Low long-term rates: bond bubble or symptom of secular stagnation?

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Executive Summary

- Yields on European sovereign bonds have reached historically low levels in 2016, to between 0 percent and 1.5 percent in most cases, compared to above 10 percent at the beginning of the 1980s. This secular decline in long-term sovereign yields is not limited to the euro area, and can also be observed in the United States, the United Kingdom and Japan.

- The decline in yields over the last 30 years and the most recent fall are the result of various factors: reduced inflation, low risk premia in European countries and, most importantly, the fall in the real (ie inflation adjusted) interest rate.

- The decrease in the real rate is itself driven mainly by the secular decline of the 'neutral' rate – the short-term equilibrium rate between demand for and supply of funds compatible with full employment and price stability.

- Central banks therefore cannot be blamed for the actual level of long-term real rates: they adopt, to fulfill their mandates, the necessary policies to influence market rates in order to make them consistent with neutral rates, over which they have little influence.

- Given that the neutral rate is an important guide to monetary policy (and a good benchmark to determine if the current level of rates is justified), a growing empirical literature has tried to estimate where this neutral rate is.

- Although there is uncertainty around the results, there is some evidence of time-variation in the neutral rate, with a downward trend since the 1980s. This suggests that the decline in real rates of the last 10 years is not the result of an overly accommodating monetary policy but of a combination of structural and cyclical factors.

- The determinants of the fall in the neutral rate are all the factors affecting the supply and demand for funds. These include demographics, lower productivity growth, lower investment, rising inequality and shifting preferences for less risky assets.

- The disappointing recoveries in advanced countries have raised the possibility that we might have entered a period of secular stagnation. Understanding the mechanism at work behind this phenomenon could thus be crucial to understand why rates are currently so low.

- The main driver of secular stagnation appears to be the structural mismatch between the high proclivity of people to save and the low demand for those savings to be translated into risky productive investment, leading to a lower and possibly negative real interest rate to clear the market for funds.

- Although secular stagnation is an appealing hypothesis that provides an explanation for many of the economic features of the last 30 years, including the decline in real rates, it is too early to settle the debate. Nevertheless, even if secular stagnation remains a hypothesis, most of the structural features of secular stagnation are already weighing on growth and on interest rates.

- Low rates are the symptoms of our diseases, not their cause. It is therefore crucial to tackle the structural causes behind the fall in long-term rates, but also to find solutions for the harmful consequences that lower equilibrium rates could have for the conduct of monetary policy.

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Introduction

Yields on European sovereign bonds have reached historically low levels in 2016: German 10-year government bond yields stand at 0.03 percent, French at 0.25 percent, and Italian and Spanish yields are respectively at 1.37 percent and 1.07 percent. All were well above 10 percent at the beginning of the 1980s (Figure 1a). This secular decline in long-term sovereign yields is not limited to the euro area; it is also observed in the United States, the United Kingdom, Japan and Switzerland. Short-term policy rates in the euro area and elsewhere are also at historically low levels and far from their long-term average (Figure 1b). Given that short-term rates are constrained by the zero lower bound, this has resulted in a flattening of the whole yield curve.

Figure 1: European interest rates

Panel A: 10-year sovereign bond yields (%)

Panel B: Central bank policy rates (%)

DE — IT — FR — US — UK — PT — ES

DF rate — MRO rate — France pre-euro refinancing rate — Germany pre-euro refinancing rate — Germany Bundesbank discount rate
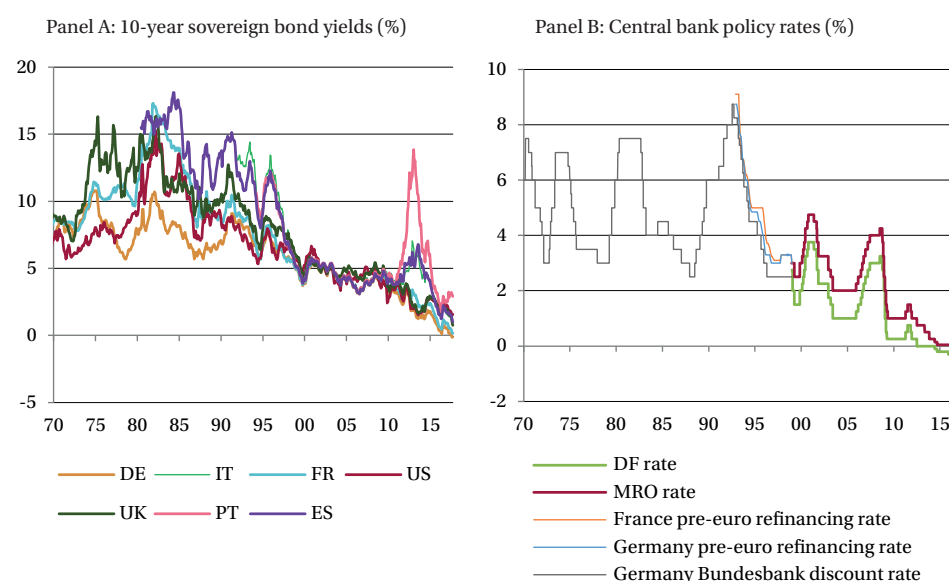
Source: Bruegel based on OECD Statistics, Bloomberg. Note: DF and MRO rates refer respectively to the European Central Bank's Deposit Facility and Main Refinancing Operations rates. The German Discount Rate is the equivalent of today's ECB Marginal Lending Rate.

It is legitimate to ask if the current levels of long-term yields on European sovereign bonds are justified, or if there is some kind of European bond market bubble fuelled by ECB monetary policy.

