Historically low real interest rates in the coming decade

The global real interest rate has trended downwards over the past 30 years. It is now very low, and pricing in financial markets indicates that it will be low for a long time. For structural reasons, the NIER expects real interest rates in Sweden and elsewhere to rise slowly in the coming decade but remain low.

This special analysis discusses the structural factors behind the NIER's forecast for central bank policy rates over the next ten years. A description of how real interest rates have moved over the past 30 years is followed by a theoretical discussion of structural factors influencing real interest rates and an analysis of how these and other factors will develop going forward. The analysis concludes with the NIER's forecast for nominal and real policy rates in Sweden, the US and the euro area in the coming decade.

## Real interest rates over the past 30 years

The expected real interest rate is central to macroeconomic analysis. It is defined as the nominal interest rate less expected inflation. As there are various different nominal interest rates and inflation expectations, there are various different real interest rates in the economy.

Central bank policy rates are a measure of a risk-free short-term interest rate level that takes account of both cyclical and structural factors. Government bonds issued by countries with high credit ratings are often used to gauge expectations of future risk-free short-term interest rates. The yields on these bonds are affected by largely the same factors as central bank policy rates, but are normally higher on account of their longer maturity (the so-called maturity premium).

The capital market is global, and so the trend in domestic real interest rates is dictated largely by global structural factors. As Sweden is a small, open economy with free movement of capital, it cannot deviate from global movements in the longer term. To obtain a global perspective on the current low level of real interest rates, Diagram 147 presents the interest rate on a weighted real (inflation-protected) government bond for the G7 countries (excluding Italy) with a long maturity, normally ten years or more. This real interest rate serves as the market's view of long-

Diagram 147 Real interest rate, long-term government bonds
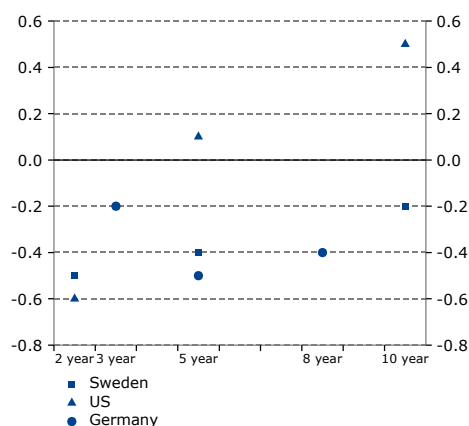Per cent, quarterly values
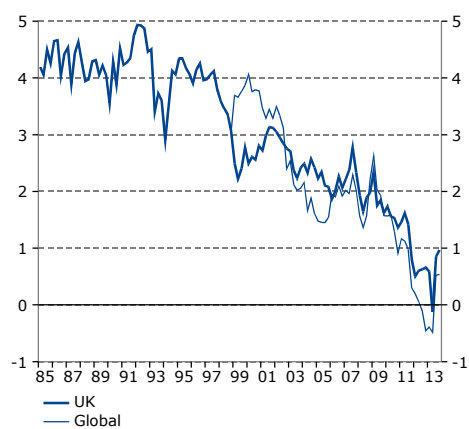
Note. The global series starts 1999Q1.
Source: King and Low (2014).

Diagram 148 Real interest rate, long-term government bonds
Per cent, 5 DecemBer 2014

■ Sweden
▲ US
● Germany

Source: Macrobond.

term real interest rates.[101] The UK was the first of the G7 countries to issue inflation-protected government bonds and is reported separately in the diagram. Not until the second half of the 1990s did other G7 countries follow suit with similar bonds.[102]

The downward trend in the global real interest rate is clear from Diagram 147, not least since the turn of the millennium. This picture is confirmed by Diagram 148, which shows the market pricing of inflation-linked bonds with different maturities. The real return is negative for Sweden and Germany at maturities up to ten years, and is only slightly positive in the US for the ten-year maturity (0.5 per cent). The overall picture is a downward trend in the real interest rate on government bonds and further very low real rates going forward.[103]

Several structural factors have been put forward to explain the historical trend over the past 30 years.[104] Falling investment relative to GDP in developed markets, lower risk premiums due to lower inflation and greater financial integration are three factors that contributed to the decline in the 1980s and the first half of the 1990s. The sharp downturn in the new millennium can be explained by increased saving in emerging markets and their greater preference for low-risk assets, predominantly government bonds.[105] The financial crisis and subsequent economic downturn also brought increased demand for government bonds from central banks, insurers and pension funds, among others.[106] It should be stressed that movements since the financial crisis in 2007 are harder to interpret, because the period has been affected by very weak cyclical developments as well as structural factors.

