Using Intersectoral Financial Balances to aid Forecasting and Policymaking

paper by
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Keith Rankin, Unitec Institute of Technology, 19 June 2014

> Every dollar of government deficits has to be offset with private sector surpluses purely from an accounting standpoint, because one sector's income is another sector's spending, so it all has to add up to zero. That's the starting point. It's a truism, basically. Where it goes from being a truism and an accounting identity to an economic relationship is once you recognize that cyclical impulses to the economy depend on desired changes in these sector's financial balances...
> If the business sector is basically trying to reduce its financial surplus at a more rapid pace than the government is trying to reduce its deficit then you're getting a net positive impulse to spending which then translates into stronger, higher, more income, and ultimately feeds back into spending.
> [Jan Hatzius, quoted in Economist 2012c]

Introduction

Intersectoral financial balance analysis is, at its core, an inspection of annual financial flows between the major sectors of the global economy or of national economies. It is 'identity economics' based around the constraint that all sector balances combined equal zero. It remains on the fringe of macroeconomics, possibly because it is based around an accounting identity that is widely (though implicitly) interpreted in a way that renders it uninteresting.

In its simplest global form there are just two sectors – private and government – and therefore just one degree of freedom. If we know the financial balance of one of those two sectors, then we know the balance of the other. If the governments of the world run a combined deficit of one trillion dollars in 2014, then the global private sector is running a surplus of one trillion dollars. When we consider individual nations, a further sector appears: the foreign sector.

For many purposes, the private sector may be split into a household sector and a business sector, and the business sector itself may be split into financial and non-financial businesses. The balances of all sectors must add to zero. It is easy to calculate countries' private-sector (or at least their aggregated non-government sector) balances. These balances equal the current account balance minus the general government balance. In Nicholas Kaldor's early statement of this inter-sectoral balance identity (in which he treats households and businesses separately), his language betrays the assumption that both business and government sectors naturally operate in deficit mode.[1]

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[1] Nicholas Kaldor wrote in 1944 of the household sectoral balance: "This is equal to the sum of the items private net investment at home, the balance of foreign payments, and Government expenditure out of loans", from Kaldor's 1944 article 'Quantitative Aspects of The Full Employment Problem in Britain', published as Appendix C to *Full Employment In A Free Society* by William Beveridge. (Ramanan 2012b). This says that the household surplus equals the sum of the deficits of the business, foreign and government sectors.

An identity becomes a theory when variables that make up that identity are given significance as either essentially autonomous or essentially accommodating. For example, the quantity theory of money uses an identity to explain prices (treated as accommodating) through the idea that the quantity of money is essentially autonomous.

For individual country analyses, especially of small countries, it is not uncommon to treat the entire domestic sector as financially autonomous, with foreign sector accommodation. Indeed, in New Zealand in the era before financial liberalisation, foreign sector accommodation was explicit, generally through the Minister of Finance negotiating loans with foreign bankers[2].

Neoclassical assumptions and twenty-first century reality

When investigating the financial relationships between the major sectors, the neoclassical theory is that business sector balances are accommodating, and that household and government balances are essentially autonomous. Given that business investment expenditure is understood as an essential driver of economic growth, both government borrowing and a paucity of household savings represent a constraint on growth. Further, the neoclassical assumption is that the business sector's financial balances accommodate via the price mechanism, through flexible interest rates. Business borrowing is understood to accommodate household lending when interest rates (presumed to be always positive[3]) are set at their equilibrating levels. Further, the process of growth – nominal and real – may ensure that the debits of the debtor (business) sector maintain a stable ratio to gross domestic product.

In the neoclassical view, crowding-out of the business sector by a spendthrift government sector is regarded as a significant impediment to economic growth. Neoclassical economists can be quick to link increased government expenditure to rising interest rates, an issue that is raised whenever centre-left parties contending for office make spending promises.

In the twenty-first century, these assumptions about government and household sector autonomy have become untenable. It is clear that the global financial crisis of 2007-10 was preceded by huge household deficits that cannot be passed-off as autonomous, and significant corporate savings (Karabarbounis and Neiman, Economist 2012a, Wilder 2012) in a number of advanced economies. While government balances, in their global aggregate, were close to zero in 2006 and 2007, they became the critical accommodating factor during and after those crisis years when "the private sector tries to save money aggressively (as happened during the crisis)

[2] "Government-led development had priority use of overseas funds, especially borrowed funds" (Gustafson 2007, p.326)

[3] Corden (2011) discusses the problematic "return journey" of finance by drawing readers' attention to the core idea of "inter-temporal trade" (see also Wolf 2012a). It is quite conceivable that negative interest rates may clear the market between savers and borrowers. Indeed the problem of excess savings may be an important characteristic of twenty-first century capitalism. Weisenthal (2012a): "The economy for years has been characterised by … a private sector that remained in massive surplus (meaning excess savings)."

the government deficit will inevitably explode (as happened)".[4] Businesses repaid debt and accumulated cash hoards in a process now commonly described as a "balance sheet recession".[5] Even very low interest rates largely failed to excite businesses into taking on more debt as governments and households tried to consolidate their balance sheets.

Japan’s experiences in its "lost decade" (from 1992) foreshadowed the wider experiences of the developed world this century. In the period from 1985 to 1991, in a rising and high exchange rate environment, Japanese businesses took on a lot of essentially speculative debt.[6] From then on, the principal mode of operation of these businesses was to repay debt, regardless of near-zero interest rates. Further, Japanese households followed a largely autonomous strategy to accumulate savings. It was the Japanese government that for the most part accommodated these clearly autonomous private-sector financial choices, with secondary accommodation being provided by Japan's foreign sector. With almost zero net business investment, for two decades Japan was able to run a trade surplus and maintain high living standards by maintaining high productivity levels. Koo argues that, had the Japanese government not acted to accommodate these huge private sector financial surpluses, then Japan would have suffered a great depression of 1930s' magnitude.

The thesis presented here is that private sector balances, globally, have become substantially more autonomous than they may have been in the post- World War 2 decades, and that government balances are revealed as being much more accommodating than we had thought. Indeed even the government surpluses that appeared in some countries (including New Zealand, Appendix Chart D) in the 2000s' decade should be understood to be much more a result of natural accommodation of private sector deficits rather than due to the fiscal choices of those countries' finance ministries (Wolf 2012a).

Signature Balances

Different national economies have come to show persistent signature patterns of autonomous and accommodating financial activity. Crises are clearly visible as temporary or permanent interruptions to those signatures. In a recent paper (Rankin 2014) I compared and contrasted the financial signatures of New Zealand and Australia with the Nordic economies. The Scandinavian countries together had significant financial crises in the early 1990s. Following a

[4] Refer to Appendix, Charts A and B. OECD estimates of global government deficits for the years 2001 to 2010 were published by the OECD in 2011. The series has since been discontinued. Chart B uses linear regression estimates (derived from the major developed economies' balances) to extend the global estimates of actual (as opposed to intended) private sector balances to the whole period from 1984 to 2012.

[5] The phrase has been most publicised by Richard Koo, subsequent to his 2003 book about Japan's recession.