It is therefore legitimate to ask if the current levels of long-term yields on European sovereign bonds are justified, or if there is some kind of European bond market bubble fuelled by ECB monetary policy. Unwarranted unconventional monetary policies that keep rates artificially low could distort the allocation of resources and produce harmful side effects. There is concern about a potential increase in financial stability risks because investors are searching for yield and because the profits of insurers, pension funds and banks are being strongly squeezed. There is also a fear that inequality could increase because of the rise in prices of assets that are held by only a small fraction of the population[1].

Of course, a bubble is generally difficult to identify in real time and is more easily characterised *ex post* by the rapid escalation in an asset price[2] that is unwarranted by its fundamentals and is followed by its contraction. The objective of this Policy Contribution is therefore to try to understand why interest rates are currently so low and to determine if this level is justified by fundamental factors, or if it is an artificial phenomenon.

1   For our assessments of the potential side effects of unconventional monetary policies, see Claeys and Darvas (2015) and Claeys, Darvas, Leandro and Walsh (2015).

2   To be clear, declining yields mean that the prices of bonds are currently rising because they are inversely related.

What are the determinants of long-term rates?

Nominal rates can be primarily decomposed into real (ie inflation-adjusted) safe rates, term premia including inflation expectations, and risk premia (to compensate investors for various risks, such as default and liquidity). Movements in long-term yields can be explained by changes in these three main components. Let's take a look at them in turn.

First, a big part of the story behind the decline of nominal long-term rates in the last 35 years has been the fall in inflation and inflation expectations. On average, inflation in the euro area fell from more than 15 percent per year at the beginning of the 1980s to around 2 percent at the end of the 1990s (Figure 2). This is mainly a consequence of the adoption by the central banks of advanced economies of credible inflation targeting regimes (with a clear mandate of price stability defined by low and stable inflation, generally around 2 percent) after the surge in inflation at the end of the 1970s and the beginning of the 1980s. In that sense, central banks have had a clear impact on long-term rates by anchoring inflation expectations around their targets.

In addition, Figure 2 also shows a more recent fall both in headline inflation, which has been trending around 0 percent for the past two years (Panel A), and in market-based inflation expectations to well below the ECB's target of *"below but close to 2 percent"* (Panel B). This has surely contributed to the recent decline in nominal rates.

Figure 2: Euro-area inflation

Panel A: Headline CPI inflation (%)   Panel B: Market-based inflation expectations (%)



5y5y EUR inflation swap rate
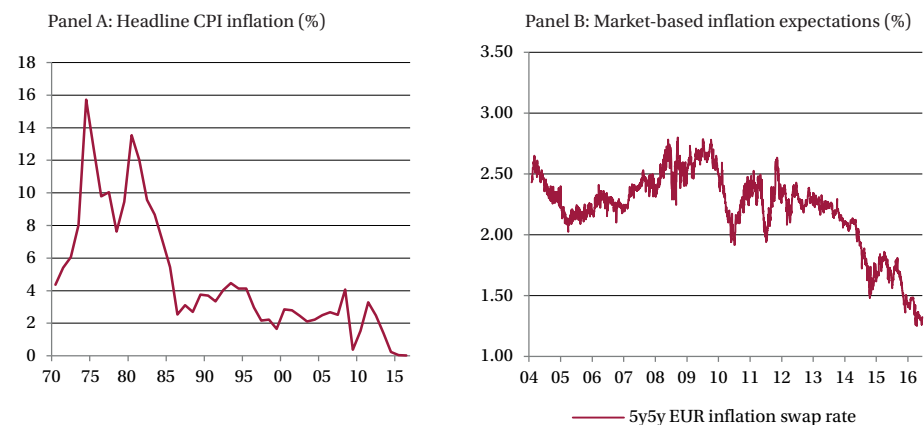
Source: Bruegel based on World Development Indicators (World Bank), Bloomberg.

Second, long-term sovereign bond yields are also affected by changes in the risk premium. As Figures 1 and 3 illustrate, this was the case during the euro-area crisis when there was a rapid increase in the probability of default and the re-denomination risk related to a potential break-up of the monetary union. Independent central banks generally do not have a direct impact on this component of long-term interest rates because it depends mainly on the solvency of governments and therefore on the health of public finances. However, the recent crisis has shown that sovereign bond markets can also be affected by self-fulfilling liquidity crises. Central banks can avoid these bad equilibria in which there is a run on the bond market by playing the role of lender of last resort in the same way that they do for the banking sector to avoid self-fulfilling bank runs (De Grauwe, 2013). The ECB decided to assume this role in 2012 when it announced the creation of its OMT (Outright Monetary Transactions) programme, a potentially unlimited but conditional purchase programme for bonds issued by euro-area governments, aimed at *"safeguarding an appropriate monetary policy transmission and the singleness of the monetary policy"*. This put an end to the liquidity crisis and resulted

in a quick fall in country risk premia across the euro area. However, the spreads did not return to the negligible pre-crisis levels because market participants realised that credit risks still differed in the different countries of the euro area, despite the monetary union (see again Figures 1 and 3).

