

Short bios:

Mikael Juselius is a senior economist at the Research Unit of the Bank of Finland. He has previously worked at the Bank for International Settlements where he began exploring topics such as real-time output gap measurement, early warning indicators for banking crises, and the interaction between financial and real cycles. His main field of expertise is applied time-series econometrics. He holds a PhD in economics from Hanken School of Economics in Helsinki.

Claudio Borio is Head of the Monetary and Economic Department (MED), Bank for International Settlements. He has been at the BIS since 1987, covering various responsibilities in the Monetary and Economic Department including Director of Research and Statistics and Head of the Secretariat of the Committee on the Global Financial System and the Gold and Foreign Exchange Committee, which examine, inter alia, issues related to financial stability and market functioning. From 1985-1987, he worked as economist at the OECD in the country studies branch of the Economics and Statistics Department. Prior to that, he was Lecturer and Research Fellow at Brasenose College, Oxford University. He holds a DPhil and MPhil in Economics and a BA in Politics, Philosophy and Economics from the same university. Author of numerous publications in the fields of monetary policy, banking, finance and issues related to financial stability.

Piti Disyatat is Executive Director of the Puey Ungphakorn Institute for Economic Research at the Bank of Thailand. Prior to his current position, he has worked in various areas of the Bank including, financial risk management, foreign reserve management, and monetary operations. From 2007-2010, he served as Senior Economist in the Monetary and Economic Department at the Bank for International Settlements. Before joining the Bank of Thailand in 2001, he worked as an Economist at the International Monetary Fund for two years. He has also served as Adjunct Faculty in the Economics Department at Chulalongkorn University and Thammasat University in Thailand. His research interests are in monetary economics, banking, and international finance. He holds a PhD from Princeton University and a Bachelor of Economics (First Class Honours) from the Australian National University.

Mathias Drehmann is a Principal Economist at the Bank for International Settlements. His main expertise lies in financial stability questions, macroprudential regulation and addressing procyclicality, where his research provided the basis for the countercyclical capital buffer adopted under Basel III. Mathias has widely published in academic journals such as the American Economic Review, the Journal of Financial Intermediation or the Journal of Banking and Finance. Mathias received a PhD from the University of Bonn and the London School of Economics, as part of the European Doctoral Program for Quantitative Economics.

Title:

Monetary policy, the financial cycle and ultralow interest rates

Summary:

The prevailing view that currently exceptionally low real interest rates reflect an exogenous fall in natural interest rate is incomplete and ignores the endogenous influence of finance on real activity. We argue that explicitly accounting for financial factors yields an estimate of the natural rate that is higher and has fallen by less than prevailing empirical approaches would suggest. Moreover, given that financial imbalances can lead to permanent output losses, monetary policy endogenously influences the natural rate through its effects on them. Consequently, a monetary policy framework that systematically takes financial factors into account can lead significant output gains with little difference in inflation performance.

Main text:

Inflation-adjusted (real) interest rates, short and long, have been on a downward trend for a long time and have remained exceptionally low since the Great Financial Crisis (Graph 1). Why is this so?

The prevailing view is that this downward trend and the exceptionally low level largely reflect a fall in natural interest rate – the rate that would prevail when actual output equals potential output – driven by changes in saving and investment fundamentals (IMF (2013), Obstfeld and Tesar (2015)). This view crucially rests on *inflation* being the key signal that output is not at its potential level. All else equal, if output is above potential, inflation will tend to rise; if it is below, inflation will tend to fall. According to this view monetary policy passively tracks the natural rate in the medium to long run. As a result, the observed decline in real interest rates is purely a function of forces beyond central banks' control.

We argue for an alternative view of the natural rate, in which financial factors also are allowed to play a role. Indeed, a recent strand of empirical work indicates that financial cycle proxies can help identify when output is away from potential (eg Borio et al (2014), Kiley (2015), Juselius et al (2017)) and that inflation is less informative in this regard (Borio et al (2014)). It thus seems logical to consider also outside financial booms and busts a key symptom of unsustainability, especially given the havoc they can wreak on output (eg Schularick and Taylor (2012), Borio and Lowe (2002)). Moreover, incorporating the influence of financial factors in standard frameworks would avoid the conclusion that interest rates may be at their natural level and yet encourage the build-up of serious financial instability (eg Summers (2014), Bean et al (2015)).

