Can Disequilibrium Macroeconomic Models Be Used to Anticipate Financial Instability?

A Case Study

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ABSTRACT
The 2007 global crisis and the recessions that followed started a vigorous debate on the merits of macroeconomic models and their foundations. One type of criticism relates to the treatment of money, debt and banks, which are often absent in conventional models. This paper summarizes the criticism and introduces a type of disequilibrium models which do include financial flows and stocks. It explores the structure of these stock-flow consistent models in comparison to DSGE models, and their evolutionary nature. And it shows an application by providing a case study of one such model, which was used to anticipate the 2007 crisis and the recession that followed. In conclusion, it reflects on implications for macroeconomic analysis and policy. The research implications are that (i) including money, debt and banks in macroeconomic models is an important contemporary challenge, and (ii) facing this challenge requires greater pluralism in the economics profession.

KEYWORDS: financial crisis, stock-flow consistent models, case study, pluralism

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1. Introduction: ‘No One Saw This Coming’?

The 2008 crisis started a vigorous debate on the merits of macroeconomic models and their foundations. How was it possible that macroeconomists ‘did not see it coming’, and what guidance do their models provide now that it has? In the summer of 2010, the Committee on Science and Technology of the U.S. House of Senate Representatives held hearings on ‘Building a Science of Economics for the Real World’. One of those who gave testimony was Robert Solow. On 20 July 2010 he said the following:

“It may be unusual for the Committee to focus on so abstract an issue, but it is certainly natural and urgent. Here we are, still near the bottom of a deep and prolonged recession, with the immediate future uncertain, desperately short of jobs, and the approach to macroeconomics that dominates serious thinking, certainly in our elite universities and in many central banks and other influential policy circles, seem to have absolutely nothing to say about the problem. Not only does it offer no guidance or insight, it really seems to have nothing useful to say.’

Only a few years ago the complaint that ‘modern macroeconomics is on the wrong track.’ would have been radical. Today, it is the title of a piece published in 2010 in the IMF flagship journal Finance and Development, written by William White, former Chief Economist of the Bank for International Settlements and currently chairman of the Economic and Development Review Committee of the Organization for Economic Cooperation and Development. Nor is he the only one voicing these sentiments. ‘How Did Economists Get it so wrong?’ asked Paul Krugman, Nobel Prize winning economist in the New York Times in September 2009. ‘What’s Wrong With Modern Macroeconomics?’, was the title of a workshop organize in November 2009 in Munich, by Germany’s prestigious economics research centre CesIfo. In the Journal of Economic
Perspectives, Ricardo Caballero wrote in the Fall 2010 issue about ‘Macroeconomics After the Crisis: Time to Deal with the Pretense-of-Knowledge Syndrome’.

In the present paper, I connect this to economists’ treatment of finance. Woody Allen quipped that economics is about money and why it is good. But much of macroeconomics, oddly, avoids treating money. The cutting edge macroeconomic models to which Solow referred (which go under the name of Dynamic Stochastic General Equilibrium model, or DSGE models) are characterised, quite literally, by missing money- or as BIS researcher Camillo Tovar (2008:29) noted, by the “absence of an appropriate way of modeling financial markets”. Nor is this accidental: economics has a long tradition of ignoring finance, money and credit.

The aim of this paper is to provide a case study of a type of models which do include money, and of one model of this brand which has been used to anticipate the 2007 crisis. I discuss stock-flow consistent (SFC, for short) models, show how they were applied to policy analysis and reflect on their place in macroeconomic analysis. To set the scene, in Sections 2 and 3 I discuss SFC models compared to the conventional approach as in DSGE models, drawing out the evolutionary, Schumpeterian features of SFC theorizing. Sections 4 and 5 are the meat of the paper, where I discuss the structure of SFC models and, in some detail, crisis assessments based on SFC analysis. This constitutes one of several warnings by economist who – in contrast to most- did ‘see it coming’ (Bezemer 2009c), but few were as rigorously model-based. I then consider the implications for macro-monetary modeling, addressing the argument that ‘DSGE+’ - that is, adding more explicitly to DSGE models financial frictions or heterogeneous agents or bounded rationality - is the appropriate response to the challenge posed by the 2008 crisis and ensuing recession. The question is also whether economics should change its ‘workhorse’ model and its underlying paradigm, or whether we should ‘mix ‘n’ match’ different models. Section 7 concludes with a plea not so much for paradigm change as for plurality.

2. Finance and the Economy: The Problem with Conventional Models

Contemporary analyses of the role of the financial sector in the economy come in four flavours. The first flavour is the strand of general-equilibrium models called ‘Dynamic Stochastic General Equilibrium’ (or DSGE) models. DSGE models (Figure 1) abstract from financial flows. The
only financial variable is the interest rate, but it is endogenous to the real sector: its value is determined via the Taylor rule, linked to the output gap and inflationary expectations.

