a differential equation, rising as long as the entrepreneur's profit rate (the profit rate net of interest payments) is above the interest rate. Their innovation is to add a second term in the differential equation, arguing that the state of confidence rises as long as the leverage ratio of firms is lower than some normal rate. As in Taylor and O'Donnel, households hold interest-free money, interest-bearing deposits and stock market shares, with a portfolio choice that depends on rates of return.

The Franke and Semmler model has drawbacks that are similar to those of its predecessor. First, the stock market value of firms is determined by fundamentals, and not the confrontation of the demand for and supply of equities. Second, although there is some endogeneity in the money supply, this is a supply-led sort of endogeneity, since the authors assume that bank reserves are being provided as a fixed ratio to the government deficit, an assumption similar to that of Taylor (1985, p. 392) and that they attribute, unsurprisingly, to Tobin (1982). Third, stock-flow consistency, or its achievement, is in doubt. Somewhat mysteriously, interest-free deposits turn out to be exactly equal to bank reserves, while bank loans turn out to be exactly equal to interest-bearing deposits. However, it should be noted that their extended model gets the accounting of saving right, in contrast to several articles before and after theirs. Their main contribution, relative to Taylor and O'Donnel, is that Franke and Semmler track the leverage ratio explicitly in their simulations.

A quite complete model in this tradition has also been built by Marc Radke (2005, ch. 4). He assumes that the state of confidence keeps rising until the discrepancy between the profit rate and the interest rate becomes too low, or until the debt ratio of firms becomes too high. Furthermore, he introduces the possibility of credit rationing, by assuming that banks grant a higher proportion of demands for loans when the q ratio of firms is high, since this implies that firms can offer more collateral against borrowed funds.

A Minsky endorsed attempt at synthesis

As some may know, 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 two Italian economists, 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. the purpose of which was 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.[2] 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 recourse 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 those of Taylor and O'Donnel (1985) and Franke and Semmler (1991). The 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. In other words, it is not really stock-flow consistent.

Another symptom of this deficiency is that there are some black holes in some of the models. For instance, in Delli Gatti, Gallegati and Gardini (1990, p. 105-107), firms must make interest payments on their past debt, but these interest payments appear nowhere in the consumption function. One could say that this is because the propensity to consume of rentiers is nil, but the consumption function assumes that the propensity to consume out of dividends is positive. Another instance of inconsistency is found in the sectoral balance sheets of Delli Gatti and Gallegati (1992, p. 136). Banks have reserves, but in contrast to the other financial assets these reserves have no countepart. 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.

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[2] A similar process is found in the finance frontier of the firm, as described in Lavoie (1992, p. 111).

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. As mentioned earlier, it was pointed out by Davidson (1968) that Kaldor (1966) failed to introduce money in his neo-Pasinetti model, thus assuming that all savings were done in the form of equities. Peter Skott (1981) very early on proposed a modified neo-Pasinetti model that would remedy to this. 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 money and equities. His initial model is not much detailed, as it serves mainly to justify the Kaldorian saving function, but it is definitely stock-flow consistent.

The model was further developed and modified in an article (Skott 1988) and a book (1989) that appeared nearly ten years later. However, the model did not seem to attract much interest, despite paying close attention to standard post-Keynesian concerns with both finance and the real sector. In contrast to the models of Franke-Semmler and Taylor-O'Donnel, the money supply is endogenous in the main variant of Skott's model, and the interest rate on bank deposits is exogenous, as most post-Keynesians would argue.[3] The price of equities depends on demand and supply, with the former itself depending on the level of net profits of firms.

Two features of the model, besides its novelty with respect to portfolio choice theory, 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. In other words, Skott (1989) assumes that the model is unstable in the medium run, but that, when the economy keeps booming, it is eventually slowed down by the lack of labour, which will reduce the rate of growth of production. The mechanism, in my view, is not so easy to fathom, and is certainly difficult to present in a pedagogical manner, in contrast to the standard Kaleckian model. The second disturbing feature of the model is its short-run adjustment mechanism. Skott (1988, 1989) assumes

[3] There is also a monetarist variant of this model, with an exogenous rate of growth of the money supply.

that output is given in what he calls the ultra-short period and that demand adjusts to supply through stabilizing 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 swallow as a description of a modern economy with sticky prices, as several studies commissioned by central banks have shown. Finally, as an additional explanation regarding their unfortunate lack of impact, the Skott (1988, 1989) models do not explicitly consider leverage ratios, and so could not be tied to the burgeoning literature on Minsky debt models.