[6] This from Goto-Jones: "The banks made casual loans: very famously the Industrial Bank of Japan lent an Osaka woman 2 billion dollars against a small [fake] chain of restaurants, which she proceeded to lose on the stock market after taking financial advice from her psychic.", backed up by Thayer Watkins, and apparently sourced from Wood (1992). See Appendix Chart C for Japan's 3-sector balances from 1988, and Wilder (2012) for a 4-sector chart.

period of private deleveraging from 1989 to 1994 Norway (Chart E), with its oil revenues moved into a post-crisis mode of large autonomous government surpluses, accommodated, through foreign lending, via its sovereign wealth funds.

Sweden is a good example of a country that responded to its banking crisis in a seemingly permanent – indeed mercantilist way – by choosing to run surpluses in both private and government sectors, trusting in accommodation through large current account surpluses (meaning foreign sector deficits; the rest of the world ran, and still runs, significant deficit balances with respect to Sweden). While this combination of public and private austerity may have served Sweden well – although it is not clear if Swedes ever intend to cash in on their unenjoyed wealth (in contrast to Japan which is now running trade deficits) – Sweden's is clearly a policy strategy that cannot be successfully employed by all nations simultaneously.

A current account surplus means that a country's foreign sector has a deficit balance; that there is an outflow of financial capital from the domestic economy. A persistent current account surplus is commonly regarded as beneficial, at least in mercantilist policy-making circles (Rankin 2011). Simultaneous attempts to raise current account balances in the world's largest national economies in the 1920s were almost certainly a significant contributing cause of the Great Depression of the 1930s (Eichengreen and Temin 2000).

The general interpretation in these examples is that surplus activity (with the exception of small cyclical government surpluses) is largely autonomous whereas deficit activity tends to be accommodating. This conforms to the neoclassical view that the business sector is the capitalist economy's principal debtor sector and also its principal accommodating sector. (Growth serves essentially as a by-product of accumulating business debt.) It does not conform to the view that New Zealand's private sector runs autonomous deficits, by way of insufficient savings, and that foreign parties accommodate us by lending to us. The Swedish and Norwegian dynamics would appear to be closer to a general truth: foreign outflows accommodate domestic surpluses in those countries.

China and Germany have similar signatures (Appendix Charts G and H): persistent private surpluses matched largely by foreign deficits, and with smaller government deficits. (Germany's signature varied from this pattern only during the reunification decade of the 1990s.) Spain's signature (Chart I) represented – at least until the Eurozone crisis – the obverse of Germany's, giving substantial insights into how the creation of the Eurozone modified financial flows within Europe.

While Japan acquired a signature in which private surpluses are matched mainly by government deficits, the United Kingdom (Chart J) has a signature somewhat like Japan's – private surpluses offset by government deficits – except that foreign surpluses replace foreign deficits. Government deficits accommodate foreign as well as domestic private surpluses. The Economist (2012a) shows that corporate cash stashes have prevailed in the United Kingdom since 2002, simply becoming more entrenched since 2008.

These medium-long-term national financial signatures reveal the accumulating imbalances that on occasions lead to dramatic and potentially catastrophic financial corrections. They suggest what most likely will happen in the future, but not when.

Variations from (and reversions to) signature behaviour become a significant tool for short-run forecasting. The key idea is to focus on detecting changes in private-sector balances, which, our argument suggests, are largely autonomous rather than accommodating through the interest rate price mechanism. They are probably non-accommodating in part because monetary policy settings (focussed on domestic inflation targets; meaning that interest rates are set in domestic markets, not conforming to the 'law of one price') interfere with the role that interest rates may play in equilibrating private lending and borrowing behaviour.

Monetary policy settings do have a significant effect on the direction of global lending, if not on its quantity. Thus countries with interest rates that attract foreign savings tend to find their household sector running deficits that accommodate the foreign inflow (with much of the accommodation appearing in the housing market), with small government surpluses largely accommodating those deficits. This has been the story in New Zealand in much of the 2000s, and appears likely to be a central story in New Zealand in the 2010s also.

Balancing mechanisms in the private sector include monetary policy settings, and the intensive marketing of consumer and mortgage finance. In the government sector they include both automatic stabilisers and intentional stabilisation through fiscal policy.

Wynne Godley, Jan Hatzius and Business Cycle Forecasting

> I've long been fascinated with looking at private sector financial balances in particular. There was an economics professor at Cambridge University called Wynne Godley who basically used this type of framework to look at business cycles in the UK and also in the US for many years, so we just started reading some of his material in the late 1990s, and I found it to be a pretty useful way of thinking about the world. It's usually not something that gives you the secret sauce at getting it all right, because there are a lot of uncertain inputs that go into this analytical framework, but I do think it's a reasonable organizing framework for thinking about the short to medium term ups and downs of the business cycle. Basically, in order to have above trend growth, a cyclically strong economy, you need to have some sector that wants to reduce its financial surplus or run a larger deficit in order to provide that sort of cyclical boost, most of the time.
>
> [Jan Hatzius, quoted from Business Insider's Joe Weisenthal]

Economists who have effectively used the intersectoral balance-sheet approach for short-term macroeconomic forecasting include Jan Hatzius of Goldman Sachs, and his mentor, the late Wynne Godley. Godley was a forecaster with the British Treasury in the 1960s (Schlefer), and became director of the Department of Applied Economics at Cambridge in 1970. He was regarded as a practitioner of "hydraulic Keynesian" economics (Krugman); a term that became quite pejorative in the 1980s when Godley's forecasting approach became unfashionable. While Godley's work emphasised the flows of inventories over the price mechanism as being critical

to business decision-making, he pushed for those inter-sectoral insights of Nicholas Kaldor to become more widely incorporated into his forecasting trade.

On retirement from Cambridge Godley joined the Levy Institute in New York, and remained active until his death in 2010. He, along with his acolyte Hatzius, is now recognised as being among the foremost of those who foresaw the 2008 global financial and economic crisis.

Whereas Godley's reputation was made by his ability to predict major turning points in the business cycle, Jan Hatzius – now chief Economist at Goldman Sachs – has specialised in using the method for making short period forecasts. He has been widely acknowledged for the accuracy of his work, twice receiving the Lawrence Klein Award for his team's forecasting prowess (Arizona State University).

Hatzius forecasts by focussing on changes to private-sector financial behaviour, treating private choices as essentially autonomous, much in the vein of Keynes' 'animal spirits'. His most recent forecasting efforts have been in picking the United States recovery, based on his interpretation of falling private balances as representing a desire by the American private sector to increase its spending at a faster rate than US governments are choosing to consolidate their balance sheets. He emphasises that this is a deliberative process on the part of the private sector, and not a response to government austerity.

> The economy for years has been characterised by below-trend growth and a private sector that remained in massive surplus (meaning excess savings). That's been the essence of what we've seen, and Goldman believes that's almost over.
> [Joe Weisenthal, *Business Insider*, "Goldman: The Economic Crisis Ends In 2013"]

From a forecasting point-of-view, and adopting the approach that business-sector activity is substantially (and possibly increasingly) autonomous, reduced private surpluses in the 2014-16 period point to a more buoyant global economy for a few years, reduced government deficits and more governments registering surpluses.

Balance Sheet Recession and Policymaking

> When the balance-sheet-repair process has proceeded sufficiently, you will get a boost from the private sector, and you're seeing it.
> [Jan Hatzius of Goldman Sachs]

> The popular consensus is that austerity and fiscal consolidation is the right approach, or at least the one that sounds most responsible. In a time when households are feeling the pressure and tightening their belts, a government that seeks to spend in extravagance is sure to look out of touch. Thus to speak of growing budget deficits in the United States (and some European countries) encroaches on political suicide, even if economic survival is at stake.
> [Clement Wong, on Richard Koo's policy dilemma.]

