Economic Commentary

How should we view the development of the krona?

NO. 3 2023, 28 March

Summary

The Swedish krona weakened significantly in 2022. Is there any explanation for the long-term development of the krona? Does the weaker krona indicate weakness in the Swedish economy and what role does monetary policy play?

The development of the nominal exchange rate against some currencies in recent years may seem dramatic, but the fluctuations are not remarkably large from a historical perspective. A trade-weighted exchange rate was, on average, at about the same level in 2022 as it was in 1993 when the floating exchange rate and inflation targeting regime was introduced. However, it is the real exchange rate – which takes inflation differences between countries into account and thus says something about relative price levels – that is relevant for the purchasing power of the Swedish krona in other countries. The real exchange rate weakened for several decades until the early 2000s. This development can be understood in the light of factors such as productivity and saving. However, from around 2005, no trends in these fundamental explanatory factors can be seen. The development of the real exchange rate since then appears different depending on which price level measures in Sweden and abroad are compared. Finally, we discuss how monetary policy affects the nominal and real exchange rates. Monetary policy certainly affects the nominal value of the krona, but cannot achieve targets for both the krona and inflation.

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The krona exchange rate from a longer-term perspective

For most of the last hundred years, Sweden has tried to maintain a fixed exchange rate.[2] But this exchange rate policy was abandoned at the end of 1992 and, soon afterwards, it was replaced by an inflation target. After its initial weakening, the krona exchange rate has fluctuated around the 1993 level. It is now weaker against a number of individual currencies but is not exceptionally weak from a longer-term perspective. This is shown in Figures A1 and A2 in the appendix, the contents of which are

[1] Jesper Hansson has now left the Riksbank and will join Swedbank in August. We thank Mattias Erlandsson, Caroline Jungner, Marianne Nessén and David Vestin for comments on earlier drafts, and Calum McDonald for the translation to English.

[2] For descriptions of the development of the krona against different currencies over a longer-term perspective, see Bohlin (2010).

summarised in Table 1. For example, this data shows that, compared with 1993, the krona exchange rate is currently weaker against the US dollar but is slightly stronger against the Norwegian krone.

The value of the krona in relation to a trade-weighted index of foreign currencies measured using the krona index (KIX) – the nominal effective exchange rate – is shown in Figure A3 in the appendix. The effective exchange rate has been more stable than the exchange rate against many individual currencies such as the US dollar. The difference between the highest and lowest points of the annual average for the krona index (KIX) has been around 20 per cent. In this sense, the krona has been more stable under the floating exchange rate regime than during the period of the 'semi-fixed' exchange rate between 1973-1993,[3] when the effective exchange rate weakened by 45 per cent.

Table 1. Krona exchange rate against a selection of currencies

Annual and monthly averages

	1973	1993	2022	January 2023
US dollar (USD)	4.36	7.79	10.12	10.40
Pound sterling (GBP)	10.68	11.69	12.47	12.72
Danish krone (DKK)	0.72	1.20	1.43	1.51
Norwegian krone (NOK)	0.76	1.10	1.05	1.05
Nominal effective exchange rate	69	100	99	102
Real effective exchange rate	77	100	134	134

Note: The nominal and real effective exchange rates are KIX weighted. To make them comparable with later diagrams, they have been indexed 1993 = 100, which differs from the indexation to 18 November 1992 that usually applies to the krona index (KIX) published by the Riksbank. Here, the real exchange rate has been calculated with the CPI as the price measure for Sweden and the CPI or HICP for the rest of the world.

Sources: Macrobond, national sources and the Riksbank

Since inflation targeting and the floating exchange rate were introduced, the krona exchange rate has not shown any clear trend. However, rapid exchange rate changes such as those that have taken place since the end of 2021 raise questions concerning what lies behind them and whether the Riksbank's monetary policy should consider the development of the krona exchange rate and perhaps even have the ambition of stabilising it.[4] In this context, it is worth remembering that the development of the

[3] These are annual averages. The first year of the inflation targeting period, 1993, is included in the comparison to capture the sharp depreciation that took place when the fixed exchange rate regime was abandoned in November 1992.