However, because of their common pedigree based on the neo-Pasinetti model, there is a substantial degree of similarity between the Skott models of the 1980s and the Lavoie-Godley (2001-02) model, which was to link Minskyan concerns and real issues a dozen years later. Indeed, another feature of Skott's (1988, p. 351) models, which will be dealt in more detail below, is that in his models an increase in the interest rate necessarily leads to an increase in the rate of utilization, as it decreases retained earnings and the proportion of saving, and hence aggregate demand.

The debt of households

Other models have also 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 into an otherwise simple effective demand growth model based on the interaction between saving and investment, Jarsulic's model having inspired a series of authors, in particular Charles (2006, 2008) who built models attempting to mix Minskyan and Kaldorian insights. Despite the mathematical ingenuity of their authors and the nice chaotic diagrams that they draw, with bifurcations and other such surprising features, I find these models somewhat artificial, in the sense that non-linearities (squared terms and so on) are introduced without much apparent justification. I realize that there is no reason the world ought to be linear, but, to give just one instance, I do not see why the growth function, seen from the investment side, ought to be a differential equation which is a function of the difference between actual and desired accumulation, an assumption also taken up by Dutt (1995) in his Steindlian model with fixed costs.

So far we have only discussed the debt ratio of firms. But what about the debt of households? Dorene Isenberg (1988, p. 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 center of the financial fragililty 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, 1996), whose work, in retrospect, seems destined to become more fashionable. As Palley (1996, p. 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, p. 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 (1991-1992).

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, p. 128). I myself argued that: "Stability breeds instability. The more tranquil the economy, the more entrepreneurs and bankers are ready to indulge in risky ventures" (Lavoie 1984, p. 790).

The main drawback of Palley's little model is that it is not in growth terms, while banks are nowhere to be found. This gives the misleading impression that households can only borrow if there are lending households out there. However, one should note that this problem is absent from Palley's (1991-92) more complicated model, which includes banks explicitly, with bank lending to both households and firms. However, despite tracking adequately interest flows, this other model is not so easy to decipher and to square with intuition, probably because of his assumptions tied to the money supply. For instance, Palley (1991-92, p. 197) claims that "increased investment expenditures actually decrease interest rates". Similarly, Palley (ibid, p. 198) claims that "increased anticipated profits reduce employment, because this increases the value of equities, which drives up money demand, causing an increase in interest rates". Also, as is the case of many surveyed models, this one is not fully stock-flow coherent, as bank reserves are being introduced without any financial counterpart. In any case, this more complex model does not deal with the fluctuations of the leverage ratios of firms or the debt ratios of workers, so that Palley's simpler model is more instructive.

Stock-flow consistent models

The main claim of the present paper 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.[4]

In attempting to provide a useful model of the economy that deals both with the real and the monetary factors, economists face two sorts of difficulties. First they have to identify the structural

[4] 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

framework that they believe is relevant to the problem at hand. This means they have to choose the number of sectors that they wish to consider: firms, banks with or without non-bank financial institutions, the government, a central bank, the external sector, households, split or not into two categories, say workers and capitalists. From there, the modeller has to choose what assets and liabilities ought to be included in the model, and whether an asset or a liability can be omitted without much damage from a particular sector. For instance, should banks be assumed to hold long-term bonds or be assumed to issue equities, and should firms be assumed to issue corporate paper or be assumed to hold financial assets such as Treasury bills? These choices lead to the construction of a balance sheet matrix, which insures that the model starts out in a coherent way. A proper balance sheet matrix also 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 fulfills its budget constraint.

