"It ain't what you don't know that gets you into trouble.
It's what you know for sure that just ain't so." - Mark Twain

Revisiting three intellectual pillars of monetary policy received wisdom

Speech by Claudio Borio

Head of the BIS Monetary and Economic Department

Luncheon address, Cato Institute

Washington DC, 12 November 2015

It is both a great pleasure and an honour to have been asked to give this luncheon address at the Cato Institute.

The Great Financial Crisis has triggered much soul-searching within the economic profession and the policymaking community. The crisis shattered the notion that price stability would guarantee macroeconomic stability: financial markets are not self-equilibrating, at least at a price that society can afford. And it showed that prudential frameworks focused on individual institutions viewed on a standalone basis were inadequate: a more systemic perspective was needed to avoid missing the wood for the trees. Hence the welcome trend of putting in place macroprudential frameworks. But has this soul-searching gone far enough?

Today I shall argue that it has not. More specifically, I would like to revisit and question three deeply held beliefs that underpin current monetary policy received wisdom. The first belief is that it is appropriate to define equilibrium (or natural) rates as those consistent with output at potential and with stable prices (inflation) in any given period – the so-called "Wicksellian" natural rate. The second is that it is appropriate to think of money (monetary policy) as neutral, ie as having no impact on real outcomes, over medium- to long-term horizons relevant for policy – 10–20 years or so, if not longer. The third is that it is appropriate to set policy on the presumption that deflations are always very costly, sometimes even to regard them as a kind of red line that, once crossed, heralds the abyss.

Based on these considerations, I shall then draw two conclusions. I shall argue that the received interpretation of the well known trend decline in real interest rates – as embodied, for example, in the "saving glut" (Bernanke (2005)) and "secular stagnation" (Summers (2014)) hypotheses – is not fully satisfactory. Instead, I shall provide a different – best regarded as complementary – interpretation, which stresses that the decline is, at least in part, a disequilibrium phenomenon, ie one that is not consistent with lasting financial, macroeconomic and monetary stability. I shall then suggest that we need to make adjustments to current monetary policy frameworks in order to have monetary policy play a more active role in preventing systemic financial instability and hence in containing its huge macroeconomic costs. This would call for a more symmetrical policy during financial booms and busts – financial cycles. It would mean leaning more deliberately against financial booms and easing less aggressively and, above all, persistently during financial busts.

Let me discuss each of these five points in turn. Given the time available, I will necessarily have to be quite brief. But these themes have been developed in more detail in the two latest BIS Annual Reports (BIS (2014, 2015)) and in BIS research carried out over the years, on which I will be drawing heavily.

I – Equilibrium (natural) rates revisited

First, a few facts. Interest rates, short and long, in nominal and inflation-adjusted (real) terms, have been exceptionally low for unusually long, regardless of benchmarks. In both nominal and real terms, policy rates are even lower than at the peak of the Great Financial Crisis. In real terms, they have now been negative for even longer than during the Great Inflation of the 1970s (Graph 1, left-hand panel). Turning next to long-term rates, it is well known that in real terms they have followed a long-term downward trend – a point to which I will return. But between December 2014 and end-May 2015, on average no less than around $2 trillion worth of long-term sovereign debt, much of it issued by euro area sovereigns, was trading at *negative* yields. At their trough, French, German and Swiss sovereign yields were negative out to a respective five, nine and 15 years (Graph 1, right-hand panel). While they have ticked up since then, such negative nominal rates are unprecedented. And all this has been happening even as global growth has not been far away from historical averages, so that the wedge between growth and interest rates has been unusually broad.

How should we think of these market rates and of their relationship to equilibrium ones?

Both the received perspective and the one offered here agree that market interest rates are determined by a combination of central banks' and market participants' actions. Central banks set the nominal short-term rate and, for a given outstanding stock, they influence the nominal long-term rate through their signals of future policy rates and their asset purchases. Market participants, in turn, adjust their portfolios based on their expectations of central bank policy, their views about the other factors driving long-term rates, their attitude towards risk and various balance sheet constraints. Given nominal interest rates, actual inflation determines ex post real rates and expected inflation determines ex ante real rates. So far, so good.

But how can we tell whether market rates are at their equilibrium level from a macroeconomic perspective, ie consistent with sustainable good economic performance? The answer is that if they stay at the wrong level for long enough, something "bad" will happen, leading to an eventual correction. It is in this sense that many economists say that the influence of central banks on short-term real rates is only transitory.

But what is that something "bad"? Here the two perspectives differ. In the received perspective, it is the behaviour of inflation that provides the key signal. If there is excess capacity, inflation will fall; if there is overheating, it will rise. This corresponds to what is often also called the "Wicksellian" natural rate, ie the rate that equates aggregate demand and supply at full employment (or, equivalently, the rate that prevails when actual output equals potential output).

The perspective developed here suggests that this view is too narrow. Another possible key signal is the build-up of financial imbalances, which typically take the form of strong increases in credit, asset prices and risk-taking. Historically, these have been the main cause of episodes of systemic financial crises with huge economic costs. Think, for instance, of Japan and the Nordic countries in the late 1980s; Asia in the mid-1990s; and the United States ahead of the Great Financial Crisis or, going back in time, ahead of the Great Depression (eg Eichengreen and Mitchener (2003)).

The reasoning is straightforward. Acknowledge – as indeed some of the proponents of the received view have – that low interest rates are a factor in fuelling financial booms and busts. After all, intuitively, it is hard to argue that they are not, given that monetary policy operates by influencing credit

intuitively, it is hard to argue that they are not, given that monetary policy operates by influencing credit expansion, asset prices and risk-taking. Acknowledge further that financial booms and busts cause huge and lasting economic damage – in fact, no one denies this, given the large amount of empirical evidence (see below). Then it follows that if we think of an equilibrium rate more broadly as one consistent with sustainable good economic performance, rates cannot be at their equilibrium level if they are inconsistent with financial stability.

This is partly an issue of the time frame envisaged for the disequilibria to cause damage. In the received view, it is relatively short, as the focus is on output deviations from potential at business cycle frequencies. In the view proposed here, it is longer, as the focus is on the potentially larger output fluctuations at financial cycle frequencies. As traditionally measured, the duration of the business cycle is up to eight years; by contrast, the duration of financial cycles since the early 1980s has been 16–20 years (red and blue lines, respectively, in Graph 2) (Drehmann et al (2012)).[1]

It is not uncommon to hear supporters of the "saving glut" and "secular stagnation" hypotheses say that the equilibrium or natural rate is very low, even negative, and that this rate generates financial instability.[2] Seen from this angle, such a statement is somewhat misleading. It is more a reflection of the incompleteness of the analytical frameworks used to define and measure the natural rate concept – frameworks that do not incorporate financial instability – than a reflection of an inherent tension between natural rates and financial stability. There is a need to go beyond the full employment-inflation paradigm to fully characterise economic equilibrium.

