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Low real interest rates: Causes and outlook

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Low real interest rates: Causes and outlook

Over the past few decades, inflation has been driven down both in the world's developed countries and on a global scale, so much so that fears of deflation now outweigh concerns about imminent inflation. This development has driven nominal interest rates down as the interest rate inflation component expected by investors becomes smaller and smaller. What is striking, however, is that the drop in interest rates has been much more dramatic than the drop in inflation. Real interest rates are now exceptionally low on almost all of the major bond markets.

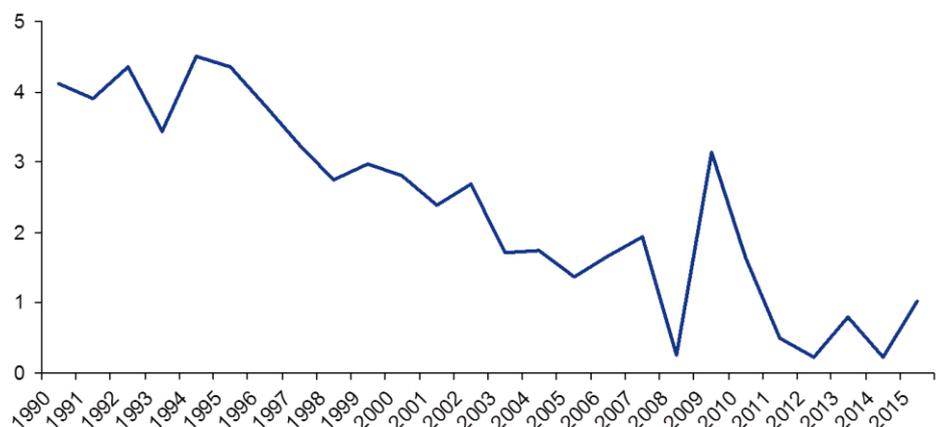
Can these low interest rates be attributed to long-term trends, as an analysis based on neoclassical models for explaining interest rates in terms of the supply and demand for savings would tend to suggest, or are they a monetary phenomenon, i.e. one determined by monetary policy and the overall credit market context? We do not believe that one-directional interest rate explanations are of much help. The theoretical idea that real interest rates cannot be influenced by monetary factors in the longer term, for example, would appear to us to be a hasty simplification. As a result, we have attempted to weigh up the main possible explanations for the drop in real interest rates.

Chart 1 shows how the "real global interest rate" has developed in the period from 1990 to date. We have calculated the global interest rate as the average real interest rate, weighted based on relative market sizes of the main bond markets – the US, Japan, the UK, Italy, France and Germany. The real interest rate corresponds to the difference between the yield on ten-year government bonds and the rate of increase in private consumption prices – while acknowledging for one thing, that the current inflation rate does not necessarily reflect inflation expectations but also, for another, that it is virtually impossible to reliably measure the inflation expectations that consumers and investors have.

Chart 1

Development of global real interest rate¹⁾

Annual average, in %



1) Bond markets included: USA, Japan, UK, Italy, Germany and France; nominal interest on 10yr govt bonds price-adjusted with consumer price indices and weighted by relative market size (total debt securities, Q4 figure).

Sources: BIZ, Datastream, Eurostat, own calculations.

Whereas the first half of the 1990s saw global real interest rates, calculated as set out above, still sitting at a level of around 4% on average, the level seen over the past five years – 2011 to 2015 – has averaged only 0.5%. This sort of slump in real interest rates points towards huge changes in the economic environment. Economists have brought a

whole number of possible explanations for this development to the discussion table. The IMF (2014) and the US Council of Economic Advisers (2015) both provide overviews of the potential determining factors lurking behind the slide in real interest rates. Economists at the Bank of England¹ have attempted to quantify various factors influencing real interest rates. They conclude that secular trends that impact the supply of savings and the demand for investments could explain most of the drop in real interest rates. We have taken these analyses as a basis for our own evaluation of the factors influencing real interest rates below, before moving on to a forecast as to how these factors will impact the development of real interest rates in the future. We believe that the main possible explanations for the drop in real interest rates are:

- The monetary policy "sea-change"
- Structurally higher supply of savings
- Lower investment demand irrespective of the interest rate level
- Changes in portfolio behavior
- Lower productivity growth

