

■ What is a normal level for the repo rate?

As a consequence of the financial crisis, the level of the repo rate has been abnormally low for some time. A higher repo rate level can be expected in the future and, against this background, warrants revisiting the question of which repo rate level can be considered normal. A previous article in the Riksbank's Inflation Report 2006:2 concluded that a normal level for the long-run repo rate was probably in the interval of 3.5 to 5 per cent. An updated analysis indicates that it is less likely that the long-run normal repo rate level lies in the upper range of this interval. Based on this analysis, a reasonable assessment of the level of the repo rate in the long run is likely to lie between 3.5–4.5 per cent.

Normal long-run repo rate level in the light of historical growth levels

In the article "What is a normal level for the repo rate?" in the Inflation Report 2006:2, the history of economic growth and interest rates in Sweden and other countries was examined in order to determine what may be considered a normal long-run level for the repo rate. A normal long-run repo rate is one that can be expected to prevail in a normal economic climate.

The repo rate is a nominal interest rate that can be divided into two components, the real interest rate and expected inflation. Economic theory suggests a close long-term connection between the real interest rate and growth in the economy over the long run. Households typically wish to smooth out their consumption over time. A higher rate of economic growth, which brings with it expectations of higher future levels of income and consumption, entices households to bring forward some consumption to today and save less. As a consequence, households demand a higher real rate of return on their savings as compensation for postponing consumption. With higher rates of economic growth, higher real interest rates are needed to establish a balance between the supply of savings and the demand for investment funding.¹²

The average rate of growth in the economy over a longer period of time can thus give an idea of what the long-run normal real interest rate may be. Table B1 illustrates the average rate of growth of GDP per capita for Sweden and for a group of OECD countries. The picture revealed by Table B1 is that average growth in GDP per capita has fallen somewhat, both in Sweden and internationally, since publication of the article in 2006. With inflation expectations that, under normal circumstances, correspond with the Riksbank's inflation target of two per cent, historical real GDP growth in Sweden and abroad indicates a normal long-run repo rate of 3.9–4.4 per cent.

¹² It is often also assumed that households attach less importance to the future in their consumption. Such a tendency leads to a marginally higher real interest rate.

Table B1. Growth in real GDP per capita in Sweden and a selection of OECD countries

Per cent

	1960-2005	1998-2005	1998-2008
Sweden	2.3	2.8	2.4
International*	2.1	2.2	1.9

* Unweighted average for Australia, Canada, Germany, New Zealand, Sweden, Great Britain and the United States.

Source: The World Bank

Long-run normal repo rate in the light of historical interest rate levels

Another way to assess a reasonable level of the repo rate in the long run is to consider historical averages of the repo rate itself or other similar interest rates. On any given occasion, the repo rate will probably deviate from its long-run normal level, particularly following adjustment to the economic cycle, but, over a longer period of time, its average level should correspond to the level experienced during normal economic activity. A study analysing the development of the short-term real interest rate since the mid-1800s concludes that the last fifty years make up the longest relevant reference period and that a long-run normal level for the short-term real interest rate lies at around 2 per cent.¹³

In recent decades, several changes have occurred in the conditions for monetary policy, making it highly probable that the long-run normal repo rate level has also changed over time. The article published in 2006 notes that the period since 1998 is particularly interesting as, by this point, the credibility of the current monetary policy regime had become fully established. Table B2 shows that the average real interest rate for three-month treasury bills in Sweden remains the same in the period 1998–2005 as compared with the longer period since 1960. However, when the years 2006–2008 are included, the average decreases somewhat, both in Sweden and internationally.

Table B2. Nominal and real three-month interest rates for government bonds in Sweden and internationally

Per cent

	1960-2005	1998-2005	1998-2008
Nominal 3- month interest rate			
Sweden	7.4	3.3	3.3
International*	7.2	4.2	4.4
Real 3-month interest rate			
Sweden	2.2	2.2	1.9
International*	2.8	2.4	2.2

* Unweighted average for Australia, Canada, Germany, New Zealand, Sweden, the United Kingdom and the United States.

Sources: OECD and Reuters EcoWin

¹³ Lagerwall, B. (2008), "Real interest rates in Sweden", Economic commentary 2008:5, Sveriges Riksbank.

What do market participants consider to be the long-run normal level of the repo rate?

Alongside historical data illustrating the development of economic growth and interest rate levels over time, forward-looking information from financial markets can shed light on investors' perceptions of the long-run normal level of the repo rate. Below are presented the opinions of financial market participants concerning the level of the long-term normal interest rate, as far as this can be discerned from the results of surveys and the market pricing of debt securities.

