The decline in global interest rates and the "new normal" of monetary policy[1]

Dimitris Malliaropulos, Bank of Greece, June 21, 2019

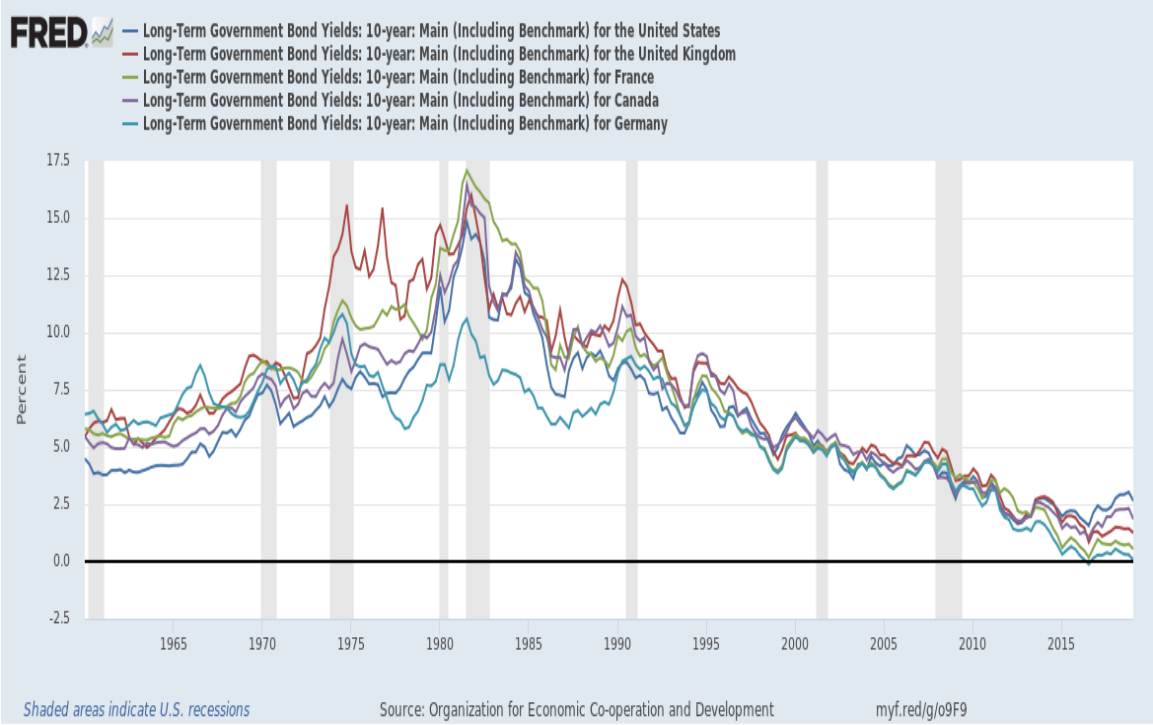
One of the most striking characteristics of the current macroeconomic environment is the exceptionally low level of nominal and real interest rates in advanced economies. The downward trend in interest rates started in the early 1980s, as part of the "Great Moderation" and coincided with a strong and persistent reduction of inflation and a period of low macroeconomic volatility (Figure 1). The decline in global interest rates accelerated in the aftermath of the Global Financial Crisis (GFC) in 2007-2008, when central banks cut short-term interest rates aggressively and monetary policy turned very accommodative.

There are four major issues in the current debate among academics and policymakers: 1. What are the drivers of the downward trend in global interest rates? 2. Will the low interest rate environment last and for how long? 3. Will central banks continue to use unconventional monetary policy measures in the future (and why)? 4. *Should* central banks keep their balance sheets adequately large (and why)?

As the debate is still ongoing, there are no definitive answers to these questions. In my short remarks, I will try to summarize the different views expressed in this debate, emphasizing the role of the so-called "natural interest rate" and its economic drivers in shaping the macroeconomic environment and the "new normal" of monetary policy. I will argue that the low interest rate environment is likely to last for a considerable time. As real rates are driven by both structural and cyclical (but relatively persistent) forces, real rates will ultimately increase from their current lows but will stabilize at lower levels than their long-run historical average. Central banks will likely continue to use QE in the future, mainly because the zero lower bound will remain a binding constraint. Finally, central banks should consider the benefits in terms of financial stability from keeping their balance sheets adequately large.