1. The monetary policy "sea-change"

Central banks have expanded their arsenal considerably in recent years. Their unconventional measures mean that they have become direct players on the bond markets, meaning that they exert direct influence over the yields on fixed-income securities. Nevertheless, it is important not to underestimate the role played by interest rate policy on bond market yields either. With their key rates and liquidity policy, central banks largely control rates on the interbank market. If banks have a large volume of liquidity available to them at favorable rates, and if the lending demand among non-banks is subdued at the same time, then banks have a considerable incentive to buy bonds as a sort of liquidity buffer. This allows central banks to influence long-term rates. Gehringer and Mayer go a step further when it comes to assessing the impact that monetary policy has on long-term rates.² They call the theory that banks largely act as intermediaries between the supply and demand for savings into question and explain interest rates based on the credit creation process, in which lending rates are determined by the current and expected interbank interest rate, plus premiums for liquidity and credit risks. This means that nominal market interest rates are heavily dependent on current and expected monetary policy. They argue that central banks can, in the process, push the market interest rate down to below the "natural interest rate level", at which saving and investing are in equilibrium with each other, and that this accelerates lending and growth, but also promotes misguided investments. Ultimately, they argue, the market interest rate rises due to excessive investment demand, and parts of the capital stock become unprofitable. This triggers a recessive phase that is exacerbated by the need for debt reduction. Although theories like these, which center around the credit cycle and are based on Wicksell, von Mises and von Hayek, appear mechanical, they do provide a clear illustration of how monetary policy can influence market interest rates. Another reason why this is significant is because there have been prolonged phases of expansive and restrictive monetary policy in the past.

¹ Rachel and Smith (2015a, b)

² Gehringer and Mayer (2015)

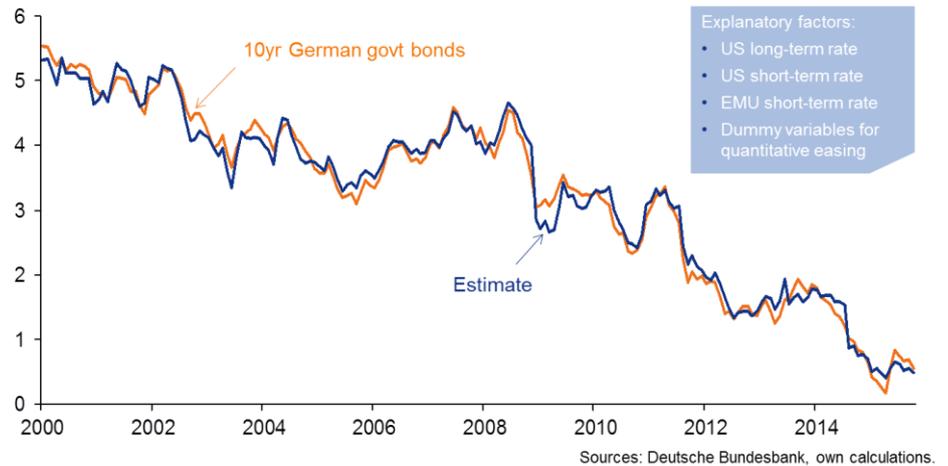
In the period between the 1970s and the 1990s, monetary policy focused on preventing inflation. By withdrawing liquidity and imposing what were at times very high key interest rates, it attempted to break the cycle of cost and price increases. There is little doubt that high key interest rates push the yields on long-term bonds up. This theory is backed up by econometric analyses. The situation is exacerbated by the fact that monetary policy can only reduce inflation expectations based on many years of experience very, very gradually. As a result, it generally takes some time before monetary policy moves to combat inflation are able to push the inflation component of the long-term interest rate down to any degree to speak of. This means that the high real interest rates calculated for the first half of the 1990s are likely to be an after-effect of the anti-inflation policy, at least in part.

At the very latest after the bursting of the New Economy bubble and the global uncertainty that emerged after September 11, 2001, monetary policy in the US and Europe switched to a largely expansive course. After a relatively brief period of fairly high key rates in 2007/2008, the global economic and financial crisis triggered a definitive monetary policy "sea-change". Unlimited access to liquidity for banks, unconventional monetary policy measures and key interest rates edging towards zero were the new hallmarks of monetary policy, which assumed an anti-deflationary stance. The question as to how much of a contribution the zero interest rate policy and the unconventional monetary policy measures have made to pushing real interest rates down is an open one. We have taken an econometric approach to explaining the yield on 10-year German government bonds, which involves looking at the US yield on 10-year government bonds, the US three-month interest rates, the European three-month interest rates and dummy variables for the ECB's bond purchases as determining factors, in an attempt to quantify the effects of the zero interest rate policy and the bond-purchasing program. We believe that the three-month rate is determined by monetary policy. With an explanatory quality of 98.4%, the adjustment capacity between the values predicted by the model and the actual yields is exceptionally good. The estimated yield-reducing effect of quantitative easing comes to around 65 basis points, while a reduction in the short-term EMU interest rates to the tune of 100 basis points, taken on its own, reduces the yield on 10-year bonds by almost 40 basis points. If the bond purchase program were to come to an end and the ECB's key rates were to be hiked from the current level of 0.05% to 2%, and if US short-term interest rates were to increase by 200 basis points, with US long-term rates going up by 150 basis points, then this would, based on our explanatory model, nudge German long-term rates up by around 180 basis points. The objection could be raised that this does not necessarily have to involve an increase in real interest rates, because the ECB will not correct its extremely expansionary monetary policy until inflation rates start to pick up again. This is true in principle. Nevertheless, the level of the estimated monetary policy effects on the long-term interest rates suggests that the real interest rate would be significantly higher if the central banks were pursuing a "neutral" monetary policy course.