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[101] See King and Low (2014).

[102] Some countries' real interest rates may be affected by both exchange rate premiums and risk premiums. Globally, the sum of these exchange rate premiums will be zero. In order to avoid some countries' risk premiums having a disproportionate weight, King and Low (2014) calculate GDP-weighted real interest rates. Italy is one of the G7 but is excluded from the calculations because in recent years the Italian real interest rate is considered to have been dominated by risk premiums associated with the possibility of sovereign default and/or exit from the EMU.

[103] There is an international debate both in the academic world and at policy institutes about whether it is the so-called neutral rate that has fallen back and will remain low going forward – see, for example, Armelius et al. (2014), Borio and Disyatat (2014), Bouis (2014), IMF (2014) and Tuelings and Baldwin (2014).

[104] For an overview, see Bouis et al. (2014) and IMF (2014).

[105] IMF (2014).

[106] Bouis et al. (2014) and Summers (2014).

Theoretical explanations for movements in real interest rates

The research literature includes various theories about the real interest rate. In a barter economy, the real interest rate is determined by three factors: productivity growth, population growth and the trade-off between current and future consumption. With money as a means of payment, there are two interest rates: one is the neutral real rate, which is determined by the same factors as in the barter economy, and the other is the bank rate.[107] One common assumption in this type of model is that the economy is driven by technological advances. Cyclical fluctuations are then explained by fluctuations in technological progress. It is unlikely, however, that the sharp falls in GDP seen periodically over the past century can be explained by normal cyclical shocks. Instead, it has been found that, besides these normal fluctuations, there are occasionally very strong negative shocks to demand that trigger a huge decrease in GDP.

Barro (2006) studies how large negative shocks to technology and production capacity affect asset prices in a barter economy. He estimates the annual probability of disasters where GDP per capita falls by 15 to 64 per cent at 1.5 to 2 per cent. The likelihood that the economy will be hit now and again by major negative shocks means that the interest rate on risk-free assets, such as bank deposits covered by deposit guarantees and treasury bills, will be low. The reason for this is that investors can be expected to be risk-averse, and so the higher the chances of a disaster, the less willing they will be to invest in risky assets. Miles (2014) develops Barro's analysis and reaches similar conclusions, namely that an increase from 1 to 2 per cent in the likelihood of an extreme event that results in a 20 per cent drop in GDP will reduce the risk-free real interest rate by 1.4 percentage points.

In these traditional, neoclassical models, it is assumed that households can be aggregated in such a way that it is possible to study the sum of all households, or a so-called representative household. Saving and investment are then determined by the representative household's trade-off between consumption today and consumption tomorrow. However, this result may be rejected if account is taken of different generations saving to

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[107] The neutral (natural) interest rate and the bank interest rate are venerable concepts originally introduced by Knut Wicksell at the end of the 19th century. He argued that inflation was determined by the difference between these two rates – see Wicksell (1898). The idea of a neutral interest rate is now a key component of all central banks' models.

different degrees. Eggertson and Mehrotra (2014) develop an OLG model[108] with three generations (the young, who borrow; the middle-aged, who save; and the old, who consume these savings). The authors identify various reasons why the supply of saving increases and demand for loans decreases, with the result that the real interest rate falls. One cause of a falling real interest rate over a long period is if the young, who subsequently turn into savers, for some reason borrow less than before. One reason for this might be that the economy is hit by a debt crisis (deleveraging shock) similar to the financial crisis. The real interest rate falls because demand for loans among the young decreases. Another cause is if the intermediate generation, which saves the most, increases as a percentage of the population. Under certain demographic conditions, the neutral real interest rate could end up persistently negative. Combined with low inflation and an assumption of restrictions on monetary policy (for example, that the nominal interest rate cannot fall below zero), this means that the actual real interest rate will be higher than the neutral rate. The economy could then end up in a state of secular stagnation.

CREDIBLE MONETARY POLICY ANALYSIS MORE LIKELY TO INFLUENCE THE ECONOMY

A central bank's policy rate is its key instrument for influencing economic activity. Besides setting the policy rate in the short term, some central banks – including the Riksbank and the Federal Reserve – also publish forecasts for the policy rate several years ahead. If these forecasts are credible (for example, because they are supported by sound economic analysis), market rates at long maturities can also be influenced. To present credible forecasts for the policy rate, central banks must carefully analyse both cyclical and structural factors. They must also communicate how they balance factors such as unemployment, inflation and financial stability.