[4] For example, the Swedish krona weakened by around 14 per cent between June 2000 and June 2001, whereupon the Riksbank decided to intervene in the foreign exchange market and new principles for this were developed; see Heikensten and Borg (2002). The krona depreciated by around 10 per cent between December 2004 and November 2005, which led the Riksbank to hire a number of external researchers to analyse the development of the krona; see Riksbank initiates cooperation with external researchers on exchange rate determinants | Sveriges Riksbank. From January 2016 and three years ahead, the Riksbank had increased preparedness to intervene on the foreign exchange market so as to counteract an appreciation of the krona leading to a rate of inflation that was too low. When the krona instead unexpectedly depreciated strongly, new analyses were made; see Sveriges Riksbank (2019), Askestad et al. (2019), Belfrage et al. (2019) and Bachetta and Chikhani (2021).

nominal krona exchange rate says nothing about how prosperity in Sweden is developing in relation to other countries. Let us take a few examples from the countries in Table 1. Between 1993 and 2022, the krona weakened by around 30 per cent against the US dollar and by around 20 per cent against the Danish krone. Over the same period, GDP per capita increased by 55 per cent in the United States, 48 per cent in Denmark and 67 per cent in Sweden.[5] The development of the nominal exchange rate thus obviously says nothing about how much a country is able to produce. If we are interested in the development of the krona’s purchasing power, what happens to the nominal exchange rate is irrelevant. Instead, we must examine the so-called real exchange rate, which compares the price levels of products in different countries, measured using a common currency. For example, it does not matter if Swedes have to pay 1.50 Swedish kronor for one Danish krone if beer is 50 per cent more expensive in Sweden than in Denmark. In this case, a beer costs the same in Sweden as in Denmark, measured using a common currency.

Sweden’s real exchange rate has weakened over time

A real exchange rate is defined as follows:

$$\text{Real exchange rate} = \text{nominal exchange rate} * \frac{\text{foreign price level in foreign currency}}{\text{domestic price level in domestic currency}}.$$

An increase in the index value of the real exchange rate means that foreign products have become more expensive relative to domestic ones, either because the nominal exchange rate has weakened – meaning that we have to pay more kronor per unit of foreign currency – or because prices have risen faster abroad.

In an example above, we mentioned a situation in which the nominal exchange rate meant that 1 Danish krone was equivalent to 1.5 Swedish kronor, while the Swedish price of beer was 1.5 times the Danish price. In this case, the real exchange rate, with beer as the price level measure, is 1.0. This means that the price of beer is at the same level in both countries when measured using a common currency. Such price comparisons for individual products are sometimes made and published in discussions of whether a currency is ‘overvalued’ or ‘undervalued’. One example is the 'Big Mac Index' published by The Economist magazine.

However, comparing prices of individual products is not particularly interesting. What says something about purchasing power is the country’s overall price level in relation to the price level abroad.[6] Real exchange rates are therefore often calculated for baskets of products, such as those used to calculate the consumer price index. In Figure 1, we show such a measure of real exchange rates for a selection of countries where the trend depreciation of Sweden’s real exchange rate stands out. The index value for