Figure 3: 10y sovereign credit default swap in the euro area (basis points)
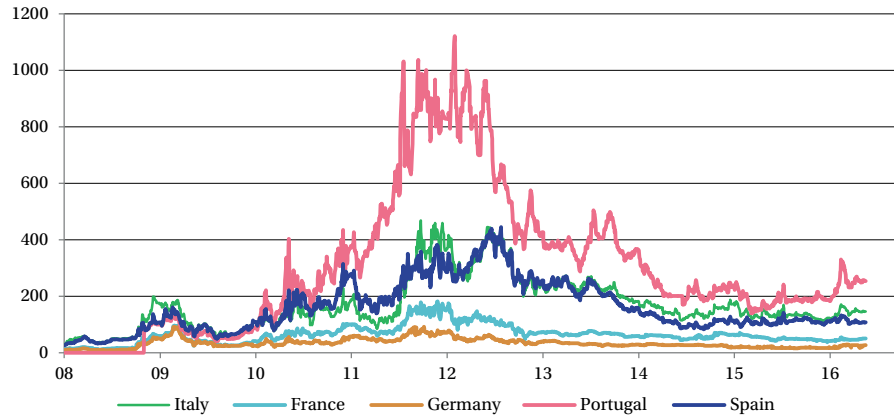
Source: Bruegel based on Eikon Reuters. Note: Credit default swaps (CDS) are financial agreements under which the seller will compensate the buyer in the event of a loan default or other credit event.

Finally, while inflation might have been the most important factor behind the downward trend in nominal rates from 1980 to the end of the 1990s, most of the decline over the last 15 years is a result of the global fall in long-term real safe rates[3] (Figure 4). In turn, real long-term rates are mainly determined by the expected path of short-term rates over the life of the asset plus a small additional term premium for holding long-term debt instead of rolling over short-term debt across the entire period.

Figure 4: Long-term 'world' real interest rate (%)
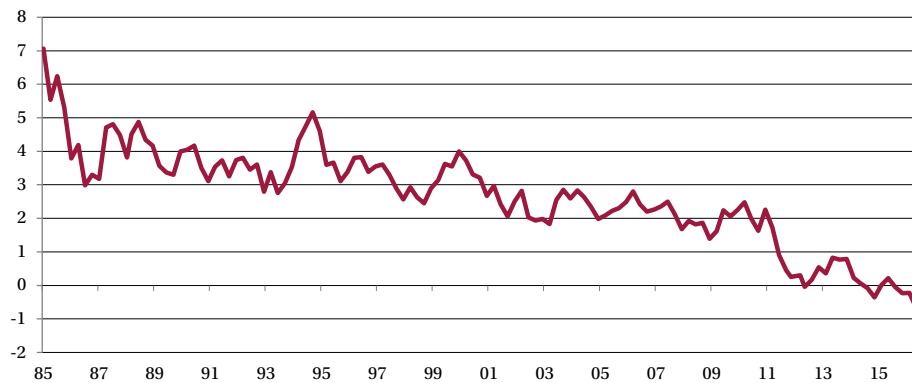
Source: Bruegel based on Bloomberg. Note: The 'world' real interest rate is based on data for G7 countries' real 10-year yields (except Italy) computed by Bloomberg (as the difference between the generic 10-year yield and core CPI) and weighted according to the real average GDP per country over the whole time period. Note that our measure takes into account the availability of the data across countries by including them gradually into the sample.

Most of the decline in nominal rates over the last 15 years is a result of the global fall in long-term real safe rates.

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3 To be clear, there are no perfectly safe assets. By safe asset we mean the safest assets available for which the default risk premium is almost negligible. In addition these assets generally benefit from a negative premium because holding them allows investors to hedge themselves partly against recessions, given their negative correlation with risky assets during crisis episodes in which risk aversion increases. This is the case, for instance, for US Treasuries, German Bunds and Swiss bonds.

The concept of neutral rate of interest and monetary policy

Does that mean that central banks are responsible for the fall in real rates because they have signalled their willingness to leave their policy rates at very low levels for a long time? Yes and no. To understand why real rates have steadily declined over the last 15 years, it is very useful to introduce the concept of the 'neutral rate of interest' (also called the natural rate, Wicksellian rate, or simply r* by some economists[4]).

This rate is defined as the short-term equilibrium rate between demand and supply of funds compatible with full employment of capital and labour resources and with price stability (ie inflation around the central bank's target). This concept was first introduced by Wicksell (1898) before being resuscitated a century later in New Keynesian models, in particular by Woodford (1998), and in practice thanks to the advent of inflation-targeting regimes in most of the world's central banks and their use of the short-term rate as the main monetary policy instrument.

Central banks cannot be held responsible for the actual level of long-term real rates. They influence market rates to make them consistent with neutral rates over which they have little influence.

The neutral rate points to the level of the real interest rate when monetary policy is neither stimulating nor restraining economic growth. If market rates are above neutral rates[5], investment and consumption are discouraged: the economy cools down and could ultimately end up in recession and in deflation if rates are maintained at that level for too long. On the contrary, if market rates are below neutral rates the economy heats up and inflation rises above target. That is why central banks are not really responsible for the actual level of long-term real rates as they adopt, to fulfil their mandates, the necessary policies to influence market rates in order to make them consistent with neutral rates over which they have little influence.

In normal times, central banks simply adjust the short-term rate up and down to influence medium to long-term market rates that are relevant for economic decisions related to investment or consumption of durable goods. However, when short-term rates reach the zero lower bound, central banks need to rely on unconventional tools to affect directly the medium and long-term part of the yield curve. To do that, they have developed a diverse array of tools: forward guidance (ie communication about the likely future course of monetary policy), negative policy rates and, most importantly, changes in the size, composition and maturity of their balance sheets, mainly through asset purchases.

Since 2008, the ECB has gradually resorted to all of these policies. First, it reduced its policy rates, and at -0.4 percent its deposit rate is now even slightly in negative territory (Figure 1b). The ECB also provided very quickly long-term lending to European banks with favourable conditions. Since 2013, the ECB has provided forward guidance on the future path of its policy interest rates. Finally, the ECB has put in place a diversified asset purchases programme that originally included Asset Backed Securities (ABS) and covered bonds, but which was vastly expanded in 2015 with the inclusion of sovereign and European supranational bonds and, later, of corporate and local government bonds[6].

