

## ■ The rate of increase in the CPIX will be below the CPI for a long time

Even if the Riksbank leaves the repo rate unchanged, inflation measured in terms of the CPIX is expected to be approximately 0.3 percentage points below inflation measured in terms of the CPI over the course of a couple of years and beyond the forecast horizon. The reason for this is that the CPIX is not affected by the increase in the value of the housing stock in the mortgage cost index, nor by the annual indexation of excise duties. It is believed that the CPI with a fixed interest rate (CPIF), which is introduced in this report, will correct the CPI for the direct effects of monetary policy in a better way than the CPIX.

### The mortgage cost index is not only affected by the Riksbank's repo rate changes

In May 2008, the annual rate of increase in the CPI and the CPIX was 4.0 and 2.9 per cent respectively, a difference of 1.1 percentage points. The most important explanation of this difference is that the CPIX has not been affected by the increase in mortgage costs over the last 12 months. This is because this component is entirely excluded from the CPI when calculating the CPIX. The direct effects of changes in indirect taxes and subsidies are also excluded. The fact that the Riksbank has increased the repo rate in recent years is one important explanation of the increase in mortgage costs, but other factors have also contributed to the difference between the CPI and the CPIX. A detailed review of these factors is presented below.

The index for mortgage costs in the CPI aims to measure the development of the households' capital costs for living in owner-occupied, single-family dwellings. The index is calculated as a product of two indices in accordance with the following, somewhat simplified, formula:

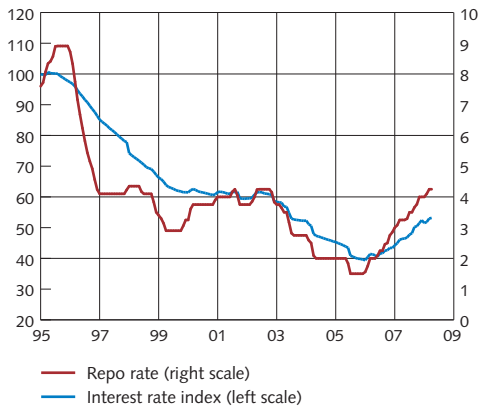
$$\text{Mortgage Cost Index} = \text{Interest rate index} * \text{Capital stock index}$$

The *interest rate index* measures the development of the average interest rate for last mortgage loans in banks, variable-rate loans in mortgage institutions and loans in mortgage institutions with fixed-rate terms of 1, 2, 3, 5 and 8 years.<sup>14</sup> The interest rates for the fixed-rate loans are included in the calculations as a moving average for the term concerned. For example, a change in the five-year interest rate is included as a moving average over the last 60 months. The interest rate index is then calculated as a weighted average of the interest rates included where the weights reflect the actual loan structure of the households. Variable-rate loans have a weighting of over 50 per cent of the interest rate index. This means that any change in the short-term interest rates has a direct impact on the interest rate index. As the remaining interest rates are calculated as a moving average over time, the interest rate index nevertheless develops in a relatively stable way (see Figure 1).

<sup>14</sup> Loans with terms of 1, 3 and 8 years were included in the CPI in 2004. Last mortgage loans in banks, variable-rate mortgages and fixed-rate loans with terms of 2 and 5 years were already included. Loans with a fixed-rate term of 8 years are lightly weighted in the interest rate index (approximately 3%). Fixed-rate loans with a term of 5 years have a weight of 19.5%. Loans with terms of 1, 2 and 3 years have weights of 1.5, 14.2 and 9.7% respectively.

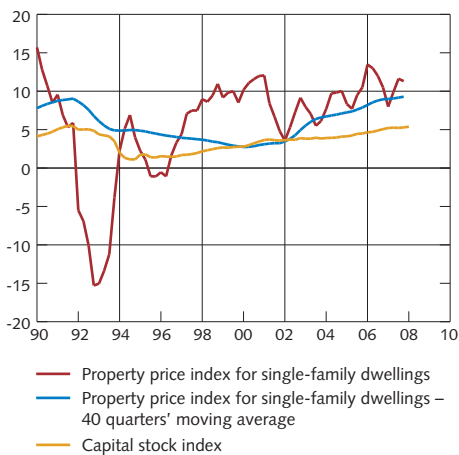
**Figure B1. The repo rate and the interest rate index in the CPI**

Per cent for the respective indices, January 1995 = 100



Sources: Statistics Sweden and the Riksbank

**Figure B2. Capital stock index in the CPI and the property price index for single-family dwellings**  
Annual percentage change



Sources: Statistics Sweden and own calculations

The interest rate index is thus not only affected by the repo rate. Variable-rate mortgages are affected fairly directly by a change in the repo rate but can also be affected by other factors, such as changes in bank margins. In the wake of the recent turmoil on the financial markets the difference between the repo rate and the rates for variable-rate mortgages has, for example, increased. Interest rates with longer terms are also included in the index. These are largely affected by factors other than the Riksbank's repo rate decisions, even though changes in the repo rate can sometimes have an effect on interest rates with longer terms.