What I have said applies just as much to the short-term rate, which the central bank sets, as to long-term rates. For there is no guarantee that the combination of central banks' and market participants' decisions will guide long-term rates towards equilibrium. Just like any other asset price, long-term rates may be misaligned for very long periods, except that their misalignments have more pervasive effects.

Importantly, the point about how to think of equilibrium rates is not purely semantic. It has first-order implications for monetary policy, since we all agree that the central bank's task is precisely to set the policy rate so as to track the natural or equilibrium rate. I will come back to this point.

II – Monetary neutrality revisited

Let me now turn to the second pillar of received wisdom: the notion of money (monetary policy) neutrality. The previous analysis already suggests that this notion is problematic. The reason is that there is a large body of evidence indicating that the costs of financial (banking) crises are very long-lasting, if not permanent: growth may return to its pre-crisis long-term trend, but output remains below its pre-crisis long-term trend (BCBS (2010), Ball (2014)).[3] Thus, as long as one acknowledges that monetary

---

[1] For a novel empirical analysis that digs deeper into the dynamics of financial cycles and assigns a key role to interest rates, see Drehmann and Juselius (2015). The analysis does a remarkably good job of tracing, out of sample, the behaviour of US output around the Great Recession.

[2] For an in-depth analysis along these lines, see eg Bean et al (2015). In contrast to others, however, these authors do see monetary policy playing a role in leaning against financial imbalances in order to limit the risk of financial instability.

[3] The studies reviewed in BCBS (2010) that allow for the possibility of permanent effects point to a loss equivalent to some 6% of GDP on average. Reviewing the experience with the recent crisis, Ball (2014) estimates a permanent decline in potential output of over 8% among OECD countries.

policy can fuel financial booms and their subsequent bust, it is logically dubious to argue that it is neutral.

More recent evidence uncovered by BIS research confirms this point and sheds further light on it. It does so by investigating the mechanisms through which financial booms and busts cause so much lasting damage. The work shifts attention from the demand side of the equation, which is where the literature has gone (eg Reinhart and Reinhart (2010), Rogoff (2015), Drehmann and Juselius (2015)), to the supply side, which is just as important (eg Cecchetti and Kharroubi (2015)). It is well known that financial busts weaken demand as the interplay of asset prices falls and overindebtedness causes havoc in balance sheets. But what about the neglected nexus between financial booms and busts, resource misallocations and productivity?

By examining 22 advanced economies over the period 1980–2010, our research produces three findings (Borio et al (2015b)). First, financial booms tend to undermine productivity growth as they occur (Graph 3). For a typical credit boom, over ⅓ of a percentage point per year is a kind of lower bound. Second, a good chunk of this, almost ¾, reflects the shift of factors of production (labour) to lower productivity growth sectors. Think, for instance, of shifts into temporarily bloated construction and financial sectors. The rest is the impact on productivity that is common across sectors, such as the shared component of aggregate capital accumulation and total factor productivity. Third, the impact of the misallocations that occur *during a boom* is much larger if a crisis follows. The average loss per year in the five years after a crisis is more than twice that during a boom, around 0.7 percentage points per year. Taking, say, a five-year boom and five post-crisis years together, the cumulative impact would amount to a loss of some 6 percentage points. Put differently, for the period 2008–13, we are talking about a loss of some 0.6 percentage points per year for the advanced countries that saw booms and crises. This is roughly equal to their actual average productivity growth during the same window. Now, the point is not to take these figures at face value, but to note that these factors are material and should receive much more attention. The length of the periods and orders of magnitude involved are definitely large enough to cast doubt on the notion of monetary policy neutrality.

In addition to the implication for the notion of neutrality, the role of misallocations highlights three further points.

First, it is worth broadening the mechanisms behind "hysteresis" to include those that work through resource misallocations linked to financial booms and busts. The allocation of credit, over and above its overall amount, deserves much greater attention.

Second, the well known limitations of expansionary monetary policy in tackling busts appear in a new light. It is not just that agents wish to deleverage and the transmission through banks is broken; easy monetary policy cannot undo the resource misallocations.[4] For instance, it cannot, and should not, bring back to life idle cranes when there is oversupply of buildings. In other words, not all output gaps are born equal, amenable to the same remedies. During financial busts, after the financial system has been stabilised (crisis management), removing the obstacles that hold back growth is key. This means first and foremost facilitating balance sheet repair and implementing structural reforms (Borio et al (2010), Borio (2014a), BIS (2014, 2015)).

Finally, there is a need for macro models to go beyond the "one good" standard benchmark. To be sure, a number of models do, and the time-honoured distinction between tradables and non-tradables is the best known example. But the workhorse models that underlie policy are, in effect, one-

[4] For these reasons, post-financial boom recessions are best regarded as "balance sheet recessions". The term was probably coined by Koo (2003). While the spirit is similar, in BIS work we have embedded it in a somewhat different analysis, which does not imply the same policy conclusions, especially with regard to fiscal policy (eg Borio (2014a), BIS (2014, 2015)).

good models. Unless we overcome this drawback, there is a risk of throwing out the baby with the bathwater.

III – The costs of deflation revisited

Let me now turn to the third notion I wish to question – what might be called the deflation "bogeyman" (Rajan (2015)). Is deflation always and everywhere very costly for output? This is indeed the premise that seems to have underlain monetary policy for quite some time now.

In fact, if one looks at the evidence carefully, the notion does not seem to hold water. Empirical work, some of it carried out at the BIS, had already reached this conclusion pre-crisis, leading to the distinction between "good" and "bad" deflations (eg Bordo and Redish (2004), Borio and Filardo (2004), Atkeson and Kehoe (2004), Bordo and Filardo (2005)). A more comprehensive and systematic study we carried out this year has confirmed and extended this conclusion (Borio et al (2015a)).

What did we do? We used a newly constructed data set that spans more than 140 years (1870–2013), covers up to 38 economies and includes equity and house prices as well as debt, although still not for all countries in all periods. We then apply a variety of statistical techniques to examine across monetary regimes the link between deflation and (per capita) output growth and the relative impact of deflation and asset price declines. We consider both transitory and, even more importantly, persistent deflations.

We reach three basic conclusions. First, before controlling for the behaviour of asset prices, we find only a weak association between deflation and growth; the Great Depression is the main exception (Graph 4). Second, we find a stronger link with asset price declines, and controlling for them further weakens the link between deflations and growth. In fact, the link disappears even in the Great Depression (Graph 5). Finally, we find no evidence of a damaging interplay between deflation and debt (Fisher's "debt deflation"; Fisher (1933)). By contrast, we do find evidence of a damaging interplay between private sector debt and property (house) prices, especially in the postwar period.