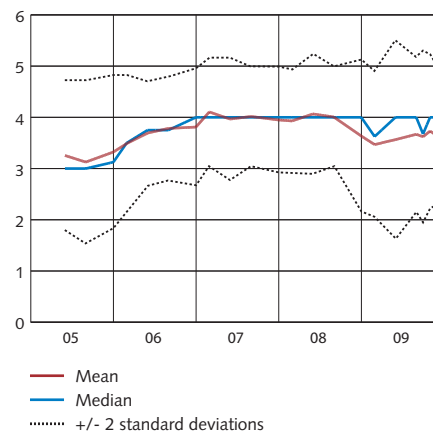
Each quarter since June 2005, Prospera has surveyed a selection of participants in the Swedish financial markets about their expectations of the level of the repo rate two and five years in the future. Expectations of the level of the repo rate after five years should provide a strong indication of the level of the long-run repo rate level that market participants consider to be normal. Figure B1 shows that market participants' expectations of the future nominal repo rate level varied between 3 and 4 per cent during the period from June 2005 to December 2009. Focussing upon the most recent survey, individual participants' expectations of the nominal repo rate level in five years time are centered around a level of 4 per cent (see Figure B2).

Market participants are also invited to provide an opinion on the level of inflation in two and five years respectively, which in conjunction with nominal repo rate expectations can be used to infer expectations regarding the real repo rate. According to the most recent survey, market participants' expectations of the real repo rate are gathered around 2 per cent.

Expectations of long-run normal repo rate levels according to the pricing of government debt securities

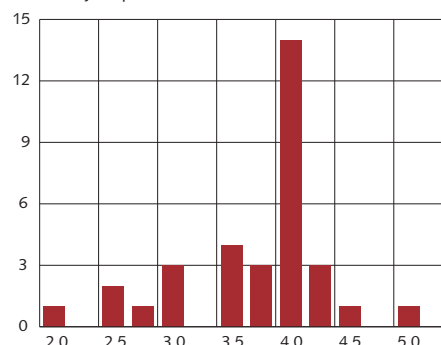
Another method of studying the market's expectations of long-run normal repo rate levels is via the yield curve of government debt securities. Nominal and real debt securities are issued for maturities of between 3 months and 30 years, and the yield curve summarises the manner in which interest rates vary by maturity at any particular point in time. With the aid of a yield curve, forward rates can then be calculated for any horizon. Forward rates consist of two components – an expected future (short-term) interest rate and a risk premium. Risk premia are typically positive. Consequently, forward rates at a long horizon provide an upper limit to the market's future expectations of short-term interest rates, such as the repo rate. Thus, a review of historical yield curves allows time series of market expectations of the repo rate to be created. Figure B3 shows the time series of 5-year forward rates implied by Swedish government bond yields from 1997. Assuming that five years is a sufficiently long period of time for the economy to return to a normal level of activity,

Figure B1. Market agents' expectations of the level of the nominal repo rate in 5 years
Survey responses between June 2005 and end of December 2009, per cent



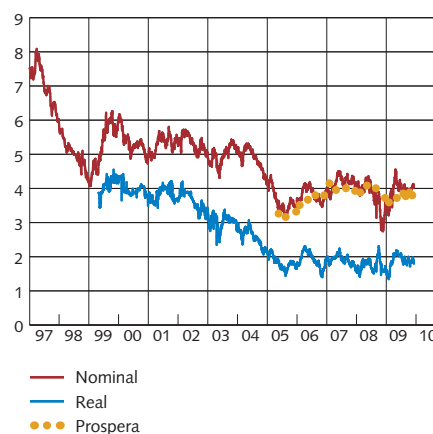
Sources: TNS SIFO Prospera and the Riksbank

Figure B2. Distribution of market agents' expectations of the level of the nominal repo rate in 5 years.
Survey responses since December 2009



Sources: TNS SIFO Prospera and the Riksbank

Figure B3. Nominal and real 5 year forward rates
Per cent



Sources: TNS SIFO Prospera and the Riksbank

Figure B3 can be interpreted as an upper limit for market expectations of the long-run normal repo rate level.¹⁴

Figure B3 shows that nominal forward rates declined noticeably between 1997 and 2006. The decrease occurring during the first years was probably due to the ongoing decrease in inflation expectations. The expected real interest rate also declined. Since 2005, the 5-year forward rate has varied around 4 per cent. The corresponding five-year ahead real forward rate derived from inflation-indexed government bonds has varied around 2 per cent over the same period.

All in all, the information based on Prospera's surveys and the pricing of government debt securities shows that in recent years market participants' expectations of the long-run normal nominal repo rate lie between 3.5 and 4 per cent, while their expectations of the long-run real repo rate are close to 2 per cent.

Conclusions

This revised update of the Swedish and international statistics forming the basis of the 2006 article on the long-run normal level of the repo rate gives cause for a marginal downwards adjustment of some relevant average growth rates and interest rate levels. Information from financial markets provides estimates of the long-run normal repo rate that are in line with, or slightly lower than, calculations based on growth rates and historical interest rate levels. Based on this analysis, a reasonable assessment of the level of the long-run repo rate is in the interval 3.5–4.5 per cent.

¹⁴ The result shown in Figure 3 is based on calculations made by the Riksbank. A zero-coupon curve has been estimated for both nominal and real government securities (eight nominal and five real). For the nominal curve, Svensson's extension of a Nelson-Siegel model with 6 parameters has been estimated. The real curve has been estimated using a similar functional form with 4 parameters.