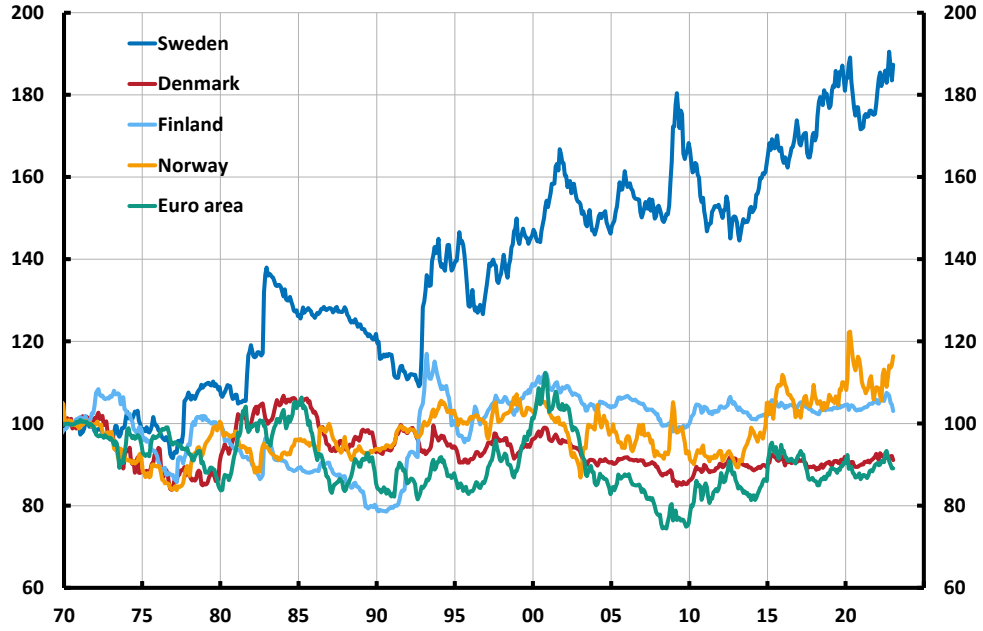
[5] Another interesting example is Norway which, despite its strongly rising prosperity over time, has had a nominal exchange rate development similar to that of Sweden; see Vredin (2017).

[6] Of course, a country’s purchasing power is also affected by the level of income and not just by the price level. However, here we focus on the real exchange rate due to the recent public debate about the purchasing power of the krona.

Sweden has clearly risen over time, which, according to the definition of a real exchange rate, is a result of a weaker nominal exchange rate and/or a faster rate of price increase abroad than in Sweden.

Figure 1. Real effective exchange rates

Index 1970 = 100



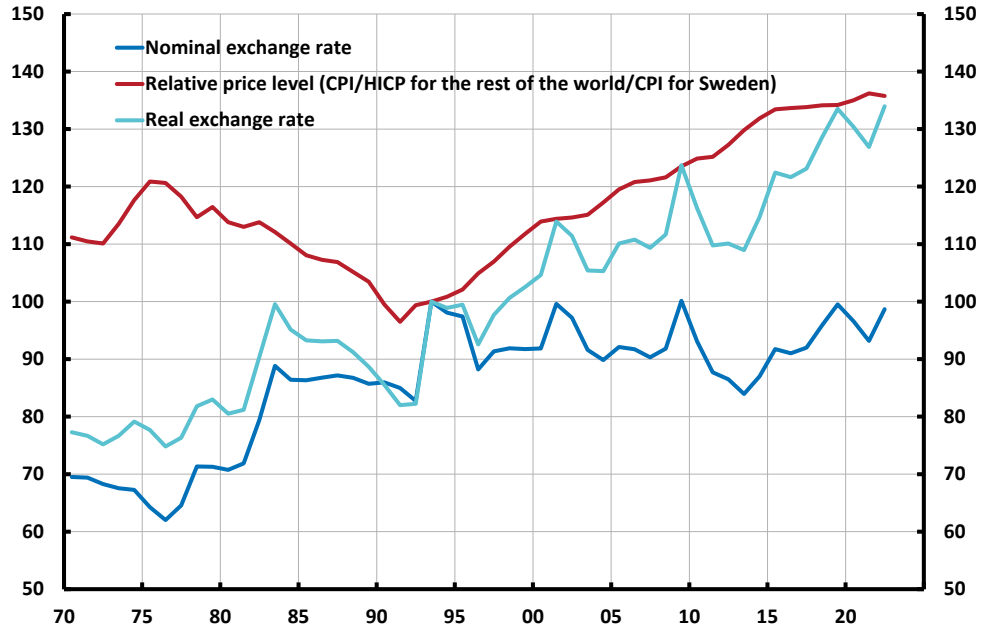
Note: Monthly data. Calculated using the consumer price index as measure of price levels.

