

Re-thinking Economics in the Light of History

# Are Stock-Flow Consistent Models The Next Paradigm?

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# Are Stock-Flow Consistent Models The Next Paradigm?

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*Or*

*What is the Problem and Can We Solve It,  
Or Has It Been Solved Already?*

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# Outline

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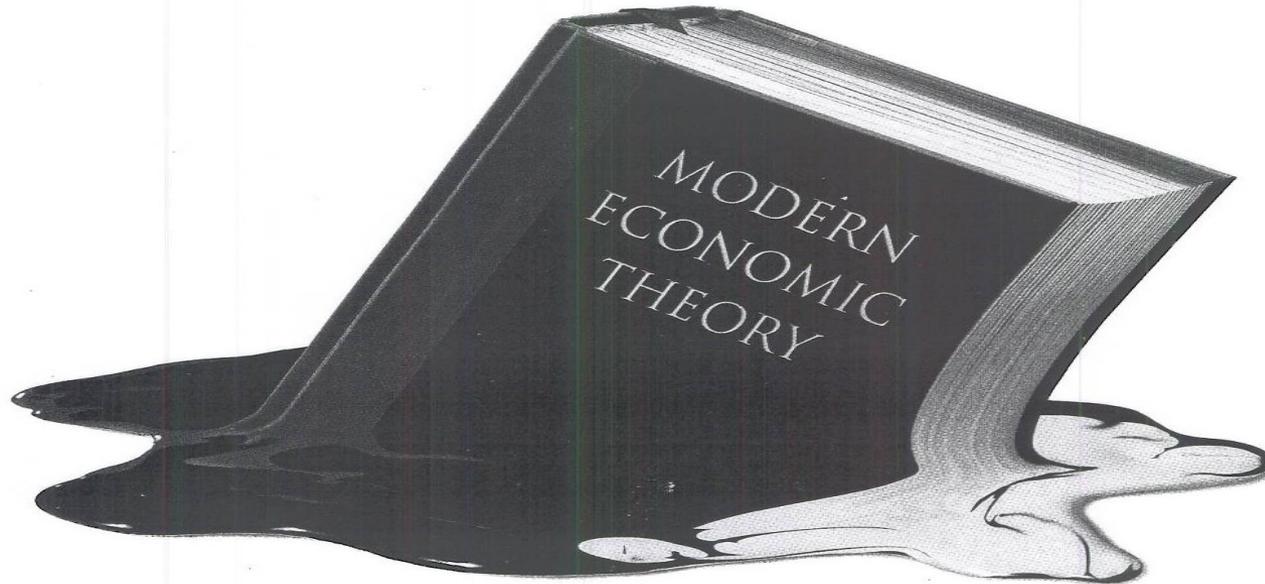
- The crisis in macroeconomics
- The 2009 'Got it Right' project
- Three solutions (to what problem?)
- Stock-flow consistent models
  - History
  - Relevance
  - Limitations?

# The Economist

JULY 18TH-24TH 2009

Economist.com

Britain agonises about Afghanistan  
The rot in Japan's governing party  
Europe's energy insecurity  
Goldman Sachs's record profits  
Summer camp for atheists



**Where it went wrong—and how  
the crisis is changing it**

Bezemer, DJ (2010) [The Credit Crisis and Recession as a Paradigm Test](#). *Journal of Economic Issues*, forthcoming

Bezemer, DJ (2010) '[Who Predicted the Crisis and What Can We Learn from Them?](#)'. In: Dejuán, O, E Febrero and C Marcuzzo (eds.) [The First Great Recession Of The 21st Century: Competing Explanations](#). Edward Elgar (2010)