Chart 2

Yield on 10yr German government bonds

Estimate and outturn (from January 2000 to October 2015)



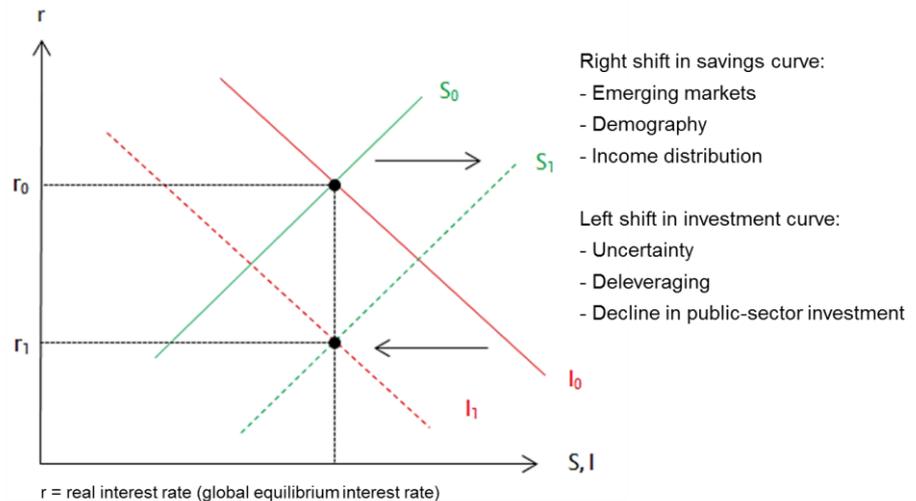
2. Shift in the savings curve

Economic theory holds that the equilibrium real interest rate can be found at the intersection of the savings and investment curve, which are derived from the supply of, and demand for, capital. As a result, examining the momentum and the individual components of this market in greater detail is paramount if we want to explain the drop in the real global interest rate. Global investments and savings have remained largely constant, in relation to global value creation, over the past 30 years.³ This implies that there must have been changes in both investment behavior and savings momentum, because the global equilibrium real interest rate today is significantly lower. Various literary sources claim that the savings curve has moved to the right over the last three decades, while the investment curve has gradually shifted to the left. This new equilibrium shows a lower real interest rate, with the investment and savings rate remaining constant (see Chart 3). The following sections explore possible explanations for this development.

³ Rachel and Smith (2015a)

Chart 3

Shift in savings and investment curve



Savings glut in the emerging markets

The savings rate in the world's up-and-coming economies soared in the period between 2000 and 2007, a trend that the IMF attributes primarily to the continued strong economic growth and the resulting income growth, particularly in China.⁴ What is more, incomes in the oil-exporting countries also rose between 2004 and 2008 on the back of high oil prices. This triggered a marked increase in the savings rate in relation to gross domestic product. According to a study conducted by the BIS⁵, the marginal propensity to save in the up-and-coming economies rose from 30% in 2000 to 40-50% in the years just before the outbreak of the financial and economic crisis. This is also reflected in the global savings rate, which the IMF reports to have risen by around 1.7 percentage points between 2000 and 2007. Out of these 1.7 percentage points, 1.5 are causally attributed to the higher savings rate in the emerging markets. A further 0.8 percentage points result from these countries' increased share of global output. There is also a deduction of 0.6 percentage points that can be explained by the reduction in savings in the developed countries during the period in question. Ben Bernanke⁶ argued that many emerging markets embarked on radical strategic changes in the wake of the Asian crisis. They started to accumulate large volumes of currency reserves to act as a safety net. This turned capital importers into capital exporters. The countries that pursued this strategy generated generous current account surpluses in the process. After the global crisis of 2008/2009, however, the savings rate in the emerging markets started to stabilize (see Chart 4), pushing the marginal propensity to save back down again.

We believe that the savings glut in the emerging markets is one of the main reasons behind the drop in real interest rates in the world's developed countries over the past decade.