*Figure 1: Schematic Overview of a closed DSGE model*

Source: Sbordone *et al.* (2010)

Most DSGE models available in the literature have a basic structure that incorporates elements of the New Keynesian paradigm and the real business cycle approach. The benchmark DSGE model is an (open or closed economy) fully micro-founded model with real and nominal rigidities (see for instance Christiano et al (2005) and Smets and Wouters (2003)). In this model, households consume, decide how much to invest and are monopolistic suppliers of differentiated types of labour, which allows them to set wages. In turn, firms hire labour, rent capital and are monopolistic suppliers of differentiated goods, which allows them to set prices. Both households and firms may face a large number of nominal frictions (e.g. sticky wages and prices or partial indexation of wages and prices) limiting, in each respective case, their ability to reset prices or wages. On the real side, capital is accumulated in an endogenous manner and there are real rigidities arising from adjustment costs to investment, variable capital utilisation or fixed costs. Households preferences display habit persistence in consumption, and the utility function is separable in terms of consumption, leisure and real money balances. Fiscal policy is usually restricted to a Ricardian setting, while monetary policy is conducted through an interest rate feedback rule, in which the interest rate is set in response to deviations from an inflation target and some measure of economic activity (e.g. output gap). Furthermore, some degree of interest
rate smoothing is often assumed. This basic model is enriched with a stochastic structure associated with different types of shocks such as supply side shocks (productivity and labour supply), demand side shocks (preference, investment specific, government spending), cost push or mark-up shocks (price mark-up, wage mark-up, risk premium) and monetary shocks (interest rate or on other target variables). Importantly, outside shocks are needed to move the economy; no endogenous instability is possible in this model world.

DSGE models are widely used in academia (De Grauwe 2010), in international institutions such as the IMF (Botman et al., 2007), and in central banks such as the European Central Bank (Smets and Wouters, 2003) and the Reserve Bank of New Zealand (Lees, 2009). Over the last quarter century, they have come to dominate macroeconomics Ph.D. program curricula and they appear in a large share of macroeconomic journal publications, as An and Schorfheide (2007, p.113) note. Their critics such as Buiter (2009) and Solow (2010) quoted above have not contested their consistence or elegance, but focused especially on their relevance to the real world of unemployment and financial instability. Chari (2010) and others have pointed to newer generations of DSGE models which have frictions and rigidities representing unemployment, financial market imperfections, and sticky prices and wages. The question remains whether ‘stable-with-friction models’ (Leijonhufvud, 2009) which can reproduce the past, are also capable of providing insight into the causes of e.g. unemployment and financial instability.

3. Finance and the Economy: Evolutionary Models

Two other approaches to modeling the macroeconomy are flow-of-funds models and stock-flow consistent models, and a fourth is agent-based models. All trace unfolding processes rather than equilibrium snapshots, and are so evolutionary. SFC models also differ from DSGE models in that they aim to be financially complete (but obviously stylized) representations of the economy. Figure 2 depicts an economy (simplified, without foreign sector) viewed through a flow-of-funds prism. Similar ‘circuitist’ representations may be found in theoretical work by Rochon (1999) and Graziani (2003), and in applied work also including a foreign sector (as in Godley and Lavoie 2007).
As stock-flow consistent (SFC) models are known to have provided specific warnings before the 2007 credit crisis (Bezemer, 2010b), it should be profitable to study their structure and intellectual foundation. SFC models differ from agent-based models and flow-of-funds analysis in that they usually operate at a higher level of aggregation. SFC models specify the relations between sectors in the economy, without necessary reference to individual behavior (as in DSGE models), or to behavioural spillovers (as in agent-based models). In Bezemer (2012) I argue for an integration of stock-flow consistent with agent-based models, so as to provide both financial realism and micro-foundations to the analysis. SFC models are compatible with — indeed, they incorporate — but go beyond flow-of-funds accounting by exploiting (i) information contained in historical stock-flow norms and (ii) constraints implied in accounting identities. Whilst the merit of flow-of-funds analysis is that it allows us to look for ‘fragilities lurking in some sector’s balance sheet’ (Barwell and Burrow 2012), the SFC modeling approach favours a less granular approach, which allows for the construction of sector-level ratios and so helps to identify unsustainable macroeconomic processes, rather than only sectoral fragilities. Both have their advantages, but in the SFC perspective a focus on sectoral balance sheets implies the danger of not seeing the wood for the trees — that is, missing the wood of processes that are systemically
unsustainable while closely studying the trees of sectoral balance sheets. Macroeconomic processes are unsustainable when they give rise to persistent deviations from historical norms – when, for instance, the flow of household consumption deviates persistently from household income.