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4   To avoid any confusion, in the rest of the paper we will only use the r* denomination for the estimate of the neutral rate.

5   We use 'neutral rates' in plural because we think it is possible, as in Brzoza-Brzezina and Kotłowski (2014), to extend the concept of neutral rate, originally thought of as a benchmark for the short-term policy rate, for each maturity of the yield curve (or each class of securities) therefore forming a whole 'neutral yield curve' that we can compare with the actual market yield curve. For simplicity, in the rest of the paper, we use the singular to talk about the short-term neutral rate and the plural to talk about the whole 'neutral yield curve'.

6   For details on the policies implemented by the ECB since the beginning of the crisis, see Claeys (2014), Claeys, Leandro and Mandra (2015) and Claeys and Leandro (2016).

The current level of the short-term neutral rate of interest

As we have seen, the neutral rate is an important guide to monetary policy, and thus represents a good benchmark to answer our original question and determine if current interest rate levels are justified by fundamentals or if rates are distorted by the central bank's policies. It is therefore critical to know where this neutral rate is.

Unfortunately, this value is not directly observable. In addition, historical averages of past real rates do not shed light on the current or future level of neutral rates and therefore on the adequate level of interest rates: what was considered 'normal' in terms of interest rates in the past might not be 'normal' in the future. It is therefore necessary to estimate the neutral rate.

In theory, this neutral rate depends mainly on the following factors: the saving behaviour of households and the potential growth rate of an economy (mainly determined by productivity growth and population growth). In a simple model, such as the Solow model (1956), the saving behaviour of households is fully exogenous, so the equilibrium rate depends only on technological change and population growth. In micro-founded models, such as the Ramsey model or New Keynesian models, household preferences (their patience represented by the discount rate, and their inter-temporal elasticity of substitution for consumption) will, combined again with population and productivity growth, determine the equilibrium rate in the long run. However, in more sophisticated models, such as Eggertsson and Mehrotra (2015), in which households can transition from borrowing to saving over their lifecycles, an increase in inequality or a tightening of borrowing limits can also impact negatively on the equilibrium rate.

Figure 5: Examples of estimated neutral rates

Panel A: World neutral rates (%)

Panel B: European neutral rates at national level (%)
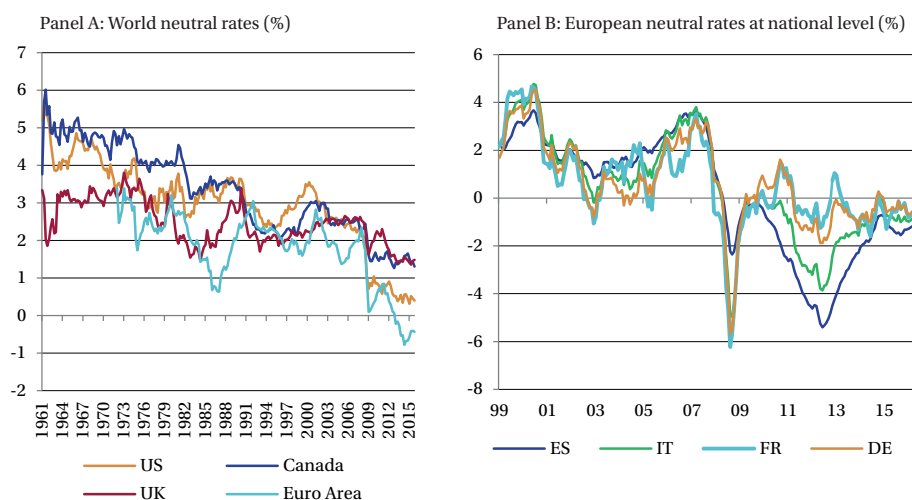
Source: Holston, Laubach and Williams (2016) and Fries *et al* (2016).

In practice, various empirical approaches have been proposed to estimate the neutral rate, ranging from statistical filters extracting unconditional trends of observed real interest rates to fully-fledged DSGE models, and including semi-structural approaches. For instance, Holston, Laubach and Williams (2016), whose main results are reported in Figure 5a, use a semi-structural approach to filter the data on output, inflation and short-term interest rates to extract highly persistent components of the natural rate of output, its trend growth rate and the natural rate of interest for the US, the UK, Canada and the euro area. They find evidence of time-variation in the neutral rate of interest in all four economies, with a clear downward trend in estimated neutral rates since the 1960s, accelerating after 2008. Their results also indicate substantial co-movement in the estimates of the neutral

rate across economies, suggesting an important role for global factors. These main findings appear to be robust to alternative methodologies[7].

Focusing on the euro area, Figure 5a suggests a collapse in the equilibrium real rate after 2008 and points towards a negative value for the last few years. Fries *et al* (2016), using a similar method, estimated time-varying national natural rates of interest for each of the euro area's largest four economies (Germany, France, Italy and Spain) since the creation of the euro in 1999. Their results (Figure 5b[8]) also suggest that neutral rates in the euro area's biggest countries have drifted very far into negative territory in recent years.