Some might argue that the recent Japanese experience contradicts this, but in fact it does not. The key is to adjust for demographics (growth per working age population), which cloud analyses based on headline growth figures and which are clearly exogenous. On this basis, Japan did very badly in the 1990s, when deflation had not yet set in but asset prices were collapsing following the outsize financial boom in the 1980s. And it did comparatively well in the 2000s, once the banking system got fixed and deflation set in, raising real interest rates as policy rates got stuck at the zero lower bound. While, on a per capita basis, average growth was roughly similar at some 0.8–0.9% in 1991–2000 and 2000–13, it rose from 1.0% to 1.6% on a per working age population basis. A comparison with the United States is quite telling. Between 2000 and 2013, cumulative growth per working age population exceeded 20% in Japan, compared with roughly 11% in the United States. This picture does not change if one excludes the Great Financial Crisis. Japan lost one decade, in the 1990s, not two.

How should we interpret these results? To my mind, they are consistent with the distinction between supply-driven and demand-driven deflations: the former depress prices while boosting output (ie they may be regarded as "good"); the latter coincide with both price declines and weak output (and hence may be regarded as "bad"). The results are also consistent with the different size and nature of the falls in the price level and asset prices: the former are typically smaller and essentially redistributional; the latter are typically much larger and are normally perceived as non-distributional.

From this viewpoint, there are grounds to believe that a sizeable chunk of the secular disinflationary forces since the 1990s have been of the good variety. They may well reflect the globalisation of the real economy as well as, possibly, technological innovation. The integration of China

and former communist countries into the global economy has surely been critical. It has made labour and goods markets much more contestable, eroding producers' pricing power and labour's bargaining power as well as reducing the risk of upward wage-price spirals. BIS research has found evidence to that effect. It has uncovered a larger role played by global factors at the expense of domestic ones in driving both wages and prices (Borio and Filardo (2007), BIS (2014)).[5]

This analysis hints at some broader policy conclusions. It suggests that it may be worth rebalancing the policy focus, away from exclusive attention to deflation threats and towards financial cycle threats.

IV – Reinterpreting the long-term decline in real interest rates

Consider next the implications of the analysis for how to interpret the long-term decline in real interest rates (Graph 6). The analysis helps provide a complementary interpretation to the received one. It suggests that the decline is not just an equilibrium phenomenon but, in part, a disequilibrium one.

In the received view, central banks and market participants have been pushing short- and long-term real interest rates towards their equilibrium, Wicksellian level. In turn, this natural rate is determined by deep exogenous forces, such as technology, demographics and income distribution. A common narrative is that these have led to a structural, or at least long-lasting, deficiency in aggregate demand.

In the view offered here, the long-term decline reflects in part asymmetrical monetary policy over successive financial and business cycles. Global disinflationary forces, in the wake of the globalisation of the real economy and technological innovations, have kept a lid on inflation. Monetary policy has failed to lean against unsustainable financial booms. The booms and, in particular, subsequent busts have caused long-term economic damage. Policy has responded very aggressively and, above all, persistently to the bust, sowing the seeds of the next problem. Over time, this has imparted a downward bias to interest rates and an upward one to debt, as indicated by the steady rise in total debt-to-GDP ratios (Graph 6).

This can contribute to a kind of "debt trap" (Borio and Disyatat (2014), BIS (2014)). Over time, policy runs out of ammunition. And it becomes harder to raise rates without causing economic damage, owing to large debts and the distortions generated in the real economy. It is as if the whole economic system adjusted to such low rates and became less tolerant of higher ones, at least without some transitional pain. This process gives rise to a new, insidious form of "time inconsistency", whereby policy steps may appear reasonable when taken in isolation but, as a sequence, lead policy astray.

The bottom line is that, over sufficiently long horizons, low interest rates become to some extent self-validating. Too low rates in the past are one reason – not the only reason! – for such low rates today. In other words, policy rates are not simply passively reflecting some deep exogenous forces; they are also helping to shape the economic environment policymakers take as given ("exogenous") when tomorrow becomes today.

Here the international monetary and financial system plays a key role (Borio (2014b), BIS (2015)). For successive crises need not occur in the same country, although sometimes they have. Low rates in countries that are fighting a financial bust may induce problems elsewhere. Policymakers in the

[5] That said, there is no consensus on this point. While some empirical studies have reached similar conclusions (eg Bianchi and Civelli (2013), Ciccarelli and Mojon (2010), Eickmeier and Moll (2009)), others have not (eg Ihrig et al (2010) and Martínez-García and Wynne (2012)).

struggling economies try very hard to stimulate demand but get little traction through domestic channels, for the reasons mentioned before. As a result, exchange rate depreciation becomes the key transmission mechanism. This induces unwelcome exchange rate appreciation in countries that may also be in a bust or at different points in their financial cycle. Appreciation pressure is resisted by keeping interest rates lower than otherwise and/or by intervening in the exchange rate market (Rajan (2014)). Thus, easing begets easing.[6]

This helps explain a couple of developments taking place before our very eyes. It is a reason why policy rates appear unusually low for the world as a whole regardless of benchmarks: Graph 7 illustrates this point with the help of a range of Taylor rules (eg Hofmann and Bogdanova (2012)). And it is also a reason why for quite some time now we have been seeing signs of the build-up of dangerous financial imbalances in countries less affected by the crisis, especially emerging market economies (EMEs) (including very large ones), but also in some advanced economies less affected by the crisis (BIS (2014, 2015)). Commodity exporters have been very prominent here, in the wake of the exceptionally strong commodity price booms. Recently, these financial booms have matured and begun to turn. If serious financial strains did materialise, spillbacks to the rest of the world could spread weakness across the globe: the heft of EMEs has greatly increased over the last couple of decades, from around one third to almost half of world GDP.

V – Adjusting monetary policy frameworks

This analysis suggests that it would be important to adjust monetary policy frameworks to take financial booms and busts systematically into account (Borio (2014c), BIS (2014, 2015)).

This amounts to putting in place more symmetrical policies across financial booms and busts. It means leaning more deliberately against financial booms even if near-term inflation stays low and stable or may be below numerical objectives, and easing less aggressively and, above all, persistently during financial busts, recognising the limitations of monetary policy following the crisis management phase. Taken together, these adjustments should help reduce the risk of a persistent easing bias that can lead to a progressive loss of policy room for manoeuvre over time and entrench instability and chronic weakness in the global economy.

Three common objections have been levelled against such adjustments. While they are well founded, I believe none of them is a show-stopper.[7]

The first is that is hard to identify financial imbalances as they develop. This is true, but a whole apparatus is now in place to do precisely that in the context of macroprudential frameworks. There is a certain tension, to say the least, in arguing that macroprudential policies should be actively used while highlighting measurement difficulties for monetary policy. Moreover, it is not sufficiently acknowledged that traditional monetary policy benchmarks are also very hard to measure: think of output gaps, non-accelerating inflation rates of unemployment (NAIRUs) or natural interest rates, just to name a few. This is precisely why the behaviour of inflation ends up being the real deciding factor when measuring them

[6] Quite apart from policy responses to spillovers, there are several mechanisms through which the international monetary and financial system can amplify financial booms and busts, including the outsize reach of international currencies and the ebbs and flows of global liquidity. For a fuller discussion, see Borio (2014b) and BIS (2015). For specific aspects, see also Borio and Disyatat (2011), Shin (2012, 2013), Rey (2013) and McCauley et al (2015).