The  
Economist

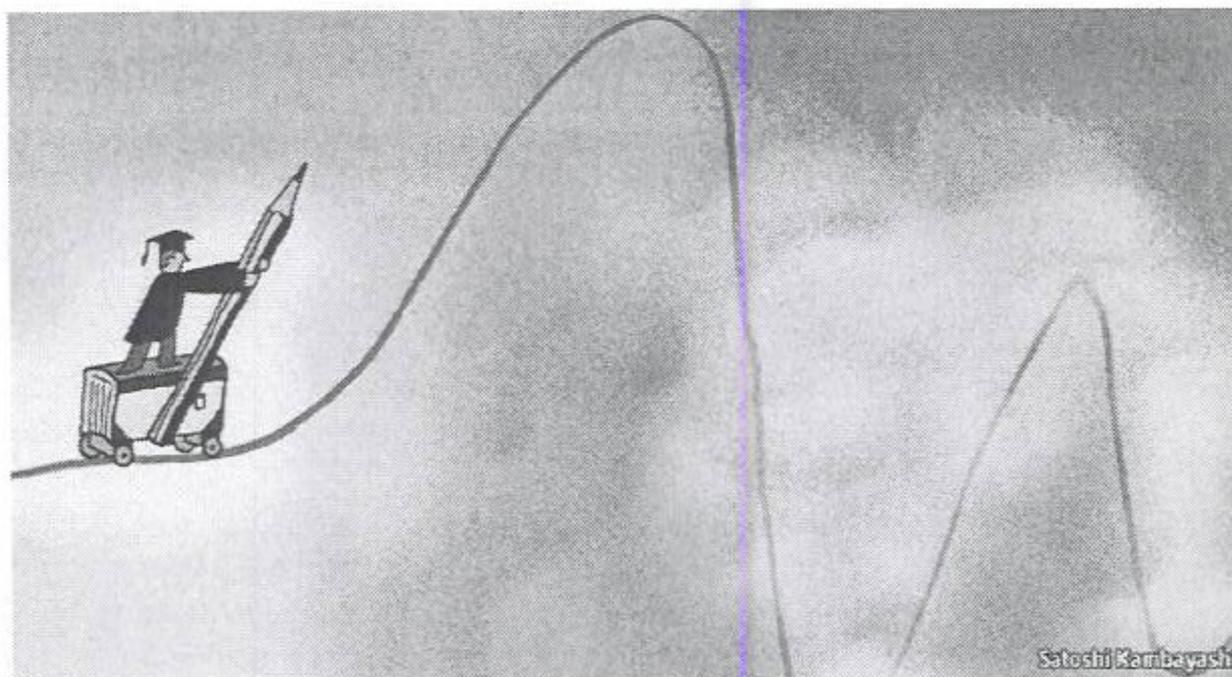
Finance and Economics

Friday April 2nd 2010

## Revise and resubmit

# The crisis is changing how macroeconomics is taught

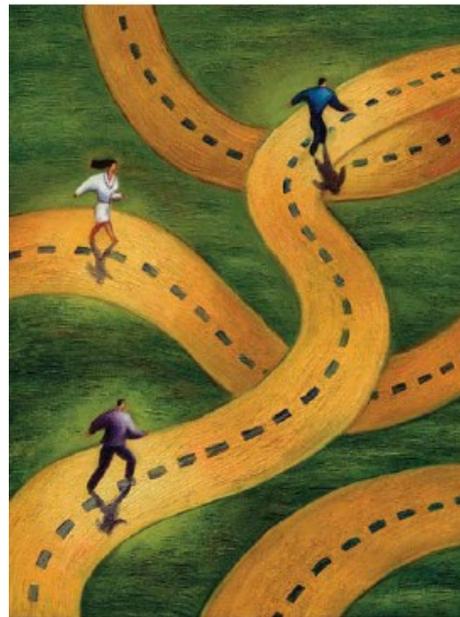
Mar 31st 2010 | From *The Economist* print edition



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# Modern Macroeconomics Is on the **Wrong** Track

*William White*



**The former BIS chief economist argues that the global economic crisis should prompt a rethinking of macroeconomic analysis**

Simply improving our macroeconomic analytical frameworks will likely not be sufficient to avoid future crises. Nevertheless, a reevaluation is necessary. There are many dead ends from which to escape, but there are also many promising strands of thought to be pursued.

#### **Mainstream modern macroeconomics**

In a recent paper, Gregory Mankiw (2006) offered “a brief history of macroeconomics.” He began with the Keynesian revolution, then moved to the New Classical and New Keynesian schools, which have dominated the teaching of macroeconomics in recent decades.

Perhaps the greatest accomplishment of the Keynesian revolution (named for the late economist John Maynard Keynes) was that it provided a general equilibrium model capable of explaining the simultaneous determination of output, interest rates, and (later) prices and inflation—subject to the assumption that wages reacted only slowly to changes in other economic variables. Large, empirically estimated macroeconomic models made the Keynesian model more concrete. Unfortunately, expectations, which were of crucial concern to Keynes, were treated in a rudimentary fashion in most of these models. There also seemed (at least to many academics) inadequate theoretical justification for assum-

# 'Building a Science of Economics for the Real World'

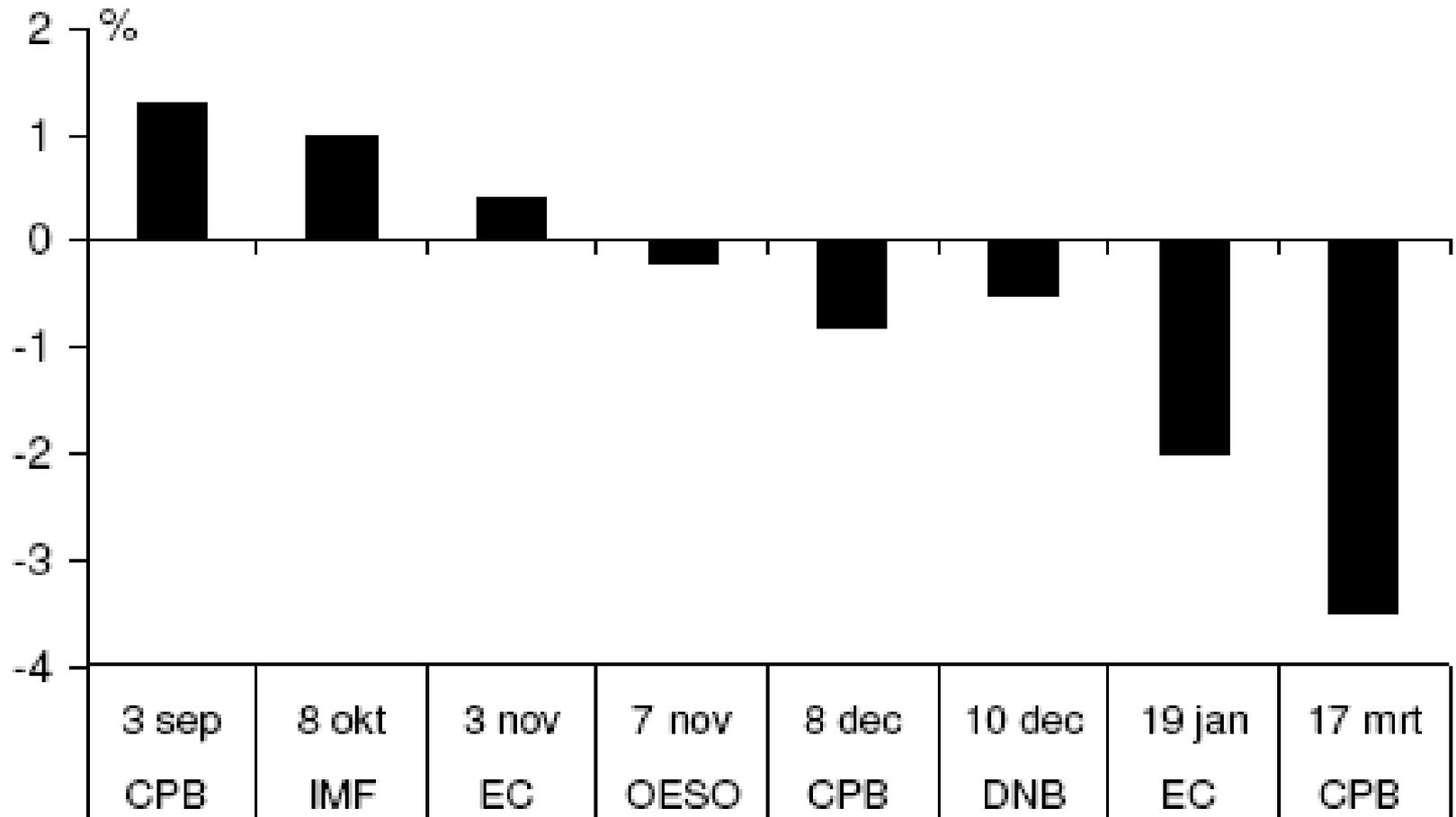
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# Why did mainstream models miss the crisis?