Source: BIS

Figure 2 shows this change in Sweden's CPI-based real exchange rate with 1993 as the base year, but also broken down into the nominal exchange rate and the ratio between CPI (or HICP) abroad and CPI in Sweden. The chart shows that the nominal exchange rate has not followed any trend between 1993 and 2022, but that the depreciation of the real exchange rate over the same period reflects the fact that CPI inflation has been lower in Sweden.

Figure 2. Sweden's real and nominal effective exchange rates, and the country's domestic price level in relation to that abroad

Index 1993 = 100



Note: Annual data. KIX weights have been used to create aggregate values. A broader set of countries than those in Figure 1 is included. For years up to and including 1994, we have used KIX weights from 1994.

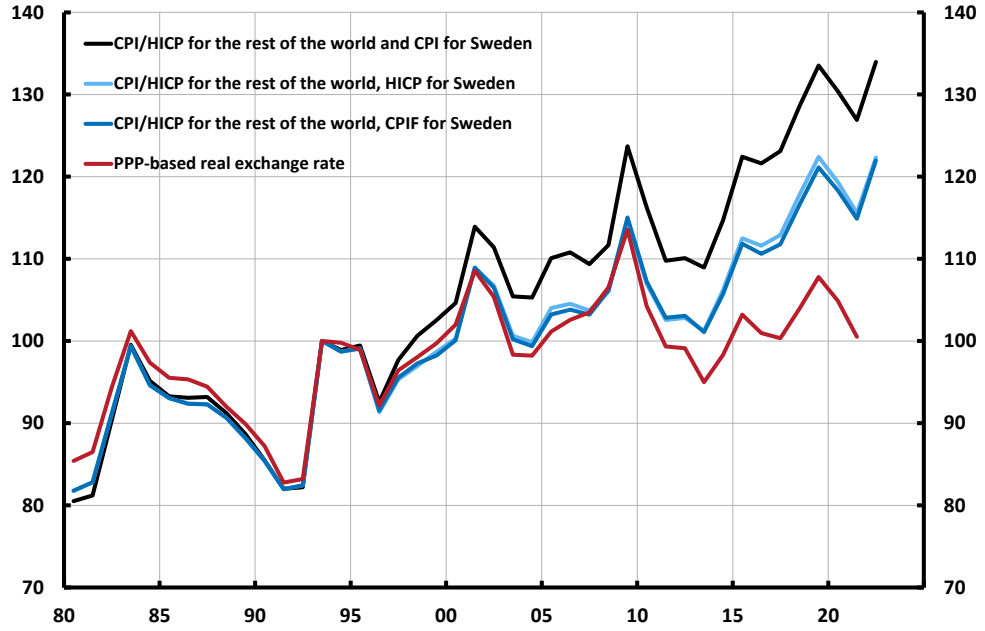
Sources: BIS, Macrobond, Statistics Sweden, Sveriges Riksbank and own calculations

However, when comparing price levels internationally, it should be noted that different countries use different measurement methods, which may affect the picture of real exchange rate developments. We provide some examples to illustrate this in Figure 3. Sweden differs from many countries by including mortgage interest costs in the calculation of the CPI. The treatment of mortgage rates becomes more uniform if we instead use the CPIF (CPI with a fixed interest rate) or the European harmonised consumer price index HICP as the price level measure for Sweden.[7] In the diagram, we see that the measured relative price increase abroad (the weakening of Sweden's real exchange rate) between 1993 and 2022 would then be just over 20 per cent instead of almost 35 per cent.

[7] Mortgage rates have shown a falling trend over the period, which has contributed to inflation in Sweden according to the CPI being significantly lower than when measured using the CPIF and HICP.

Figure 3. Sweden's real effective exchange rate with different measures of the consumer price level

Index 1993 = 100



Note. Annual data. KIX weights have been used to create aggregate values. A broader set of countries than those in Figure 1 is included. For years up to and including 1994, we have used KIX weights from 1994.

Sources: BIS, National Institute of Economic Research, Macrobond, Statistics Sweden, Sveriges Riksbank and own calculations

One way to avoid the effects of differences in how countries produce their consumer price indices is to calculate the real exchange rate based on direct comparisons of prices of identical or very similar products. This is done within the international comparison programme used to derive comparable GDP levels based on purchasing power parity (PPP).[8] According to this measure, the real exchange rate has not depreciated at all in recent decades.[9]

Why has the real exchange rate weakened?