One topical example that illustrates the above reasoning is the Riksbank's revisions of its repo rate projections over the past year. As can be seen from Diagram 149, the path was revised down significantly between October 2013 and October 2014. On the occasion of the most recent downward revision, the Riksbank analysed structural factors that may mean that the repo rate needs to remain low for a long period.[109] The Riksbank has

Diagram 149 The Riksbank's repo forecasts
Per cent, quarterly values

— October 2014
- - - April 2014
—— October 2013
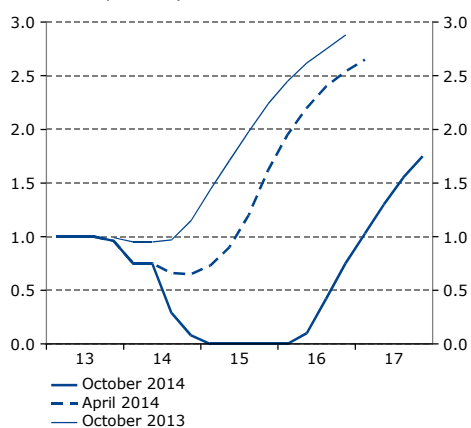
Source: The Riksbank.

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[108] Overlapping generations model.

[109] See Armelius et al. (2014).

also communicated that it now intends to attach much greater importance than in recent years to pushing up the low level of inflation than to curbing growth in household debt.

The Riksbank's analysis and statements taken together have probably contributed to market expectations for the repo rate having come down both two and five years ahead over the past year (see Diagram 150). The interest rates faced by households and firms have also fallen during this period. It is difficult, however, to gauge just how much the Riksbank's analysis and revised interest rate path contributed to this decrease, because underlying factors such as interest rates abroad have also changed.

Key factors for real interest rates in the coming decade

Current pricing in financial markets implies a lower expected future real interest rate for safe assets than before the financial crisis. This section discusses various factors that influence real interest rates via effects on the propensity to save or invest in real assets.[110]

Figure 1 illustrates how the global real interest rate is determined. If, for example, the global propensity to save increases, the supply curve will shift outwards. If the propensity to invest in real assets decreases, the demand curve will shift inwards. Both of these changes will contribute to a lower real interest rate.

SEVERAL FACTORS POINT TO CONTINUED HIGH GLOBAL PROPENSITY TO SAVE

Uncertainty: The financial crisis and the dramatic changes in the value of real estate and many securities, together with question marks over the future of the euro, have probably increased the risk of the rare disasters referred to by Barro (2006). Households, firms and market participants may perceive a greater probability than before the financial crisis of some major negative event occurring, making future income from labour and capital more uncertain than before. This will increase the propensity to save on a precautionary basis and reduce the propensity to invest in real assets (see Figure 1).
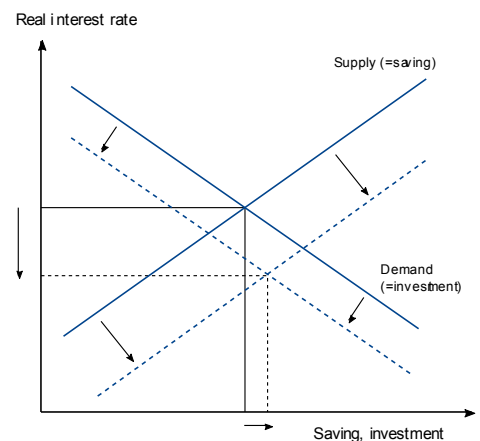
Diagram 150 Money market agents' repo rate expectations
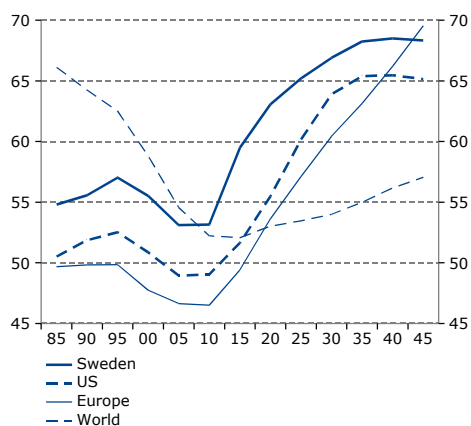Per cent, monthly values

Source: TNS Sifo Prospera.