[7] For a recent analysis that reviews the literature and reaches more sceptical conclusions about the role of monetary policy, see IMF (2015)). See also G30 (2015) for a less sceptical view.

– the practice that proved so dangerous pre-crisis. In fact, BIS research has found that financial cycle information – credit and property price growth – can assist in obtaining a better measure of potential output in real time (Graph 8), helping to overcome the deficiencies of traditional approaches. Our failure to recognise the limitations of traditional monetary yardsticks is probably more a reflection of our familiarity with them than of their inherent properties. Familiarity breeds complacency.

The second objection is that it is better to rely on macroprudential policy and leave monetary policy to focus on inflation – a sort of "separation principle". To my mind, this would be too imprudent (Borio (2014d)). Even where they have been activated vigorously, macroprudential measures have not prevented the emergence of the usual signs of financial imbalances, such as in EMEs. And as a means of reining in financial booms, as opposed to building resilience, macroprudential tools operate in a similar way to monetary policy: they restrain credit expansion, asset price increases and risk-taking (eg Borio and Zhu (2014), Bruno and Shin (2014)). To be sure, they can be more targeted. And they can help relieve pressure on currency appreciation, which may in turn fuel risk-taking where foreign currency borrowing is widespread (Borio et al (2011), Bruno and Shin (2014), Bruno et al (2015)). Even so, there is a certain tension in pressing on the accelerator and brake at the same time, such as when loosening monetary policy while seeking to offset its impact on financial instability through macroprudential measures.

The third objection is that the proposed adjustments are not consistent with inflation objectives. They require too much tolerance for persistent deviations of inflation from targets. This, in turn, could undermine credibility to secure price stability. No doubt, the adjustments pose serious communication challenges: they should not be underestimated.

Still, two responses are possible.

For one, it is not clear that central banks have exploited all the flexibility that current frameworks allow. Even when numerical targets are in place, the frameworks often make it explicit that the permitted persistence of deviations depends on factors driving inflation away from targets. The reluctance to use the flexibility available reflects perceived trade-offs and hence costs and benefits. These could change if, for instance, views about the effectiveness of macroprudential tools and the costs of deflation evolved, possibly under the force of events. Time will tell.

In addition, if mandates are seen as overly constraining the room for manoeuvre, revisiting them should not be taboo. After all, mandates are a means to an end. That said, the analytical lens through which one perceives how the economy works matters more than mandates. It is easy to see how adding an explicit financial stability objective could sometimes make matters worse. For instance, even if inflation is rising briskly, it could be taken as a reason not to tighten policy in order to avoid short-term damage to a weak banking system: such a response would be myopic. Given where we are, the priority is to use the existing room for manoeuvre to the full; revisiting mandates should be a last resort.

Conclusion

There are good reasons to question three deeply held beliefs underpinning monetary policy received wisdom.

First, defining equilibrium (or natural) rates purely in terms of the equality of actual and potential output and price stability in any given period is too narrow an approach. An equilibrium rate should also be consistent with *sustainable* financial and macroeconomic stability – two sides of the same coin. Here, I highlighted the role of financial booms and busts, or financial cycles.

Second, money (monetary policy) is not neutral over medium- to long-term horizons relevant for policy – 10–20 years or so, if not longer. This is precisely because it contributes to financial booms

and busts, which give rise to long-lasting, if not permanent, economic costs. Here I highlighted the neglected impact of resource misallocations on productivity growth.

Finally, deflations are not always costly in terms of output. The evidence indicates that the link comes largely from the Great Depression and, even then, it disappears if one controls for asset price declines. Here I highlighted the costs of asset price, especially property price, declines and the distinction between supply-driven and demand-driven deflations.

From this, I drew two conclusions.

The long-term decline in *real* interest rates since at least the 1990s may well be, in part, a disequilibrium phenomenon, not consistent with lasting financial, macroeconomic and monetary stability. Here I highlighted the asymmetrical monetary policy response to financial booms and busts, which induces an easing bias over time.

There is a need to adjust monetary policy frameworks to take financial booms and busts systematically into account. This, in turn, would avoid that easing bias and the risk of a debt trap. Here I highlighted that it is imprudent to rely exclusively on macroprudential measures to constrain the build-up of financial imbalances. Macroprudential policy must be part of the answer, but it cannot be the whole answer.

I am, of course, fully aware that questioning deep-seated beliefs is a risky business. I do not pretend to have all the answers. But I do believe it is essential to explore these beliefs critically and to have a proper debate. The stakes for the economic profession and the global economy are simply too high. And, as Mark Twain once famously said: "It ain't what you don't know that gets you into trouble. It's what you know for sure that just ain't so."

References

Atkeson, A and P Kehoe (2004): "Deflation and depression: is there an empirical link?", *American Economic Review*, vol 94(2), May, pp 99–103.

Ball, L (2014): "Long-term damage from the Great Recession in OECD countries", *European Journal of Economics and Economic Policies*, vol 11(2), pp 149–60.

Bank for International Settlements (2014): *84th Annual Report*, June.

——— (2015): *85th Annual Report*, June.

Basel Committee on Banking Supervision (2010): *An assessment of the long-term economic impact of stronger capital and liquidity requirements*, July.

Bean, C, C Broda, T Ito and R Kroszner (2015): "Low for long? Causes and consequences of persistently low interest rates", *Geneva Reports on the World Economy*, 17, International Center for Monetary and Banking Studies, CEPR Press.

Bernanke, B (2005): "The global saving glut and the US current account deficit", Sandridge Lecture, Richmond, 10 March.

Bianchi, F and A Civelli (2013): "Globalization and inflation: structural evidence from a time-varying VAR approach", *Economic Research Initiatives at Duke (ERID) Working Papers*, no 157, July.

Bordo, M and A Filardo (2005): "Deflation and monetary policy in a historical perspective: remembering the past or being condemned to repeat it?", *Economic Policy*, vol 20(44), October, pp 799–844.

Bordo, M and A Redish (2004): "Is deflation depressing: evidence from the Classical Gold Standard", in R Burdekin and P Siklos (eds), *Deflation: current and historical perspectives*, Cambridge University Press.

Borio, C (2014a): "The financial cycle and macroeconomics: what have we learnt?", *Journal of Banking & Finance*, vol 45, pp 182–98, August. Also available as *BIS Working Papers*, no 395, December 2012.

——— (2014b): "The international monetary and financial system: its Achilles heel and what to do about it", *BIS Working Papers*, no 456, August.

——— (2014c): "Monetary policy and financial stability: what role in prevention and recovery?", *Capitalism and Society*, vol 9(2), article 1. Also available as *BIS Working Papers*, no 440, January 2014.