The differences between price level measures make it difficult to determine the extent to which the real exchange rate has depreciated over the last two decades. Overall, however, the real exchange rate appears to have weakened since the early 1970s. Economic research offers a number of possible explanations for this.[10]

[8] See EU and OECD (2012).

[9] Measures based on unit labour costs give a similar picture. For a more detailed discussion of the strengths and weaknesses of different measures of the real exchange rate, see Belfrage (2021). One possible contributing explanation for this deviation from the CPI-based measures is the elimination of differences between how statistical authorities make quality adjustments when calculating the CPI; see Tysklind (2020).

[10] See Lagerwall and Nessén (2009) for a brief overview of different theories and their relevance to Sweden.

Economic theory identifies two main drivers of changes in real exchange rates. One is that developments that make us richer compared to our neighbours strengthen the real exchange rate. The basic idea behind this is that the more a country can produce with the available resources (its productivity) or obtain through trade (its terms of trade), the higher wages and prices in the country can be expected to be. This implies that higher productivity, higher capital income from abroad and more favourable prices for the country's exports relative to its imports, which is to say more favourable terms of trade, will lead to a higher price level and a stronger real exchange rate.

The other main driver of changes in real exchange rates is how much countries save relative to how much they invest. A high level of saving compared to investment implies a positive current account and that domestic demand is weak compared to domestic production and compared to international demand. This restrains the development of domestic prices compared to those abroad and weakens the real exchange rate. Changes in saving and investment that strengthen the current account are therefore expected to result in a weaker real exchange rate.[11]

Patterns can be seen in the development of Swedish productivity and income that are in line with such changes in the real exchange rate. This also applies to the development of the current account; see Figures A4-A6 in the appendix. From the mid-1970s, productivity growth, measured in terms of GDP per capita, was weaker than abroad, while the Swedish terms of trade deteriorated. Subsequently, both household saving and public sector net lending increased, leading to a current account surplus. In other words, all the main fundamental driving forces indicate that the real exchange rate should be weaker today than it was in the mid-1970s. However, neither relative productivity nor the terms of trade have changed significantly since 2005, while the current account surplus has fallen slightly.[12] It is also after 2005 that the different measures of the real exchange rate shown in Figure 3 clearly diverge.

Philip Lane was one of the researchers commissioned to analyse the development of the krona and possible explanatory factors after the depreciation of the krona in 2004–2005.[13] He concluded that the evolution of the real exchange rate in the period 1970–2005 could be explained well by the development of the current account and the terms of trade, and that the development of the current account could, in turn, be explained well by a reduction in public indebtedness and by demographic factors that had led to a high level of saving. In a similar assignment, Bachetta and Chikhani (2021) concluded that the development of the real exchange rate could be explained by changes in the terms of trade, relative productivity and how public consumption has differed from that of other countries. Compared with the model estimates, Bachetta and Chikhani argued that there has been a "growing undervaluation" of the real exchange rate since 2014. Belfrage et al. (2019) have reached a similar conclusion.

[11] This theory of the link between the current account and the real exchange rate was developed by John Maynard Keynes and Bertil Ohlin, among others, in response to German reparations payments after the First World War, the so-called transfer problem.

[12] See Camacho and Lindström (2021) for a more detailed discussion of the development of the Swedish current account.

[13] See Lane (2007) and footnote 5.

To summarise, it is the real rather than the nominal exchange rate that is relevant for the development of purchasing power. A stronger real exchange rate can be an expression of high prosperity compared with the rest of the world, and can be perceived as such when travelling to countries where the price level is lower than at home. But there is no intrinsic value in having a high price level compared to the rest of the world. A weak real exchange rate may be what is needed to match demand and supply and achieve a high level of employment. This may be necessary, for example, if saving is higher at home than abroad. It appears that the weakening trend in Sweden's real exchange rate until at least around 2005 can be explained by the factors emphasised in economic theory: a deterioration in the terms of trade, relatively weak productivity growth and high saving. After 2005, however, there is no clear trend. Both the real and nominal exchange rates have shown depreciation followed by appreciation.