Thus starting out with an appropriate balance sheet matrix insures that economists "analyze how financial commitments affect the economy" (Minsky 1986, p. 221), by taking into account all the interrelated cash flows of the various sectors. Thus, 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 late in his career 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, p. 77).

The second set of difficulties is in constructing appropriate behavioural equations. This part of the model I would argue is more open to controversy. It can be relatively easy to agree on the main structural features of a simplified economy; but different economists will paint the behaviour of firms or banks or even households in many different ways. Despite a possible common structural framework that should constrain the range of possible results, as Godley and Cripps (1983) initially hoped when they proposed a first version of the stock-flow consistent approach, different economists will still disagree on behavioural equations and the appropriate closure of the model. Thus the results obtained with these different models will differ. In this sense, to use fashionable terms among methodologists, the stock-flow coherent approach, despite its closed matrix-like aspect, could be

described as open.

The matrix of Table 1 gives an exemplar of what a fairly comprehensive set of financial and tangible assets could comprise. Most models are evidently much simpler than the one implied by Table 1, and we now turn to one of them.

TABLES 1, 2 AND 3

A simple stock-flow model with equities

In the Lavoie and Godley (2001-2002) SFC model, 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 2. This framework has also been picked up by Skott and Roo (2008), but with slightly different behavioural equations, in particular the consumption function which they assume to depend on income and wealth instead of income and capital gains as in Lavoie and Godley. Their results show that the exact specification of the model are important for the achieved results, even though the framework is the same. Clévenot (2006), also using the balance sheet matrix, also shows that

The Lavoie and Godley framework has also been picked up and slightly modified. Mickaël Clévenot (2006, p. 298) assumes that firms hold equities issues by other firms, thus introducing a key characteristic of the financialization 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 (Table 3). 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. It can nevertheless be pointed out that in Godley and Lavoie (2007, ch. 11), where a somewhat similar household borrowing behaviour is being

introduced, with household new borrowing depending positively on personal income and negatively on the interest rate, 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 explicit 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. Kim's model, however, shows that it is possible to integrate monetary analysis and value theory.

A slightly simplified Lavoie and Godley (2001-02) model has been presented in analytical form by Lance Taylor (2004, pp. 272-8). There Taylor shows that two stable cases are possible, as emphasized in the previous sections. 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, p. 303) further introduces the possibility of a cycle by reintroducing the "state of confidence" that we already mentioned when discussing the Taylor and O'Donnel 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.[5] Assuming further

[5] Tymoigne (2006) also makes the distinction between short-term and long-term borrowing, in a Minskyan model that has basic stock-flow coherent features, but using a system dynamics approach. His feedback reaction functions are highly complex, but his diagrams are rather hard to interpret.

than 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.

Further extensions of the basic SFC model

The major drawback of the Lavoie and Godley (2001-02) model is that there is no government sector. Zezza and Santos and Zezza (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 4). 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).

TABLES 4 AND 5

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 5, 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, ch. 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 (in a further paper, Le Héron (2008) has the Treasury bill rate set according to a reaction function of 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, if base interest rates rise, 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 behaviour of banks is itself predominantly

responsible for the stock market valuation ratio, as households don't hold any equities.

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 (1994, p. 212, 214) 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". 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, p. 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 6). 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 6

Taking securitization and other financial innovations into consideration

In his review of Godley and Lavoie (2007), Lance Taylor (2008, pp. 643-4) wonders whether the stock-flow consistent approach will ever be able to handle the complexity and the innovations that now characterize the financial system and the recent subprime financial crisis. Godley and Lavoie (2007, ch. 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 – a not very timely assumption. 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 securitization, asset-backed commercial paper or mortgage-backed securities, collaterized 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), as shown in Table 7, 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. Repos are introduced into the balance-sheet matrix by assuming that the central bank provides whatever reserves banks are required to hold. In fact, these repos are no different from central bank advances in other models, this justifies the absence of a government sector in the model, which would be needed if repos were based on sale and purchase agreements of Treasury bills, as they are in the real world, at least in the U.S. and in Canada.