Figure 1 Global real interest rate determination

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[110] The propensity to save and invest can also change for cyclical reasons, but the analysis here focuses on structural changes.

The increased uncertainty may also mean continued high levels of saving in emerging markets.[111] In addition, governments in many developed markets will be stepping up their saving in future in order to bring down the high levels of central government debt that have built up.

Demographics: In general, it is the older generation that has negative saving, and generations with good income from employment that save. The higher the proportion of the population that needs providing for, the less the average household will save. A total dependency ratio defined as the proportion of people below the age of 16 and over the age of 64 relative to the working population aged 16−64 has been falling for a long time at a global level (see Diagram 151). Both a lower share of young people and a lower share of elderly people will have a positive effect on saving, but the old-age dependency ratio has a much greater effect.[112]

Population forecasts are now indicating a break in the trend, and a rise in the total dependency ratio in the coming decades is inevitable (see Diagram 151). This trend break is dominated by a significant increase in the old-age dependency ratio. A long period of increased saving for demographic reasons is now being succeeded by the reverse, which will gradually contribute to a higher real interest rate.[113]

There may, however, also be factors that pull in the other direction, at least in the coming decade. The financial crisis and subsequent economic downturn have left deep scars in public finances in many developed markets. Demographic developments mean that large retirement cohorts are expected in many countries. This combination – weak public finances and a large rise in the old-age dependency ratio in the coming decades – may mean that households are less confident in public pension systems than before the financial crisis, with the result that they feel a need to save more themselves.[114]

Inequality: Gradually widening inequality is another factor behind the increase in the propensity to save and so the decrease in the real interest rate.[115] Households with high incomes have a

Diagram 151 Number of young (<15) and elderly (65+) in relation to the working-age population (15−64)
Per cent

Sweden
US
Europe
World

Source: United Nations.

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[111] IMF (2014).

[112] Leff (1969).

[113] Erfurth and Goodhart (2014) and IMF (2014).

[114] Jimeno et al. (2014). See also Backus et al. (2013).

[115] Glaeser (2014), Gordon (2014) and Summers (2014).

greater propensity to save than those with lower incomes, because the latter are more likely to need to use their income for consumption. When a growing share of total income goes to a small group with already high incomes, the propensity to save in the global economy will rise, pushing down the real interest rate.

SEVERAL FACTORS POINT TO CONTINUED WEAK INVESTMENT DEMAND

Lower potential growth: As stated in the theoretical discussion above, potential growth is a fundamental factor for the level of the real interest rate. In simple neoclassical models, the latter is equal to the long-term growth rate. As can be seen from Diagram 153, international organisations estimate that potential growth shifted down in 2008−2013 relative to the period before the financial crisis.[116] They also believe, however, that it will gradually return to its pre-crisis levels. The exception is the euro area, where the potential growth rate is expected to remain lower than before the crisis in the coming decade. Lower potential growth – via both slower technological development and weaker growth in the labour force – means a reduced need for investment, which will shift demand inwards in Figure 1.

There are also other factors that point to continued weak investment demand. Empirical analysis reveals that it takes many years for investment as a share of GDP to recover from a financial crisis.[117] This may be due to a number of factors. Increased uncertainty, as discussed above, can lead to higher compensation for risk and so a higher required rate of return, putting a damper on investment growth.[118]

Dwindling balance sheets: Both the recent financial crisis and many previous financial crises have led to a so-called balance sheet recession.[119] In such recessions, the value of households' and firms' assets has fallen in many countries, while the value of their liabilities has held up. In order to restore the desired balance between assets and liabilities, both households and firms

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[116] Diagram 153 presents average estimates from the European Commission, the IMF and the OECD. The European Commission has not published estimates for the global economy or for the period 2025−2029. The IMF's estimates in its *World Economic Outlook* (WEO) cover the period through to 2019. For the period 2020−2029, estimates from the IMF's Economic Modeling Division as presented in the latest update of the Global Projection Model (GPM) have been used. These values largely correspond to the WEO estimates for 2002−2019.

[117] IMF (2014). See also Lewis et al. (2014).

[118] Jimeno et al. (2014) and Summers (2014).