The determinants of the fall in the neutral rate are all the factors affecting the supply and demand for funds. These include demographics, lower productivity growth, lower investment, rising inequality, shifting preferences for less risky assets at home and abroad. Another interesting empirical exercise is therefore to attribute more precisely the decline of the neutral rate to these various components. Rachel and Smith (2015) explain the fall of global real rates by 450 basis points (bps) since 1980 as follows: while a reduction in the growth trend explains a decline of rates by 100bps (and 50 bps are left unexplained), demographics, the increase in savings in emerging markets invested in safe assets, the rise of inequality, and lower investment (coming from a fall in relative prices of capital goods and from lower public investment) have exerted a drag on real rates equivalent to 300bps.

However, the empirical version of the equilibrium rate estimated in most of these papers is slightly different from the one described in the previous section. The estimated neutral rate, commonly called r*, is generally defined as the long-run equilibrium rate that should prevail once all cyclical factors have died out, while the neutral rate described previously is the optimal rate that ensures full employment and price stability at all times, taking both the structure of the economy and cyclical shocks into account.

Figure 6: 'Taylor Rule' for the ECB using a time-varying r* (%)
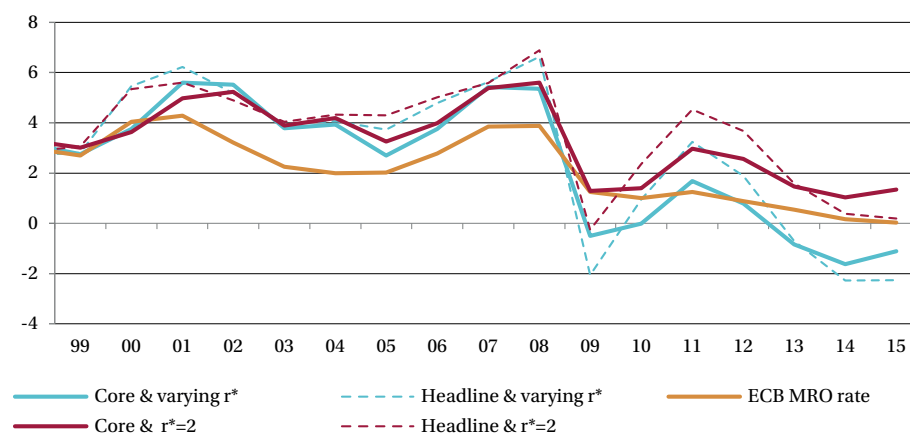
Source: Bruegel based on Eurostat, AMECO, Holston, Laubach and Williams (2016). Note: The 'Taylor rules' take the following form: r=inflation+r*+0.5(inflation-target)+0.5(output gap), using the latest output gap estimations from the European Commission, either core HICP or headline HICP inflation for the euro area, and r* either constant and equal to 2 percent or the time-varying estimates of Holston, Laubach and Williams (2016).

Hence, central banks should not try to set their policy rates precisely at the level of this estimated r*, but at a level compatible with this r* and the current economic situation (determined by the output and inflation gaps). In a simple Taylor rule, this r* could be thought as the, now time-varying, 'intercept' of the rule. To illustrate this point, we plot several versions

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7 See for instance other estimates of the US neutral rates by Hamilton *et al* (2015), Kiley (2015) or Lubik and Matthes (2015).

8 We thank the authors for sharing their data with us and allowing us to publish their results in our paper.

of a simple Taylor rule for the ECB in Figure 6, following Taylor's original specifications and coefficients (Taylor, 1993). We use headline and core inflation data from Eurostat and the (albeit imperfect[9]) output gap estimates from the European Commission, while for r* we use either the time-varying estimates of Holston, Laubach and Williams (2016), or a constant r* equal to 2 percent (the value that was used originally by Taylor but that happens to be also the pre-crisis average of equilibrium rates in the euro area). Comparing the two versions of the simple rule with core inflation (the blue and red solid lines of Figure 6), we can see that although their prescriptions were pretty similar before the crisis, they have diverged since 2008. The prescribed monetary policy taking into account both the economic situation and the evolution of the equilibrium rate has indeed been trending between 150 and 250 basis points below the one implied by a constant equilibrium rate. Moreover, this modified Taylor rule calls for a negative policy rate since the end of 2012, suggesting that the current level of ECB rates and additional unconventional policies to push the yield curve lower are justified.

Nevertheless, these numbers should not be taken too literally. A lot of uncertainty surrounds these neutral rate estimates: their values are volatile[10] and the confidence intervals reported in the literature are generally quite large. Given the limitations of estimation methods – in real time in particular – neutral rate estimates should not be used as a direct target of monetary policy (either directly or in a Taylor rule as we have done[11]) but as one important indicator among others to inform the decision making of the ECB governing council. In any case, given the complex and dynamic nature of today's economies, some discretion in policymaking is preferable to following a simple rule. However, to come back to our original question, the overall trend and the order of magnitude[12] of these estimates do not suggest the build-up of a bubble in the bond market. On the contrary, this growing empirical literature shows that the substantial decline in real rates observed over the last 10 years is not the result of an over-accommodative monetary policy but of a fall in the neutral rate, itself a result of a combination of structural and cyclical factors.

The overall trend and the order of magnitude of the neutral rate estimates do not suggest the build-up of a bubble in the bond market.

The decline in the neutral rate of interest and the secular stagnation hypothesis

As we have seen, the current decline in interest rates is strongly associated with pessimistic expectations about future economic prospects, in particular in advanced countries. The disappointing recoveries (in terms of both GDP and employment rates) observed in the US and even more in European countries, and the continuous downward revisions of potential growth estimates, have raised the possibility that we might have entered a period of secular stagnation. Understanding the mechanism that might be at work behind this phenomenon could thus be crucial to help understand why rates are currently so low.

9   Darvas and Simon (2015) assess the output gap estimations of the European Commission and provide an alternative less volatile methodology.