[1] Speech at the "8th BBVA Seminar for Public Sector Investors & Issuers ", Porto, 17-21 June 2019. Disclaimer: The views expressed here are my own and do not necessarily reflect the views of the Bank of Greece or the Eurosystem.

Figure 1: The downward trend in long-term interest rates



The secular decline in the "natural" interest rate (r*)

Much of the debate around the secular decline in global interest rates centers on the equilibrium ("natural") interest rate. The concept of the natural rate goes back to Knut Wicksell, who introduced it in 1898 in his book "Interest and prices" as a reformulation of the Quantity Theory of Money to explain inflation in a credit economy.

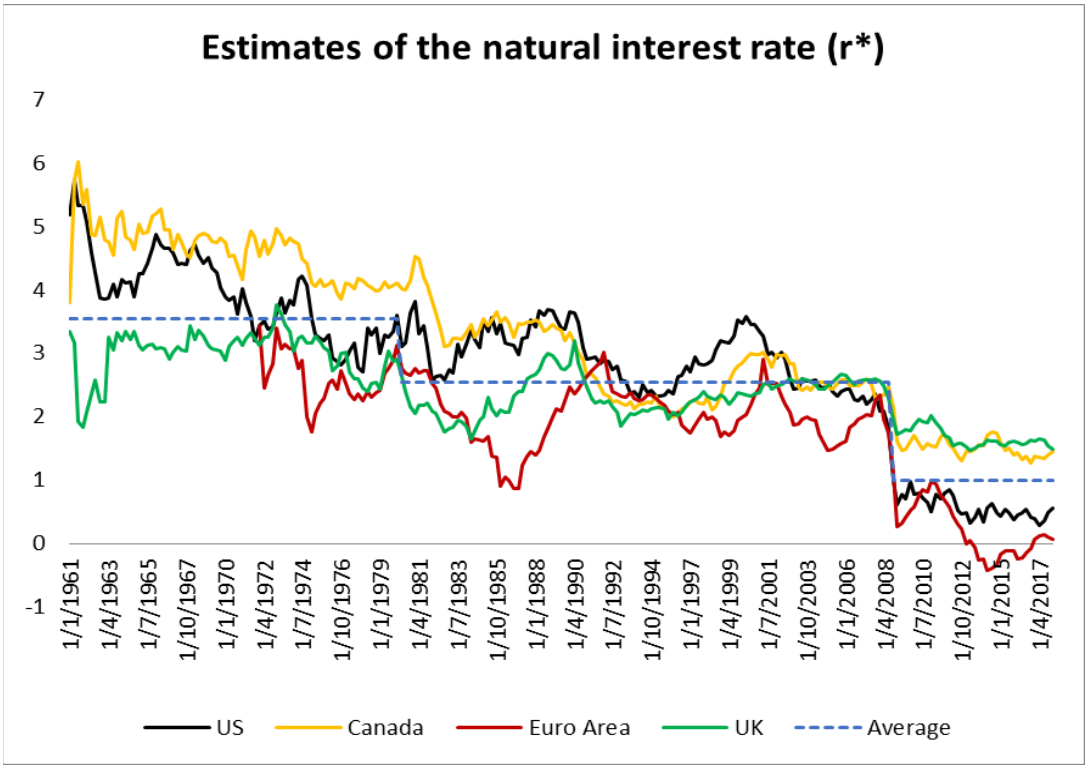
According to standard growth theory, the equilibrium real interest rate, *r*,* -- equal to the marginal product of capital, $f'(k)$-- is related to potential growth of the economy and individuals' preferences, reflected in the discount rate (z). The discount rate reflects the time value of money, i.e. the required real interest rate to substitute present with future consumption. Potential growth itself is driven by long-run productivity growth *(g)* and the trend growth rate of the labour force (n):

$$r^* = f'(k) = g + n + z \qquad (1)$$

The natural rate is unobservable and must be estimated via statistical filtering or using more theoretical, model-based methods. Figure 2 plots the Holston, Laubach and Williams (2017) estimates of the natural interest rate

for the US, Canada, the euro area and the UK. The natural rate seems to have followed a downward trend over the past fifty years or so. The great recession of 2008-09 seems to have exacerbated this downward trend, particularly in the US and the euro area. The natural rate has declined from 3.5 percent on average across the four economies in the 1960s-70s to 2.5 percent in the period 1980-2007 and declined further to 1 percent after 2008.