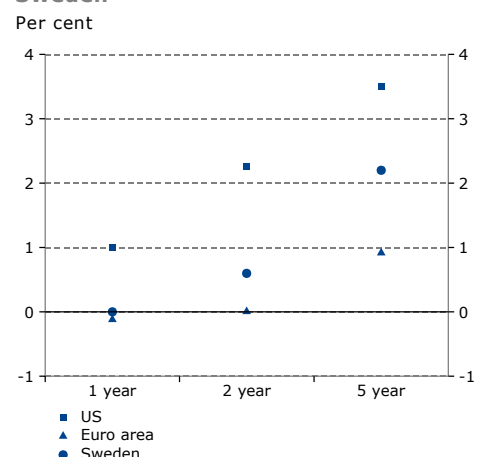[119] Koo (2014) and Buttiglione et al. (2014).

Diagram 153 Potential growth
Per cent
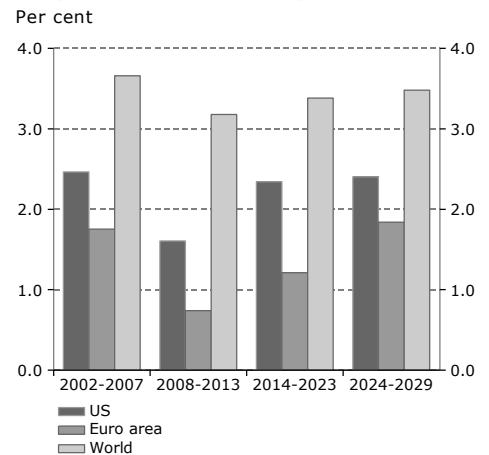
Anm. Average of three international organisations. See footnote 116.
Sources: European Commission, IMF and OECD.

Diagram 152 Nominal policy rate expectations in the US, euro area and Sweden
Per cent

Note. Referring to October (US and euro area) and December (Sweden), respectively. See footnote 120.
Sources: New York Federal Reserve, ECB and TNS Sifo Prospera.

Diagram 154 Real policy rate expectations in the US, euro area and Sweden
Per cent

US
Euro area
Sweden
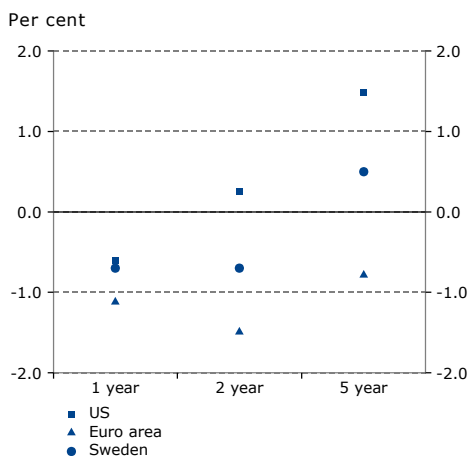
Note. October (US and euro area) and December (Sweden), respectively. See footnote 120.
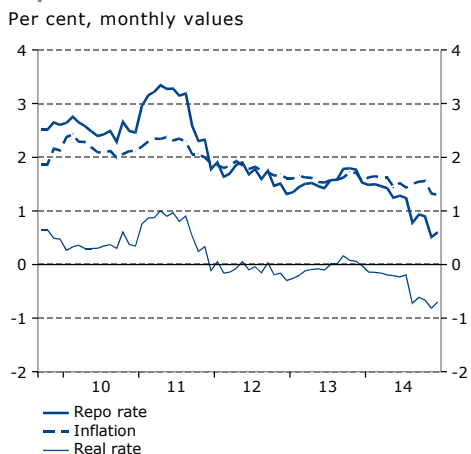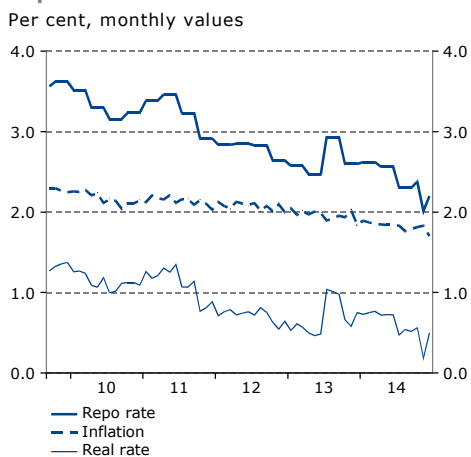Sources: New York Federal Reserve, ECB and TNS Sifo Prospera.