SFC models are firmly rooted in an evolutionary, Schumpeterian view of the economy, with attention to the importance of banks and of liquidity and recognition of disequilibrium processes. With their emphasis on the importance of financial flows, they can be placed within what Skaggs (2003) has called an ‘accounting tradition’ in economics. Elements of this are “treating money as rooted in debt (so emphasizing that every credit is mirrored in a debit); avoiding equilibrium analysis, but rather thinking in terms of unfolding processes; and treating banks as creators of credit, not mere intermediaries” (Skaggs 2003: 349, 377).

In SFC models it is recognized that without liquidity, growth is not possible, and this is reflected in the inclusion of banks (which create credit) as a separate sector in the economy and explicit tracing of financial flows (see Figures 2 and 3 below). This echoes Schumpeter’s emphasis that ‘development’ starts with borrowing as a means of providing the purchasing power for the financing of entrepreneurial ideas (Schumpeter, 1934:130). And just as Schumpeter (1934:179) excluded consumption loans explicitly from his theory on credit and its positive effect on development (see also Reisman, 2004:69), so SFC theorists in the case study that follows recognize that growth financed by consumption credit was unsustainable and had to end in recession. In a study titled ‘Seven Unsustainable Processes’, Godley (1999b) used a SFC model to analyze that such growth was ‘not only unusual but essentially temporary’. The point is very much that ‘real choices cannot be separated from financial decisions’ (Amendola and Gaffard, 1992:131). Growth driven by consumption credit is unsustainable and therefore cannot be equated to growth driven by productive investments. As in other evolutionary literature, the focus is on ‘the process of change in itself rather than on its outcome… the problem to be faced is the viability of the process of change’ (Amendola and Gaffard 1992:131). Process viability is just what concerned Godley (1999b) in his analysis of ‘Seven Unsustainable Processes’, as we explore in detail below.
4. The Structure Of Stock-Flow Consistent Models

Generic SFC models are presented in e.g. Dos Santos and Zezza (2007) and Treeck (2009). Godley and Lavoie (2006) is a macroeconomics textbook organized around SFC models. They identify as the ambitions of this approach to “describe the evolution of the whole economic system, with all financial transactions (including changes in the money supply) fully integrated, at the level of accounting” (p. xxxiv). “The fact that money stocks and flows must satisfy accounting equalities in individual budgets and in an economy as a whole provides a fundamental law of macroeconomics analogous to the principle of conservation of energy in physics” (Godley and Cripps 1983, p.14). Because of this completeness, SFC models can trace, for instance, whether finance supports or sap growth. Friedman (2009) pointed to this when he noted “an important question – which no one seems interested in addressing – is what fraction of the economy’s total returns … is absorbed up front by the financial industry.” This fraction is plausibly an important determinant of whether growth in credit will foster crisis, sustainable growth, or Ponzi-type ‘growth without development’, as has happened in many economies since the 1990s.

A SFC model shows how transactions in the real sector (e.g. consumption and investment) or the financial sector (e.g. interest payments) initiate flows of funds (e.g. cash or bank reserves growth) and how this alters balance sheets. Flow-of-funds models are therefore portrayed in a set of three linked matrices: a transactions matrix, a flow-of-funds matrix and a balance sheet matrix.

Figure 3: Balance sheet matrix of SFC model

| Source: Dos Santos and Zezza (2005) |
Figure 3 is a stylized SFC model’s balance sheet matrix, where all symbols are self-explanatory; a (+) sign denotes an asset, a (-) sign a liability. The balance sheet matrix results from the two other matrices: transactions initiate payments and flows of funds, which alter balance sheets. In turn, balance sheet items (e.g. levels of net worth and debt) co-determine transactions in the next period. The model is so inherently dynamic.

The model reflects the structure of the economy’s macroeconomic relations, including important accounting equalities – for instance, that assets equal liabilities and that within the system, all flows (but not stocks) must sum to zero. Adding to this skeleton behavioural relations (for instance, how rising asset prices may stimulate lending and consumption) and then simulating allows tracing the effects of selected trends (such as rising trade integration) or of policies and institutions (such as deregulation, euro adoption, or bond buying by central banks). It can also help trace the sources of financial leverage and fragility. For instance, an increase in households’ mortgage lending for consumption (where both –L_h and M_h expand) may be facilitated simply by banks (L_b); or domestic bank lending in turn may be fuelled by foreign lending (L_f) or by nonbank financials’ lending (–L_nb). Institutions (such as regulation and shared currency increasing for L_f) and prices (interest rates) will govern these effects.