TABLES 7 AND 8

The dynamics of the model are tightly linked to the evolution of the leverage ratio of banks. This leverage ratio is defined as the amount of repos that banks are taking, relative to their net worth. It is this last term that generates the dynamics, since repos, as said previously, only change when reserves need to rise, because of the compulsory reserve ratio on deposits. Net worth can change substantially because the price of mortgage-backed securities falls when the interest payments made on mortgages fall. This model, more akin to the modern financial structure, can generate Minskyan cycles that look like those already described by Taylor (2004) and Mouakil (2008).

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 – buys these securities. The investment banks finance these purchases by borrowing from the commercial banks, and by collecting long-term deposits from households. The leverage ratio of the investment banks may then rise either because its banks need to borrow more funds, as depositors lose trust in the investment banks, or because the price of the securities is falling. This modified modern balance sheet is shown in Table 8.

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 formalize their ideas about financial liquidity and fragility – the fundamentalist Post Keynesians.

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. One should remember however that in the end the realism of the behavioural equations, however proper is the structure of the model, still plays a key role. To give an example, Mark Settefield (2008) builds his entire macroeconomic model by assuming that firms invest as a function of the difference between their *real* profit rate and the *nominal* interest burden of their debt, thus arguing that empirical research has shown that firms are concerned with their real cash flow, instead of their real net profit rate. The same could be said about the burden of housing payments. While most authors would model housing investment as a function of the real interest rate, it may be more appropriate to say that it depends on the nominal interest rate since banks assess (or used to assess!) the creditworthiness of their customers by relying on interest coverage ratio that depends on the nominal interest rate. Thus the same balance sheet matrix may give rise to different simulations, depending on the assumptions that one prefers to entertain on the relevance of the nominal interest rate for economic decisions.

The SFC approach, despite its complexities, 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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Table 1: A possible sectoral balance sheet matrix

	Households	**Production Firms**	**Banks**	**Government**	**Central Bank**	∑
Tangible capital	$+ K_h$	$+ K_f$				$+ K$
Inventories		$+ IN$				$+ IN$
Bills	$+ B_h$	$+ B_f$	$+ B_b$	$- B$	$+ B_{cb}$	0
Bonds	$+ p_b.BL_h$		$+ p_b.BL_b$	$- p_b.BL$		0
Paper	$+ CP_h$	$- CP$	$+ CP_b$			0
Cash	$+ HPM_h$		$+ HPM_b$		$- HPM$	0
Deposits	$+ D_h$	$+ D_f$	$- D$			0
Loans	$- L_h$	$- L_f$	$+ L$			0
Equities	$+ p_f.ef_h$	$- p_f.ef$	$+ p_f.ef_b$			0
Equities	$+ p_b.eb_h$		$- p_b.eb$			0
Net worth	$- NW_h$	$- NW_f$	$- NW_b$	$- NW_g$	0	$-K -IN$
∑	0	0	0	0	0	0

Table 2: The simple Lavoie and Godley (2001-02) balance sheet matrix

	Households	**Production Firms**	**Banks**	∑
Tangible capital		$+ K_f$		$+ K$
Deposits	$+ D_h$		$- D$	0
Loans		$- L_f$	$+ L$	0
Equities	$+ p_f.ef_h$	$- p_f.ef$		0
Net worth	$- NW_h$	$- NW_f$	*0*	$-K$
∑	0	0	0	0

Table 3: The balance sheet matrix of the van Treeck (2007) model

	Household Workers	**Household Rentiers**	**Production Firms**	**Banks**	∑
Tangible capital			$+ K_f$		$+ K$
Deposits		$+ D_h$		$- D$	0
Loans		$- L_h$	$- L_f$	$+ L$	0
Equities		$+ p_f.ef_h$	$- p_f.ef$		0
Net worth		$- NW_h$	$- NW_f$	*0*	$-K$
∑	0	0	0	0	0

