The Economics of Credit and Debt: Glosses from a Small, Open, Basket-Case Economy

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1. The Marching Season

'What bloody man is that?' 'A drum, a drum!'
Prepossessed by what I know by heart,
I wait for Banquo and Macbeth to come
Unbowed, on cue, and scripted from the start.

–Seamus Heaney, "Ten Glosses", *Electric Light* (2001)

I came to stock flow consistent modeling because of the need to teach something sensible.

I suppose like most young lecturers, I wasn't given much of a choice of what to teach when I arrived at the University of Limerick in 2006. Handed a masters-level module called 'international monetary economics', on day 1, I was quite unsure of myself in terms of what to teach, and how to teach it.

I saw (and still see) myself as an empirical economist with heterodox training, and my interests are primarily practical and policy-focused. My pedagogical problem was: How to teach non-specialists a specialist subject that was simultaneously realistic, useful, and non-mainstream?

Most junior researchers ape their professors when it comes to teaching material. They are, as Heaney says, prepossessed by what they know by heart. I was no different.

I was lucky to have people like K. Vela Velupillai and Ed Nell to talk to. Both recommended looking at a newly released book on monetary economics by

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Godley and Lavoie. Neither recommended their own individually innovative work.

Monetary Economics (2006/7) took a novel approach to the creation of a macroeconomic model using stocks and flows as primal elements. Working through the chapters before the lectures taught me a lot of post-Keynesian economics, the economics of effective demand, the balance sheet approach, what are now called 'Godley tables', and the notion of simulation as computational experiment.

Here was a coherent, contained, and sensible approach to modeling macroeconomic phenomena based on simple, primal, concepts like stocks, flows, behavioural and identity equations, and adding things up in the correct way. The whole intellectual edifice is an answer to Copeland's (1949, p. 254) question:

> "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?"

In an earlier work, Godley and Cripps (1983, page 18) made an analogy with Wignerian invariance principles using the principle of quadruple accounting developed by Copeland:

> "[T]he 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".

The *Eviews* programs of some of Godley and Lavoie's models built by Gennaro Zezza showed me clearly what could be done with this theory. It all felt a bit raw, in the sense that *Monetary Economics* is clearly the first book in a new literature. You could almost see the areas of the book where more thought and more intellectual manpower was required. This was very exciting. But I still needed to know how to teach this new, somewhat radical material.

Vela contacted Wynne Godley on my behalf, and in a series of email and phone conversations, Wynne told me how to teach his and Marc's ideas. He was not well for most of the time we corresponded. Nonetheless he was deeply interested in my progress.

An example from an email exchange with Wynne in 2007:

> "In my [Wynne's] Danish class no-one knew what the GDP was or that it existed. A puzzle I set them. Take a bundle of concepts say wages, consumption, rent, government expenditure, manufacturing output, interest payments and a few more. Jumble them in a bag and ask them to say of each whether it is income, expenditure or output (or perhaps as is the case with rent all three). And then, find the time series in a book of stats. Teach them directly using the stock flow concepts."

(In its first incarnation, I should say the students hated the stock-flow approach, but over the years, as they and I have eased into the surrounding literature, the utility of the approach has become more and more obvious given the experience of the Irish economy after 2006.)

So my introduction to stock flow modeling was driven entirely by the need to teach something sensible and coherent to my students in 2006. It was the Irish debt crisis that showed me how useful the SFC modeling approach could be for understanding Ireland's economic crisis.

The SFC approach turned out to be incredibly useful in examining the post-boom Irish economy.

Despite coming to SFC modeling from the need to teach something sensible and based on available macroeconomic data, the usefulness of SFC as a modeling platform became obvious to me during Ireland's economic collapse. It became clear to me almost immediately that excessive flows of credit from private banks to the private sector were the root cause of the problem. Figure 1 below shows the increase in the loan books of the major Irish banks in the crisis period.