⁴ World Economic Outlook (April 2014)

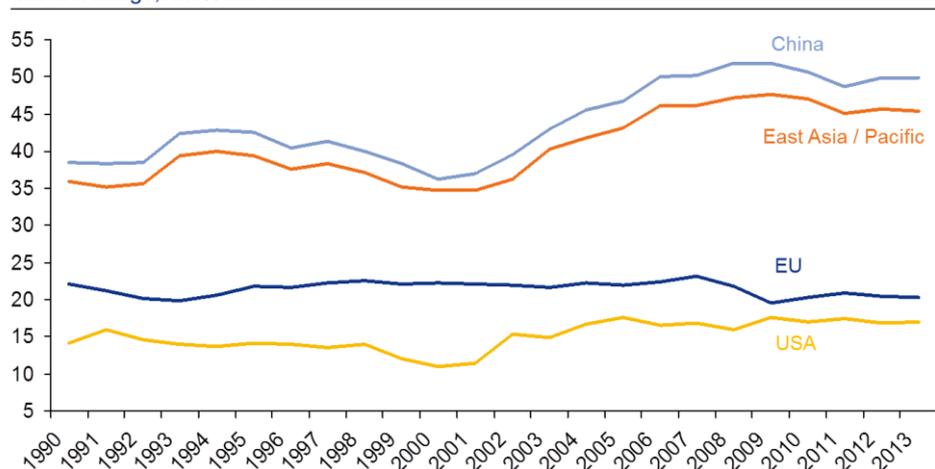
⁵ Turner and Sobrun (2015)

⁶ Bernanke (2005)

Chart 4

Rising savings rates in emerging markets

Gross savings, as % of GDP



Source: Worldbank.

When attempting to explain the shift in the savings curve, reference is often also made to demographic trends, although these factors are very unlikely to be responsible for the dramatic rise in the savings rate in the emerging markets over such a relatively short period, i.e. from 2000 to 2007.

Demographic development

Over a longer period, however, demographic developments can be considered as one of the main possible reasons behind the rightward shift in the savings curve. Over the past 30 years, the proportion of the non-working population (aged 0-19 and 65 and above) in relation to the total global population has fallen from 50% to 42%.⁷ The lifecycle hypothesis establishes a negative link between the average savings rate and the proportion of the non-working population in relation to the population as a whole. It is assumed that the working population has a higher average savings rate, while people of retirement age use a higher proportion of their income for consumption purposes. This implies that the drop in the percentage of the population that is of non-working age, as mentioned above, or the increase in the working population has pushed the savings rate up. This development is likely to have shifted the savings curve to the right.

The world is currently faced with a large-scale structural demographic change. Most parts of the world expect to see the proportion of the population that is of working age drop in relation to the population as a whole, with many countries even likely to see a drop in the absolute number of members of the working age population.⁸ This has direct implications for the future development of macroeconomic parameters. It can be assumed that the rightward shift in the savings curve will be corrected again to a certain extent. This means that, from a demographic perspective, real interest rates are expected to rise again in the future.

⁷ Rachel and Smith (2015a)

⁸ Morgan Stanley (2014)

Inequality in the distribution of income

Studies conclude that the distribution of income has become less equal in many countries over the past few decades.⁹ An ongoing increase in income inequality, however, would result in a higher average savings rate.¹⁰ This argument is based on the assumption that richer people have a higher propensity to save. Estimates show¹¹ that individuals in the top quintile of income distribution save an extra third of their income compared with the rest of the population. The higher overall savings rate that emerges as a result implies a rightward shift in the savings curve.

It is also, however, possible to argue that, as the world's emerging markets continue to catch up in global terms, global income distribution is becoming more equal. So the impact of income distribution on savings is not clear-cut. As a result, we do not believe that it is of much significance as a factor influencing real interest rates.

3. Shift in the investment curve

Drop in public-sector investment

In model simulations, the IMF has calculated exceptionally positive macroeconomic effects resulting from additional public-sector infrastructure investment, particularly in the world's developed economies.¹² These investments provide a short-term boost to aggregate demand and increase production potential in the medium term. The model results suggest that even credit-financed infrastructure investments are often self-financing in the sense that they do not push the government debt ratio up.

Since the 1980s, however, public-sector investment in the world's developed countries, expressed in relation to gross domestic product, has been on the decline in general. This produces a lower overall investment ratio, shifting the investment curve to the left. This development is exacerbated by the fact that private investments have also been put on hold due to a lack of public-sector infrastructure. Rachel and Smith put the drop in the global investment ratio due to low public-sector investment at around 1 percentage point, which they translate into a drop in the global real interest rate of 20 basis points. Although the scale of the effect appears plausible, we believe that it is virtually impossible to quantify this effect.