Table 4: The balance sheet matrix of the Zezza and Dos Santos (2004) model

	Households	**Production Firms**	**Banks**	**Government**	**Central Bank**	∑
Tangible capital	$+ K_h$	$+ K_f$				$+ K$
Bills	$+ B_h$		$+ B_b$	$- B$	$+ B_{cb}$	0
Cash	$+ HPM_h$		$+ HPM_b$		$- HPM$	0
Advances			$- A$		$+ A$	0
Deposits	$+ D_h$	$+ D_f$	$- D$			0
Loans		$- L_f$	$+ L$			0
Equities	$+ p_f \cdot ef_h$	$- p_f \cdot ef$				0
Net worth	$- NW_h$	$- NW_f$	*0*	$- NW_g$	0	$-K$
∑	0	0	0	0	0	0

Table 5: The balance sheet matrix of Le Héron and Mouakil (2008)

	Households	**Production Firms**	**Banks**	**Government**	**Central Bank**	∑
Tangible capital		$+ K_f$				$+ K$
Bills			$+ B_b$	$- B$		0
Bonds		$- p_b.BL$	$+ p_b.BL_b$			0
Paper		$- CP$	$+ CP_b$			0
Cash			$+ HPM_b$		$- HPM$	0
Advances			$- A$		$+ A$	0
Deposits	$+ D_h$		$- D$			0
Loans		$- L_f$	$+ L$			0
Equities		$- p_f.ef$	$+ p_f.ef_b$			0
Net worth	$- NW_h$	$- NW_f$	$- NW_b$	$- NW_g$	0	$-K$
∑	0	0	0	0	0	0

Table 6: The balance sheet matrix of the Zezza (2008) model

	Rich Households	**Other Households**	**Firms**	**Banks**	**Govt**	**Central Bank**	∑
Productive capital			$+ p_k.k_f$				$+ K_f$
Homes	$+ p_h.h_{rh}$	$+ p_h.h_{oh}$					$+ K_h$
Bills	$+ B_{rh}$		$+ B_f$	$+ B_b$	$- B$	$+ B_{cb}$	0
Cash	$+ HPM_{rh}$	$+ HPM_{oh}$		$+ HPM_b$		$- HPM$	0
Advances				$- A$		$+ A$	0
Deposits	$+ D_{rh}$	$+ D_{oh}$		$- D$			0
Loans			$- L_f$	$+ L$			0
Mortgages	$- M_{rh}$			$+ M$			
Equities	$+ p_f.ef_{rh}$		$- p_f.ef$				0
Net worth	$- NW_h$	$- NW_h$	$- NW_f$	*0*	$- NW_g$	0	$-K$
∑		0	0	0	0	0	0

Table 7: The balance sheet matrix of the Eatwell, Mouakil and Taylor (2008) model

	Households	**Firms**	**Banks**	**Special Purpose Vehicles**	**Central Bank**	$\sum$
Inventories		$+ IN$				$+ IN$
Homes	$+ p_h.h_h$					$+ K_h$
Cash			$+ HPM_b$		$- HPM$	0
Repos			$- R$		$+ R$	0
Deposits	$+ D_h$		$- D$			0
Loans		$- L_f$	$+ L$			0
Mortgages	$- M_h$			$+ M$		0
Mortgage-based securities			$+ p_s.s$	$- p_s.s$		0
Net worth	$- NW_h$	$- NW_f$	$- NW_b$	$- NW_g$	0	$-K_h - IN$
$\sum$	0	0	0	0	0	0

Table 8: A revised balance sheet matrix with mortgage-based securities

	Households	**Firms**	**Commercial banks**	**Investment banks**	**Central Bank**	∑
Inventories		$+ IN$				$+ IN$
Homes	$+ p_h.h_h$					$+ K_h$
Cash			$+ HPM_b$		$- HPM$	0
Advances			$- A$		$+ A$	0
Deposits	$+ D_h$		$- D$			0
Term deposits	$+ TD_h$			$- TD$		
Loans		$- L_f$	$+ L$			0
Repos			$+ R$	$- R$		
Mortgages	$- M_h$		$+ M$			0
Mortgage-based securities			$- p_s.s$	$+ p_s.s$		0
Net worth	$- NW_h$	$- NW_f$	$- NW_b$	$- NW_g$	0	$-K_h - IN$
∑	0	0	0	0	0	0