Figure 2: The secular decline in the natural interest rate



Source: Holston, Laubach and Williams (2017).

How does the decline in r* affect monetary policy?

The natural rate provides an anchor to a monetary economy. If long-run neutrality of money holds, as the standard textbook model predicts, then monetary policy follows the trend of r*. Central bankers clearly acknowledge the role of r* as a benchmark for monetary policy:

> *"The best strategy for the Fed I can think of is to set rates at a level consistent with … the (today low) equilibrium rate" (Ben Bernanke, former Chairman of the Fed, 2015)*

> *"The role of monetary policy should therefore be to steer policy and market rates to that equilibrium rate" (Vitor Constancio, Vice-President of the ECB, 15 June 2016)*
>
> *"Our understanding of the economy and monetary policy is underpinned by the concept of the natural interest rate…that balances monetary policy so that it is neither accommodative nor contractionary in terms of growth and inflation" (John Williams, President of FRB of San Francisco, August 15, 2016)*

These views of monetary policymakers are underpinned by the Taylor rule, which provides a fairly good ex-post account of movements in the nominal policy rate, i:

$$i = r^* + \pi^* + \alpha(\pi - \pi^*) + \beta(y - y^*)$$

where $(\pi - \pi^*)$ is the deviation of inflation from the central bank target (π^*) and $(y - y^*)$ is the deviation of output from potential (output gap).

In equilibrium, when the output gap is zero and inflation is equal to the central bank target, the nominal policy interest rate is equal to the sum of the natural rate and equilibrium (target) inflation: $i^* = r^* + \pi^*$. The implication is that, if the natural rate has declined from an average of 3% in the period 1960-2007 to less than 1% following the GFC and the central bank maintains its inflation target at 2%, the nominal short-term interest rate will be in equilibrium 3% rather than 5%.

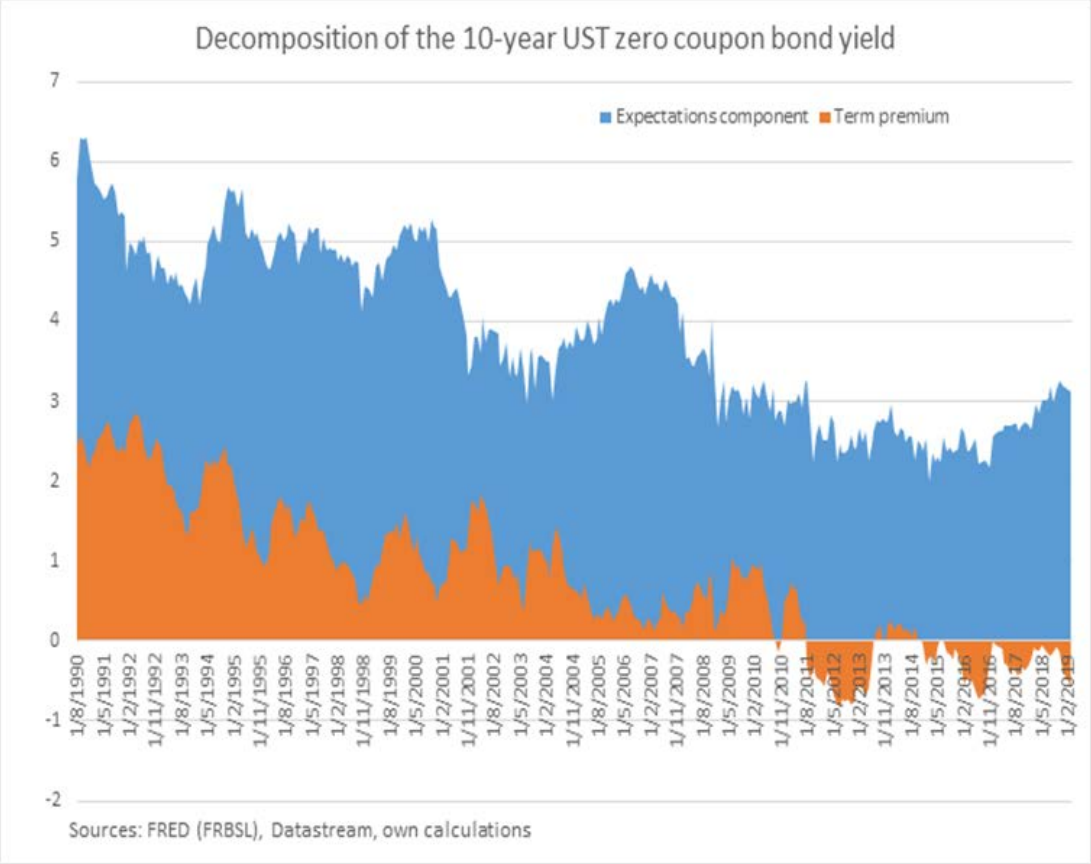
Hence, if the new normal is characterized by a lower natural rate, nominal interest rates will hit the zero lower bound more often in the future, central banks will have less room to stimulate the economy during an economic downturn, recessions will likely be longer and recoveries slower. This will necessitate greater reliance on unconventional monetary policy tools, along with conventional tools such as policy interest rates.