Hatzius adopts Richard Koo's schema of a world in balance sheet recession in the half-decade

commencing 2008. His focus is on the private-sector forces that generate both contractions and recoveries.

Koo is more explicit than Hatzius about the need for an accommodating fiscal policy response once a recession is identified as a balance-sheet recession; a recession that involves a substantial liquidity trap, and in which business strategy is to minimise debt no matter how low interest rates go. Thus Koo emphasises insensitivity to the interest rate price mechanism, and suggests that, in these situations, a reliance on monetary policy to induce private sector uptake of debt is at best futile.

The problem here, which Clement Wong states with clarity, is that the politics (or some more deep-seated fear) of debt intrude into the economic argument, making austerity the default policy option. The public (albeit less in Japan than in the United States) struggles to get the idea that the largesse of another sector (especially the government sector) may be the catalyst to the revival of the private sector. Politicians feel impelled to match enforced private austerity with enforced public austerity, and economists generally fall short in communicating (to politicians and their other audiences) the wilful blindness to the sectoral-balances-identity that this involves.[7] A New York Times (2010) article picks up President Obama pushing this easily-sold austerity message:

> The hard truth is that getting this deficit under control is going to require some broad sacrifice, and that sacrifice must be shared by employees of the federal government.
> [*New York Times* "Amid Deficit Fears, Obama Freezes Pay" 29 November 2010]

Politics, or something deeper in the human condition, trumps economics.

The core of the long-term problem appears to be the tendency – possibly structural – for corporations to run surplus balances, accentuated by policies that encourage households to run increasing surplus balances. In the absence of specific countries – such as emerging economies – taking an approach that accommodates increased global savings, then some other rebalancing force must at some stage take effect.

The long-term imbalances between sectors and countries are likely to be greater at the end of this decade than they were at the onset of the global financial crisis, given that signature financial behaviours have been accentuated, rather than reversed by, the global financial crisis. This analysis suggests that, until and unless substantial modification of private sector behaviour take place, the global economy faces an escalating boom-bust cycle, with the booms appearing increasingly in asset markets, and the busts becoming increasingly difficult to accommodate. Indeed governments may be reaching the political limits of their capacity to accommodate further private-sector shocks to the global system.

[7] "The sum of all sector financial balances must be zero. This is basic accounting. As the Oxford University macroeconomist, Simon Wren Lewis notes, sectoral financial balances provide a fundamental check of the feasibility of envisaged adjustments". (Wolf, *Financial Times*, 2012b)

In the first half of the twentieth century, much rebalancing took place, unintentionally, during world wars, laying the ground for decades of restorative balanced growth. Then, in the 1970s, global inflation also had some unintended rebalancing consequences, somewhat reducing the purchasing value of accumulated financial assets and reducing the obligations of indebted sectors to run surplus balances.

Conclusion

In summary, the financial balances approach emphasises the role of accommodating fiscal policy to maintain economic output at close to its potential level. And it emphasises the need, in the long run, to defuse the still-accumulating global savings glut and its conjoint opposite, the global debt mountain. Like correlation analysis, it is suggestive rather than definitive. Certainly it is a very useful aid to forecasting and policy-making. Blindness to (or unawareness of) the sectoral-balances-identity will lead to significant future forecasting errors and policy mistakes.

References

Arizona State University (2011) "'Most Accurate Economist' to deliver 2012 forecast" (https://asunews.asu.edu/20120928_business_kleinaward)

Corden, W. Max (2011) "Global Imbalances and the Paradox of Thrift", Melbourne Institute Working Paper No. 20/11 (http://ssrn.com/abstract=1903562; http://www.voxeu.org/article/global-imbalances-and-paradox-thrift)

Economist (2010) "Goldman Sachs: The Ben Stein Defence" 28 April (http://www.economist.com/node/21006345/)

Economist (2012a) "Stashing the Cash" 17 March (http://www.economist.com/node/21550279/)

Economist (2012b) "Dead Money" 3 November

Economist (2012c) "In search of 'natural' velocity" 11 December (http://www.economist.com/blogs/freeexchange/2012/12/recovery/)

Economist (2013) "Looking Better" 26 January (http://www.economist.com/node/21570738/)

Eichengreen, Barry and Peter Temin (2000) "The Gold Standard and the Great Depression". *Contemporary European History*, 9:2(183-207) Cambridge University Press

Fiebiger, Brett (2013) A constructive critique of the Levy Sectoral Financial Balance approach *Real-World Economics Review* 64 (http://www.paecon.net/PAEReview/issue64/Fiebiger64.pdf)

Fullwiler, Scott (2009) "The Sector Financial Balances Model of Aggregate Demand - Revised" *New Economic Perspectives* 26 July (http://neweconomicperspectives.org/2009/07/sector-financial-balances-model-of_26.html)

Fullwiler, Scott (2011) "The Sector Financial Balances Model of Aggregate Demand and Austerity" *New Economic Perspectives* 9 June (http://neweconomicperspectives.org/2011/06/sector-financial-balances-model-of.html)

Godley, Wynne and Marc Lavoie (2007) *Monetary Economics: An Integrated Approach to Credit, Money, Income, Production and Wealth*, Palgrave MacMillan

Goto-Jones, Christopher (2009), *Modern Japan - A Very Short Introduction*, Oxford University Press

Gustafson, Barry (2007) *Kiwi Keith: a Biography of Keith Holyoak*e, Auckland University Press

Harrison, Edward (2012) "Chart of the day: Goldman does US sectoral balances", CreditWritedowns 10 December (http://www.creditwritedowns.com/2012/12/chart-of-the-day-goldman-does-us-sectoral-balances.html)

Heffernan, Margaret (2011) *Wilful Blindness: why we ignore the obvious at our peril*, London: Simon and Schuster

Hickey, Tom (2013) "Who else got it right? Jan Hatzius, for one. And there were others, too", Mike Norman Economics, 7 June (http://mikenormaneconomics.blogspot.co.nz/2013/06/who-else-got-it-right-jan-hatzius-for.html)

Karabarbounis, Loukas and Brent Neiman (2012) "Declining Labor Shares and the Global Rise of Corporate Saving" Working Paper 18154, National Bureau of Economic Research (http://www.nber.org/papers/w18154; http://faculty.chicagobooth.edu/brent.neiman/research/LabShare.pdf)

Kelton, Stephanie (2011a) "What Happens When the Government Tightens its Belt?" *New Economic Perspectives* 27 May

(http://neweconomicperspectives.org/2011/05/what-happens-when-government-tightens-2.html)

Kelton, Stephanie (2011b) "What Happens When the Government Tightens its Belt? (Part II)" *New Economic Perspectives* 3 June (http://neweconomicperspectives.org/2011/06/what-happens-when-government-tightens.html)

Koo, Richard (2003) *Japan's Struggle with Uncharted Economics and its Global Implications*, Singapore: John Wiley and Sons

Koo, Richard (2009) *The Holy Grail of Macroeconomics: Lessons from Japan's Great Recession*, Singapore: John Wiley and Sons

Koo, Richard (2011) "The world in balance sheet recession: causes, cure, and politics", *Real World Economics Review* 58 (http://www.paecon.net/PAEReview/issue58/Koo58.pdf)