Although the state has reduced its investment demand in general, fiscal policy has been largely expansive overall in many countries, particularly over the course of the last decade. The public purse's considerable financial needs, owing to high deficits, should actually have pushed interest rates up considerably. But with the exception of Italy, this is not how things have materialized in the major bond markets. All of the major and liquid bond markets are likely to be benefiting from the increasing demand for "safe haven" investments (see section 4). All in all, it is not possible to identify any clear link between public spending and debt policy on the one hand, and real interest rates on the other. As a result, an increase in public-sector investment would be unlikely to have any impact on interest rates to speak of.

⁹ Piketty (2014)

¹⁰ Rachel and Smith (2015a)

¹¹ Dynan et al. (2004)

¹² World Economic Outlook (October 2014)

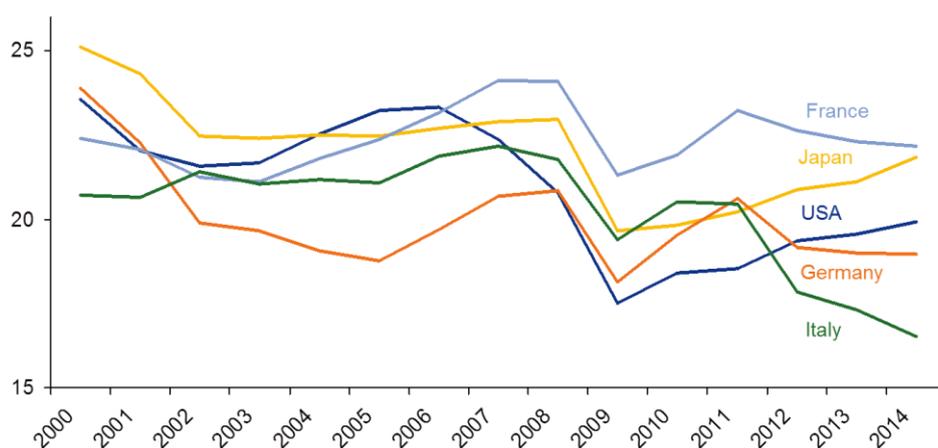
Deleveraging in the private sector

The years prior to the financial and economic crisis were characterized by high debt levels among private households and the corporate sector alike, as well as by a steady rise in bank leverage. When the property bubble burst and the financial markets slumped as a result, the private sector started to reduce its debt – a process that continues to this day, particularly in some European countries. When a company is in the process of slashing its debt, it no longer takes out loans for investments. Any investment is financed primarily using existing liquid assets, which tends to limit companies to replacement investments. Even if the order books are full and capacity utilization levels are good, companies generally shy away from making expansion investments. Debt reduction also gives rise to potential deflationary trends, putting downward pressure on long-term nominal interest rates via the expectation channel on the one hand, and via monetary policy reactions on the other. Since the debt reduction trend among private households is likely to be a temporary effect, the shift in the investment curve can be expected to correct itself again in time.

Chart 5

Falling investment ratios in industrial countries

Gross investment, as % of GDP



Source: Worldbank.

Mounting uncertainty

The reluctance to invest witnessed since the crisis is not just linked to the need to reduce debt, but is also related to the perceived uncertainty resulting from the debt reduction process. This uncertainty is "priced in" in the form of a risk premium on yields. The bigger the difference between the risk-free interest rate and the return on investment, the weaker investment demand is.

Within this context, it is important to refer to *tail risks*, which can have a marked impact on long-term interest rates. Tail risks are extreme events that are very unlikely to occur, but would have serious consequences if they did. Nowadays, investors are becoming increasingly aware of extreme risks like these and their potential for causing financial instability. The likelihood of such *tail risks* materializing would appear to be continually on the rise given the increasing geopolitical instability, the new risks associated with cyber attacks and the increased incidence of environmental catastrophes. This has a corresponding impact on the risk premium and, as a result, on investor investment be-

havior.¹³ This approach does not, however, go very far in explaining the downward trend in real interest rates that has been ongoing for several decades. Rather, it is more significant when it comes to the developments witnessed in recent years.

An empirical analysis conducted by the IMF¹⁴ shows that the investment rate had fallen by 1 percentage point on average one year after the outbreak of the financial crisis, and by as much as 3 percentage points after a period of three years. This effect would appear to be highly persistent, meaning that it continues to have an impact several years down the line.

So the influencing factors explored above produce a new market equilibrium with a much lower level of real interest rates. While demographic trends and rising income levels in the emerging markets have favored higher savings rates, mounting uncertainty, a drop in state investment and private debt reduction efforts have triggered an investment slump that persists to this day. The damper put on investment demand by the drive to reduce debt and the uncertainty fueled by the financial and economic crisis are likely to gradually taper out. Events outside of the economic sphere, however, such as geopolitical instability, could emerge at any time and leave an ever-growing cloud of uncertainty hanging over investment planning.