Bond markets seem to agree with the view that short term interest rates will be lower in the future. Expectations of short-term interest rates can be extracted from yields of zero-coupon bonds. The Federal Reserve Bank of St Louis provides estimates of such a decomposition of US Treasury yields into an expectations and a term premium component.[2] Figure 3 plots this decomposition for the ten-year Treasury yield. The figure suggests that bond markets currently discount that, over the next ten years, Fed Funds rates in the US will average slightly above 3 percent. In contrast, over the period

[2] https://fred.stlouisfed.org/search?st=term+premium

1990-2000, ten year US Treasury bonds discounted that Fed Funds rates would be on average 5 percent over the life of the bonds.

Figure 3: Bond yield decomposition



Several explanations for the persistent decline in interest rates have been put forward in the literature. Two broad analytical strands are the "real/structural" approach and the "financial cycle drag" approach.

The **"real/structural" approach** has two variants. One variant is based on the analytical framework of the neoclassical growth model, according to which the equilibrium real rate is determined by potential growth and consumers' preferences. Accordingly, the secular decline in the equilibrium real rate is the result of the slowdown in trend productivity growth combined with the decline in the growth rate of the labour force due to ageing of population ("secular stagnation" hypothesis: Gordon 2015, 2016).[3] The

[3] Summers (2016) sees secular stagnation as the result of a chronic weakness of demand.

second variant is based on the analytical framework of the savings-investment balance. According to this approach, structural shifts in the supply of savings and the demand for investment have led to a secular decline in the equilibrium real interest rate. These explanations focus on global factors such as the "global savings glut" due to a higher propensity to save in emerging markets (Bernanke 2005); the decline in the relative price of capital goods which has led to a decline in aggregate investment relative to savings (Rachel and Smith 2015); and the rebalancing of economies towards the service sector, which is less capital intensive than manufacturing, hence less investment is needed on aggregate in order to produce the same output (Summers 2014).

The **"financial cycle drag" approach** relates the decline in real interest rates to the global financial cycle, or the burst of a "debt super-cycle" (Rogoff 2015, Lo and Rogoff 2015). The narrative of this approach goes as follows: due to the inherent instability of financial markets, poor risk management and inadequate regulation, financial market booms turn into busts causing major recessions. During the boom, leverage increases and financial vulnerabilities build up. When the financial cycle turns down, credit constraints become binding, private agents and governments find themselves with a debt overhang and start to deleverage. The slow deleveraging process and the lack of credit give rise to a "balance-sheet recession" and sluggish growth in the aftermath of financial crises (Reinhart and Rogoff 2009). In this interpretation, the decline in global interest rates over the past ten years may be seen as the result of the global financial crisis of 2007-2008.

A second variant of the financial cycle drag approach suggests that the drop in r* following the GFC is related to a **shortage of safe assets** as the financial crisis has destroyed a significant part of the supply of safe assets, such as asset backed securities with a AAA rating. On the other hand, the demand for safe assets increased not only due to a general increase in risk aversion following the GFC but also due to changes in liquidity regulation for banks and the increased need for safe and liquid assets to be posted in collateralized transactions. This has led to the emergence of a deflationary "safety trap", pushing real risk-free rates lower (Caballero and Fahri 2014).[4] Del Negro et al (2017) find that the decline in the natural rate reflects primarily an increase in the premium for safety and liquidity since the late 1990s (the so-called "convenience yield") and to a lesser extent a secular

[4] According to Caballero and Fahri (2014), the global supply of safe assets has declined from USD 20 trn in 2007 to USD 12 trn in 2011. Barclays (2012) estimates that the GFC and the subsequent euro area sovereign debt crisis have destroyed about 50% of the supply of safe assets. A review of the safe asset literature is provided by Golec and Perotti (2017).

decline in potential growth. An increase in the convenience yield depresses the real risk-free rate because investors are willing to accept a lower yield in exchange for higher safety and liquidity (Krishnamurthy and Vissing-Jorgensen (2012).