## *2009 growth predictions catching up with reality*



# Who 'Got It Right'?

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- Bezemer D (2009) "No one saw this coming" - or did they? [Vox.EU.org](http://Vox.EU.org) , 30 September 2009
- Bezemer D (2009) [Why some economists could see it coming.](#) *Financial Times*, 8 September 2009
- Bezemer, DJ (2010) [Understanding Financial Crisis Through Accounting Models.](#) *Accounting, Organizations and Society*, August 2010
- Bezemer, DJ (2010) [Do we Need an Accounting of Economics?](#) *Fiducie* 17(2): 28-33
- Bezemer, (2010) [Flow of Fund moels and Financial INstabilitiy Anticipations](#) In: Dejuán, O, E Febrero and C Marcuzzo (eds.) [The First Great Recession Of The 21st Century: Competing Explanations.](#) Edward Elgar
- Bezemer, DJ (2011) [The Credit Crisis and Recession As A Paradigm Test.](#) *Journal of Economic Issues*, March 2011
- (see also 'Got It Right', [www.AFEE.net](http://www.AFEE.net))

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## The Credit Crisis and Recession As A Paradigm Test

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*Dirk J. Bezemer*

**Abstract:** This paper contributes to the debate on what economics can learn from the credit crisis and recession. It asks what are the elements in the mainstream paradigm that caused many economists to misjudge the state of the economy so dramatically in the years leading up to the 2007 credit crisis and the 2008-2009 recession. It scrutinizes the work of twelve economists who warned of the crisis and identifies, as the common elements in their thinking, financial assets, debt, the flow of funds and behavioral assumptions on uncertainty, bounded rationality and non-optimizing behavior. These are then contrasted to mainstream thinking. The conclusion is that economics, if it is to be relevant to reality, should stop neglecting money, wealth and debt, and turn away from an individualistic view and toward a systemic view of the economy.

**Keywords:** credit crisis, paradigms, prediction, recession

**JEL Classification Codes:** B52, E44, E52

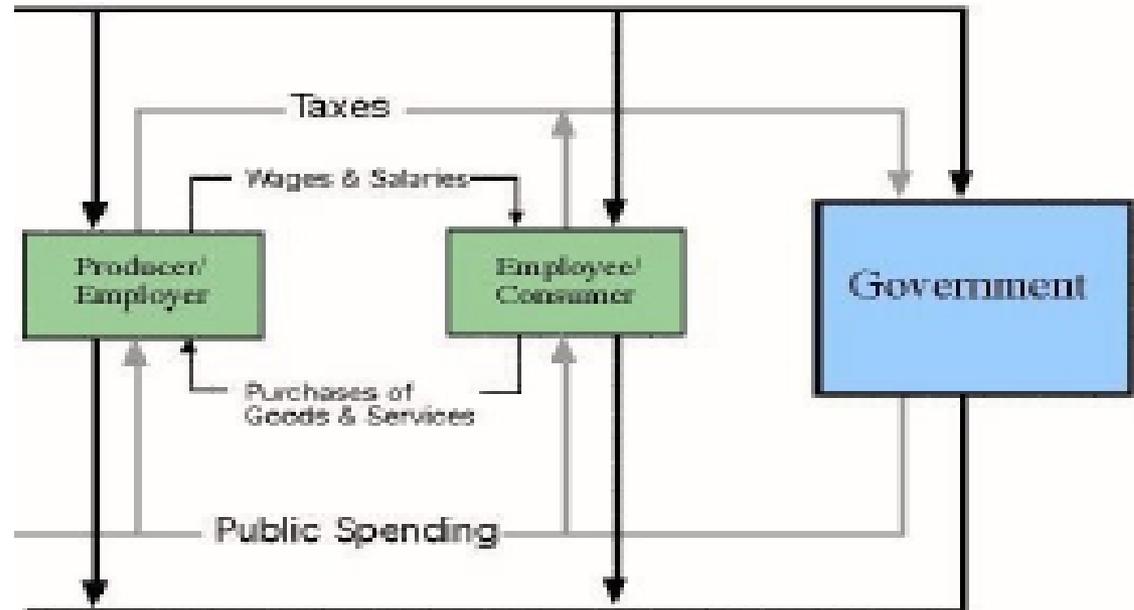
The recent credit crisis and recession are seen to have discredited the mainstream economic paradigm because so many economists “got it so wrong” (Krugman 2009). Friedman (2009) linked both when he wrote on “the failure of the economy and the economists.” The present paper takes this view as a starting point rather than a conclusion. It asks what, precisely, are the elements in the mainstream paradigm that caused many economists to misjudge the state of the economy so dramatically in the years leading up to the 2007 credit crisis and the 2008-2009 recession? In order to address this question, this paper adopts an inductive approach. The research method is to scrutinize the work of twelve economists who warned of the crisis and to identify the common elements in their thinking. This is then contrasted to mainstream thinking. This is a new angle, as neither Krugman nor Friedman paid much attention to those economists who did not “get it wrong” (see also Galbraith 2009). Moreover,