——— (2014d): "Macroprudential frameworks: (too) great expectations?", *Central Banking Journal*, 25th Anniversary issue, August. Also available in BIS Speeches.

Borio, C and P Disyatat (2011): "Global imbalances and the financial crisis: link or no link?", *BIS Working Papers*, no 346, May. Revised and extended version of "Global imbalances and the financial crisis: reassessing the role of international finance", *Asian Economic Policy Review*, 5, 2010, pp 198–216.

——— (2014): "Low interest rates and secular stagnation: is debt a missing link?", article on VoxEU.org, 25 June, www.voxeu.org/article/low-interest-rates-secular-stagnation-and-debt.

Borio, C, P Disyatat and M Juselius (2013): "Rethinking potential output: embedding information about the financial cycle", *BIS Working Papers*, no 404, February.

Borio, C and A Filardo (2004): "Looking back at the international deflation record", *North American Journal of Economics and Finance*, vol 15(3), December, pp 287–311. Also available, in extended form, as "Back to the future? Assessing the deflation record", *BIS Working Papers*, no 152, March 2004.

——— (2007): "Globalisation and inflation: new cross-country evidence on the global determinants of domestic inflation", *BIS Working Papers*, no 227, May.

Borio, C, M Erdem, A Filardo and B Hofmann (2015a): "The costs of deflations: a historical perspective", *BIS Quarterly Review*, March, pp 31–54.

Borio, C, E Kharroubi, C Upper and F Zampolli (2015b): "Labour reallocation and productivity dynamics: financial causes, real consequences", *BIS Working Papers*, forthcoming.

Borio, C, R McCauley and P McGuire (2011): "Global credit and domestic credit booms", *BIS Quarterly Review*, September, pp 43–57.

Borio, C, B Vale and G von Peter (2010): "Resolving the current financial crisis: are we heeding the lessons of the Nordics?", *Moneda y Crédito*, no 230, pp 7–49. Also available, in extended form, as *BIS Working Papers*, no 311, June 2010.

Borio, C and H Zhu (2011): "Capital regulation, risk-taking and monetary policy: a missing link in the transmission mechanism?", *Journal of Financial Stability*, December. Also available as *BIS Working Papers*, no 268, December 2008.

Bruno, V, I Shim and H S Shin (2015): "Comparative assessment of macroprudential policies", *BIS Working Papers*, no 502, June.

Bruno, V and H S Shin (2014): "Cross-border banking and global liquidity", *BIS Working Papers*, no 458, September.

Cecchetti, S and E Kharroubi (2015): "Why does financial sector growth crowd out real economic growth?", *BIS Working Papers*, no 490, February.

Ciccarelli, M and B Mojon (2010): "Global inflation", *Review of Economics and Statistics*, August.

Drehmann, M, C Borio and K Tsatsaronis (2012): "Characterising the financial cycle: don't lose sight of the medium term!", *BIS Working Papers*, no 380, November.

Drehmann, M and M Juselius (2015): "Leverage dynamics and the real burden of debt", *BIS Working Papers*, no 501, May.

Eichengreen, B and K Mitchener (2003): "The Great Depression as a credit boom gone wrong", *BIS Working Papers*, no 137, September.

Eickmeier, S and K Moll (2009): "The global dimension of inflation: evidence from factor-augmented Phillips curves", *ECB Working Papers*, no 1011.

Fisher, I (1933): "The debt-deflation theory of great depressions", *Econometrica*, vol 1(4), October, pp 337–57.

Group of Thirty (2015): *Fundamentals of central banking – Lessons from the crisis*, Washington DC, October.

Hofmann, B and B Bogdanova (2012): "Taylor rules and monetary policy: a global 'Great Deviation'?", *BIS Quarterly Review*, September, pp 37–49.

Ihrig, J, S Kamin, D Lindner and J Márquez (2010): "Some simple tests of the globalization and inflation hypothesis", *International Finance*, December.

International Monetary Fund (2015): "Monetary policy and financial stability", *IMF Policy Papers*, September.

Koo, R (2003): *Balance sheet recession: Japan's struggle with uncharted economics and its global implications*, John Wiley & Sons, Singapore.

Martínez-García, E and M Wynne (2012): "Global slack as a determinant of US inflation", Federal Reserve Bank of Dallas, *Globalization and Monetary Policy Institute Working Papers*, no 123.

McCauley R, P McGuire and V Sushko (2015): "Global dollar credit: links to US monetary policy and leverage", *Economic Policy*, vol 30(82), pp 189–229. Also available as *BIS Working Papers*, no 483, January 2015.

Rajan, R (2014): "Competitive monetary easing: is it yesterday once more?", remarks at the Brookings Institution, 10 April.

——— (2015): *Rethinking Macro Policy III*, panel remarks, IMF Conference, Washington DC, April 15–16.

Reinhart, C and V Reinhart (2010): "After the fall", *NBER Working Papers*, no 16334, September.

Rey, H (2013): "Dilemma not trilemma: the global financial cycle and monetary policy independence", paper presented at the Federal Reserve Bank of Kansas City Economic Policy Symposium on *Global Dimensions of Unconventional Monetary Policy*, Jackson Hole, 22–24 August.

Rogoff, K (2015): "Debt supercycle, not secular stagnation", article on VoxEU.org, 22 April, www.voxeu.org/article/debt-supercycle-not-secular-stagnation.

Shin, H S (2012): "Global banking glut and loan risk premium", Mundell-Fleming Lecture, *IMF Economic Review*, vol 60(2), pp 155–92.

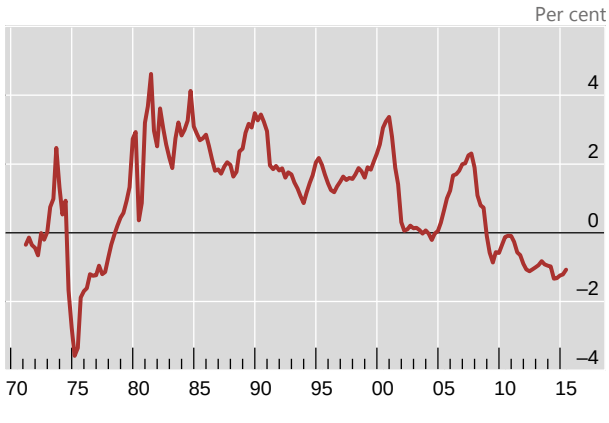
——— (2013): "The second phase of global liquidity and its impact on emerging economies", proceedings of the Federal Reserve Bank of San Francisco Asia Economic Policy Conference, November, pp 1–10.

Summers, L (2014): "Reflections on the 'New Secular Stagnation Hypothesis'", in C Teulings and R Baldwin (eds), *Secular stagnation: facts, causes and cures*, VoxEU.org eBook, CEPR Press.