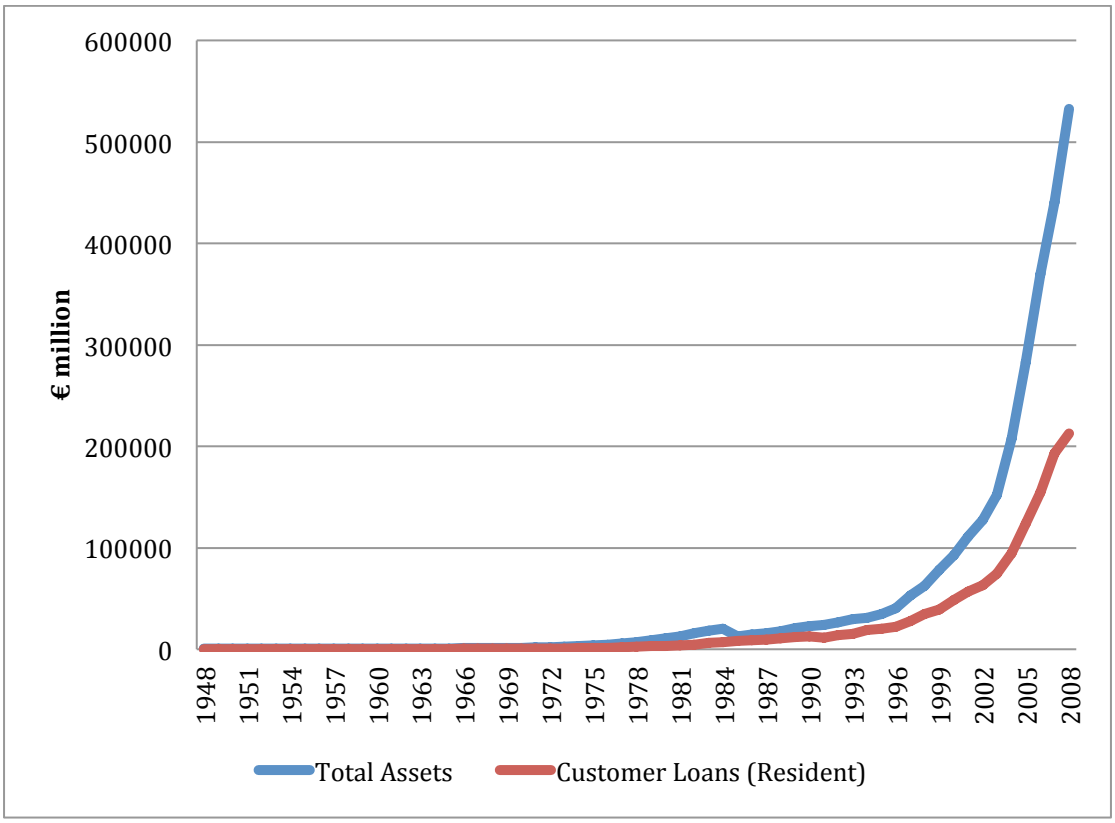

Figure 1. An explosion of lending by private sector banks led to Ireland's current malaise. Source: Kinsella and O'Sullivan, 2012.

Ireland experienced a construction boom fueled by cheap credit from 2002 to 2007. During this boom period, unemployment averaged less than 4% a year. At its peak, real per capita gross domestic product was 20% above the OECD average. Core inflation averaged 3 to 4% from 2002 to 2007, and immigration, the persistent feature of Irish economic life since the 1840s, reversed. Ireland in fact imported workers over this period.