Table 1: Anticipations of the Housing Crisis and Recession

Analyst	Capacity	Forecast
Dean Baker, United States	Co-Director, Center for Economic and Policy Research	“... plunging housing investment will likely push the economy into recession” (2006).
Wynne Godley, United States	Distinguished Scholar, Levy Economics Institute of Bard College	“The small slowdown in the rate at which U.S. household debt levels are rising resulting from the house price decline, will immediately lead to a ... sustained growth recession ... before 2010” (2006). “Unemployment [will] start to rise significantly and does not come down again” (2007).
Fred Harrison, UK	Economic Commentator	“The next property market tipping point is due at end of 2007 or early 2008 ... The only way prices can be brought back to affordable levels is a slump or recession” (2005).
Michael Hudson, United States	Professor, University of Missouri	“Debt deflation will shrink the ‘real’ economy, drive down real wages, and push our debt-ridden economy into Japan-style stagnation or worse” (2006).
Eric Janszen, United States	Investor and <i>iTulip</i> Commentator	“The U.S. will enter a recession within years” (2006). “U.S. stock markets are likely to begin in 2008 to experience a “Debt Deflation Bear Market” (2007).
Stephen Keen, Australia	Associate Professor, University of Western Sydney	“Long before we manage to reverse the current rise in debt, the economy will be in a recession. On current data, we may already be in one” (2006).

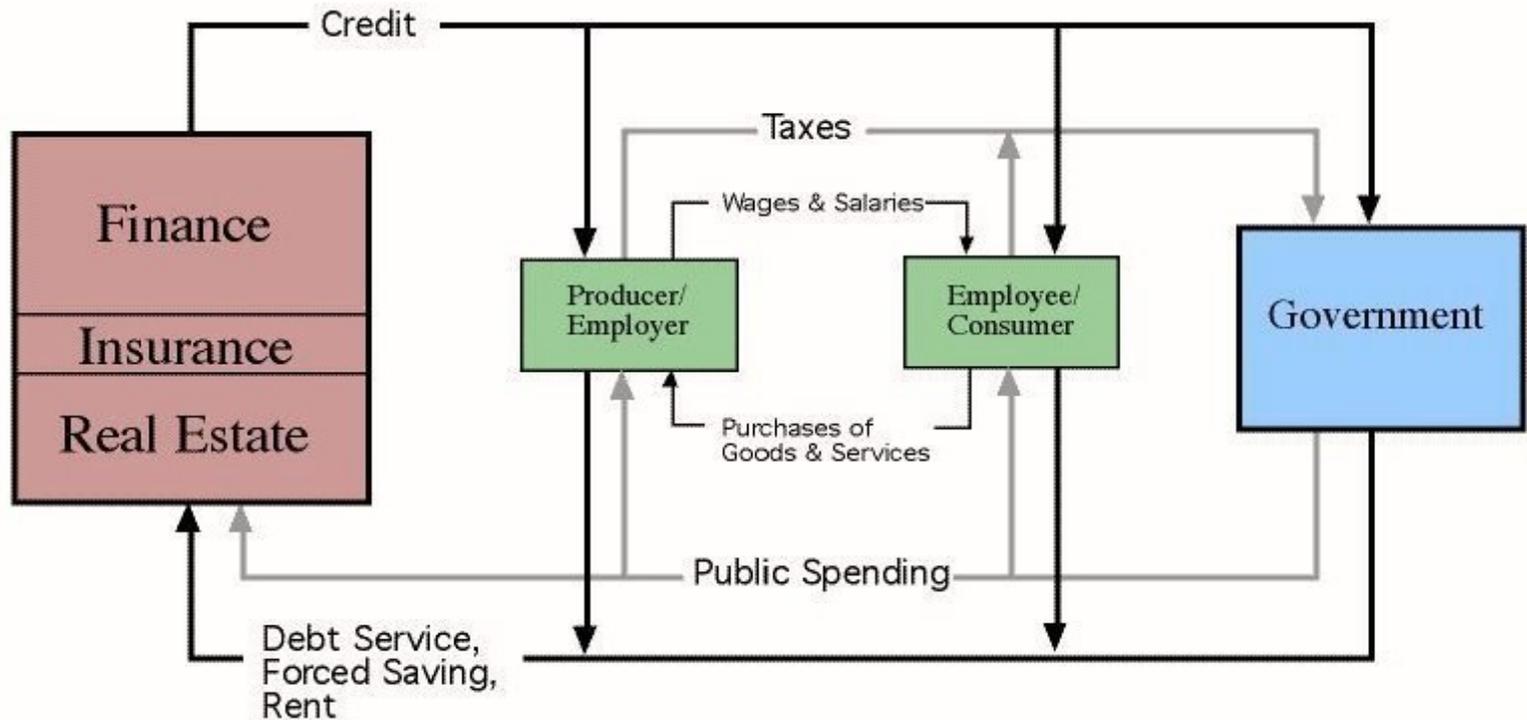
# The Problem: mainstream macro models are real-sector models

(Figure: Hudson, 2006)



# Financial instability models must have financial AND real sectors.

(Figure: Hudson, 2006)



# What is happening to incorporate the financial sector into macro models?



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 and business

## **The Financial Sector in Models For Policy Use: A Progress Workshop**

Friday June 18 2010  
University of Groningen

Since the 2008 credit crisis and ongoing financial turmoil, macroeconomic policy institutions have been reconsidering how their models and research reflect and anticipate finance-driven change in the economy. This workshop brings together representatives from the European Central Bank, the Nederlandsche Bank, the Netherlands Bureau for Policy Analysis and the European Commission's DG for Economic and Financial Affairs to exchange views and progress.