Koo, Richard (2012) "The World in Balance Sheet Recession: What Post-2008 West Can Learn from Japan 1990-2005" David Finch Lecture, University of Melbourne, 9 August (http://fbe.unimelb.edu.au/alumni/events/public/2012/david_finch_lecture_2012)

Koo, Richard (2013) "Central Banks in Balance Sheet Recessions: A Search for Correct Response" Nomura Research Institute (http://ineteconomics.org/sites/inet.civicactions.net/files/Koo Paper.pdf)

Krugman, Paul (2013) "Wynne Godley and the Hydraulics" 13 September (http://krugman.blogs.nytimes.com/2013/09/13/wynne-godley-and-the-hydraulics)

New York Times (2010) "Amid Deficit Fears, Obama Freezes Pay" 29 November (http://www.nytimes.com/2010/11/30/us/politics/30freeze.html?_r=0)

OECD (2011) International Monetary Fund, World Economic Outlook Database, September (http://www.imf.org/external/pubs/ft/weo/2011/02/weodata/index.aspx)

OECD (2014) International Monetary Fund, World Economic Outlook Database, April (http://www.imf.org/external/pubs/ft/weo/2014/01/weodata/index.aspx)

Ramanan (2012a) "Martin Wolf On Wynne Godley's Sectoral Financial Balances Approach", *Concerted Action*, 19 July (http://www.concertedaction.com/2012/07/19/martin-wolf-on-wynne-godleys-sectoral-financial-balances-approach)

Ramanan (2012b) "Origins of The Sectoral Balances Identity", *Concerted Action*, 29 November (http://www.concertedaction.com/2012/11/29/origins-of-the-sectoral-balances-identity)

Rankin, Keith (2011) "Mercantilist Reasoning in Economic Policy Making", paper for the 2011 Conference of the New Zealand Association of Economists, Wellington, 1 July (http://nzae.org.nz/wp-content/uploads/2011/Session5/57_Rankin.pdf)

Rankin, Keith (2014) "Private Sector Financial Balances 1980-2012: Contrasting Experiences of Australasian and Northern European Countries" Paper for Asia Pacific Economic and Business History Conference, Hamilton, New Zealand, 13-15 February (http://apebh2014.files.wordpress.com/2014/02/rankin_balances_hamilton-conference_2014.pdf)

Roche, Cullen (2012) "Jan Hatzius Connects All the Dots" *Pragmatic Capitalism* 13 November (http://pragcap.com/jan-hatzius-connects-all-the-dots)

Scalise, Paul J. (2005) "Richard Koo: The Final Fiscal Solution" review of Koo (2003) in JapanReview.net (http://www.japanreview.net/review_bsr.htm)

Stanford, Jim (2010) "Remembering Wynne Godley" The Progressive Economics Forum (http://www.progressive-economics.ca/2010/05/20/remembering-wynne-godley) [includes comment from Godley's co-author Marc Lavoie]

Schlefer, Jonathan (2013) "Embracing Wynne Godley, an Economist Who Modeled the Crisis", *New York Times* 10 Sept (http://www.nytimes.com/2013/09/11/business/economy/economists-embracing-ideas-of-wynne-godley-late-colleague-who-predicted-recession.html)

Watkins, Thayer (n.d.) "The Bubble Economy of Japan" San José State University Department of Economics (http://www.sjsu.edu/faculty/watkins/bubble.htm)

Weisenthal, Joe (2012a) "Goldman: The Economic Crisis Ends In 2013" *Business Insider* 2 December (http://www.businessinsider.com.au/goldman-the-economic-crisis-ends-in-2013-2012-12)

Weisenthal, Joe (2012b) "Goldman's Top Economist Explains The World's Most Important Chart, And His Big Call For The US Economy" *Business Insider* 11 December (http://www.businessinsider.com.au/goldmans-jan-hatzius-on-sectoral-balances-2012-12)

Wilder, Rebecca (2012) "Japan's Lopsided Financial Balances" *Economonitor*: a Roubini Global Economics Project (http://www.economonitor.com/rebeccawilder/2012/01/22/japans-lopsided-financial-balances/)

Wolf, Martin (2012a) "The balance sheet recession in the US" *Financial Times* 19 July (http://blogs.ft.com/martin-wolf-exchange/2012/07/19/the-balance-sheet-recession-in-the-us)

Wolf, Martin (2012b) "Getting out of debt by adding debt" *Financial Times* 25 July (http://blogs.ft.com/martin-wolf-exchange/2012/07/25/getting-out-of-debt-by-adding-debt)

Wood, Christopher Wood (1992) *The Bubble Economy: Japan's Extraordinary Speculative Boom of the '80's and the Dramatic Bust of the '90'*, The Atlantic Monthly Press

Wong, Clement (2012) "Koo's Keynesian Key to the Balance Sheet Recession" Economics Student Society of Australia, (http://economicstudents.com/2012/08/koos-keynesian-key-to-the-balance-sheet-recession)

Wray, L Randall (2011) "The Growing Government Deficit Actually Means Savings For The Private Sector", *Business Insider* 4 February (http://www.businessinsider.com.au/the-growing-government-deficit-actually-means-savings-for-the-private-sector-2011-2)

Wray, L Randall and Eric Tymoigne (2013) "MMT 101: A Reply to Critics" Working Paper No. 778 Levy Institute (http://www.levyinstitute.org/publications/modern-money-theory-101)