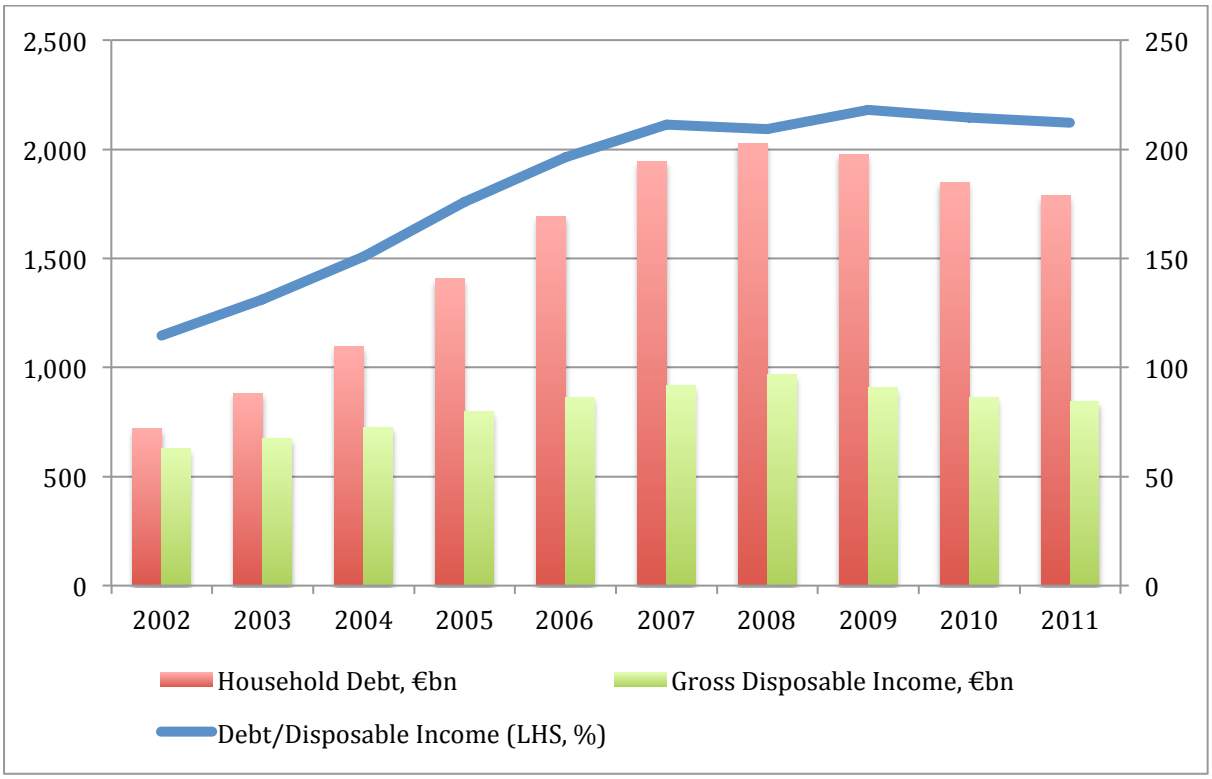

Figure 2. Debt and income dynamics in Ireland, 2002-2011. Source: Irish Central Statistics Office.

Of course, it was all built on cheap credit. Expressing household debt as a proportion of the gross disposable incomes of households the derived debt to income ratio increased from 115% in 2002 to 212% in 2011. We see this buildup and the subsequent drop in both gross disposable income and debt in figure 2. Contrast the relationship between household gross disposable income and gross saving, also shown in figure 3, and we have a puzzle. Consumption has collapsed, deposits did not increase in the post 2007 period—far from it, money left the island—so where did the extra `savings' go? The answer lies in the stock of debt relative to the flow of funds required to service these funds.

In effect, faced with a wave of readily available money, the Irish, like so many before them in other countries and at other times, decided the best thing to do was sell bits of Ireland to one another. This accounts for the drop in savings rates through the 2002 to 2007 period, but not for the drop in post 2009 savings.