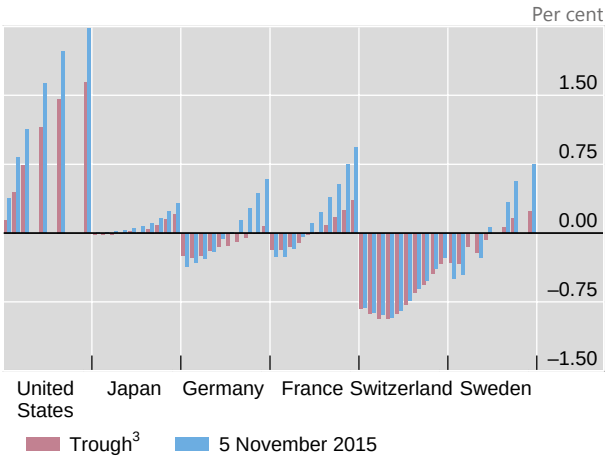
Interest rates have been exceptionally and persistently low

Graph 1

G3 real policy rates[1]



Bond yields[2]

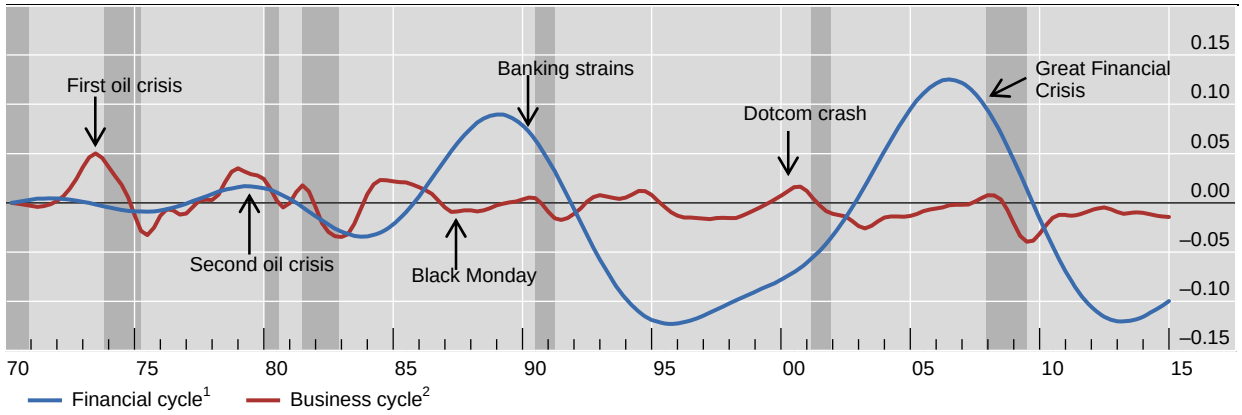


[1] Nominal policy rate less consumer price inflation excluding food and energy. Weighted averages for the Euro area (Germany), Japan and the United States based on rolling GDP and PPP exchange rates. [2] Yield per maturity; for each country, the bars represent the maturities from 1-year to 10-year. [3] For the United States, 30 January 2015; for Japan, 19 January 2015; for Germany, 20 April 2015; for France, 15 April 2015; for Switzerland, 27 October 2015; for Sweden, 17 April 2015.

Sources: Bloomberg; national data.

Financial and business cycles in the United States

Graph 2

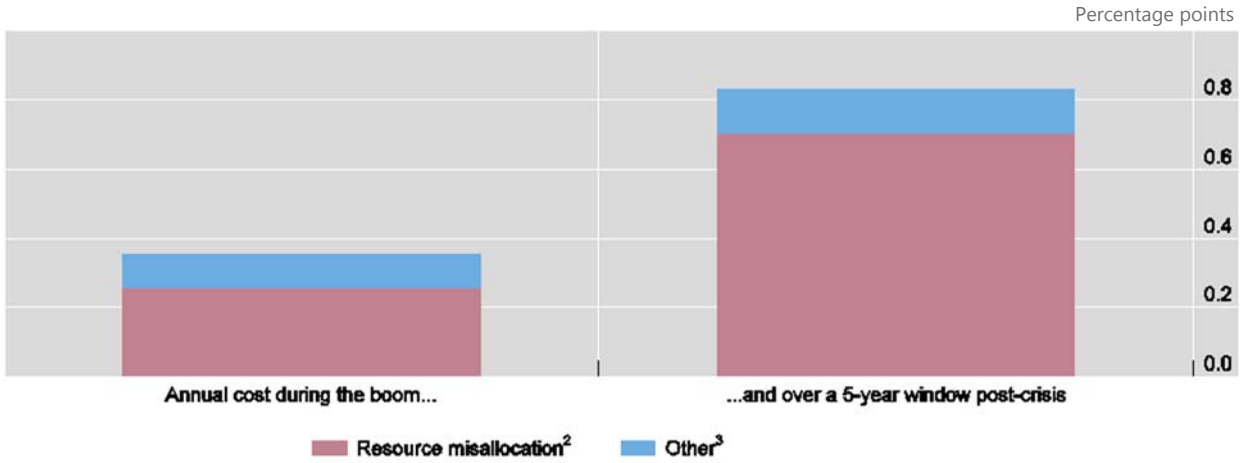


[1] The financial cycle as measured by frequency-based (bandpass) filters capturing medium-term cycles in real credit, the credit-to-GDP ratio and real house prices; Q1 1970 = 0. [2] The business cycle as measured by a frequency-based (bandpass) filter capturing fluctuations in real GDP over a period from one to eight years; Q1 1970 = 0.

Sources: Drehmann et al (2012), updated.

Financial booms sap productivity by misallocating resources[1]

Graph 3



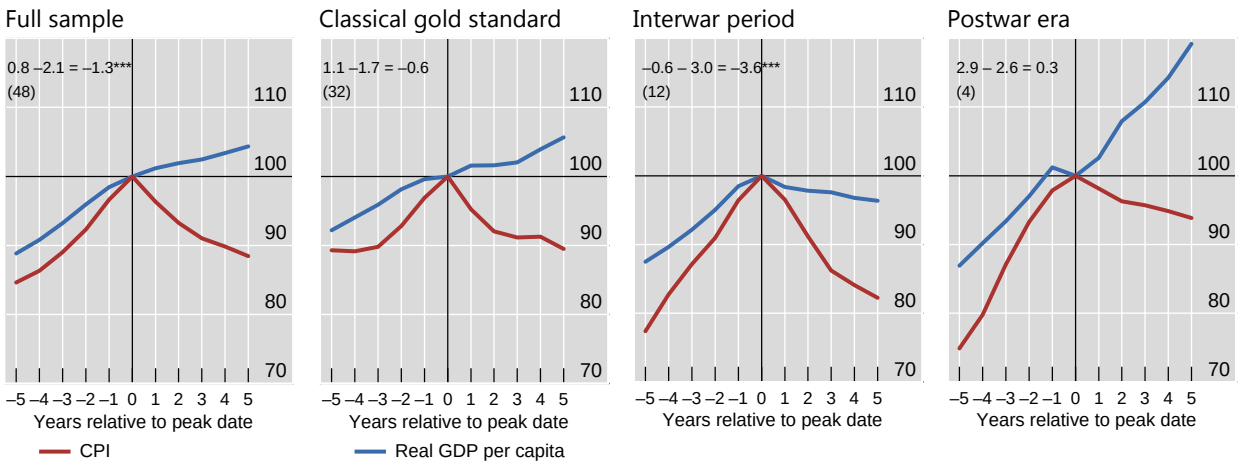
[1] Estimates calculated over the period 1980–2010 for 22 advanced economies. [2] Annual impact on productivity growth of labour shifts into less productive sectors during the credit boom, as measured over the period shown. [3] Annual impact in the absence of reallocations during the boom.