10   For instance, *prima facie*, the very quick and steep decline of the equilibrium rate in 2009 seems counterintuitive given that it should be the result of structural changes. However, a quick reassessment of future productivity growth, expectations of hysteresis effects coming from a big crisis, the breakdown of the financial system and the impact of enhanced regulation and supervision could explain this steep fall in the long-run equilibrium rate.

11   In addition, Taylor rules use output gap estimates that are also very difficult to estimate in real time as shown by Darvas and Simon (2015).

12   Two quick reality checks also support this order of magnitude for the neutral rate: the current level of inflation, which is well below target, and the absence of obvious financial bubbles (see Claeys and Darvas, 2015) also suggest that monetary policy is not over-expansionary.

The term secular stagnation was coined by Hansen (1939) to describe *"sick recoveries which [...] leave a hard and seemingly immovable core of unemployment"* taking place in the aftermath of the Great Depression. The main symptoms of secular stagnation described by Hansen were low growth, low employment and low interest rates because of the combination of low capital formation and a high savings rate. Hansen believed that the driving forces behind this phenomenon were the low population growth of the time and the fact that there were no new territories or techniques in which to invest. Ultimately, Hansen was proved wrong by the massive increase in government spending triggered by the second world war and, most importantly, by the postwar economic boom, the baby boom and a new wave of innovation.

Figure 7: Current account surpluses to world GDP (%)
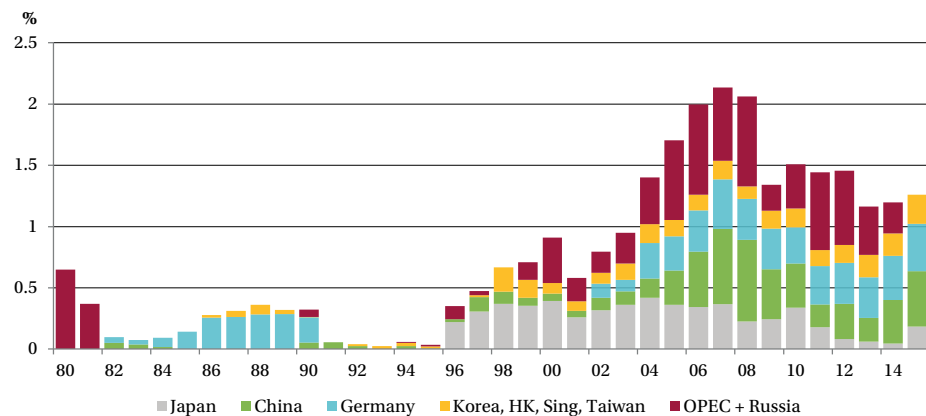
Sources: World Development Indicators (World Bank).

However, the secular stagnation hypothesis was resurrected by Summers (2013) and Krugman (2011, 2013a, 2013b) in the aftermath of the Great Recession. The secular stagnation concept describes well many features of the current slow recovery affecting the US, Japan and Europe. Unlike Hansen's original idea, today's version of the secular stagnation hypothesis does not rely as much on a technological slowdown, even if some research – eg Gordon (2014) – focuses on this aspect. The main driver of secular stagnation today appears to be the structural mismatch between the high proclivity of people to save and the low desire for those savings to be translated into (risky) productive investment, leading to a lower and possibly negative real interest rate to clear the market for funds.

Economies prone to secular stagnation oscillate between two unenviable situations: a chronic insufficiency of aggregate demand or financial instability.

According to this hypothesis, economies prone to secular stagnation (ie with low neutral rates) tend to oscillate between two unenviable situations. Either the real interest rate is constrained from equilibrating at full employment by the zero lower bound on nominal interest rates, leading to a chronic insufficiency of aggregate demand. With an inflation target of 2 percent, real rates cannot go below -2 percent, which might not be low enough to ensure full employment. Or the real interest rate consistent with equating investment and saving at full employment is so low that it is not consistent with sustainable finance and generates bubbles. Permanent negative real rates might not be compatible with financial stability if, at negative rates, some investors have a tendency to invest in 'unworthy' projects (bubbles) instead of 'worthy'/productive projects (maybe because of a relatively lower elasticity of supply of 'worthy' projects to the real rate), and if the regulation and supervision of the financial system is not effective enough.

This theory could therefore explain the current situation but also some important features of previous decades: the fact that full employment was obtained only at the price of increased leverage and bubbles (.com, housing), and the secular downward trend in inflation and long-term real interest rates. Secular stagnation would explain today's slow recovery but also the

Great Moderation[13] and Greenspan's conundrum[14] (Greenspan, 2005).

The main factors behind secular stagnation are found on both the supply side and on the demand side for savings. On the supply side, the last two decades have seen an increase in savings concentrated in the hands of savers with a low propensity to invest in risky activities. As highlighted by Bernanke (2005) in his famous 'Global Savings Glut' speech, some governments in emerging markets – China and oil-exporting countries in particular – have been accumulating huge international reserves since the end of the 1990s, overwhelmingly invested in safe assets (ie sovereign bonds from advanced countries). This was fuelled by significant current account surpluses (Figure 7) resulting from an over-reliance on exports and exchange rate interventions. In addition, an historical rise in inequality in advanced countries took place, driven by a massive increase in wages and capital gains at the very top of the income distribution, and a stagnation in real revenues for the bottom half of the distribution since the end of the 1970s (Piketty, 2014). This resulted in an increase in savings/wealth of the most affluent part of the population, characterised by a lower propensity to consume. This increase in savings at the global level should have supported an increase in capital expenditure across the world, but this is not what we observed in practice. One explanation might be that these particular savers might not maximise their risk-adjusted returns but might have other objectives with a preference for 'nominal safety' or liquidity, resulting in the absence of risk-taking investors and a high demand for safe assets (a movement amplified during the crisis by the drastic decrease in the global safe-asset supply: from $20 trillion in 2007 to $12 trillion in 2011, as highlighted by Caballero and Farhi, 2014).