4. Structural shifts in portfolio structure

Shifts in how the risks associated with certain investment forms, such as bonds and equities, are perceived can be of a cyclical, but also of a structural nature. The bursting of the "dot-com bubble" in 2000/2001 is likely to have been one event that prompted longer-term investors, in particular, to attach a higher risk rating to equities in the long run, shifting the investment structure in favor of bonds. This may have pushed real interest rates down.

Another significant effect as far as portfolio shifts are concerned is likely to have come from central banks in the emerging markets. The IMF, which believes that shifts in investment behavior¹⁵ are also relevant to the development of real interest rates, considers the sharp rise in foreign currency reserves in the emerging markets in the period after 2000, a trend which created additional demand for US Treasuries, in particular, to be one of the reasons behind the drop in real interest rates.

The global financial market and economic crisis of 2008/2009 is likely to have increased the risk valuation of equities in relation to fixed-income securities yet again. So it comes as little surprise that studies point towards an increased preference for conservative investment structures among long-term investors. A detailed discussion paper published by the Bank of England and the Procyclicality Working Group¹⁶ concludes that, among insurance companies and pension funds, there is a long-term structural trend moving away from investments in equities.

Major regulatory changes also play a significant role as far as portfolio structure is concerned. Solvency II and Basel III have imposed much higher requirements for the capital backing of assets that are classed as entailing a high risk. By contrast, government bonds in bank balance sheets are assigned a risk weighting of zero for the purposes of capital

¹³ Council of Economic Advisers (2015)

¹⁴ World Economic Outlook (April 2014)

¹⁵ World Economic Outlook (April 2014)

¹⁶ Procyclicality and structural trends in investment allocation by insurance companies and pension funds (2014)

requirements. What is more, the liquidity regulations set out in Basel III categorize government bonds as highly liquid assets.¹⁷ We can assume that this regulatory preference for government bonds has boosted demand and reduced interest rates in the process.

Finally, the European debt crisis has created particularly high demand for government bonds with good credit ratings. The loss of confidence in certain European government bonds meant that those government bonds that are accepted as safe were in shorter supply, as they were used by banks as a source of refinancing via repo transactions.¹⁸ Yields on government bonds with high credit ratings dropped considerably in the course of the debt crisis, with German government bonds, in particular, benefiting from their safe haven status. Although empirical studies¹⁹ tend to conclude that fears of a general shortage of "high-quality assets" are unfounded, market forces and regulatory changes are likely to have increased the demand for these assets considerably.

5. Drop in productivity growth

The neoclassical growth theory is based on a production theory analysis and believes that macroeconomic growth is the main factor determining the development of the equilibrium real interest rate. Economic growth is, in turn, determined by productivity and population growth on the one hand, and investment and savings habits on the other. Consequently, the reasons for the changes in the supply of savings and in investment demand discussed in sections 2 and 3 are not competing theories in the race to explain real interest rates. Rather, they are merely based on a different perspective.

From a production theory point of view, macroeconomic growth is determined by the extent to which labor productivity and the volume of labor grow. The development of labor productivity includes both the contribution to growth made by capital as a production factor – as a result of investment activity – and technological progress, while the volume of labor describes the growth contribution made by labor as a resource. Productivity studies often also look at total factor productivity, which describes technological progress or the rate of innovation. It is expressed in the form of a residual value, because it describes the proportion of macroeconomic growth that can be explained neither by the capital factor nor by the labor factor. This is why total factor productivity growth tends to be lower than labor productivity growth, because the latter concept also takes the capital factor into account.

Many countries have been experiencing weak, or even stagnating, productivity growth for years now, giving rise to concerns about secular stagnation. The economic, financial and debt crises seen in recent years have lowered many market participants' expectations of future trend growth. The lower rate of labor supply growth in the developed countries, lower economic momentum in the emerging markets and the sense of skepticism regarding the rate of technological progress are also putting a damper on growth expectations.

Technological progress is generally tied to investment. Subdued investment activity has a direct impact on capital intensity and total factor productivity. These two parameters, in turn, influence labor productivity. This means that the current investment slump is one of the main factors explaining the weak productivity trend.