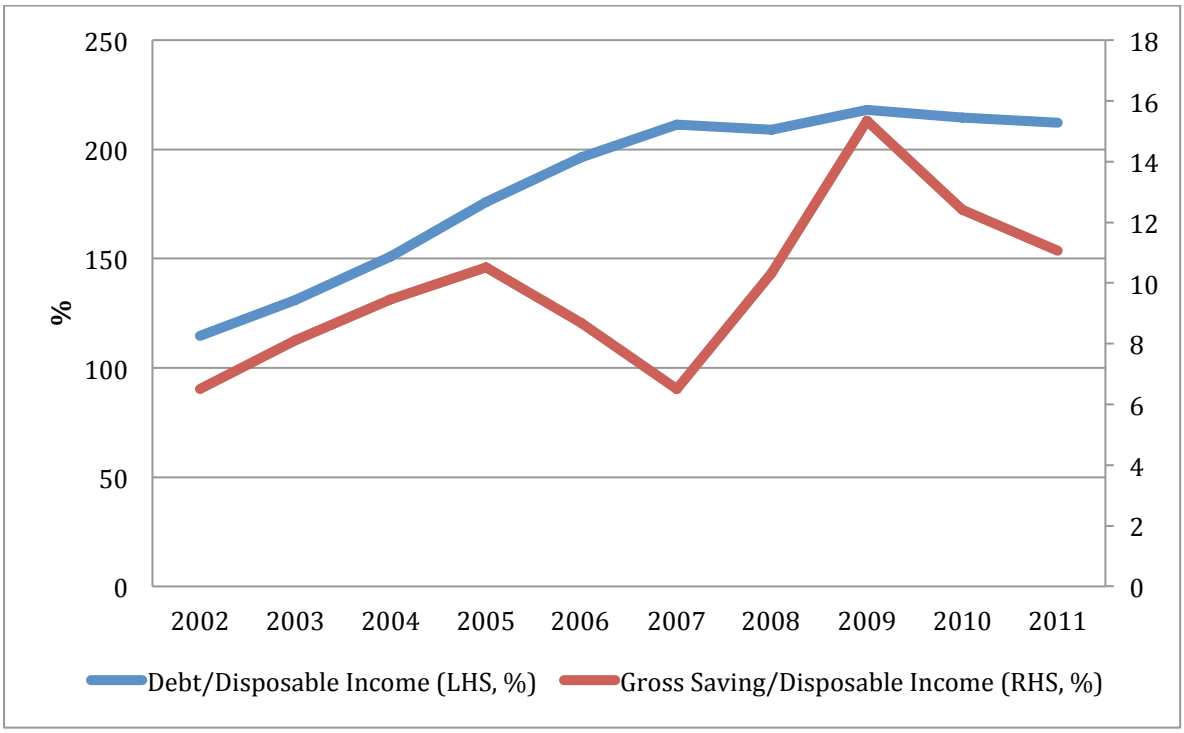

Figure 3. Household debt/disposable income, right axis, and gross household saving, left axis. Source: Irish Central Statistics Office and author's calculations.

These past ten years are a rather unique period in Irish history, but they are by no means the most interesting part our Ireland's story. Table 1 below maps out the decadal performance of the Irish economy relative to Germany and the UK. The important distinction in the Irish case between Gross Domestic Product and Gross National Product is also highlighted. The 1990s were truly a special time. The 2000s? Not so much.

	1961-1970	*1971-1980*	*1981-1990*	*1991-2000*	*2000-2010*
Ireland (GDP)	3.8	3.2	3.3	6.4	3.4
Ireland (GNP)	3.6	2.2	2.8	5.8	3.2
Germany	3.5	2.6	2.0	0.5	1.2
UK	2.3	1.9	2.4	2.3	4

Table 1: Average Annual Growth Rate of GDP/GNP per Capita in 2005 PPS US Dollars. Source: AMECO.

The balance sheet tells the story, as it usually does. Figure 1 shows the buildup of debt in the Irish economy from the `supply' side—the private banking sector. Figure 2 shows where that debt went. It shows the buildup of assets and

liabilities within the system for Irish households. A clear expansion of the balance sheet post 2002 is easily discernable. Gross domestic income (GDI) shot up from 2002 to 2007, as did personal consumption expenditure (PCE), and both have experienced a sharp fall post 2007.

The household sector has moved from being a net borrower to a net lender. This is largely as a result of the collapse in investment in non-financial assets by the household sector (i.e., buying new houses).

Gross fixed capital formation by the household sector was 17 billion euros in 2008. This fell from 26 billion euros in 2006 to 4.7 billion euros in 2011. With depreciation of existing household capital valued at around 4.7 billion euros, clearly net capital formation of the household sector in 2011 was just 44 million euros. Repair of existing capital and investment in new capital just about covered the depreciation of existing capital.

The household sector is not using its gross savings to invest in fixed capital. The households sector is not using its savings to build up deposits. It is therefore paying down debt, in a classic balance sheet recession reaction (Koo, 2009, pgs. 64-66 especially).

Ireland's households are desperately trying to deleverage. Ireland's banks, firms, households, and indeed its government, are all debt-minimisers in Koo-style. The rapid deleveraging is having an adverse affect on the economy. Only a sustained fiscal stimulus would be appropriate in this scenario to alleviate large-scale financial distress.

This is, in effect, what the Irish economy got. A stimulus package in the form of EU and IMF-supported borrowing to keep government spending at or near its peak levels, with a large increase in borrowing to sustain the balance sheets of Ireland's now-insolvent private banks. The `austerity' mandated by the EU and IMF allows the Irish government to deleverage its banks relatively slowly, while reducing government expenditure on a series of key items, notably health and education expenditure.

The stock-flow perspective showed me where to look for solutions in the Irish case.

The main elements of the buildup in household debt were property-related. Of the outstanding household debt of approximately 117 billion euros in 2011, 114 billion euros was due to residential mortgages and 34 billion euros was due to investment-grade mortgages.