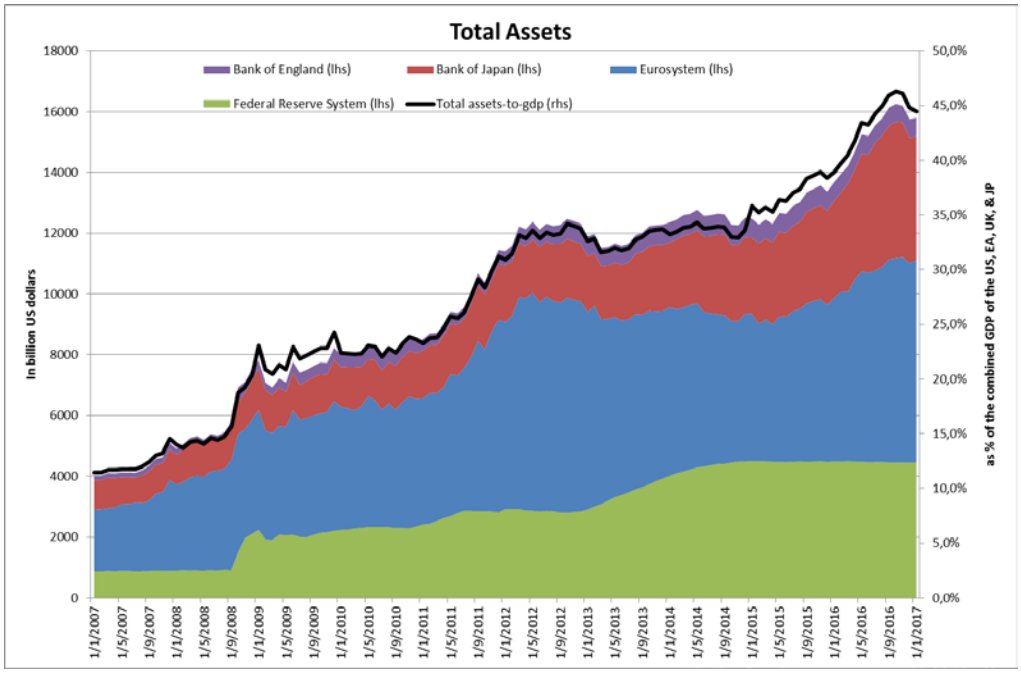
The two approaches have different implications for the persistence of the low interest rate environment. The "real/structural" approach points at slow moving and persistent factors affecting equilibrium real rates such as technology, demographic trends and preferences, hence it predicts that the decline in real rates is persistent. In contrast, the "financial cycle drag" approach predicts that the debt super-cycle effect will not be forever. After deleveraging and borrowing headwinds subside, economic growth will likely accelerate, pushing real interest rates to higher levels. The two approaches also differ in their implications for monetary policy.

Quantitative Easing as a global factor driving interest rates

Without dismissing the role of real and financial factors, one could argue that the use of unconventional monetary policy over the past ten years has also contributed to the decline in global interest rates. As a matter of fact, the size of the aggregate balance sheet of the four major central banks (Fed, ECB, BoJ, BoE) quadrupled from USD 4 trillion in 2007 to about USD 16 trillion at the end of 2016. This is equivalent to 45% of combined GDP in the four countries/economic areas, up from about 10% of GDP in 2007 (Figure 4).

In the context of QE strategies, central banks purchased long-term bonds by issuing short-term liabilities (i.e., reserves). Because long-term bonds and reserves are imperfect substitutes, QE lowered long-term interest rates and stimulated spending, thereby supporting the economic recovery and limiting deflationary pressures. Because global capital markets are highly integrated, QE had significant international spillover effects, particularly to emerging markets which witnessed large capital inflows and currency appreciations (MacDonald 2017).

Figure 4: Combined balance sheet of four major central banks



Source: Malliaropulos and Migiakis (2019): Unconventional monetary policy and sovereign bond yields: a global perspective (Bank of Greece Working Paper).