¹⁷ Lambert (2014)

¹⁸ Große Steffen (2015)

¹⁹ Fender and Lewrick (2013)

The rate of growth in the global supply of labor has been falling continually since 1980 due to demographic trends. But it is difficult to estimate the extent to which the lower supply of labor is having an impact on real interest rates. Yet with demographic developments as they are, productivity is becoming more and more relevant as a driver of economic growth. As far as the future development of real interest rates is concerned, this means that the question as to whether the current productivity slump is merely a temporary phenomenon, or one that is likely to bear with us for some time, is a decisive one. The demographic effect also has an impact via the investment channel, since risk aversion and age are likely to be positively correlated. This means that the current aging process that is affecting our societies will slam the brakes on investment and innovation.²⁰

Chart 6

Declining total factor productivity undermining labor productivity

Growth rate of global labor productivity and total factor productivity in %

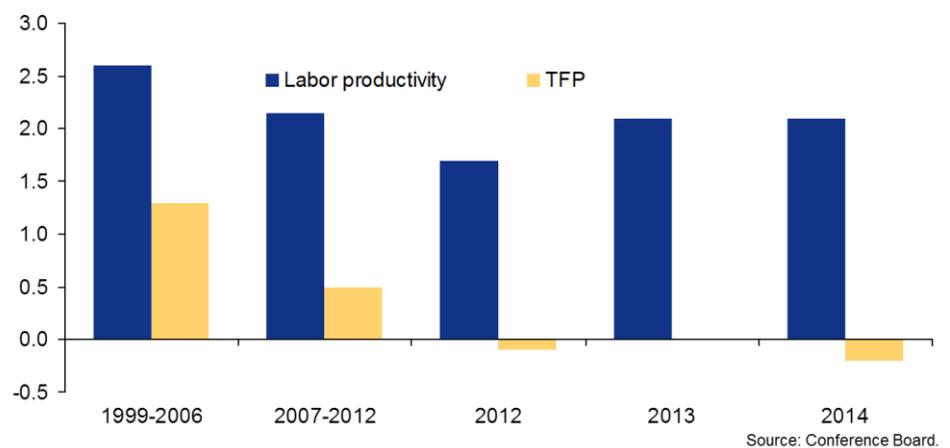


Chart 6 shows the development of labor productivity and total factor productivity at global level since 1999. It shows that total factor productivity growth has fallen considerably over time in line with the Conference Board estimates²¹, and even slipped into the red in 2012 and 2014. Labor productivity has also fallen over the period analyzed, albeit to a lesser degree. As explained above, the sluggish productivity growth reflects a whole number of factors that are significant to real interest rates. This means that productivity growth is likely to have a decisive influence on real interest rates in the longer term.

6. Outlook: Real interest rate to rise again in the medium term

The analysis of the various determining factors supports our theory that both fundamental factors and monetary policy have their role to play in the falling real interest rates. The massive efforts made on the monetary policy front are likely to have pushed the market interest rate to below its "natural" levels. The associated risks, such as excessive valuations on the asset markets and the misallocation of resources, should not be underestimated.

While our calculations show a marked increase in real global interest rates in 2015 (from 0.2% in 2014 to around 1.0%), this is unlikely to mark a turning point in developments, as inflation rates fell considerably in 2015 due to the drastic drop in energy prices and understate the fundamental price trend. This is likely to play a role in 2016 as well.

²⁰ Heise et al. (2015)

²¹ Conference Board (2015)

However, we would like to use the following section to look beyond 2016. In the medium term a number of parameters that we deem to be significant to the development of real interest rates could certainly undergo fundamental changes. Monetary policy is most certainly one of them. We still do not think that the US or Europe are heading for deflation or secular stagnation, cementing the extremely expansionary monetary policy seen at present in the long term. Inflation rates will edge back towards the 2% mark in the next two, three years, as the inflation-curbing impact of the slide in energy prices gradually fades and wages start to pick up slightly in most countries. This will prompt monetary policy to lower the curtain on quantitative easing and bid farewell to the zero interest rate policy as well. Although monetary policy is likely to remain on the accommodative side and avoid sending out restrictive signals, key interest rates of around 2%, i.e. roughly in line with inflation, would appear realistic in this sort of environment. As already explained, German long-term rates would then surpass the 2% mark again, in line with our estimate.

Although this sort of monetary policy normalization would not trigger any significant increase in real interest rates due to the higher rates of inflation, an increase is certainly within the realms of possibility in combination with changes in other factors determining real interest rates. The drop in oil prices will see the revenue and, as a result, the supply of capital from oil-exporting countries on the global markets drop considerably. In some cases, public budgets will even rack up hefty deficits. In the medium term, we expect fewer savings to be accumulated for demographic reasons. The proportion of the working age population in relation to the population as a whole, for example, is already expected to drop appreciably in the next few years, as the number of older people increases considerably. Older people save less. What is more, the very high savings rates witnessed in emerging Asia are expected to fall back slightly in the future as welfare networks are expanded. All of these factors suggest that global savings accumulation will lose momentum, which should help to push real interest rates up to at least some degree.