This perspective has first-order implications for monetary policy. If monetary policy has a material impact on financial booms and busts and if inflation is a poor indicator of deviations of output from potential, then ignoring financial cycles may lead policy astray. In addition, since recessions that coincide with banking crises can involve permanent output losses (Cerra and Saxena (2008), Ball (2014)), monetary policy may not be neutral in the long run. This raises the possibility that lower-frequency output and real interest rate fluctuations – beyond those associated with typical business cycle frequencies – are endogenous and influenced by monetary policy.

We propose an empirical framework in which financial factors can play a pivotal role in economic fluctuations at both standard business cycle frequencies and at lower ones. In particular, we expand the familiar Laubach and Williams (2003, 2015) reduced-form model for estimating potential output and the natural rate by incorporating two empirical proxies for the financial cycle – the leverage gap and debt service gap (Juselius and Drehmann (2015)). Our objective is twofold: (i) to revisit the measurement of the natural

interest rate, and (ii) to put forth a case for a monetary policy rule that *systematically* takes into account the financial cycle. By establishing a link between monetary policy and longer-run output trajectories, the framework also provides a richer perspective on the secular decline in real interest rates. We apply it to US data over a 30-year period, 1985-2015.

We reach three main conclusions.

First, once financial factors are taken into account, the natural interest rate is higher and falls by less than prevailing empirical approaches would suggest, at least since 2000. Importantly, the actual real policy interest rate has been persistently below our estimate of the natural rate (middle panel, Graph 2, red line), especially in the most recent period. Sharp interest cuts in response to financial crises in the early 1990s, early 2000s and 2008 were not taken back in the ensuing normalisation phase, suggesting substantial policy asymmetry with respect to the financial cycle. Compared to the Laubach-Williams natural rate estimate (blue line), which is currently negative, ours shows a decline from 3.4% in 2000Q1 to 0.6% at the end of our sample. The reason for this difference is that our framework puts more emphasis on financial factors for determining the state of the business cycle rather than relying solely on inflation for the same purpose. Moreover, our estimates suggest that the financial cycle has currently recovered even as inflation remains subdued.

Second, monetary policy is indeed not neutral in the long run. The way policy is systematically conducted has a first-order impact on financial factors and hence on output fluctuations. And the resulting booms and busts leave permanent scars, at least on the *level* of output. This appears to be the case even when banking crises do not break out. This suggests that a narrative that attributes the decline in real interest rates and their persistently ultra-low post-crisis levels primarily to an exogenous fall in the natural rate is incomplete. Monetary policy, through its impact on the financial cycle, influences the evolution of real interest rates over the medium term. In this sense, beyond the structural evolution of the economy, the decline reflects, in part, also policy frameworks.

Third, monetary policy frameworks matter. An effective “lean-against-the-wind” approach requires policy to take financial developments into account *systematically*. Such a policy could be represented by a standard Taylor rule augmented to incorporate financial cycle indicators. The rule embodies a fundamentally different interpretation of a “lean-against-the-wind” policy from standard ones, which call for increases in interest rates only when signs of financial imbalances emerge, such as in the form of credit and asset price run-ups beyond historical norms (eg Svensson (2016), IMF (2015)). Responding to financial stability risks only when they become evident would inevitably lead to doing too little too late, as it would ignore the *cumulative* impact of policy over the whole financial cycle. Rather, our rule indicates that policy rates should be set so that the economy is *never* too far away from “financial equilibrium”.

To illustrate the potential gains from responding systematically to the financial cycle, we perform a counterfactual experiment. Accordingly, we assume that monetary policy follows a variant of our suggested policy rule in an economy generated from our estimated empirical framework. This experiment is necessarily more speculative, as it faces well-known and serious econometric challenges such as the “Lucas critique”. Thus, our results should best be interpreted as suggestive.