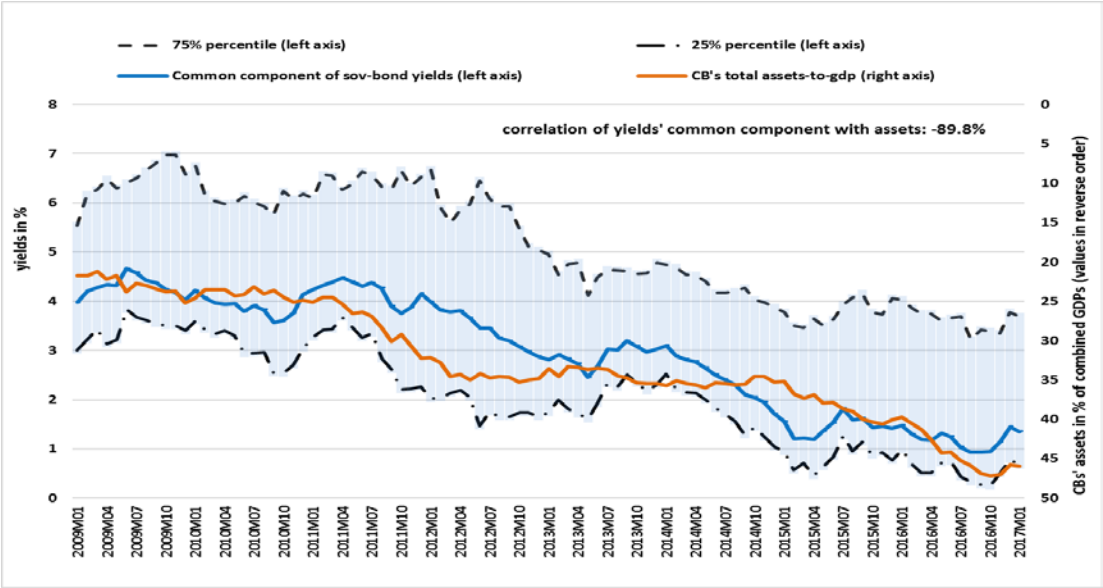
Research at the Bank of Greece suggests that QE of major central banks has acted as a *global factor*, driving sovereign bond yields lower worldwide. Figure 5 plots the aggregate balance sheet of the four major central banks as a share of the combined GDP of the four countries/areas along with the first principal component of ten-year sovereign bond yields of 45 sovereigns across all rating classes. The figure suggests that the increase in the size of the balance sheet of major central banks explains about 90% of the common variation of global bond yields over the period 2009-2017 (Malliaropulos and Migiakis 2019).

Applying panel cointegration techniques[5], it turns out that QE has led to a *permanent* decline in sovereign bond yields globally, ranging from 250 bps

[5] The regression used is $R_{it} = \alpha_i + \beta_1 c_{it} + \beta_2 \left(\frac{CBs' total\ assets}{GDP}\right)_t + \beta_3 \left(\frac{CBs' total\ assets}{GDP}\right)_t \cdot c_{it} + e_{it}$, where R_{it} is the 10-year bond yield of sovereign *i*, (*i*=1,…45), c_{it} is the credit rating of the sovereign and $(CBs' total\ assets/GDP)$ is the size of the balance sheet of the four major central banks as a fraction of

for AAA rated bonds to 330 bps for B rated bonds. One interpretation of this result is that large-scale asset purchases of central banks reduce the "free float", i.e. the effective supply of government bonds available to the private sector, leading to a permanent decline in yields.[6]

Figure 5: QE as a global risk factor



Source: Malliaropulos and Migiakis (2019): Unconventional monetary policy and sovereign bond yields: a global perspective (Bank of Greece Working Paper).

Monetary policy in the "new normal"

Looking forward, a main challenge relates to the formulation of monetary policy strategies in the aftermath of the crisis. Will central banks eventually

GDP of the four countries/areas. The regression explains 79% of cross-country-time variation of sovereign bond yields over the period January 2009 – January 2017.

[6] A similar argument has been recently made by Benoît Cœuré (2019) with respect to the effect of ECB's Asset Purchase Programme on government bond yields in the euro area: "Indeed, I would argue that the effects of asset purchases are highly persistent, and that they have affected recent pricing dynamics in two important ways: through a yield level channel and through a yield sensitivity channel. […] The first channel relates to the growing evidence that central banks, through their stocks of acquired assets and by reinvesting maturing principals, can persistently lower the yield *level* around which investors evaluate changes to the economic outlook. […] In short, as the central bank reduces the bond free float – the share of outstanding government bonds held by private price-sensitive investors – it also reduces the compensation, or term premia, that investors, as a whole, demand for holding long-term bonds."

converge to the pre-crisis status quo of an *as lean balance sheet as possible*, or will they add unconventional policies to the standard policy toolkit?