Figure 8: Gross capital formation (investment) as % of GDP
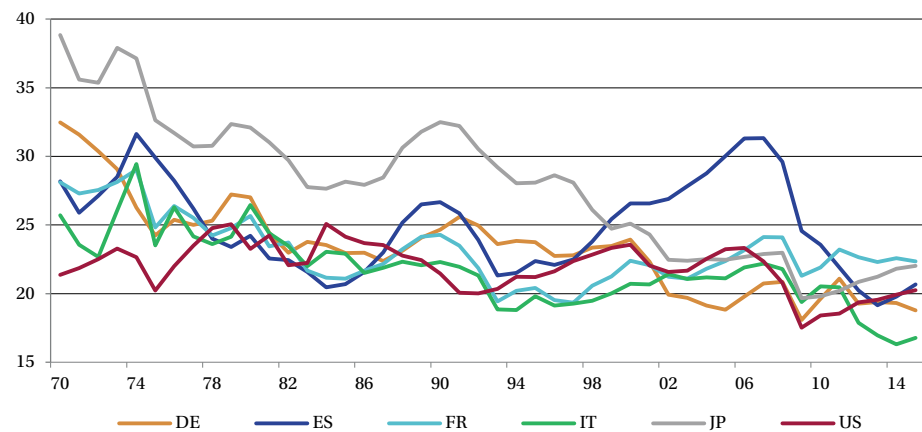
Source: World Development Indicators (World Bank).

On the demand side, a variety of structural changes could explain the lower demand for savings for financing investment in advanced countries (see Figure 8). There could be a lack of profitable, or more probably sufficiently safe, private investment opportunities in advanced economies: this would also explain the tendency to invest in bubbles that could be seen as safer during the build-up phase, in particular in housing, despite all the evidence to the contrary[15]. As suspected by Hansen in the 1930s, low population growth in advanced countries could translate into low future demand for goods and services and could weigh on

13 The Great Moderation refers to the period between the early 1990s and 2007 during which the volatility of business cycle fluctuations was reduced in many advanced countries. During that period, GDP growth was steady and inflation was stable at around 2 percent.

14 Greenspan's conundrum refers to the episode in 2005 during which 10-year US Treasury yields failed to increase and even declined despite an increase in the Fed's policy rate of 150 basis points.

15 See for instance Jordà *et al* (2016).

current investment. Other factors could also drive the decline in capital expenditure: the fall in the relative price of durable equipment; a broken financial sector or one that has wrong incentives (Claeys, 2016); poor managerial incentives to invest within companies; a techno-logical slowdown or at least a difficulty in rewarding innovators; monopoly positions in some industries leading to huge rents leading to disincentives to increase production; and finally the reduced capital intensity of leading industries (think General Motors, 220,000 employees worldwide, 400 offices and plants, market capitalisation of $48bn vs. Whatsapp, 55 employees, 1 office and valued at $19bn, ie 40% of GM).

Should we take the secular stagnation hypothesis seriously?

Given that the global savings glut is mostly the result of bad government policies, secular stagnation could prove temporary if those policies are changed.

Although secular stagnation is an appealing hypothesis that provides an explanation for many of the economic features of the last 30 years, it is still very early to settle the debate. In the euro area in particular, the recovery has just started, so it is so far very difficult to distinguish the secular from the cyclical trend. The cyclical component could still be very strong in the after-math of a one-in-a-century crisis, in particular because the European crisis was characterised by some significant policy mistakes, with a fiscal policy that was on aggregate pro-cyclical from 2011 to 2014 (and broadly neutral in 2010 and 2015 at a time where it should have been coun-ter-cyclical), and a monetary policy that was often very slow and behind the curve. In terms of investment, a vicious circle of weak demand and sluggish investment also emerged during the crisis. Various hysteresis effects are also at work, leading to lower productivity growth resulting from cuts to investment and R&D during the crisis and from the destruction of human capital because of the prevalence of very high unemployment rates for almost a decade now.

In particular, as suggested by Rogoff (2015), the current slow recovery and the low-rate environment could more simply be the result of the *"debt super-cycle"*. Unlike the V-shaped recovery of 'standard' recessions, financial crises are often followed by U-shaped recoveries, because of the length and the difficulty of the deleveraging process. This would also imply low safe real rates, because of the deleveraging taking place after an asset price bust and the move away from risky assets, as shown by Gourinchas and Rey (2016). In that case, the policy response should be straightforward and twofold: support the deleveraging process by facilitating debt write-downs and maybe by increasing temporarily the inflation target, while implementing strong micro- and macro-prudential policies to avoid a repeat. This could well be a good description of the current European situation in which the banking sector has not been totally cleaned up (eg non-performing loans still represent a big part of some banks' portfolio, especially in the periphery) and private debt is still very high.

Given that the global savings glut – one of the main factors behind the secular stagnation hypothesis – is mostly the result of bad government policies, secular stagnation could also prove temporary if those policies are changed, as argued by Bernanke (2015). A transforma-tion of the Chinese economic model away from exports towards internal demand, and the steep fall in the oil price, should result in a reduction of excess savings in emerging markets. In order to accelerate the end of the global savings glut, it would thus be important for emerg-ing countries to avoid intervention in foreign exchange markets, while advanced economies should reduce the remaining barriers to capital flows towards emerging markets.