### **Program**

12:30 Arrival

13:00 Welcome and Introduction

13:30 – 15:30 Four presentations plus discussion by representatives from the European Central Bank, De Nederlandsche Bank, the Netherlands Bureau for Policy Analysis and the European Commission's DG for Economic and Financial Affairs

15:30 Tea Break

16:00 Panel Discussion

17:30 Concluding Remarks

Drinks

# What is happening to incorporate the financial sector into macro models?

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**(DS)GE models** with information asymmetries, sticky prices, bounded rationality (Smets, De Haan).

*challenge: rational equilibrium maintained; no independent financial dynamics, no systemic risk*

- **Agent-Based Models**, connectivity & cascades (Cincotti, Della Gatti).

*Challenge: to link real-financial sectors, to take macro-constraints into account*

- **Flow-of-fund** macro models (Tobin, Godley, Lavoie, Zezza).

*Challenge: behavioural assumptions*

=> mix 'n' match or choose?

**Economics focus**

## **Agents of change**

**Conventional economic models failed to foresee the financial crisis. Could agent-based modelling do better?**



# (DS)GE models with information asymmetries, sticky prices, bounded rationality (Smets, De Haan, De Grauwe).

## TOP-DOWN VERSUS BOTTOM-UP MACROECONOMICS

Paul De Grauwe  
University of Leuven

*Abstract:*

I distinguish two types of macroeconomic models. The first type are top-down models in which some or all agents are capable of understanding the whole picture and use this superior information to determine their optimal plans. The second type are bottom-up models in which all agents experience cognitive limitations. As a result, these agents are only capable of understanding and using small bits of information. These are models in which agents use simple rules of behavior. These models are not devoid of rationality. Agents in these models behave rationally in that they are willing to learn from their mistakes.

These two types of models produce a radically different macroeconomic dynamics. I analyze these differences.

JEL codes : E10, E32, D83

Keywords : DSGE-model, imperfect information, heuristics, animal spirits

	Households	Firms		Banks		Govt.	Row sum
		current	capital	current	capital		
Consumption	$-C$	$+C$					0
Govt. expenditure		$+G$				$-G$	0
[Sales]		$[S]$					
Change in the value of inventories		$+\Delta I$	$-\Delta I$				0
Tax		$-T$				$+T$	0
Wages	$+WB$	$-WB$					0
Profits	$+F$	$-Ff$		$-Fb$			0
Interest on loans		$-rl.L_{-1}$		$+rl.L_{-1}$			0
Interest on money	$+rm.M_{-1}$			$-rm.M_{-1}$			0
Interest on bills	$+rb.Bsp_{-1}$			$+rb.Bsb_{-1}$		$-rb.Bs_{-1}$	0
Interest on bonds	$+B_{-1}$					$-B_{-1}$	0
Stock of cash	$-\Delta Hp$				$-\Delta Hb$	$+\Delta H$	0
Stock of current deposits	$-\Delta Mn$				$+\Delta Mn$		0
Stock of demand deposits	$-\Delta M$				$+\Delta M$		0
Stock of bills	$-\Delta Bsp$				$-\Delta Bsb$	$+\Delta Bs$	0
Stock of bonds	$-\Delta B.pb$					$+\Delta B.pb$	0
Stock of loans			$+\Delta L$		$-\Delta L$		0
Column sum	0	0	0	0	0	0	0

## Three different responses - to three different questions?

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Problem: "During the crisis, agents behaved differently from our assumptions."

Challenge: "Can I include that behaviour in my model?"

**solution: (DS)GE models with information asymmetries, sticky prices, bounded rationality**

- Problem: "The crisis resulted from interactions which are typical of complex systems, not equilibrium systems."
- Challenge: "Can I build models so as to capture complexity?"
- **solution: Agent-based / computational modelling**
  
- Problem: "'they' missed the crisis because macro models do not trace flows of credit and debt"
- Challenge: "Can I change my model so as to capture financial flows, and their impact on the economy?"
- **solution: Stock-flow consistent flow-of-fund models**



# Background of the SFC approach

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(courtesy Marc Lavoie)

# 1 Keynesian and modern macroeconomics

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$Y = C+I+G$ : There is no role for (central) banks

- Individuals and firms netted out (representative agent)
- Where does personal saving go?
- What are the liability counterparts of this saving?
- What sector provides the counterparty to a transaction?
- How are government deficits financed?
- What role for financial stocks?
- Godley and Shaikh 2002: this must be so

# Taking money and macro accounting seriously: precursors

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Physiocrats'/Classical circular flow, Say's Law, Smith' Great wheel of circulation

- The British/Scottish 'accounting tradition' (Skaggs): McLeod, Thornton, Tooke, ...
- Marx and the Profit puzzle: "[h]ow can the entire capitalist class manage to draw continually £600 out of circulation, when it continually throws only £500 into it?"
- Kalecki and the profit equation: "profits must, by definition, be equal to the sum of gross investment, plus the fiscal deficit, plus the trade surplus, plus capitalists' consumption minus workers' savings."
- Keynes (of the TTM), Schumpeter, Tobin, Minsky, Circuitists (Graziani, Rochon), Godley, Lavoie

# Key features: Financial assets distinguished from money

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*Keynes: 'financial vs. real circulations'*

- *Schumpeter:* "Debt arising from credit created to finance the innovations and business expansions that increase productivity is 'productive' debt. But credit created in the secondary wave for consumers, speculative businesses and financial speculators, results in a build-up of 'unproductive' debt..."
- *Marx:* 'productive credit, whose volume grows with the growing volume of production', as different from 'the plethora of moneyed capital- a separate phenomenon alongside industrial production'
- "distinguish between different categories of credit, which perform different economic functions" as the authors of the LSE report on *The Future of Finance* wrote (LSE, 2010:16).