At the same time, there is a fairly good chance that investment activity will bounce back again in the medium term. The trend towards debt reduction in the private sector of many economies is a temporary phenomenon – albeit one that may persist for several years – and is likely to play less of a role in determining investment demand in the foreseeable future. The longer the economic recovery in the advanced economies proves to be stable, the more the mood of uncertainty among investors triggered by the various crises since 2008 will gradually lift. Finally, we also hope that an increase in public-sector investment will make a contribution. Many countries are becoming increasingly aware that, without maintaining and expanding their public infrastructure, growth prospects will remain only moderate. As a result, a rightward shift in the investment curve is likely to nudge real interest rates up ever so slightly.

It is difficult to forecast future structural shifts in portfolio structure. In general, government bonds are likely to continue to enjoy a regulatory preference over riskier forms of investment, even if a certain degree of political resistance is starting to emerge. The caution exercised by some investors when it comes to riskier assets like equities is not merely a temporary phenomenon either. We do not believe that portfolio shifts will have any marked impact on real interest rates in the foreseeable future.

While it is not easy to explain the very weak productivity growth seen in recent years, we do not believe that this will be a permanent state of affairs. As investment ratios bounce back, the adoption of innovations is also likely to step up a gear. The "digital revolution" should start to provide increasingly positive impetus for productivity. Many companies

that are currently still in the "learning phase" or the "transition phase" will be able to use new business models to achieve considerable efficiency gains in the future. While we believe that a global productivity boom is unlikely, we do expect to see a moderate acceleration in productivity growth, which could also have a slightly positive impact on the development of real interest rates.

So all in all, there are a whole number of reasons suggesting that global real interest rates of 0.5% – the average level for the past five years – will remain an exception to the rule. In the medium term – i.e. in three to four years – our rough estimate puts real interest rates at around 1.5%, even if global growth remains on the moderate side. We see the real yield on 10-year German government bonds somewhat lower, because they are considered European benchmark bonds and are likely to retain their particularly pronounced "safe haven" status due to Germany's low debt ratio in an international comparison.

To gain a picture of the outlook for nominal rates, we need an assessment of future inflation rates. As described above, inflation in two years' time will be back at around 2%, in the course of which German long-term nominal rates will also climb to around 2%. Over the medium-term horizon up to 2020 long-term German interest rates are likely to head towards 3%. Global nominal interest rates will then be around 3.5%.

Chart 7

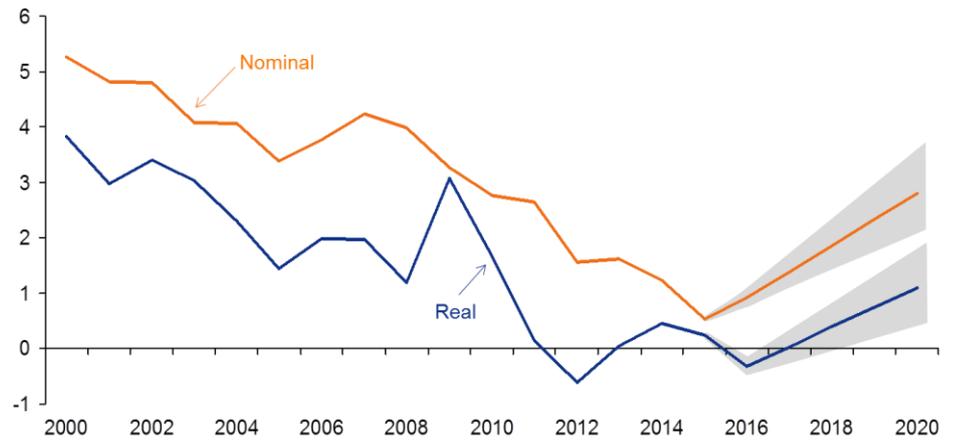
Global real interest rate heading for new equilibrium over medium term

Determinants	Impact on real interest rate
Monetary policy <ul style="list-style-type: none"> ▪ Quantitative easing comes to an end ▪ End of zero interest rate policy } less expansionary	upward on nominal, unclear on real interest rate
Shift in savings curve <ul style="list-style-type: none"> ▪ Demography: Rising proportion of older people ▪ Subdued savings in emerging markets } more to left	slightly upward
Shift in investment curve <ul style="list-style-type: none"> ▪ Pressure from private sector deleveraging eases ▪ Public-sector investment rises slightly } more to right	slightly upward
Portfolio shifts <ul style="list-style-type: none"> ▪ Little change, regulatory preference for government bonds 	unchanged
Productivity growth <ul style="list-style-type: none"> ▪ Positive impact of information and communication technology ▪ Return to higher investment 	slightly upward
	Global real interest rate climbs from average 0.5% to an estimated 1.5%

Chart 8

Medium-term trend in real and nominal interest rate

European benchmark bond



Sources: Deutsche Bundesbank, own calculations.

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