Diagram 155 Two-year market expectations in Sweden
Per cent, monthly values

Repo rate
Inflation
Real rate

Note. Money market agents. See footnote 120.

Diagram 156 Five-year market expectations in Sweden
Per cent, monthly values

Repo rate
Inflation
Real rate

Note. Money market survey. See footnote 120.
Sources: TNS Sifo Prospera and NIER.

are now increasing their financial saving and investing less, pushing down the real interest rate.

Conclusions and implications for the NIER's forecasts

Several structural factors indicate that the real interest rate will remain low for many years to come. The NIER therefore anticipates a relatively slow rise in central bank policy rates in the coming decade, not least in the euro area.

MARKET EXPECTATIONS POINT TO CONTINUED LOW POLICY RATES

Market participants' expectations, as expressed in the pricing of financial instruments and responses to surveys, can be interpreted in terms of future policy rates. It is important to stress, however, that market expectations do not necessarily coincide with other forecasters' views, including those of the NIER. This can be due to differing assessments of both cyclical and structural developments.

Diagrams 152 and 154 present market expectations for nominal and real policy rates in Sweden, the US and the euro area.[120] There is a relatively large difference between the US and the euro area. The Federal Reserve is expected to hike its policy rate to 2.25 per cent in two years and 3.5 per cent in five years, whereas the ECB's policy rate is not expected to rise at all in the next two years and will still be slightly below 1 per cent in five years, giving a negative real policy rate. Expectations for Sweden are closer to the euro area two years ahead and roughly mid-way between the US and the euro area five years ahead. The nominal policy rate in Sweden is expected to be 2.2 per cent in five years, and the real rate 0.5 per cent.

Time series for market expectations two and five years ahead for the policy rate, inflation and real interest rate in Sweden are presented in Diagrams 155 and 156. The last observation is from December 2014 and means that market participants expect a repo rate of around 0.6 per cent in two years, at which time both the Riksbank and the NIER expect the economy to be close to

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[120] The expected real interest rate has been estimated as the difference between market participants' policy rate and inflation expectations based on surveys, except for the expected nominal policy rate in the euro area which is estimated on bond pricing.

full capacity. This corresponds to a real repo rate of −0.7 per cent.

To sum up, it is clear that market participants anticipate historically low, albeit gently rising, real interest rates for many years to come. This applies, above all, to the euro area and Sweden, as expectations for the US indicate more normal developments by historical standards for an economic upturn.

### REAL INTEREST RATES LOW BUT RISING IN THE COMING DECADE

Real central bank policy rates are currently negative in Sweden, the US and the euro area. The NIER, like market participants, expects nominal and real policy rates to rise gently but remain low. This is on account of a number of structural factors continuing to exert a downward pull on real interest rates, albeit to a decreasing extent over the coming decade.

- It is reasonable to assume that fears of further major negative shocks occurring will subside the more time passes after the financial crisis. Households' and firms' expectations of future income and growth are to some extent adaptive, and uncertainty will decrease as time goes by without further major shocks.

- Households and firms have gradually reduced their debt levels since the financial crisis, which has pushed down consumption, investment and, as a result, real interest rates. This deleveraging is expected to slow as debt levels gradually approach the desired levels.[121]

- Potential GDP growth is expected to rise gradually in the coming decade (see Diagram 152).

- Underlying demographic trends should rein in global saving and gradually push up the real interest rate (see Diagram 151). In the shorter term, when uncertainty about many developed markets' public finances still abounds, this could combine with an ageing population to create a temporary surge in saving.

- The real interest rate is expected to climb towards 2 per cent at the end of the forecast period, due to both high-

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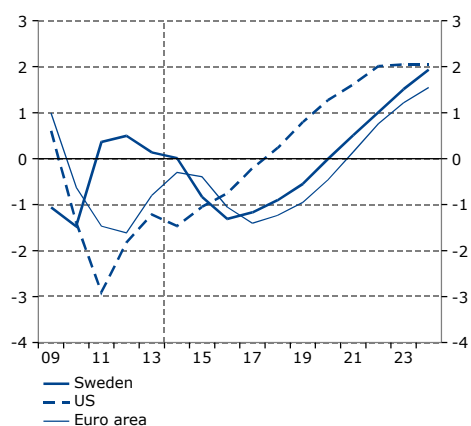
[121] See Buttiglione et al. (2014).