The capital stock index measures the change in the purchase value of the housing stock financed by the loans. Statistics Sweden attempts to estimate the change in value that takes place in the housing stock when houses change owners or new houses are constructed. A consequence of this calculation method is that there is a considerable time lag before changes in house prices are included in the index. If we assume that no new construction takes place and that the prices of single-family dwellings on one single occasion increase by 30 per cent and thereafter remain stable at the new level, and that all the properties change owners every 20 years, the purchase value of the housing stock, and thus the average purchase value, will be adjusted upwards by 1.5 per cent ( $30 \text{ per cent} * 1/20$ ) per year over a period of 20 years. An increase in house prices thus has a relatively limited direct effect on the capital stock index, although the effect is very lasting. The rate of increase in the capital stock has shown a rising trend since the mid-1990s (see Figure B2). The Figure also clearly shows that the capital stock index moves very sluggishly in relation to the prices of single-family dwellings.

### The rising value of the capital stock will contribute to the CPIX increasing at a slower rate than the CPI during the forecast period.

In May 2008, the interest rate index in the CPI had increased by a 12-month rate of 21 per cent. As the mortgage cost index has a weight of 4.5 per cent in the CPI, this contributed approximately 1 percentage point to the annual rate of increase in the CPI of 4 per cent. This contribution is partly due to the fact that interest rates have increased over the last 12 months, but also to the fact that the purchase value of the housing stock has increased. If the purchase value of the housing stock had remained constant during the period, the contribution would have been approximately 0.2 percentage points lower.

Given how the capital stock index is calculated, we can be certain that the value of the capital stock will continue to increase over the next few years almost irrespective of what happens to property prices in the near future. When houses that were bought 15 to 20 years ago are sold again, the purchase value of the housing stock will increase as prices are much higher now than when the houses were first bought.

The change in the capital stock thus affects the Riksbank's forecast for the CPI. It is assumed that the value of the housing stock will increase by just over 5 per cent as an annual percentage change towards the end of the forecast period. Average interest rates will remain practically still and it is estimated that the total mortgage cost index will increase by

just over 5 per cent. Despite the fact that mortgage rates themselves will not change, the total mortgage cost index will increase relatively quickly due to the rising value of the capital stock. As the entire mortgage cost index is excluded from the CPI when calculating the CPIX, the change in the capital stock will not affect CPIX inflation. This is the most important reason why the CPIX will increase slower than the CPI towards the end of the forecast period.

Figure B3 shows an alternative measure of inflation that is based on the CPI but where, unlike the CPIX, only the interest rate index is kept constant and the entire change in the mortgage cost index that is attributable to the change in the capital stock is still included. This measure is called the CPI with a fixed interest rate (CPIF) and is believed to be better than the CPIX as a means of correcting the CPI for the direct effects of monetary policy. The rate of increase in the CPI is expected to be higher than the rate of increase in the CPI with a fixed interest rate for most of the forecast period, but these rates are expected to coincide towards the end of the forecast period. In 2008 and 2009, however, the CPI will increase much more rapidly than the CPI with a fixed interest rate as a result of increasing interest rates.

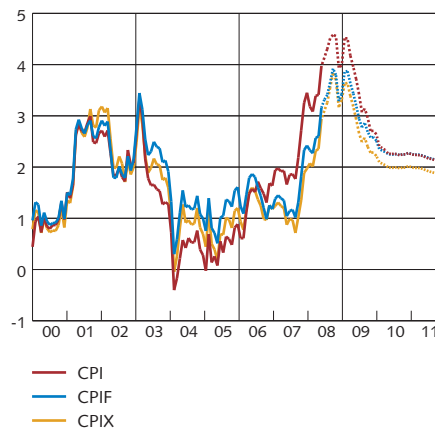
### The indexation of excise duties will not affect CPIX inflation

When calculating CPIX inflation, the direct effects of changed indirect taxes and subsidies are also excluded. In Sweden, certain excise duties are indexed as a means of preserving the duty's percentage of the price. For example, duties on energy, alcohol, and tobacco are specified as SEK/kWh, SEK/l and SEK/g respectively. If prices rise, then the excise duties' percentage of the consumer price will decline over time. The excise duty on, for instance, petrol is, in accordance with the regulations, written up by the annual rate of increase in the CPI in June of the previous year. In recent years, however, the duty on petrol has been increased above this level as part of the so-called green tax shift. Other excise duties are also normally written up by some measure of price changes. The effect of this increase in excise duties is excluded from CPI inflation when the CPIX is calculated. This means that even in the long term there are tax changes that lead to a difference between CPI inflation and CPIX inflation. The total effect of the indexation of excise duties is normally estimated to be approximately 0.1 percentage points.

### The CPI and the CPIX will differ in the long term

Given the current regulations and the Riksbank's forecast for the repo rate, the assessment is thus that CPIX inflation, towards the end of the forecast period and for some time to come, will be approximately 0.3 percentage points below CPI inflation; 0.2 percentage points due to the mortgage cost component and 0.1 percentage points due to the indexation of excise duties.

**Figure B3. CPI, CPIX and CPIF, outcomes and forecasts**  
Annual percentage change



Note. Broken lines represent the Riksbank's forecasts.

Sources: Statistics Sweden and the Riksbank