**Figure 4: Social Accounting Matrix for the Levy Institute SFC model**

<table>
<thead>
<tr>
<th></th>
<th>Production</th>
<th>Private sector</th>
<th>Government</th>
<th>Rest of the world</th>
<th>Capital account</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Production</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Aggregate demand</td>
</tr>
<tr>
<td>2. Private sector</td>
<td>Wages &amp; profits</td>
<td>Government expenditure</td>
<td>Gov’t. transfers to private s.</td>
<td>Net income payments</td>
<td>Private s. income</td>
<td>Gov’t. receipts</td>
</tr>
<tr>
<td>3. Government</td>
<td>Net indirect taxes and s.c.</td>
<td>Direct taxes and s.c.</td>
<td>Gov’t. net transfers to RoW</td>
<td></td>
<td>Gov’t. receipts</td>
<td>Payments to RoW</td>
</tr>
<tr>
<td>4. Rest of the world</td>
<td>Imports</td>
<td>Private s. net transfers to RoW</td>
<td>Gov’t. net transfers to RoW</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Capital account</td>
<td>Net acq. of fin. assets</td>
<td>Gov’t. surplus</td>
<td>-BoP</td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>Value of output</td>
<td>Private s. income</td>
<td>Gov’t. outlays</td>
<td>Receipts from RoW</td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>

Source: Zezza (2009)
This integration of real-sector and financial-sector variables is a forte of the SFC approach. The Social Accounting Matrix below represents this integration for the SFC model developed by Godley and associates (Figure 4). It includes transactions (e.g. private expenditure), financial flows (e.g. net acquisition of financial assets) and balances (e.g. the government surplus). Each row total is equal to each column total by construction. The financial sector is explicitly modeled in the ‘capital account’ row and column. This also shows the ‘three balances equation’ that the sum of the private, public and foreign balances must be zero.

I now discuss selected features of this concrete and applied example of SFC analysis. A full presentation of a similar model is in Godley (1999a). Firms and households are subsumed in the private sector, so as to bring out the central role of total private expenditure. This is represented in a crucial equation where in steady-state growth, private expenditure (DE) at any point in time is linearly related to income (YD) plus the growth in assets (FA):

\[ DE = b \cdot YD + c \cdot FA \]

This implies a long-run stable ratio (DE/YD) of expenditures to income, unless the stock of assets held by the private sector – and thus, the debt that must finance net asset acquisition – is rising. If this happens it is unsustainable, except in the short run, so that movements in the DE/YD ratio are an indicator of the sustainability of growth financed by private expenditure. Although the assumption of a long-run stable ratio of expenditures to income goes back more than three decades to the ‘New Cambridge’ models that preceded today’s SFC models (Cripps and Godley, 1976), it was again relevant in the recent run up to the recent crisis. Below I return to the centrality of this relation for crisis anticipation.

The application of SFC models is to run simulations, which requires a number of assumptions, e.g. that trade depends on income and prices and responds to exchange rates and domestic and foreign prices. Simulation outcomes are evaluated in term of financial balances which are developed from national accounts. Starting from the well-known GDP identity

\[ GDP = C + I + G + B \]
(where C is consumption, I is gross investment plus change in inventories, G is government expenditure, and B is the balance of trade), equalities can be derived between financial balances by dividing investment over its sectoral components (see Zezza, 2009, p.299):

\[(S-I_r) + (P - I_k - I_n) = GD + BP\]

where \(I_r\), \(I_k\) and \(I_n\) are residential investment, nonresidential investment and change in inventories, respectively, \(P\) is profit, \(GD\) the government deficit, and \(BP\) the balance of payments. The two terms on the left-hand side are jointly the private sector balance (household and business savings) and those on the right-hand side are the government and foreign balances, respectively. One can now trace how (say) GDP growth fuelled by consumption growth has implications for a change in (say) private balances. Since a change in balances implies accumulation (or decumulation) of net financial assets and thus an increase (or decrease) in net debt to finance this, one can then evaluate how sustainable GDP growth is – whether it will not lead to intolerably high sectoral debt levels.

More generally, with this approach one can quickly see which of the sectoral balances was financing growth in any given period. Each sector’s balance is its net injection (or drain) of liquidity into (or from) the economy. GDP growth is compatible with any constellation of balances, since they always sum to zero; but by the same identity, a change in one balance has implications for the sum of the other two and/or for GDP growth. This allows one to see that, for instance, an increase of private expenditure must increase GDP and reduce the government deficit, but worsen the current account balance (and in addition, will increase private debt). Such insights are a useful antidote to the widespread, but misleading view that it is always desirable that the private sector saves and the government budget is balanced or in surplus – simultaneously and with positive GDP growth. An SFC model makes clear that in the economies with a trade deficit, this is a logical impossibility: all three sectors (private, public and foreign) would be draining money from the economy – but without a source where it originates. Worse, attempts at attaining the supposedly worthy goal of shrinking the government deficit while the private sector is deleveraging and imports exceed exports cannot do anything else, by definition, than strongly depress growth.
SFC model also help identify the financial sources of growth over time. Figure 5 does this for the US over the last six decades, based on Zezza (2009:302). (Note that a negative government deficit is a government surplus and a negative balance of payments indicates a money outflow due to net imports and capital flows).