What role does monetary policy play in exchange rate developments?

Bachetta and Chikhani (2021) argue that the Riksbank's expansionary monetary policy from 2015 onwards has contributed to the real "undervaluation" of the krona since then. This effect is based on the idea that expansionary monetary policy over the short to medium term weakens the nominal exchange rate more than it affects the domestic price level via effects on inflation. According to economic theory, a more expansionary monetary policy than in other countries can weaken the nominal exchange rate, for example by reducing the return on assets in kronor compared with investments in other currencies and thereby reducing the demand for kronor. While an expansionary monetary policy lowers the domestic level of interest rates and weakens the nominal exchange rate, it eventually pushes up the domestic price level through higher inflation. Higher inflation in itself leads to a stronger real exchange rate. However, the effect on the nominal exchange rate tends to be immediate, while the effect on the domestic price level is gradual. An expansionary monetary policy can thus result in a potentially prolonged period with a weaker exchange rate, both in nominal and real terms. In the long run, however, real exchange rates are mainly determined by real conditions and not by monetary policy. What monetary policy can influence is the extent to which a change in the real exchange rate will take place through inflation or a nominal exchange rate change. Analyses by Akkaya et al. (2023a and 2023b) indicate that the Riksbank's bond purchases contributed 4 percentage points to the 14 per cent weakening of the nominal exchange rate between December 2014 and January 2023.[14]

One conclusion from this reasoning is that real economic factors can explain why Sweden's real exchange rate has become weaker over time, but that they also indicate that it could have been expected to have been stronger from 2015 onwards than it

[14] The nominal exchange rate is affected by many factors. Obviously, these include not only the supply of kronor (monetary policy) but also demand (e.g. risk premiums). The fact that changes in the real exchange rate are determined by real factors and that monetary policy affects the distribution of these between inflation and nominal exchange rate changes does not exclude the possibility that the latter may have additional explanatory factors.

was, at least measured in terms of relative consumer prices. A monetary policy that had been more restrictive could certainly have resulted in a permanently stronger nominal exchange rate and a temporarily stronger real exchange rate. But it would also have reduced demand and employment and pushed the already low inflation rate even further below the Riksbank's inflation target. Monetary policy can be given the task of stabilising the nominal exchange rate. In this case, inflation is governed over time by monetary policy and inflation abroad. Alternatively, an independent monetary policy can be chosen but this requires a floating exchange rate. From time to time, it may be possible to achieve targets for both the exchange rate and inflation. Now that monetary policy is being tightened, this can be expected to lead to closer-to-target inflation and a stronger exchange rate. But in the long run, a central bank can only achieve one of these targets. If the Riksbank had conducted a monetary policy during the period 2015–2021 that had led to a stronger krona, this would have been associated with a larger deviation in inflation in relation to the inflation target and a weaker development of the real economy.

The period of inflation targeting has not entailed any long-term trend depreciation of the krona. The nominal exchange rate depreciated much more during the period 1973–1993 when we did not have an inflation target. Although the objective at that time was to keep the exchange rate fixed, fiscal and monetary policy were not designed in line with this objective and the krona was devalued several times.[15] The real depreciation, which then continued for a decade, can be explained by real factors. One of them is that saving has been higher in Sweden than in the 1970s and 1980s. However, the picture since 2005 is not clear. The real exchange rate has weakened according to some measures but shows no clear trend according to others.

[15] See, for example, Jonung (2000, 2019).