Figure 2 above shows just how extensive Ireland's household debt is relative to its income. The credit crunch of late 2007 brought all debt accumulation to a sudden stop. Output and employment slumped as domestic demand collapsed. The current account swung from highly negative to mildly positive in a few years, and government indebtedness increased from 32% of GDP in 2007 to 108% of GDP in 2011 as a result of automatic stabilizer usage and costly bank bailouts beginning with a blanket guarantee of several banks' assets and liabilities in September 2008. Forecasts by the IMF and EU show Ireland's debt to GDP ratio stabilizing in 2014 at around 122%.

In 2008, a sharp decline in sovereign creditworthiness resulted in Ireland needing a package of loans supplied by the IMF, European Central Bank, and the European Commission as well as bilateral loans from the United Kingdom, Denmark and Sweden.

Ireland issued bonds again after a two-year hiatus in July 2012. A programme of expenditure cuts and tax increases, restructuring of the banking sectors and mooted structural reforms to other sectors, as well as legislative attempts to deal with the problems of commercial and residential debt are underway. The unemployment rate has remained above 14% since 2010. Despite many analysts' views on Ireland's lack of a sustainable debt profile, Moody's and Fitch have recently upgraded Ireland's outlook to `stable'.

SFC models have allowed my colleagues and I to work on understanding the needed adjustments the Irish economy must take to get out of its current situation. In particular, the extant balance sheet threats to the Irish economy are: the `promissory notes' worth 32 billion euros paid to heal the balance sheets of two banks, the 22 billion euros paid to buy parts of Ireland's bust banks, and the outstanding mortgage debt on the balance sheets of the household sector.

I have been very active in policy debates on what should be done with these key threats. In collaboration with colleagues at UL and in the University of Pavia, I have attempted to go beyond the need for simple simulations and towards fully estimated stock flow consistent models (Kinsella, 2011; Kinsella et al 2011; Kinsella et 2012; Godin et al, 2012).

Using SFC models to understand the Irish crisis clarified for me exactly where it was useful and less useful.

Stock flow models are extremely useful as tools to develop `informed intuition', but are less useful when a policy maker wants an answer to a specific question like 'what might happen to household consumption if I reduce tax credits' or 'if spending on social welfare is reduced, what is the impact on effective demand?'

Estimating stock flow models is not a trivial task. The estimation of stock flow consistent models is in its infancy, and there are very few researchers with the ability to build and simulate stock flow models who are also adept at time series econometrics and the gathering of national income and product account data[2]. Modern times series techniques can be used to make allowances for the large number of lag structures and autoregressive effects found within these models (Hamilton, 2010).

The complication of the models means that to actually simulate one, the modeler requires a set of equilibrium stock-flow norms that are attained in the steady state of the model. Ideally, stylized facts (e.g. Kaldor 1957/58; Jones and Romer, 2009) should guide choices of stock-flow ratios. I'm here to tell you: they do not.

Finding stock flow norms is, at present, a black art, and more error than trial is involved in finding them (Taylor, 2008). This is unsatisfactory intellectually, but also raises a practical concern over the stability of these models. If they are sensitive to small changes in the values of simple parameters

[2] INET can help in the training of such scholars by funding Summer Schools and helping to increase awareness of this type of modeling. Having open access to data sets, software and code, and to a public profile of the stock flow methodology, as well as links to central banks, will also be of great benefit.

like the propensity to consume out of past income by households, say, then how valid are they as representations of reality?

We have come up with one quasi-Bayesian solution, where the model's parameters are jointly determined to ensure a convergent stock-flow equilibrium. We are currently working on an estimation process for real-world data using vector error correction methods.

There may also be a problem of chaos and complexity within these models. Obviously sensitive dependence on initial conditions does not mean the models are intrinsically chaotic or capable of generating complex dynamics, but the recursive nature of the modeling, the existence of multiple feedbacks within each models and the computation issues I and my co-authors have come across when practically trying to model a real economy give me pause that there might be the seeds of a complex system somewhere within stock flow modeling. The stability of a stock flow consistent model has only been analyzed correctly once by Foley and Taylor (2006), at least to my knowledge.

The role of prices in stock flow models is not well understood at the basic levels. It takes Godley and Lavoie nearly 250 pages to allow prices to move in their models, and even then the treatment of prices is complicated and cumbersome. Prices and pricing behavior are obviously vital in the description of the macro-economy, so it makes sense to consider them as primal to tand future modeling effort.

Finally, the need for a common language and for alternative model closures within that language is paramount if the SFC endeavor is to continue to grow and develop.

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