Figure 5: United States - main financial balances, 1952-2008

Source: Zezza (2009, p.302)

The Figure shows that in the 1950s and 1960s, U.S. growth was driven by net exports and private investment. In the 1970s and 1980s, fiscal policies were the engine of growth, by creating persistent government deficits with mostly negative balances for both the private and foreign sectors. And from the 1990s, growth was fuelled by both private and government deficits, balanced by a strongly deteriorating balance of payments.

Here is how SFC analysis links to anticipating financial instability. A key assumption in Godley’s work (borne out by the data) is that the ratio of net asset acquisition to GDP is stable in the long run, so that GDP growth based on short- and medium-term deviations of the ratio from its long term path has to be unsustainable. This was key to his crisis prediction, to which we now turn.
5. **Identifying Unsustainability: How It Was Done**

Many have argued that the roots of the present crisis go back to a series of changes that took shape after the last serious US recession in 1990-1991, and which accelerated after the mild 2001 recession – especially the growth in private debt and the trade deficit. The SFC model allowed Godley to be specific about this. In 1999 (and in later publications) Godley identified how seven interrelated trends where unsustainable and explained that they would have to lead to recession, possible after ’another good year or two’. That recession duly came in 2001, but the response was not to reverse, but to reinforce the unsustainable processes identified in Godley (1999b). In 2005 (a year before US real estate prices stopped increasing) he called the end of the expansion and predicted recession before 2010.

Specifically, Godley wrote that “because its momentum has become so dependent on rising private borrowing, the real economy of the United States is at the mercy of the stock market to an unusual extent. A crash would probably have a much larger effect on output and employment now than in the past” (1999b, p.1). The dotcom crash that followed two years later (and which was smaller and less sudden than the last ‘Black Monday’ crash of 19 October 1987) did just that. In 1987 the Dow Jones Industrial Average had lost 20 per cent in two weeks without triggering recession. The 18 per cent loss between the peak of 14 January 2001 and 10 September 2001 triggered a (mild) recession from March to November (according to NBER dating).

And yet Godley’s aim was not to make short-term forecasts (1999b, p.1) but was “only concerned with developments over the next 5 to 15 years as a whole. On this longer-term outlook he wrote that “policy could not sustain the expansion, except temporarily and perversely by giving a new lease on life to the stock market boom.” Because the engine of growth he had identified was the rise in private expenditure relative to income, he analysed that it was “impossible that this source of growth can be forthcoming on a strategic time horizon… If, per impossibile, the growth in net lending and the growth in money supply growth were to continue for another eight years, the implied indebtedness of the private sector would then be so extremely large that a sensational day of reckoning could then be at hand” (1999b, p.5). He chose the number well: eight years later it was 2007, the year of the liquidity crisis that started on August 7
when BNP Paribas terminated withdrawals from three hedge funds citing "a complete evaporation of liquidity". By December, the US was officially in recession, on NBER dating.

We now know that the growth in net lending did continue ‘per impossibile’, and as Godley watched this, his ‘strategic’ warnings of 1999 turned into short-term predictions of recession. Godley warned that ‘Goldilocks is doomed’ (Godley and Wray, 2000), where ‘Goldilocks’ was a simile after the children’s tale, employed in the years after the dotcom crash for the US economy, which was said to be neither too ‘cold’ (low unemployment) nor too ‘hot’ (low inflation). Projecting developments ‘over the next 5 to 15 years’, in 2002 he made the case for the likelihood of a severe recession (Godley and Izurieta, 2002). In the summer of 2006, the US housing market turned, which spelled the end of the lending boom – but few realized it as yet. Godley and Zezza (2006, p.3) showed how he inevitable decrease in the rate of household debt growth would cause a “sustained growth recession … somewhere before 2010”. The contrast was with official forecast such as the US Congressional Budget Office (CBO) annual report of GDP growth averaging 2.85 per cent between 2007 and 2010. Godley and others noted in an April 2007 paper that its predictions implied a “Goldilocks world in the medium term”. Since this would need continued growth in household indebtedness in a falling housing market, Godley et al. (2007a, p.1) thought this ”wildly implausible”. They projected growth “slowing down almost to zero sometime between now and 2008” and warned that “unemployment [will] start to rise significantly and does not come down again.” In November 2007 Godley warned for “a significant drop in borrowing and private expenditure in the coming quarters, with severe consequences for growth and unemployment” (Godley et al. 2007, p.3).

As it turned out, these forecasts were still too positive; but no other model-based projection saw the collapse for what it was. So that is how it was done. Godley’s prediction was nothing more complex than noting that

a) GDP growth depended on continued large net lending flows to the private sector;
b) net lending flows were very sensitive to small changes in the growth of the households’ debt-to-income ratio;
c) Households’ debt-to-income ratio rose because house prices kept rising;
d) once house prices stopped rising – as they invariably would -, one could reason backwards to (a), calculate the slowdown in growth, and conclude that recession was at hand.
It is certainly an analysis that would survive Occam’s razor. But underlying this transparent reasoning lay a sophisticated SFC model, its development guided by a Minskyan view on the economy. This allowed for accurate scenario building in terms of unfolding processes, unencumbered by unrealistic equilibrium assumptions of micro foundations.