We report the results from two counterfactuals, the first starting in 2003 Q1 and the second in 1996 Q1 (Graph 3). If the policy starts in 2003, by the end of the simulation period the cumulative output gain is more than 12%, or nearly 1% per year (blue lines, top left-hand panel, Graph 3). The gains are considerably larger if one starts the experiment in 1996. Here, the cumulative output gain amounts to some 24%, or 1.2% per year. These output gains come with little change in overall inflation performance. This is not entirely surprising given the low traction that economic activity has on it empirically. Importantly, in both counterfactuals, the central bank retains greater room for policy manoeuvre than historically, with natural rates, and above all the policy rates, being considerably higher.

Why do higher interest rates, overall, lead to output gains? The reason is that leaning against the financial cycle systematically helps moderate swings in both leverage and debt-service gaps, as reflected in more subdued credit-to-GDP dynamics (third row of Graphs 3). A smaller build-up of debt service liabilities, in turn, supports faster policy normalisation.

These results are suggestive of the potential gains from incorporating financial stability more systematically into monetary policy frameworks. Limitations notwithstanding, we hope to have shown that it is possible to make further progress in making a financial stability-oriented monetary policy framework more operational. Going forward, further research could usefully shed light on a couple of issues. First, the econometric findings would be more convincing if they were shown to hold both across countries and monetary policy regimes. This would go a considerable way in addressing also the Lucas critique. Second, and related, it would be useful to go beyond the statistical relationships found in the data and develop a fully-fledged “structural” model. This would lend itself more naturally to counterfactual policy analysis.

References:

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.

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, Geneva: ICMB and London: CEPR Press.

Borio, C and P Lowe (2002): “Asset prices, financial and monetary stability: Exploring the nexus”, *BIS Working Papers*, no 114, July.

Borio, C, P Disyatat and M Juselius (2014): “A parsimonious approach to incorporating economic information in measures of potential output”, *BIS Working Papers*, no 442, February.

Cerra, V and Saxena, S (2008): “Growth dynamics: The myth of economic recovery,” *American Economic Review*, vol 98(1), pp. 439-457.

International Monetary Fund (2013): *World Economic Outlook*, April.

_____ (2015): “Monetary policy and financial stability”, *IMF Staff Report*.

Juselius, M, Borio, C and P Disyatat (2017): “Rethinking potential output: embedding information about the financial cycle”, *Oxford Economic Papers*, forthcoming.

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

Kiley, M (2015): “What can the data tell us about the equilibrium real interest rate?” *Finance and Economics Discussion Series* 2015-077. Board of Governors of the Federal Reserve System, August.

Laubach T and Williams J C (2003): “Measuring the natural rate of interest,” *The Review of Economics and Statistics* vol 85(4), pp 1063-1070.

_____ (2015): “Measuring the natural rate of interest redux”, *Federal Reserve bank of San Francisco Working Papers*, no 2015-16.

Obstfeld, M and L Tesar (2015): “The decline in long-term interest rates”, *Council of Economic Advisers*, <https://www.whitehouse.gov/blog/2015/07/14/decline-long-term-interest-rates>.

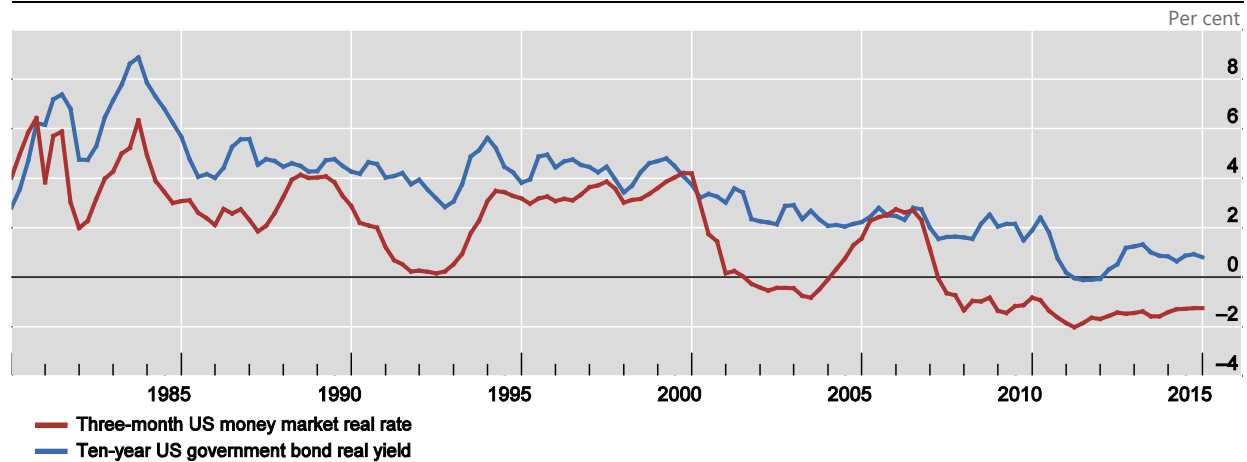
Schularick, M and A Taylor (2012): “Credit booms gone bust: Monetary policy, leverage cycles, and financial crises, 1870-2008,” *American Economic Review*, vol 102(2), pp 1029-1061.