Appendix

Chart A

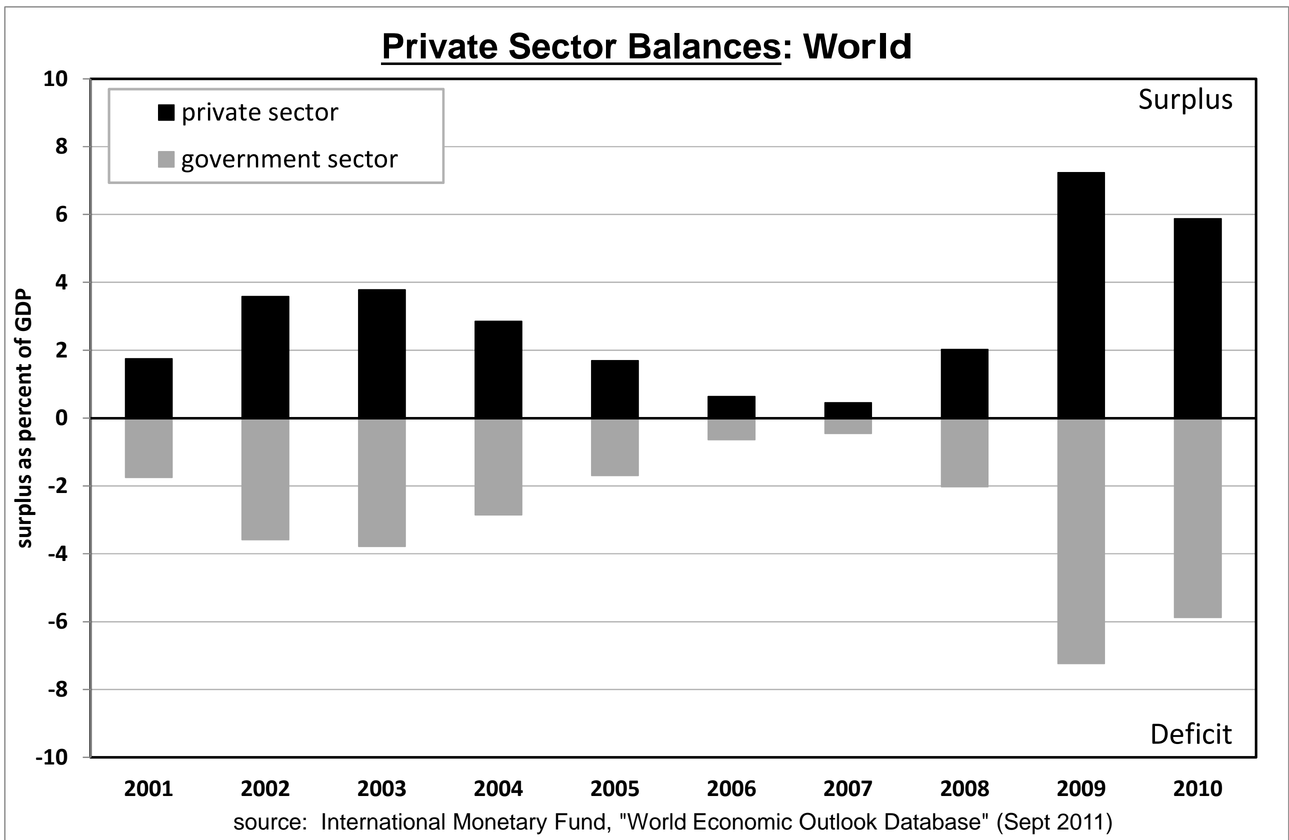

Chart B

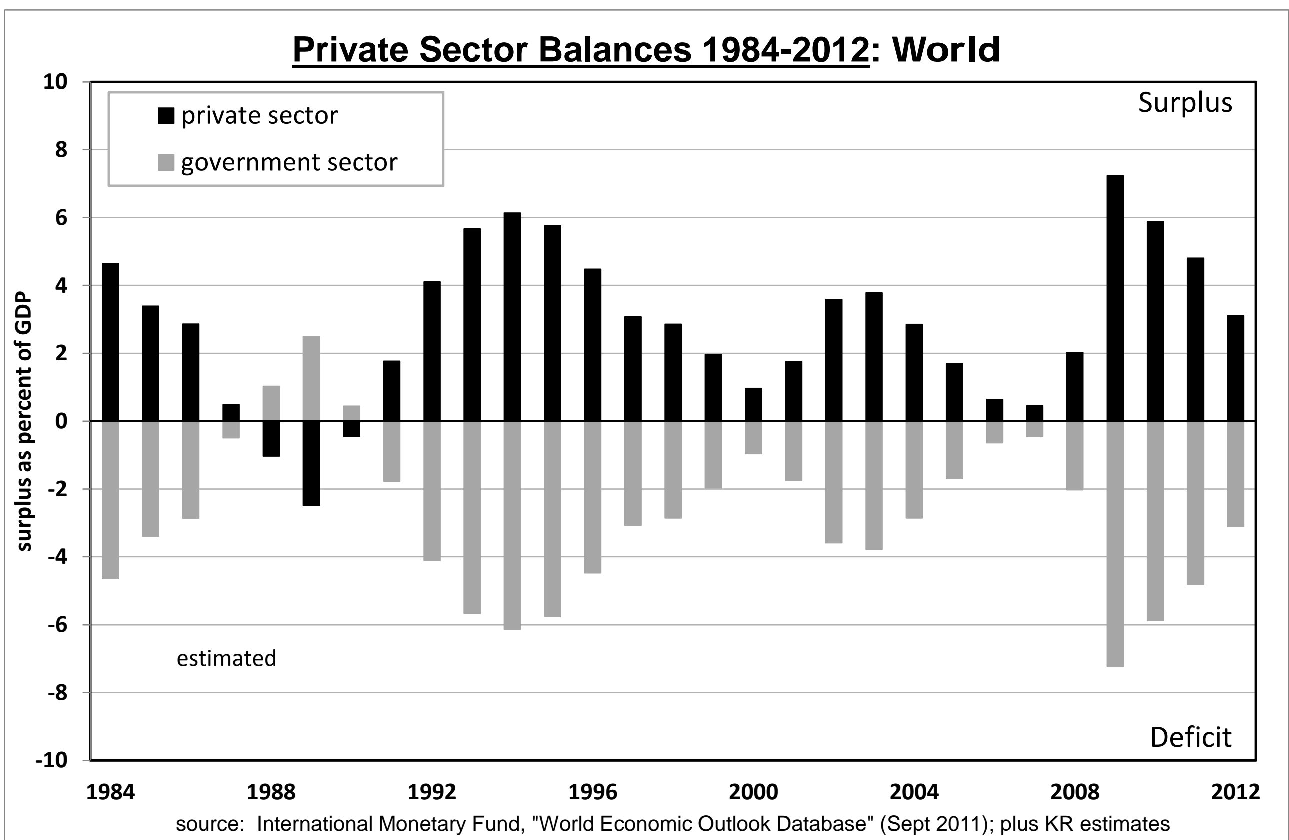

Chart C