6. The Importance of Historical Norms

This projection was based on a “profound difference in the view of how the economy works” with the consensus view (Godley, 1999b). On the other hand, and less obviously perhaps, the SFC approach also differs from ‘mere’ flow-of-funds accounting. The value-added of SFC model lies in the analysis of stock-flow norms, and the use of overall accounting constraints. These extras come at the price of less detail. Consider one example of each.

One can construct ratios and infers from their deviation from historical trends that processes are unsustainable. For instance, the ‘fiscal ratio’ (the ratio of government spending to the average rate of taxation) will be exactly equal to GDP when the budget is balanced, and exceed (fall short of) GDP when the budget is in deficit (surplus). Correcting for inflation and the business cycle gives the ‘adjusted fiscal ratio’. With a neutral fiscal stance, real government expenditure, given the average tax rate, must rise through time at the same rate as GDP; but in 1992-99 the ratio rose by only 0.9 per cent, against 3.3 per cent annual GDP growth. By tracking this ratio over four decades, it is clear that “[b]y this measure, fiscal policy since 1992 has been far more restrictive than during any seven-year period in the last 40 years.” (Godley 1999b:2).

A similar ‘adjusted trade ratio’ can be constructed, which is the ratio of exports and foreign transfers to the average import propensity, with all variables corrected for inflation, relative prices, and the business cycle. Combining both into an ‘adjusted fiscal and trade ratio’(CFTR) yields a measure for the extent to which trade and fiscal policy feed the growth of aggregate demand – namely, “the extent to which government expenditure plus exports pumped funds into the economy relative to the rate at which taxes and imports siphoned funds out of it” (1999b, p.3) Whenever the inflow of government expenditure plus exports is equal to the outflow of taxes plus imports, the level of aggregate income and output must be equal to the CFTR. Between 1961 and 1992, GDP did indeed track the CFTR one for one. In contrast, since the CFTR rose only 0.6 per cent annually over 1992-99, this implied that net demand from the
government and net exports since 1992 had been much weaker than in any other period since 1960.

This combined with the three-sector equation that the private, government and foreign sector balances must sum to zero, this implied in 1999 that ‘Goldilocks was doomed’. With CFTR growth persistently smaller than GDP growth, private spending in excess of income had to make up the difference. With a government surplus and current account deficit, US economic growth derived from private debt growth, which had to slow down in the foreseeable future. Specifically, Godley (2005) demonstrated that continued growth (of 3.3 per cent, the 2000-05 average) through 2010 would require that the net flow of private lending would have to rise from 15 per cent of disposable income in 2005 to 20 per cent in 2010, taking debt-to-disposable income to 225 per cent in 2010. He noted the ‘more plausible scenario’ that house prices stopped rising (Godley 2005, p.3) and analyzed that ‘[P]rivate debt and borrowing cannot continue to provide the motor for expansion for more than a couple of years, particularly if interest rates go on rising’. Even before housing prices stopped rising in 2006, it was a foregone conclusion that “the growth in private debt must eventually slow down, causing net lending to fall and thus threatening recession, exactly as happened in 2000.” Godley (2005, p.3) also recognized that “there can be no remedy this time in the shape of a fiscal expansion. A repeat of the 2000–2003 stimulus would take the budget deficit to 9 percent of GDP!” Interest rates remained low after 2005, postponing the showdown for which Godley continued to warn (Godley and Zezza 2006). When it came, the fiscal response was even larger than in Godley’s assessment (the deficit reached 12.3 per cent in 2009) but without rekindling growth. The rest is history.

7. **Implications For Monetary Modeling: Where is Credit?**

The question that this case study begs is: if financial flows are so important, (how) can conventional models incorporate them. For a start, let us note that the dive is not just between SFC models and DSGE (and other equilibrium) models. Just as SFC analysis is at odds with mainstream macroeconomics, so is flow-of-funds analysis outside of a SFC framework. For one example, Barwell and Burrows (2011) note that their ”approach would depart from the orthodoxy of optimising agents, [and this] would make it much easier to conduct scenario analysis in which financial fragilities arise on balance sheets, as such fragilities are generally
ruled out by construction in optimising models of rational agents.” In sum, any financially realistic analysis (whether flow-of-funds analysis or SCF models) has to depart from assumptions that are central to what Barwell and Burrows (2011) call ‘orthodoxy’ and what Godley (1999b) termed ‘the consensus view’. In both terms we can easily discern today’s ‘state of the art’ macroeconomics. In section 2 its problem was identified as the “absence of an appropriate way of modeling financial markets”, as BIS researcher Tovar (2008, p.29) notes. If this is accepted as a problem, then the question is, can financial sectors indeed not be integrated into DSGE models? Or is this impossible by construction?