## Key features: The separate role of credit and debt

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- “processes in terms of means of payment are not merely reflexes of processes in terms of goods” (Schumpeter)
- “In real life total credit must be greater than it could be if there were only fully covered credit. The credit structure projects ... beyond the existing commodity basis.” (Schumpeter)
- “[i]t follows that over a period during which economic growth takes place, at least some sectors finance a part of their spending by emitting debt or selling assets.” Minsky
- King and Levine’s (1993) “Credit and Growth: Schumpeter Might be Right

# National accounting and flow of funds analysis 1940s-1950s

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Macroeconomics is based on the system of national accounts of the UN 1953 (Richard Stone) (flow national income and product accounts)

- This system left out flow-of-funds and balance sheets
- “When total purchases of our national product increase, where does the money come from to finance them? When purchases of our national product decline, what becomes of the money that is not spent?” (Copeland 1949)
- The 1968 new *System of National Accounts (SNA)* remedies to all this (and again in *SNA 1993*). But to no avail. (2005 OECD commission)

# James Tobin 1960s - 1982

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## The New Haven school

Introduces balance sheets, with several distinct assets and liabilities

- Behavioural equations defining portfolio decisions, based on rates of return
- The debts of a sector are the assets of another sector: Financial interdependence
- Adding-up portfolio conditions: if you desire less of an asset, you want more of another

(courtesy Marc Lavoie)

## A Wall Street view: American Post-Keynesians 1960s-1970s

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Paul Davidson and Hyman Minsky

- One must at least distinguish between money and equities
- Post-Keynesian economics in the 1960s is like Hamlet without the Prince
- Debts generate flow commitments
- “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).

# Godley and Cripps 1983 and the 'New' Cambridge

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A response to monetarism

- Keynesians did not pay enough attention to money and other financial assets & inflation accounting
- Need to introduce the constraints which adjustments of money and other financial assets impose on the economy
- Money stocks and flows must satisfy accounting identities in sectoral budgets, most notably:  
Net financial saving of private sector = government balance + current account balance

## Godley in the 1990s at the Levy Institute

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- Both the Tobin and the Godley research programs had to be abandoned in 1983, when their funding was cut off.
  - For ideological reasons (Thatcher)
  - Econometric performance, due to collinearity problems, was a mixed success at best (Buiter 2003)
- In the 1990s, W. Godley makes a link between his previous work
  - which tracks income flows and the money/debt stock through time,
- and the work of James Tobin
  - which focuses on portfolio choice and rates of return.
- Godley 1996 Levy Institute working paper, with equities, but still without growth
- Godley uses simulations to describe his models and tracks variables through time.

(courtesy Marc Lavoie)



# Main features of the SFC approach

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(courtesy Marc Lavoie)

# No black holes

- ~~“The fact that money stocks and flows must satisfy accounting identities 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)
- Everything must add up.
- The simplest way to make sure that nothing has been forgotten is to construct matrices.
- This consistency requirement is particularly important and useful in the case of portfolio choice with several assets, where any change in the demand for an asset, for a given amount of expected or end-of-period wealth, must be reflected in an overall change in the value of the remaining assets which is of equal size but opposite sign (cf. Tobin)

# The quadruple entry principle

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... attributed to Copeland (1949).

- Any change in the sources of funds of a sector must be compensated by at least one change in the uses of funds of the same sector.
- But any transaction must have a counterparty. Therefore the above two changes must be accompanied by at least two changes in the uses and sources of funds of another sector.



## Application I, the US crisis: forecasts of hitting the debt wall

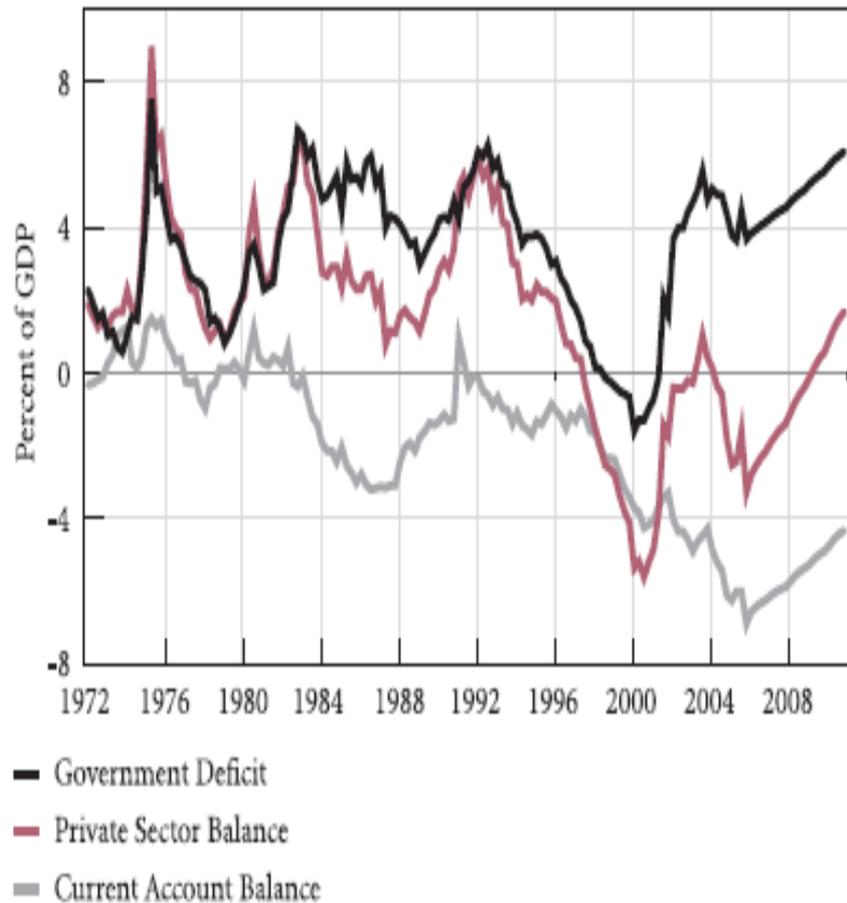
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With a government surplus and current account deficit, US economic growth *had* to be predicated on private debt growth: 'Goldilocks was doomed.' *Godley and Wray (2000)*