Svensson, L (2016): “Cost-benefit analysis of leaning against the wind: are costs larger also with less effective macroprudential policy?”, *IMF Working Papers*, WP/16/3.

Summers, L (2014): "U.S. economic prospects: Secular stagnation, hysteresis, and the zero lower bound," *Business Economics*, vol 49(2), 65-73.

The long-term decline in real interest rates¹

Graph 1

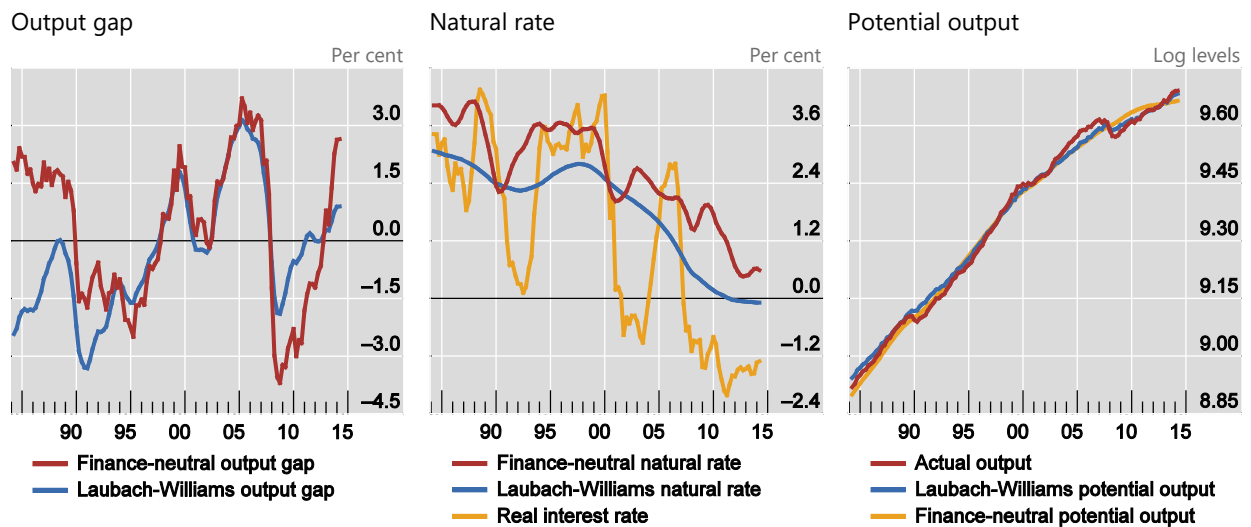


¹ Real rates are generated by subtracting realised PCE core inflation from nominal interest rates.

Source: National data.

The financial cycle: implications for the natural rate and trend output

Graph 2

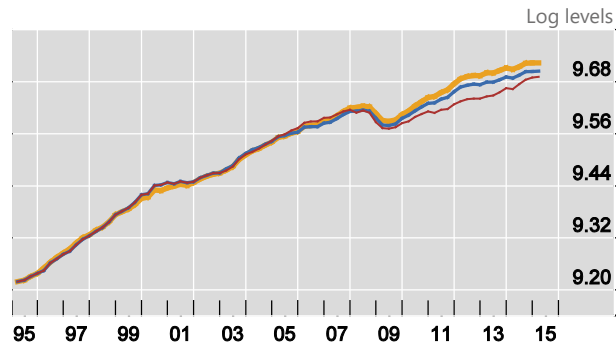


Sources: Laubach and Williams (2015); national data; authors' calculations.