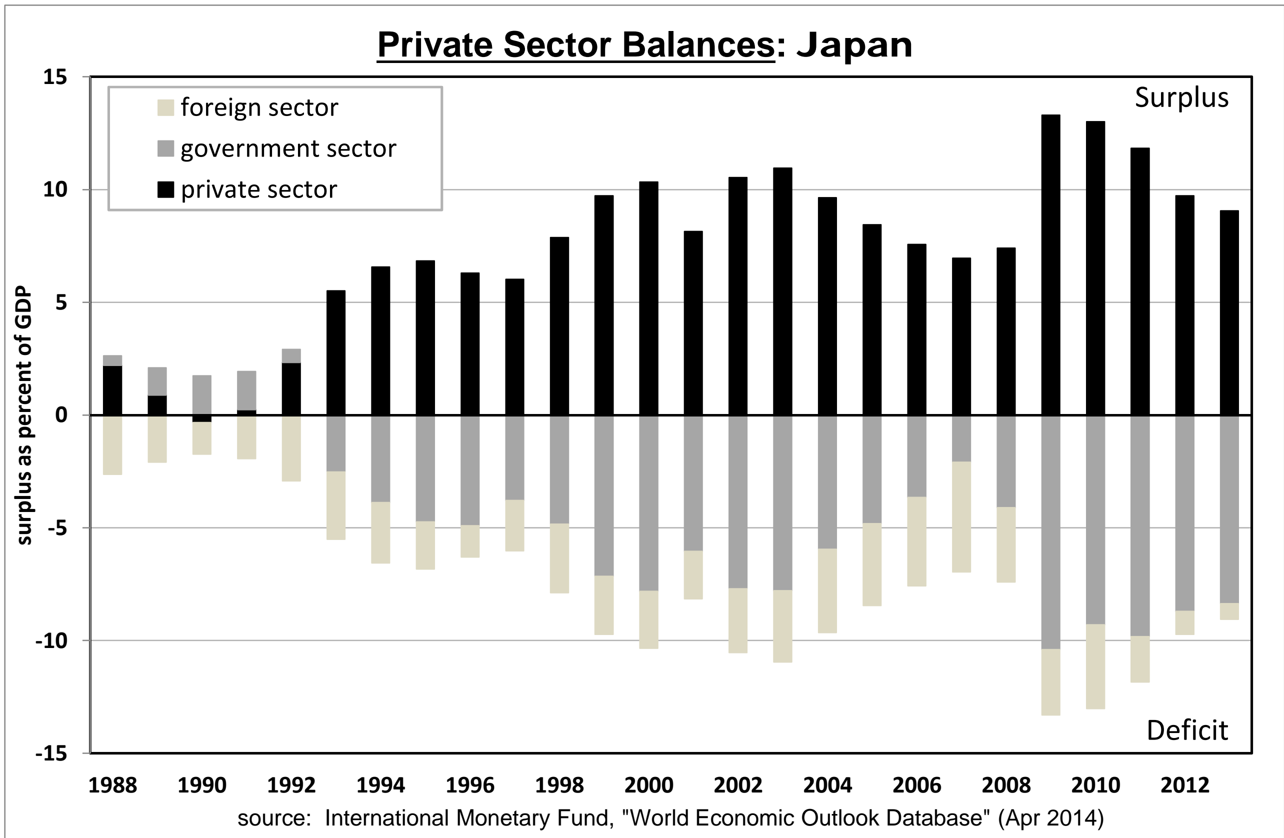

Chart D

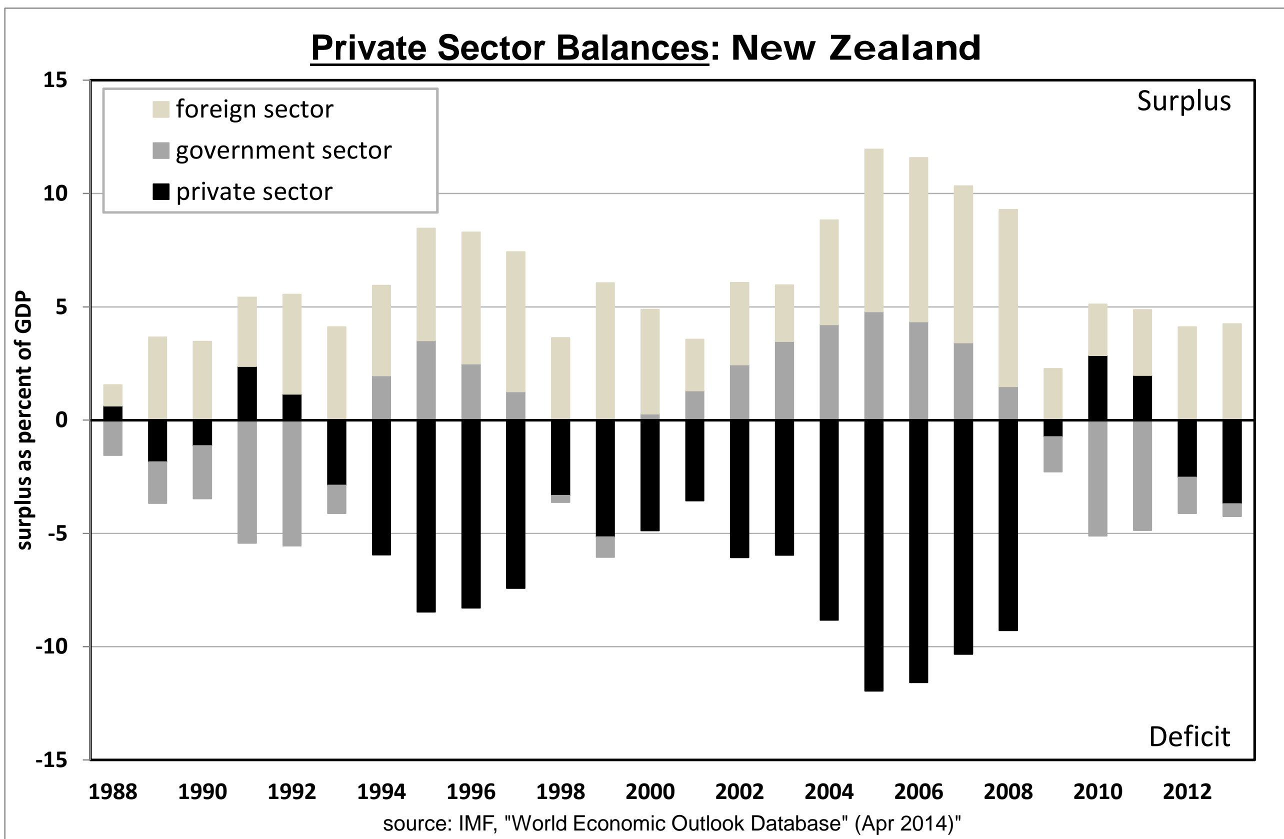

Chart E