“the small slowdown in the rate at which US household debt levels were rising, resulting from the house price decline, would immediately lead to a “sustained growth recession ... somewhere before 2010”

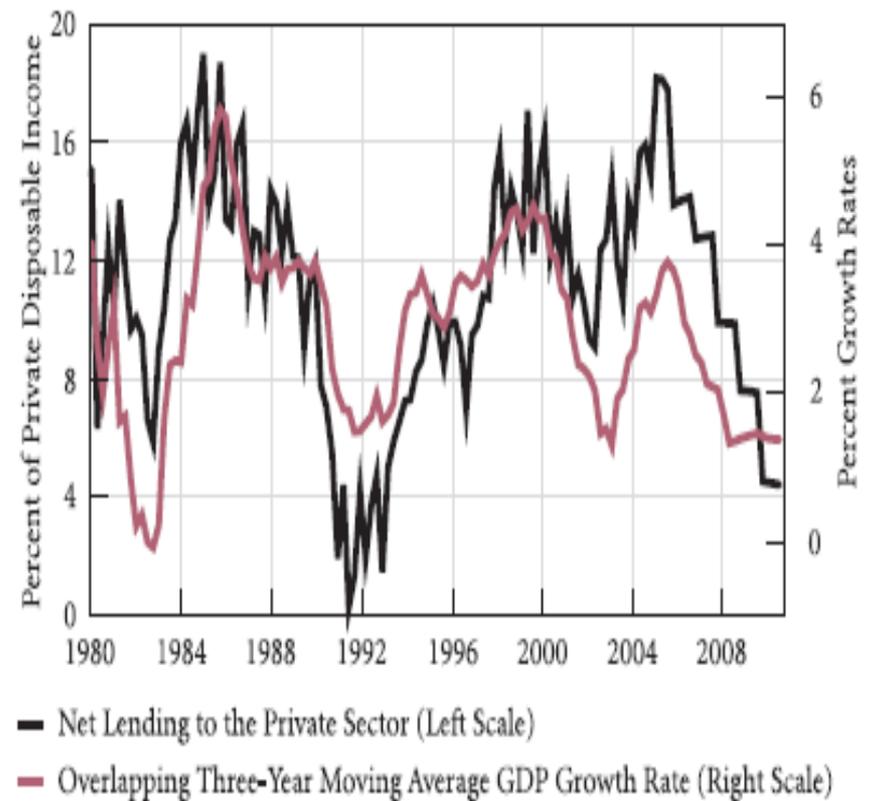
*Godley (2006)*

**Figure 6 Financial Balances in Scenario 4**



Sources: BEA and authors' calculations

**Figure 7 Net Lending and GDP Growth Rates in Scenario 4**



Sources: Flow of Funds, BEA, and authors' calculations

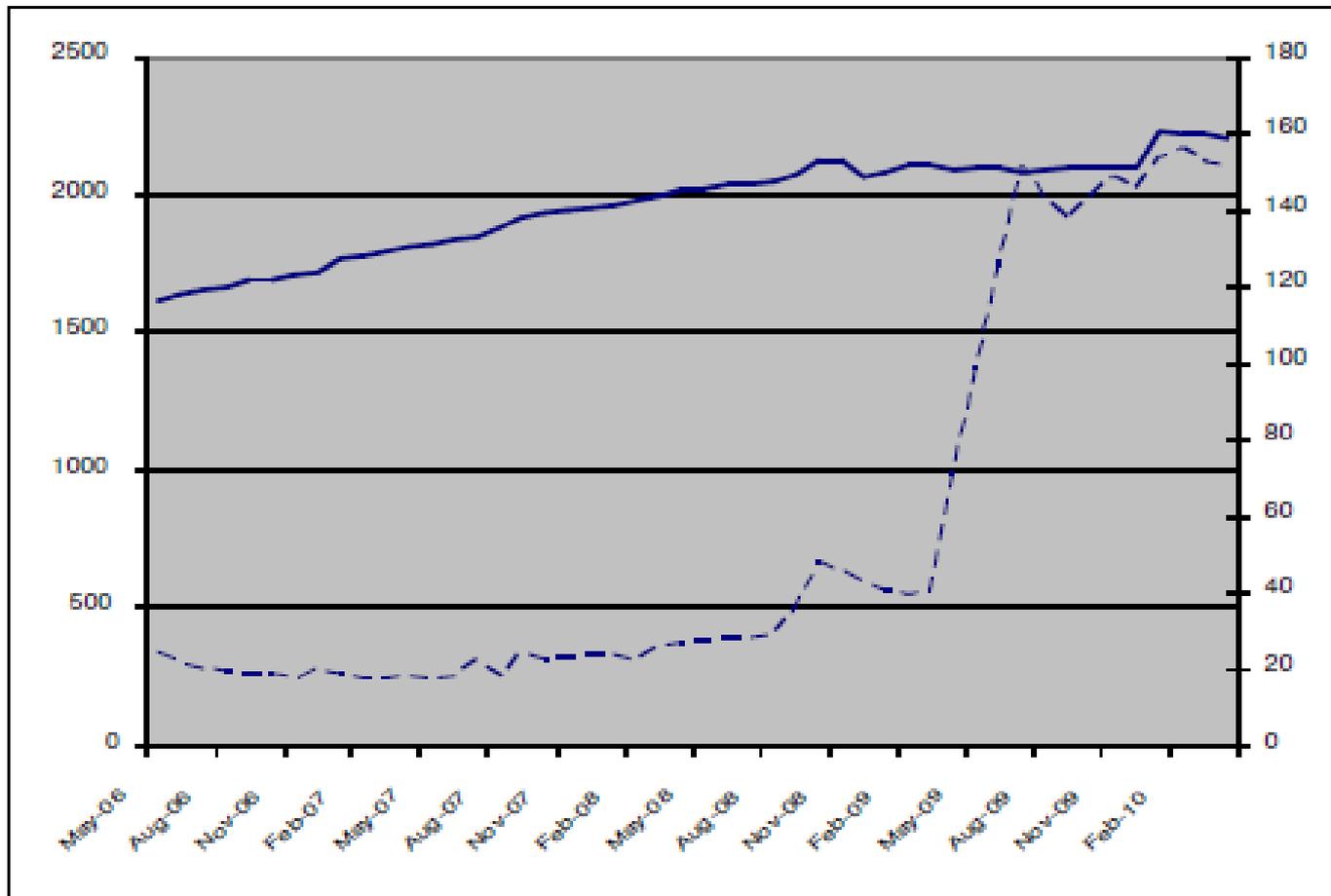
## Application 2: why QE fails

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“To take a single instance, it will show that if the fractional reserve ration is decreased/increased the effect will *not* be to “increase/reduce the money supply” in the way postulated in a multitude of textbooks including Mankiw (2003)”

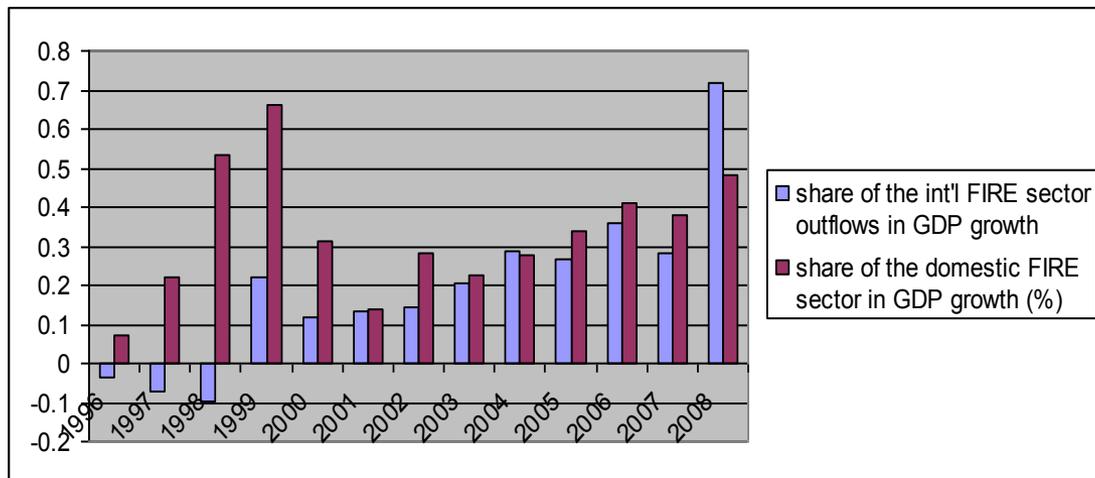