Source: Based on Borio et al (2015b).

Output cost of persistent goods and services price deflations[1]

Graph 4

Thirty-eight economies,[2] 1870–2013, variable peak[3] year = 100



The numbers in the graph indicate five-year averages of post- and pre-price peak growth in real GDP per capita (in per cent) and the difference between the two periods (in percentage points); */**/*** denotes mean equality rejection with significance at the 10/5/1% level. In parenthesis is the number of peaks that are included in the calculations. The data included cover the peaks, with complete five-year trajectories not affected by observations from 1914–18 and 1939–45. For Spain, the Civil War observations are also excluded (1936–39).

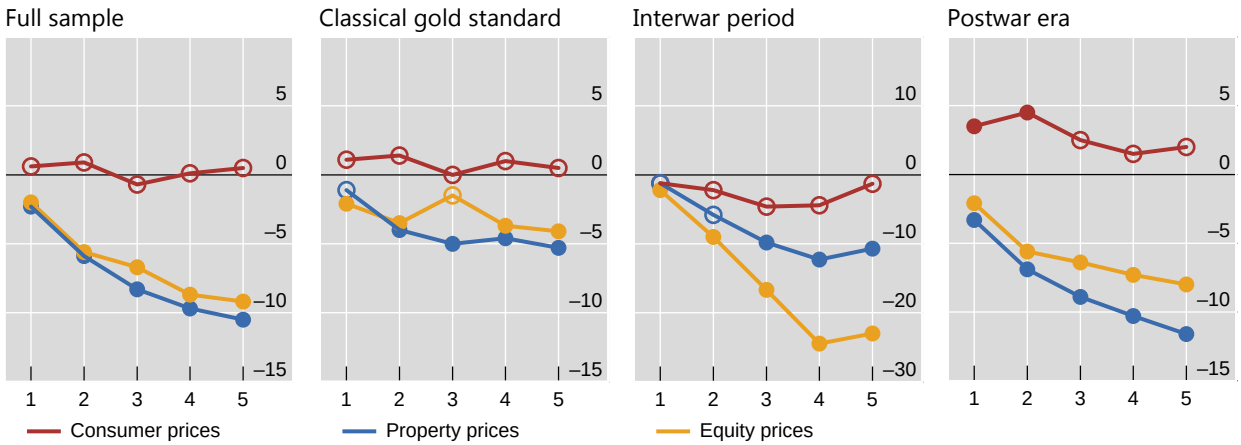
[1] Simple average of the series of CPI and real GDP per capita readings five years before and after each peak for each economy, rebased with the peaks equal to 100 (denoted as year 0). [2] As listed in Table 1. [3] Includes only persistent deflations in the price of goods and services (consumer prices) identified as periods following price peaks associated with a turning point in the five-year moving average and peak levels exceeding price index levels in the preceding and subsequent five years.

Source: Borio et al (2015a).

Change in per capita output growth after price peaks[1]

Graph 5

In percentage points[2]



The approach underlying the estimated effects shown in the graph is described in the main text of the paper; a circle indicates an insignificant coefficient, and a filled circle indicates that a coefficient is significant at least at the 10% level. Estimated effects are conditional on sample means (country fixed effects) and on the effects of the respective other price peaks (eg the estimated change in h-period growth after CPI peaks is conditional on the estimated change after property and equity price peaks) For the respective country samples, see the paper.

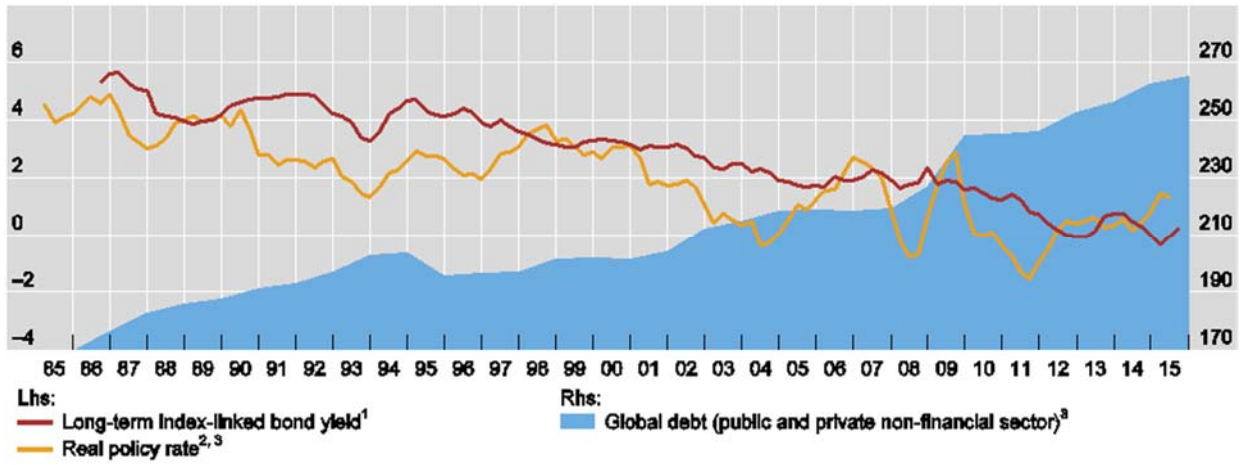
[1] The graph shows the estimated difference between h-period per capita output growth after and before price peak. [2] The estimated regression coefficients are multiplied by 100 in order to obtain the effect in percentage points.

Source: Borio et al (2015a).