Diagram 157 Policy rates
Per cent, daily values
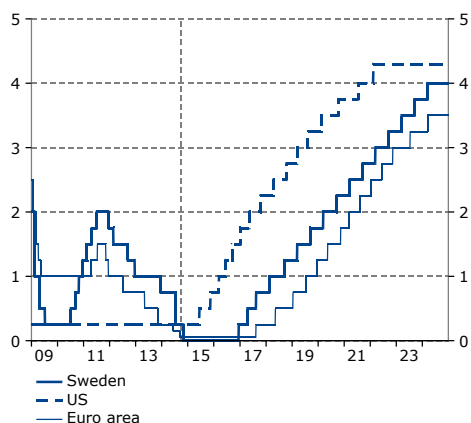
- Sweden
- - - US
- — Euro area

Sources: ECB, Federal Reserve and NIER.

Diagram 158 Real policy rates
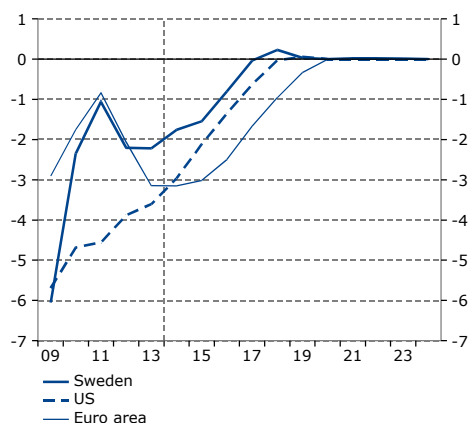Per cent, quarterly values

- Sweden
- - - US
- — Euro area

Note. Real rates based on NIER's forecasts of
CPIF, CPI and HICP, respectively.
Sources: ECB, Federal Reserve, the Riksbank,
Statistics Sweden and NIER.

Diagram 159 Output gap
Per cent of potential GDP

- Sweden
- - - US
- — Euro area

Sources: IMF, OECD and NIER.

er potential growth and demographic changes. The latter will bring a rapid rise in the dependency ratio and so a decreased propensity to save.[122]

Diagrams 157 and 158 present the NIER's forecasts for nominal and real policy rates in Sweden, the US and the euro area, and Diagram 159 its forecasts for resource utilisation.

US: The US is ahead of the euro area in the business cycle, and inflation is much closer to the target level. The market also expects an earlier and much faster rise in the policy rate in the US. All in all, rising resource utilisation and a return to full capacity in the US in 2018 are believed to be compatible with an increase in the policy rate from its current 0.25 per cent to around 2.5 per cent (see Diagram 157).[123] In the years after that, the policy rate will rise further towards 4.3 per cent, giving a real policy rate of 2 per cent. This is due partly to potential growth rising, uncertainty among households and firms continuing to subside, deleveraging continuing, and the working-age population dwindling as a share of the total population.

Euro area: Both cyclical and structural problems in the euro area are markedly greater than in the US. This means that the real interest rate compatible with the economy operating at full capacity will need to be lower than that in the US for many years. When the output gap in the euro area closes in 2020, the policy rate will still be only around 1.5 per cent, giving a real policy rate of around −0.5 per cent (see Diagrams 157−159).[124] As the structural problems ease, the policy rate will rise gradually to reach 3.5 per cent at the end of the forecast period.

Sweden: The repo rate will begin to be raised at the end of 2016 and will average around 0.5 per cent in 2017 when the Swedish economy is operating at full capacity (see Diagram 158).[125] The real policy rate will then climb slowly. This is primarily because the Swedish economy is closely bound to the euro area's economy and monetary policy. If Swedish monetary policy deviates further from that pursued in the euro area, the krona could strengthen and keep the economy below full capaci-

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[122] Erfurth and Goodhart (2014) argue that demographic changes could result in a real interest rate of 2.5 to 3 per cent in 2025.

[123] The market's policy rate expectation five years ahead is 3.5 per cent (see Diagram 153). The NIER's forecast five years ahead (i.e. in 2019) is somewhat lower at around 3 per cent.

[124] This is in line with market expectations, which imply a real interest rate of around −0.8 per cent five years ahead (i.e. in 2019).

[125] This is in line with market participants' expectation of a nominal repo rate of just over 0.5 per cent two years ahead.

ty for longer. The Swedish real interest rate compatible with the economy at full capacity will therefore be depressed for a long time on account of the euro area's cyclical and structural problems.

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