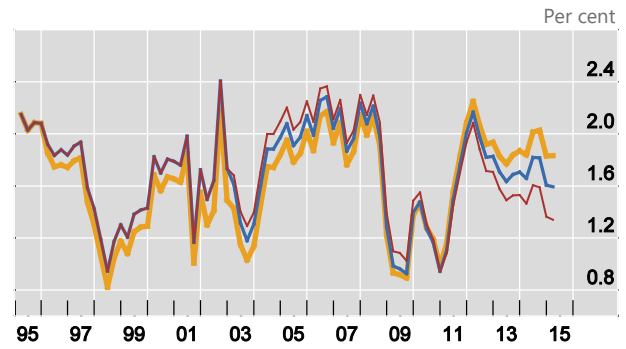
Leaning against the financial cycle improves outcomes

Graph 3

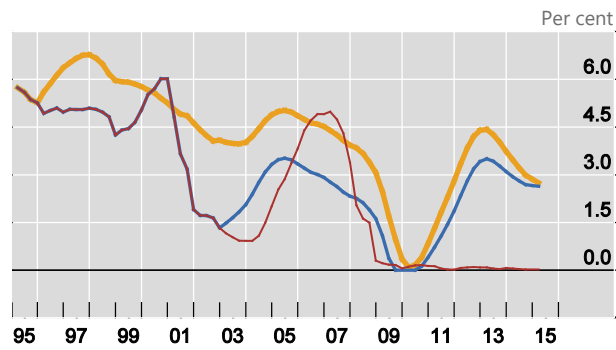
GDP



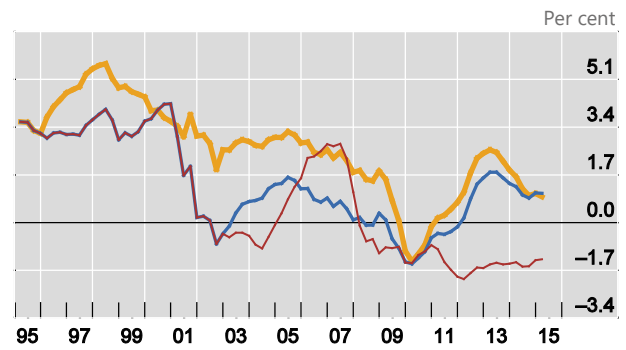
Inflation



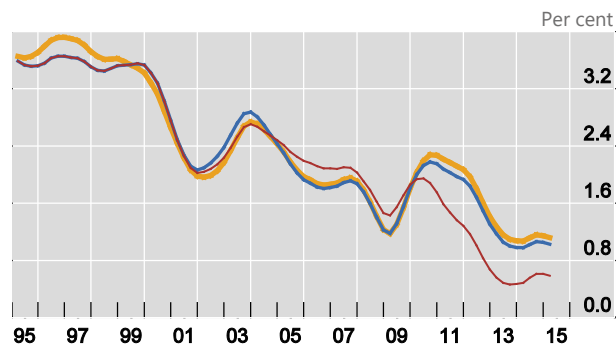
Nominal short run money market rate



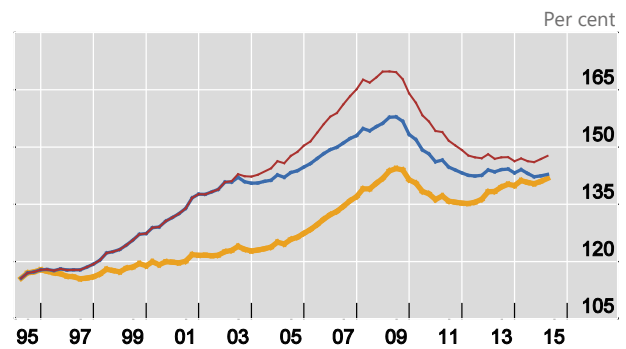
Real short run money market rate



Natural rate



Credit to GDP Ratio



— Actual — Counterfactual 2003 — Counterfactual 1996

Sources: National data; authors' calculations.