Interest rates sink as debt soars

Graph 6

% of GDP



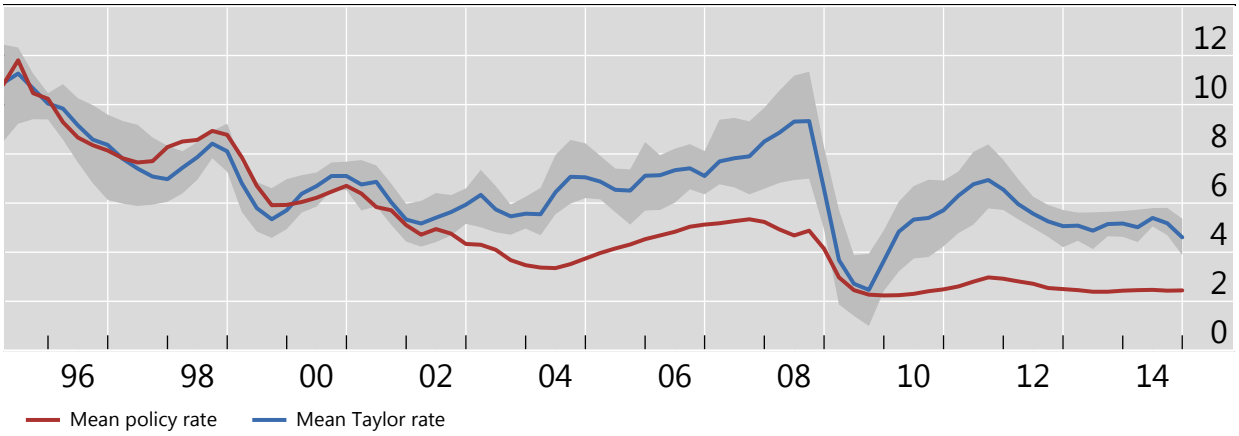
[1] From 1998, simple average of France, the United Kingdom and the United States; otherwise only the United Kingdom. [2] Nominal policy rate less consumer price inflation. [3] Aggregate based on weighted averages for G7 economies plus China based on rolling GDP and PPP exchange rates. 2015 figure is based on Q1 or Q2 data.

Sources: IMF, *World Economic Outlook*; OECD, *Economic Outlook*; national data; BIS calculations.

Unusually accommodative global monetary conditions[1]

Graph 7

In per cent



The Taylor rates are calculated as $i = r^* + \pi^* + 1.5(\pi - \pi^*) + 0.5y$, where π is a measure of inflation, y is a measure of the output gap, π* is the inflation target and r^* is the long-run real interest rate, here proxied by real trend output growth. The graph shows the mean and the range of the Taylor rates of different inflation/output gap combinations, obtained by combining four measures of inflation (headline, core, GDP deflator and consensus headline forecasts) with four measures of the output gap (obtained using Hodrick-Prescott (HP) filter, segmented linear trend and unobserved components techniques, and IMF estimates). π* is set equal to the official inflation target/objective, and otherwise to the sample average or trend inflation estimated through a standard HP filter. See B Hofmann and B Bogdanova, "Taylor rules and monetary policy: a global 'Great Deviation'?", *BIS Quarterly Review*, September 2012, pp 37–49.

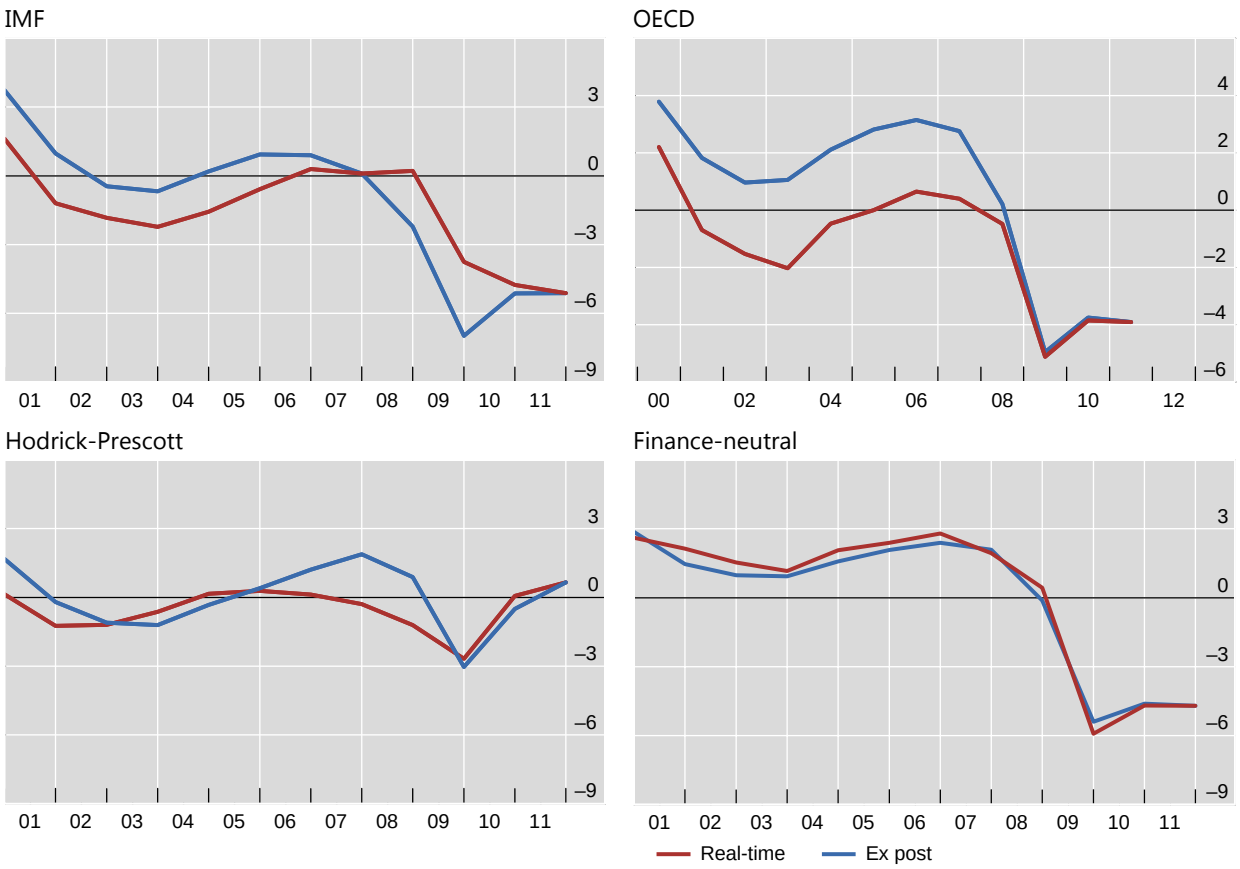
[1] Weighted averages based on 2005 PPP weights. "Global" comprises all economies listed here. Advanced economies: Australia, Canada, Denmark, the euro area, Japan, New Zealand, Norway, Sweden, Switzerland, the United Kingdom and the United States. Emerging market economies: Argentina, Brazil, Chile, China, Chinese Taipei, Colombia, the Czech Republic, Hong Kong SAR, Hungary, India, Indonesia, Israel, Korea, Malaysia, Mexico, Peru, the Philippines, Poland, Singapore, South Africa and Thailand.

Sources: IMF, *International Financial Statistics* and *World Economic Outlook*; Bloomberg; CEIC; Consensus Economics; Datastream; national data; BIS calculations.

US output gaps: ex post and real-time estimates

In per cent

Graph 8



For each time *t*, the "real-time" estimates are based only on the sample up to that point in time. The "ex post" estimates are based on the full sample.

Source: Borio et al (2013).