The cyclical arguments clearly have some merit and are definitively playing a big role in the current situation, but they do not explain fully why the decline in long-term real rates preceded the crisis. In fact, the trend in real and neutral rates between 2000 and 2007 (Figures 4 and 5a) has continued in the aftermath of the crisis with a very similar slope. In addition, although the sum of global current account surpluses has receded since the global savings

glut peak of 2005, the equilibrium real rate has continued to decline, suggesting that the external factor is important but that it might not be the main factor. Focusing on the euro area in particular, the monetary union also displays some of the most worrying features of secular stagnation. Even Germany, the top-performing country of the union, is characterised by low domestic demand, low wage growth, low inflation, an aging society and a heavy reliance on exports to ensure full employment. In addition, Germany's ever-increasing current account surpluses could be seen as a symptom of too much saving and not enough investment. In many countries of the periphery, growth and full employment before 2008 were obtained through leverage and bubbles. Today, these countries are characterised by low investment, lower potential growth and also low population growth. The periphery is now following the same export-led economic model as Germany by regaining competitiveness through prices to improve exports, but domestic demand is still very weak. This has led to an even larger current account surplus for the whole euro area, driving fears that the euro area could soon replace China and oil exporters in the global savings glut as the main savings' exporter.

Overall, the secular stagnation hypothesis is still an hypothesis, but a frightening one, and even if the particular mechanism described by Summers and Krugman or its secular nature is proved wrong over time, most of the features of secular stagnation are already present today and are weighing on growth and – to come back to the main topic of this paper – on interest rates. Imbalances leading to a global savings glut in emerging markets and now in Europe, the historical rise of inequality, the various disincentives to invest, aging populations and slowing productivity growth, are real structural problems in need of solutions, whether secular stagnation is underway or not.

Concluding remarks and future challenges for policy

The decline in long-term rates on European sovereign bonds in the last few years results from a combination of factors: a fall in inflation expectations, a return of risk premia to levels more in line with credit risks (unlike before or during the euro crisis) and most importantly a fall in real rates driven by a secular decline in neutral rates. These fundamental factors are the main drivers of the decline in long-term yields in Europe, making it very difficult to qualify the current state of the bond market as a bubble. In our view, low rates are the symptoms of our diseases, not their cause. Instead of accusing central banks, it is crucial to tackle the causes behind the fall of long-term rates, but also to find solutions for the harmful consequences that lower equilibrium rates could have for the conduct of monetary policy.

A lower neutral rate implies that episodes in which monetary policy is constrained by the zero lower bound are likely to be more frequent and longer.

If the neutral real rate is negative or around zero, even if inflation is around the 2 percent target, steady-state policy rates would be around 2 percent. This would give less leeway to cut rates when next recession arrives. For comparison, in the US, the average reduction during the past nine recessions in the Fed policy rate was equal to about 5.5 percentage points. All else being equal, a lower neutral rate implies that episodes in which monetary policy is constrained by the zero lower bound are likely to be more frequent and longer. This implies that the ECB would need to rely more heavily on unconventional policies, the effects of which are less certain, and which are more difficult to calibrate given their relative novelty. Moreover, given the particular institutional arrangement of the monetary union, the use of these policies has been politically controversial, which in turn delayed their implementation in the euro area. The ECB's quantitative easing programme started six years after the beginning of asset purchases by the US Federal Reserve and the Bank of England. The reluctance to use this type of policy could lead to permanent suboptimal monetary policymaking in the euro area, should this set of policies become the ECB's main instruments because of a fall in the neutral rate.

Lower neutral rates and their potential impact on monetary policy should also lead to a reassessment of the role of fiscal policy in tackling recessions.

If the equilibrium rate remains very low or even negative for a prolonged period, the ECB should reassess its monetary policy framework and its inflation target. This target is not set in stone and is defined by the ECB itself. The (below but close to) 2 percent target might have been suitable for the first years of the ECB and may have helped anchor inflation expectations at a low and stable level at a time when the neutral rate was around 2 percent, but it might not be a well-suited inflation target for a low neutral rate era. The ECB should determine if it would be wise to raise its inflation target (for instance to 4 percent) so that the market can clear at a lower real rate. Of course, this is a very serious decision and there would be some risks involved. Some have argued that a change to the target could lead to a loss of credibility of the central bank and dis-anchor fragile expectations. We don't think that this would be the case, but the main benefit of the 2 percent inflation target is that, at this level of inflation, many economic agents behave as if there were no inflation at all. A higher level could change that and revive indexation of contracts and thus second-round effects when there is a shock to headline inflation (for instance from energy prices).

Finally, lower neutral rates and their potential impact on monetary policy should also lead to a reassessment of the role of fiscal policy in tackling recessions and slow recoveries and in supporting monetary policy in that regard. In this type of episode, governments should take advantage of the high demand for safe assets and the low rates on long-term sovereign bonds to finance a surge in public infrastructure and R&D. As suggested by De Long and Summers (2012), given the current negative real rates, the higher multiplier at the zero lower bound and the positive impact of public investment on future potential growth, this could even result in a decrease in the debt-to-GDP ratio in the long run. As shown by Claeys, Darvas and Leandro (2016), the current European fiscal framework is, in practice if not in theory, highly ineffective and has contributed to the anaemic economic recovery in Europe. That is why it is time to design better and maybe more systematic fiscal policies in the euro area that would support the economy during recessions and recoveries, first by reforming the fiscal rules and then by enhancing the automatic stabiliser properties of European fiscal policies at the national and European levels.

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