One might defend this thesis simply by noting that DSGE models have no balance sheets, and hence no debit for every credit, which rules out a financially insightful model. The response may be that these could be added if desired. But the more forceful argument is that the absence of balance sheets, credit and debt is no coincidence, or a feature that could be rectified by adding a financial sector to the model. One can add symbolic frictions and tell a story that this represents the financial sector, which is something different. At a fundamental level, any genuine role for money is alien to the DSGE model structure and trying to introduce it undermines key model properties. Frank Hahn already noted this as a puzzle that has become known as ‘Hahn’s Problem’. The title of his famous 1965 paper ‘On Some Problems of Proving the Existence of an Equilibrium in a Monetary Economy’ may well be inverted: there are insurmountable ‘problems of proving the existence of money in an equilibrium economy’. Godley and Shaikh (2002) did follow-up work on this, showing that it is problematic to prove the existence of an equilibrium in a monetary economy – in fact, so much so that it is literally impossible to introduce money flows (specifically, flows of profit and interest) in a multi-market equilibrium model. Marx and Schumpeter, and contemporary authors in the circuitist tradition (Rochon 1999; Graziani 2003) also noted the problematic existence of profit flows. Levy (2001) and Keen (2010) explained how profit can only be understood when tracing actual financial flows.

In (DS)GE models, money and credit are thought to be passively adjusting to whatever it is that the real sector needs, as dictated by optimization processes in the real sphere. So money aggregates are assumed to move one on one with the value of transactions in goods and services. Therefore, they do not need to be modeled explicitly. General-equilibrium modeling so has no place, by construction, for the very nature of finance, which is leverage: the creation of debt claims and credit instruments in excess of current output.
But financial instability develops precisely because financial liquidity is created at a rate over and above the growth rate of output. All theories of financial instability include this element of ‘over-borrowing’, as Adam Smith called it (Bezemer 2010a). Equally, assuming a passive financial sector is unhelpful for understanding the role of credit in growth, where credit is first extended in excess of current output so that more future output can be produced (Schumpeter, 1934). General-equilibrium models also have ‘financial black holes’, where asset markets of credit aggregate may be included, but not debt. This means that assets (if present) find no counterpart in liabilities. Obviously, this precludes analysis of the risk of a debt crisis. In the logic of DSGE-type macroeconomic models, both debt and wealth are dispensable (if present at all), as (Krugman and Eggertsson (2012) recognized when they wrote that “despite the prominence of debt in popular discussion … and the long tradition of invoking debt as a key factor in major economic contractions, there is a surprising lack of models that correspond at all closely to the concerns about debt”.

Both sides of the balance sheet need to be traced. Banks create money as they extend credit, as debt (‘liquid liabilities’) to the real sector. A bank loan is an asset to banks and a liability to the real economy. It is at once credit that supports growth and debt which may precipitate crisis – two sides of the same coin called ‘finance’, so that debt is (normally) good for growth and each credit crisis is really a debt crisis (Bezemer 2009b). This is the basis for any realistic theory of finance and the economy – or as Schumpeter (1954) put it, ‘a credit theory of money is possibly preferable to a monetary theory of credit’. Because credit was and is excluded from most monetary analysis, a credit crisis will always be unexpected. Alan Greenspan (2008) watched with ‘shocked disbelief” his ‘whole intellectual edifice collapse in the summer of [2007]’. Glenn Stevens, Governor of the Reserve Bank of Australia said “I do not know anyone who predicted this course of events” in December 2008. The reason is that our central bankers keep the wrong intellectual company, so to speak (for the crisis had been forewarned). Nor is this a recent problem. BIS economists Borio and Lowe in 2004 wrote a paper titled “Should Credit Come Back From The Wilderness?”. Bernanke (1983, p.258) noted that “only the older writers seemed to take the disruptive impact of financial breakdown for granted”. Even further back, US Federal Reserve Chairman Lauchlin Currie in 1933 complained about the “Treatment of Credit in Contemporary Monetary Theory”.
This paper reflected on the questions: what models helped anticipate the crisis and what can we learn from them; and is the crisis really a paradigm test (Bezemer, 2011a,b)? The natural follow up question is, does this mean that monetary macroeconomics should adopt financially realistic modeling as its next paradigm – or at least, accord it a more prominent place? This might be SFC modeling, or perhaps more generally computational economics. One could argue that this subsumes SFC models as a special case (i.e. including balance sheets and an accounting structure).