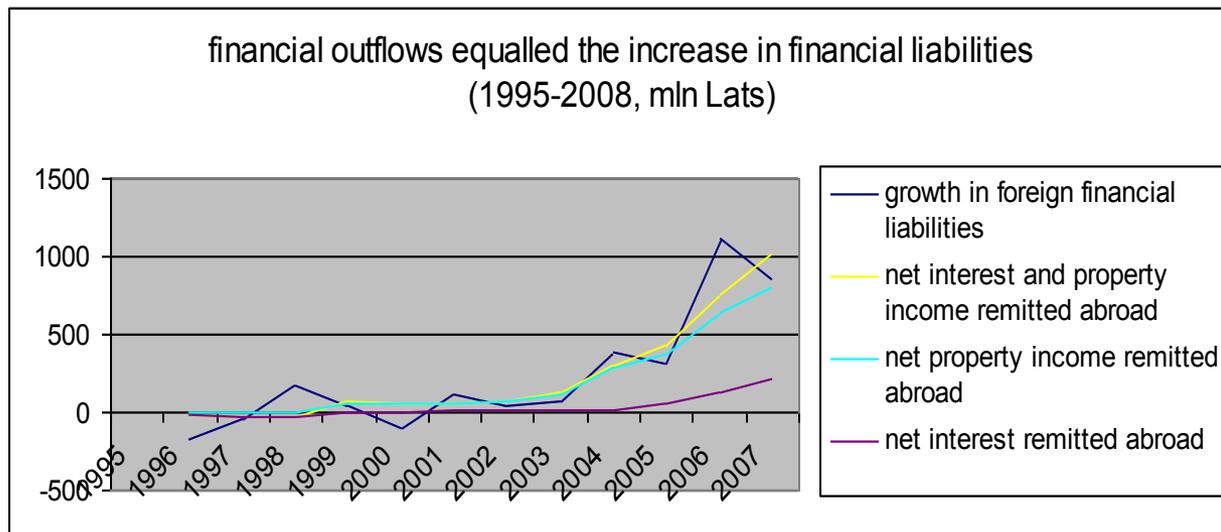
*Godley, 2004*

Figure 1: Outstanding amounts of UK resident monetary financial institutions' (excl. Central Bank) sterling loans to private and public sector (straight line, left-hand axis) and Bank of England Banking Department sterling reserve balance liabilities (dotted line, right-hand axis), billions of Pound Sterling.



Source: Bank of England

# Application III, Latvia: domestic value-added growth overtaken by rent outflows



# Limitations?

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Real-world SFCM are very large and policy analysis is in simulation only.

- Identification problems of empirical (econometric) application
- Replay of the 60-70s large models?
- Where is the behavioural underpinning? Combine it with agent-based models?
- Normal science, protective belts and revolutions