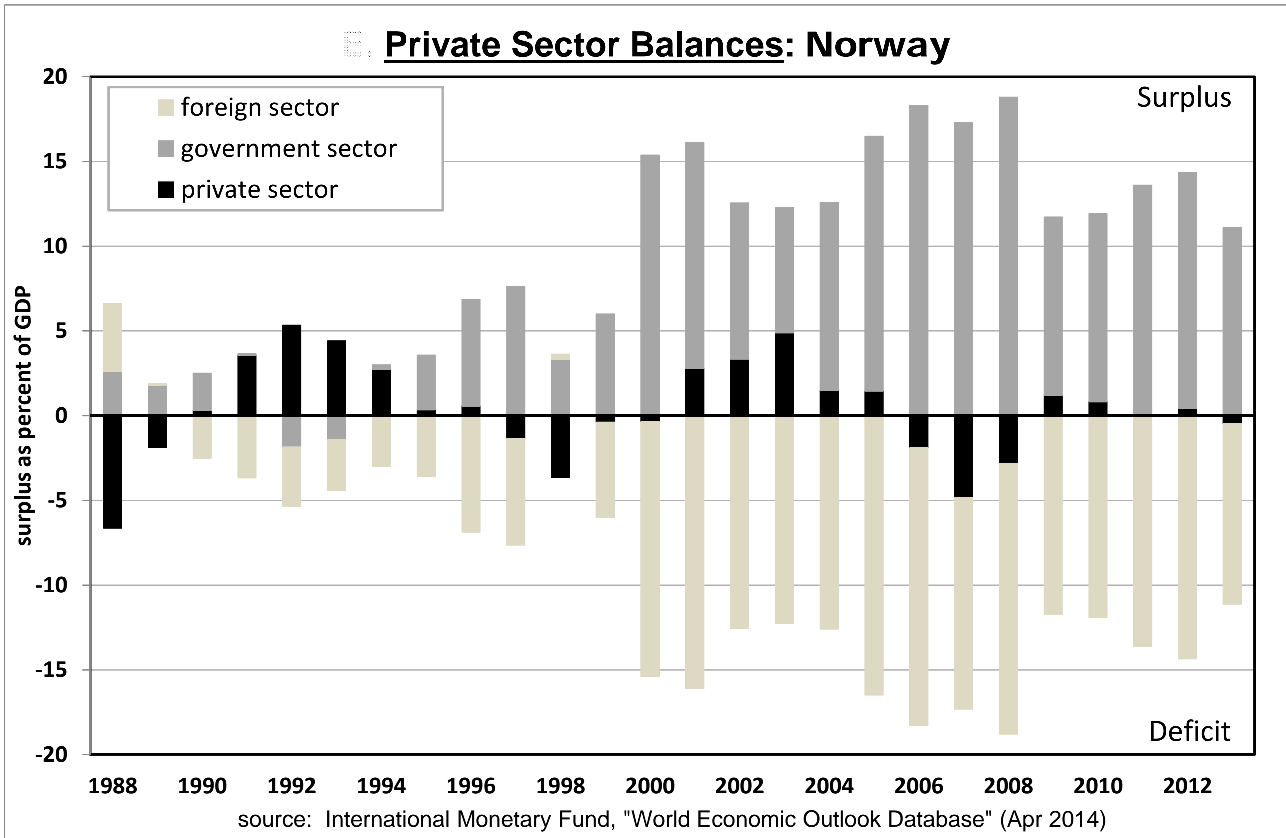

Chart F

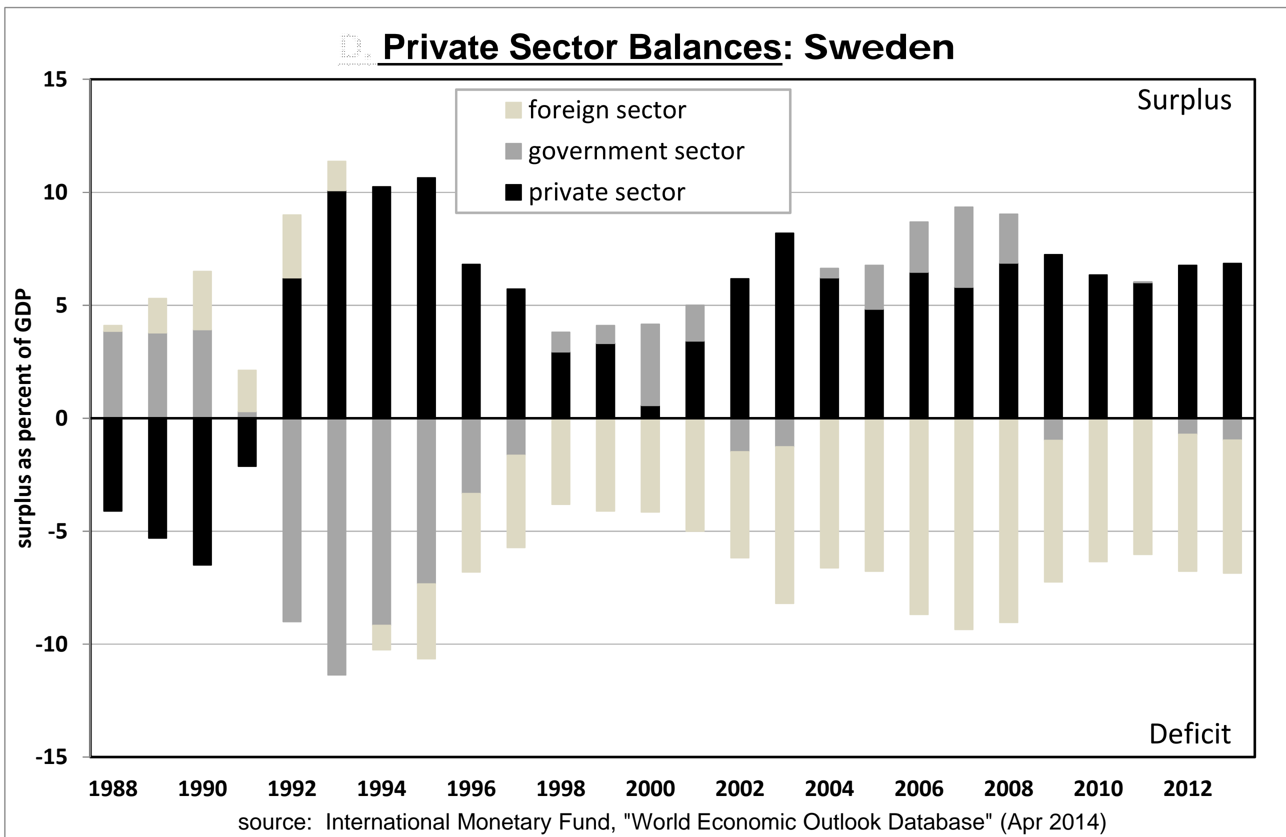

Chart G

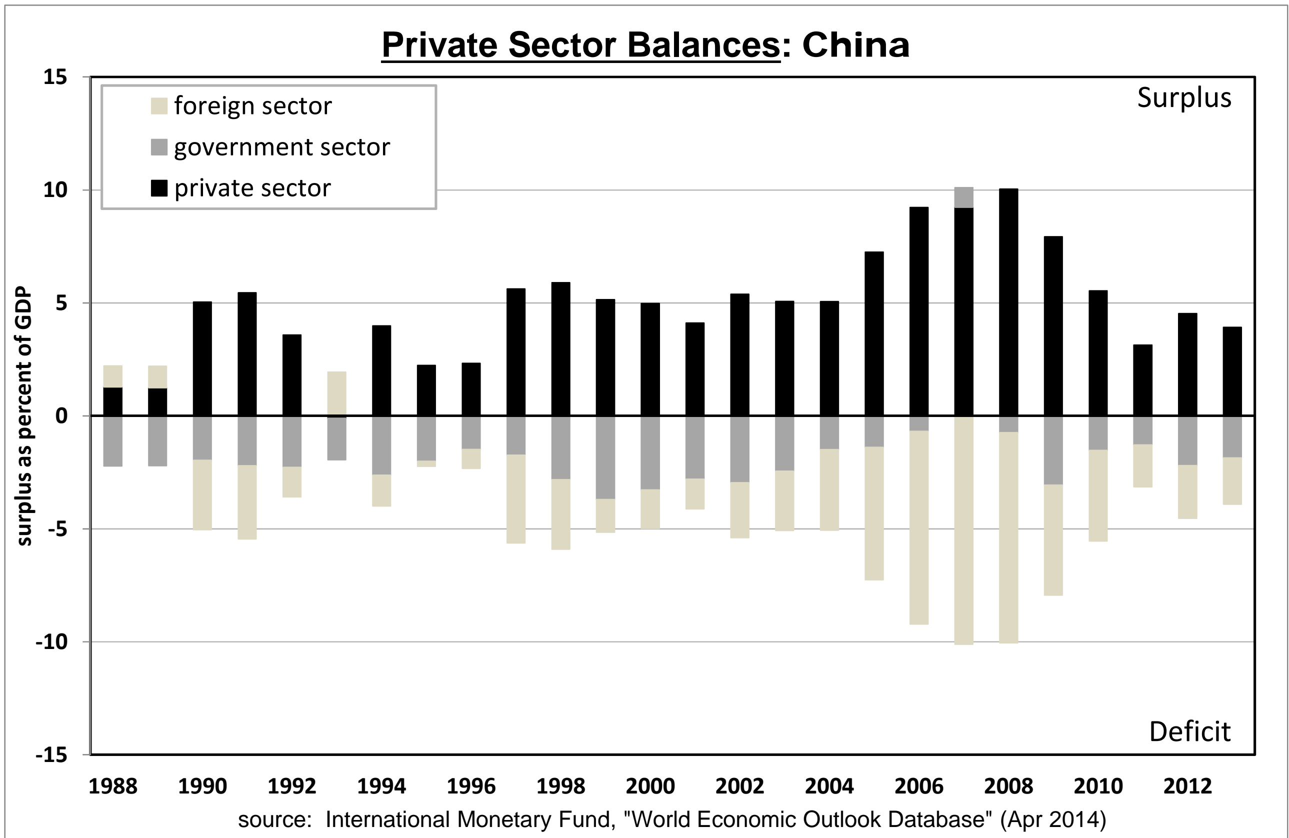