Consider two often heard objections to such change. The first is to note that all macro models satisfy the constraints of the basic macro accounting framework. These are constraints inherent in the definition of income, of savings and investment, and so on – conventional models just do not spell it out. Good modeling depends on abstraction, so is it not scientific regression to return to earlier, more detailed models? This response finds some justification in the fact that SFC models are much like the macro models in vogue in the 1970s, and they do return to an older tradition in macroeconomic modeling and, indeed, thinking. But it would be a mistake to assume that the completeness and consistency in an accounting-type macro model is already implicit in current state-of-the-art macro models, which are typically DSGE models of some variety. Explicating financial flows is incompatible with the structure of (DS)GE models. They are inconsistent with financial realism – indeed, some argue that they are an obstacle to an empirically based macroeconomics tout court (Colander et al. 2008). Of course, models should not aim at complete realism and abstract from many features of the real world. It is doubtful however, that finance and balance sheets should be among those features. The growth effects of credit as well as the economic and human cost of financial crises (as in Greece, Spain and Latvia, for instance) are simply too large and pervasive.

A second objection might be to point to the practice of flow-of-funds analysis in the research parts of central banks, large banks, investors, and the consultancy industry. Far from being a novel or out-of-the-box approach, flow-of-funds analysis is ubiquitous. So how innovative are SFC models really? The difference, I suggested, is in the use of macro accounting constraints, in the construction of ratios and studying their deviation from historical norms, and in linking the analysis to real-sector developments. This makes SFC models true macro models,
where the whole is more than a sum of the parts – or conversely, where studying the parts is not enough to understand the whole. The wood is not the trees, and macroeconomics cannot be reduced to microfoundations. To illustrate, in most flow-of-funds analyses, the (correct) assumption is that “financial fragility tends to lurk in the tails of weak institutions as Barwell and Burrows (2011, p.7) wrote, and they continue that this “argues in favour of more granularity”. But there is also macrofinancial (or systemic) fragility”. Nut often fragility does not lurk in details, but in aggregates. The SFC approach is that fragility is only apparent with less granularity: by constructing macro-level ratios on the fiscal stance, the trade deficit, and lending flows. Fragility does not arise from spill-overs, externalities, credit multipliers, and other issues which are best modeled in a network approach. It arises because the economy is fundamentally out of kilter with respect to its levels of debt and deficit, and the extent to which growth had come to rely on debt growth and on private deficit spending.

The difference matters to policy. If crisis arises out of fragile and opaque corporate or financial balance sheets, then strengthening those, for example by imposing higher capital ratios, and simplifying balance sheets by banning exotic financial products, is part of the solution. If crisis arises out of network effects of banks that are too interrelated, then the solution is to separate investment banking, insurance and deposit-taking functions of banks, and perhaps limit international banking and capital flows. But in the SFC analysis, the problem is too much debt, and too large reliance on continued debt growth. This implies two problems after the ‘day of reckoning’. Given very high levels of debt, paying down the debt will shrink the economy too much for this to be a feasible route to recovery. This suggests the need for debt restructuring rather than bank restructuring. And with no changes in the regulation of lending, or of the asset markets that drive lending flows, the ‘old’ engine of (unsustainable) growth will start purring along (and increase debt levels) even as the economy is shrinking. The asset market rally in recession year 2009 and the commodities boom since 2008 are two examples of this. The policy bottom line of SFC analysis is that ‘lending must support the real economy’ (Bezemer 2009a). Lending flows that grow the economy (rather than only asset markets) along with the debt bring a growth model that does not need an ever increasing debt-to-income ratio to continue. A policy implication of the SFC analysis is that it is probably unwise as well as infeasible to try and reinvigorate that growth model.
So wither monetary economics? None of the problems that general-equilibrium models face are new; all have been the subject of economics debate for decades, some for over a century now. But many feel that these issues have taken on a new significance in our time, both because of the unprecedented hegemony of DSGE-style macroeconomics since the 1980s, and because of the credit crisis and global recession. But is the solution really a ‘New Paradigm for Macroeconomics’, as several books have proposed even in their titles (Stiglitz, 2005; Werner 2005)? I would suggest that economics’ fundamental problem is not with its ruling paradigm - flawed though it is, to be sure, when it comes to the financial nature of our economy – but with the hegemony of that paradigm. General-equilibrium models are good at some things and bad at others.

The response should be to recognize their shortcomings and to allow other approaches to be taught, published and used in policy analyses and forecasting. This is not paradigm change; it is the introduction of plurality. An outsider might think this is quite a modest proposal; but the connaisseurs know that given the state of today’s macroeconomics, plurality would already be a revolution. In order for the profession to become receptive to pluralism, it needs three things. The first is a spectacular failure of its paradigm in application, leading to serious questioning and pressure for change. This is now happening, as the Introduction showed. The second is an understanding of the paradigm’s shortcomings. These are by now well-known and thoroughly discussed (even though that discussion has not permeated to most of the profession). The third is a vision of where the solution might be found, setting new research agendas. This paper is offered as a contribution.

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References


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