Other aspects of monetary policy strategies also feature in this debate, including, inter alia, calls for revisions of central bank mandates to encompass, for example, financial stability objectives, adopt a higher inflation target so as to reduce the likelihood of hitting the ZLB during an economic downturn (Ball 2014), target the price level instead of inflation (Bernanke 2017) or abolish cash so that central banks can push interest rates deeper into negative territory. These proposals have certainly some benefits, but they should be carefully evaluated against the broader costs of higher or more volatile inflation (such as central bank credibility and the risk of de-anchoring of inflation expectations) as well as their effects on bank profitability and bank credit.

The above discussion suggests that there is no strong case for a fundamental change in the monetary policy framework. Nevertheless, central banks will continue to use the size of their balance sheet and forward guidance as a complement to the standard interest rate policy. There are a number of both theoretical and practical reasons for doing so. First, and most importantly, the ZLB will continue to be a binding constraint on interest rate policy in a low inflation - low interest rate environment.[7]

Second, there are good arguments in favour of central banks keeping adequately large balance sheets. As Greenwood, Hanson and Stein (2016) argue, by paying interest on excess reserves and offering reverse repos, the central bank can continue to control the short-term policy rate whatever the size of commercial bank reserves and its own balance sheet. Besides, liquidity is desired and creating liquidity enhances financial stability, particularly during periods of increased demand for safe assets.

An additional argument in favour of large central bank balance sheets is that central banks' asset purchases have led to a permanent decline in global bond yields (Malliaropulos and Migiakis 2019). If this is the case, then reducing the stock of assets in central banks' portfolios too quickly could induce significant increases in long term interest rates worldwide, leading to a sharp tightening of financial conditions with severe consequences on global economic activity and financial stability.

[7] Using the FRB/US model, Michael Kiley (2018) analyses the performance of the US economy under several rules for QE. The results of these simulations suggest that, in a low interest rate environment, QE may produce sizable gains in terms of economic output and inflation stabilization compared to a pure Taylor rule. The size of these gains depends critically on the pace and the magnitude of asset purchases as well as on the timing of their initialization.

Monetary policy dilemmas

With global growth slowing since the second half of 2018 and financial conditions tightening, central banks are more likely to cut interest rates and increase the size of their balance sheet further before they start to normalize policy. Hence, the short-term dilemma is about the timing and pace of further monetary policy easing rather than tightening. However, given that, with the exception of the Fed, short-term interest rates remain close to the ZLB, central banks will make increased use of unconventional measures such as large-scale asset purchases, forward guidance and even negative interest rates in order to provide a further boost to the economy.

In the medium term, the main dilemma is whether to return to the previous or to a new normal of monetary policy. As I argued above, the "new normal" will likely be a mix of the old and the new tools, probably with little or no change to the main mandate of monetary policy, i.e. price stability. Financial stability will remain the main focus of macro-prudential policy, although monetary authorities will increasingly take into account financial stability considerations in formulating policy. This is because there is an obvious trade-off between effectiveness of monetary policy and financial stability. The faster the pace of normalization, the more leeway is created for monetary policy to be effective in a future economic downturn. On the other hand, the faster the pace of normalization, the higher is the risk of destabilizing financial markets and pushing the economy into a recession. Given this trade-off, the odds are that central banks will unwind their balance sheets at a very low pace, holding a large proportion of their assets to maturity.

Regarding the optimal size of the balance sheet, as Buiter et al (2017) argue, "The optimal size of the balance sheet is unknown and probably unknowable". Regardless of the "optimal size", there are both legal and economic constraints to central banks' expansion of balance sheets. Legally, exceeding a certain threshold makes the central bank a blocking minority, capable of opposing debt restructuring based on a Collective Action Clause (Martinelli 2016). From an economic point of view, a large balance sheet creates distortions in financial markets with financial prices no longer reflecting fundamentals but expected actions of the central bank. Finally, by acquiring the role of the Treasury in managing public debt, central banks risk their political independence.

References:

Ball, L. (2014): The case for a long-run inflation target of four percent. IMF Working Papers 14/92.