Chart H

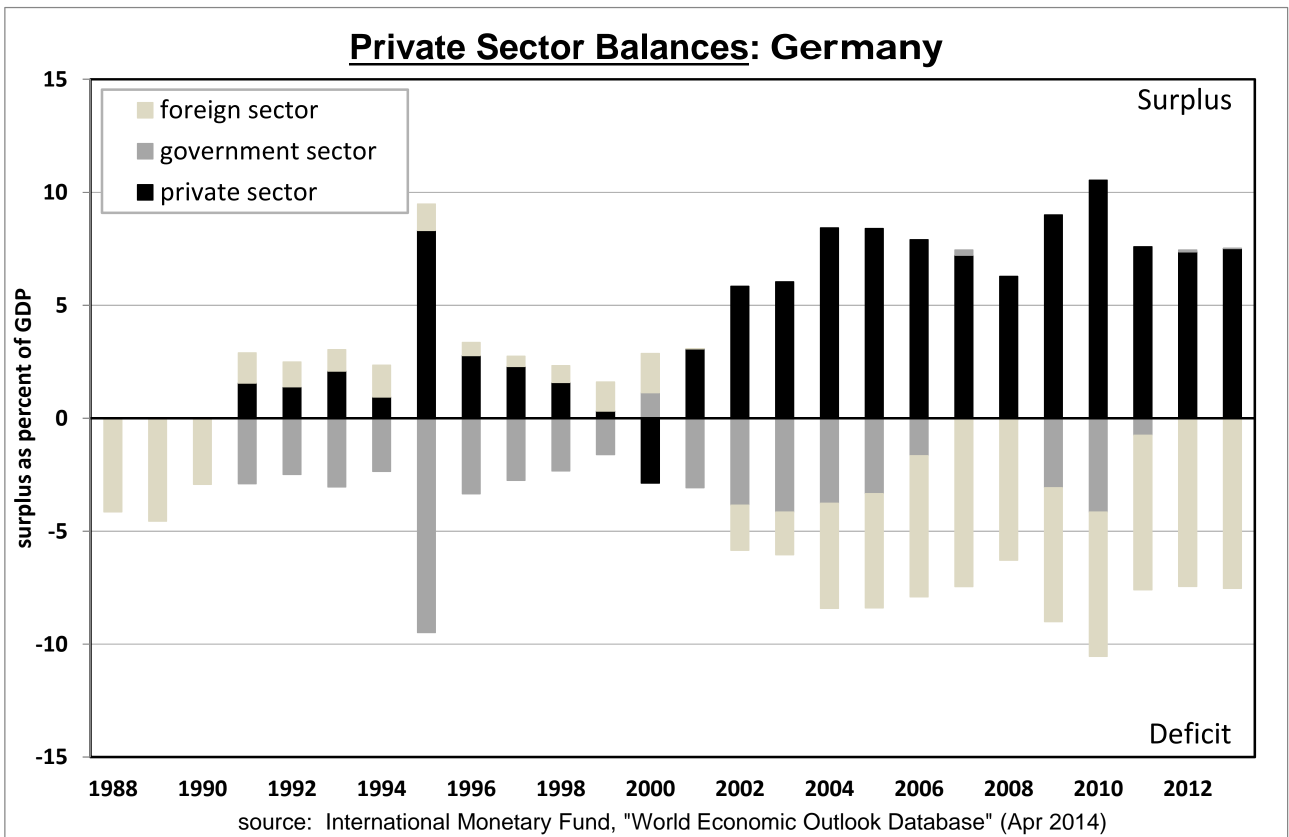

Chart I

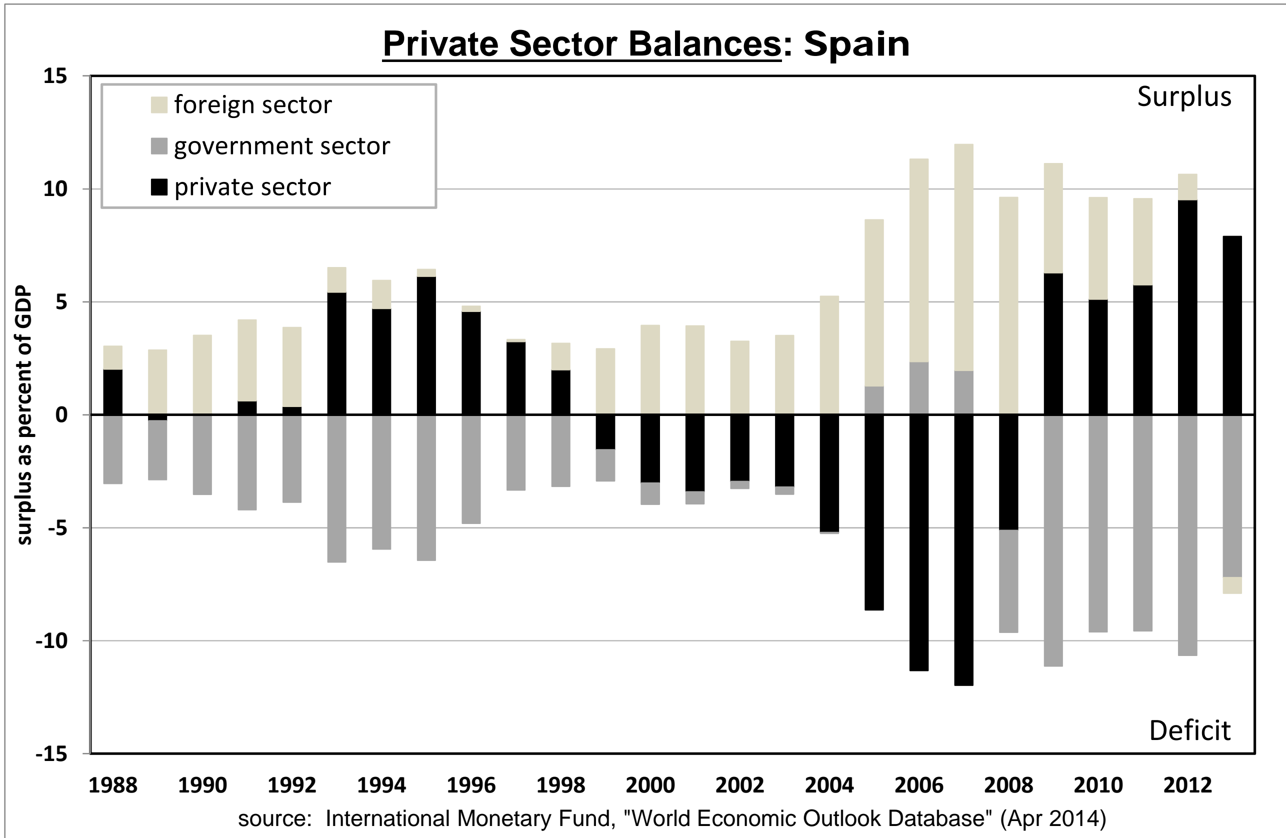

Chart J