Barclays (2012): Equity gilt study.

Bernanke, B. (2005): The global savings glut and the U.S. current account deficit. Sandridge Lecture. http://www.federalreserve.gov/boarddocs/speeches/2005/200503102/

Bernanke, B. (2017), "Monetary Policy in a New Era", conference on Rethinking Macroeconomic Policy, Peterson Institute for International Economics, 12-13 October 2017.

Buiter, W., Rahbari, E, Jensen, K.D. and Rojas, C. (2017): Global economic views: Why does the Fed (or any central bank) want to shrink its balance sheet? City Research, Global Economic Views, 9, August 2017.

Caballero, R.J. and Fahri, E., (2014): The safety trap. NBER Working Paper No 19927.

Cœuré, B. (2019): The effects of APP reinvestments on euro area bond markets. Closing remarks at the ECB's Bond Market Contact Group meeting, 12 June 2019. https://www.ecb.europa.eu/press/key/date/2019/html/ecb.sp190612_1~1a3bede969.en.html

Constancio, V. (2016): The challenge of low interest rates for monetary policy, Speech at the Macroeconomics Symposium at Utrecht School of Economics, 15 June 2016.

Del Negro, M, Giannone, D. Giannoni, M and Tambalotti, A., (2017): Safety, liquidity, and the natural rate of interest. Brookings Papers on Economic Activity (Spring 2017), pp. 235-94.

Greenwood, R. Hanson, S.G. and Stein, J.C. (2016): The Federal Reserve's balance sheet as a financial tool. Paper presented at the 2016 Jackson Hole Symposium of the Federal Reserve Bank of Kansas City.

Golec, P. and Perotti, E. (2017): Safe assets: A review. ECB Working Paper No. 2035.

Gordon, R.J. (2015): Secular stagnation: A supply-side view. American Economic Review, Papers and Proceedings, Vol 105(5), pp. 54-59.

Gordon, R.J. (2016): The rise and fall of American growth: The US standard of living since the civil war. Princeton University Press.

Hamilton, J.D., Harris, E.S., Hatzius, J. and West, K.D. (2015): The equilibrium real funds rate: Past, present and future. NBER Working Paper No. 21476.

Holston, K., Laubach, T. and Williams, J.C. (2017): Measuring the natural rate of interest: International trends and determinants. Journal of International Economics 108, pp. S59-S75.

Kiley, M. (2018): Quantitative easing and the “new normal” in monetary policy. Finance and Economics Discussion Series 2018-004. Washington: Board of Governors of the Federal Reserve System.

Krishnamurthy, A. and Vissing-Jorgensen, A., (2012): The aggregate demand for treasury debt. Journal of Political Economy 120(2), pp. 233-67.

Lo, S. and Rogoff, K. (2015): Secular stagnation, debt overhang and other rationales for sluggish growth, six years on. BIS Working Paper 482. http://www.bis.org/publ/work482.htm.

Malliaropulos, D. and Migiakis, P. (2019): Unconventional monetary policy and sovereign bond yields: A global perspective. Bank of Greece Working Paper.

MacDonald, M. (2017): International capital market frictions and spillovers from quantitative easing. Journal of International Money and Finance 70, pp. 135-156.

Martinelli, T. (2016): Euro CAC and the existing rules on sovereign debt restructuring in the euro area: An appraisal four years after the Greek debt swap. Ademu Working Paper Series No 2016/043.

Rachel, L. and Smith, T.D. (2015): Secular drivers of the global real interest rate. Bank of England Staff Working Paper No. 571.

Reifschneider, D. (2016): Gauging the ability of the FOMC to respond to future recessions. Finance and Economics Discussion Series 2016-068. Washington: Board of Governors of the Federal Reserve System.

Reinhart, C. and Rogoff, K. (2009): This time is different: Eight centuries of financial folly. Princeton University Press.

Rogoff, R. (2015): Debt supercycle, not secular stagnation, 22 April 2015. www.voxeu.org/article/debtsupercycle-not-secular-stagnation

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

Summers, L. (2016): The age of secular stagnation: what it is and what to do about it. Foreign Affairs March/April 2016.

Weil, P. (1989): The equity premium puzzle and the risk-free rate puzzle. Journal of Monetary Economics, Vol. 24, pp. 401-421.

Williams, J.C. (2016): Monetary policy in a low R-star world. FRBSF Economic Letter 2016-23, August 15, 2016.