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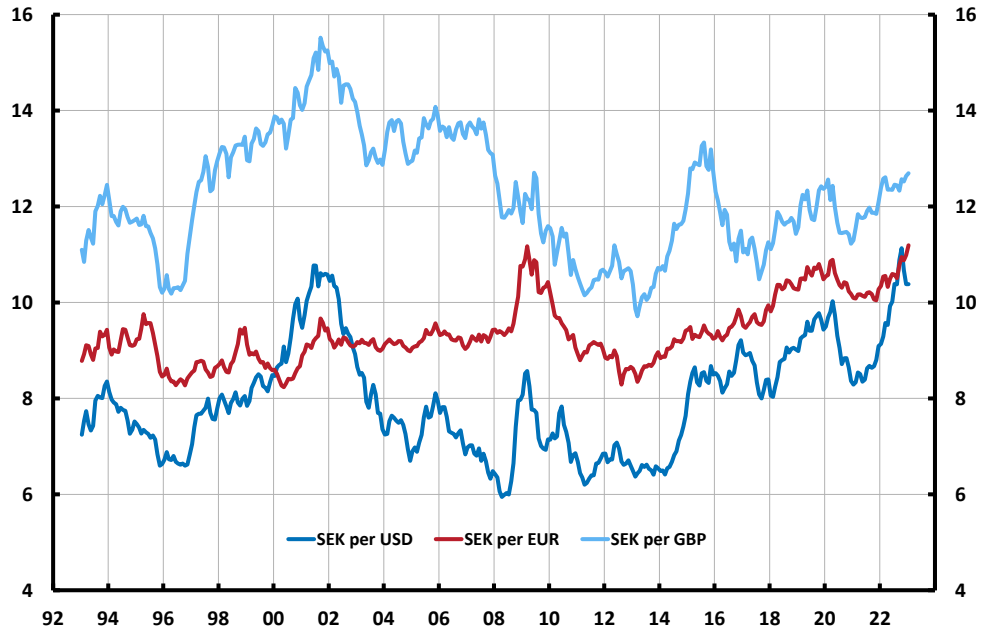
APPENDIX – Klicka här för att ange text.

Nominal exchange rates

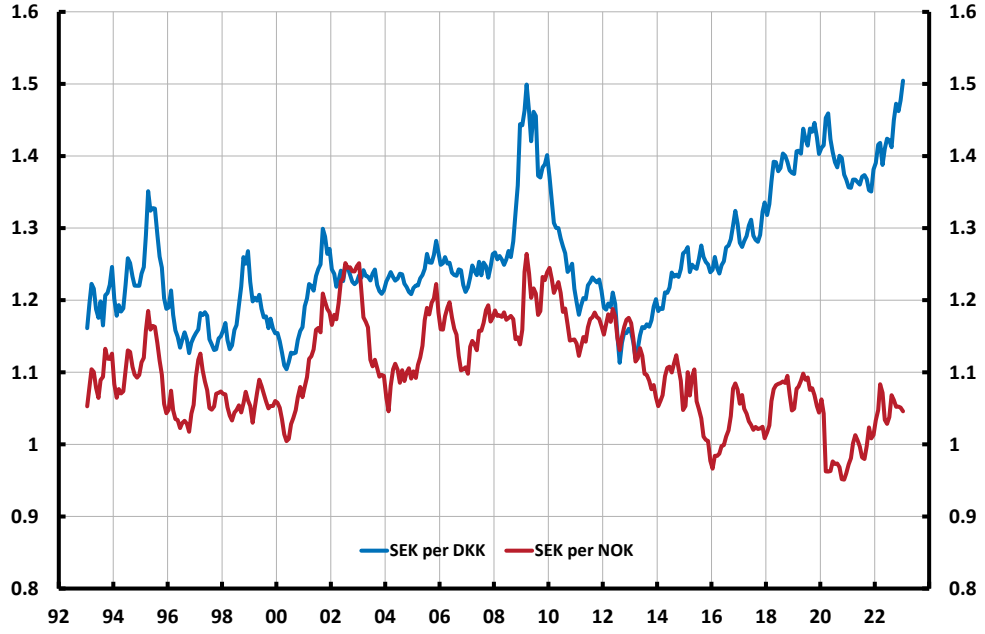
Figure A1. Krona exchange rate against US dollar, euro and pound sterling
Monthly averages



Source: Sveriges Riksbank

Figure A2. Krona exchange rate against Danish and Norwegian krone

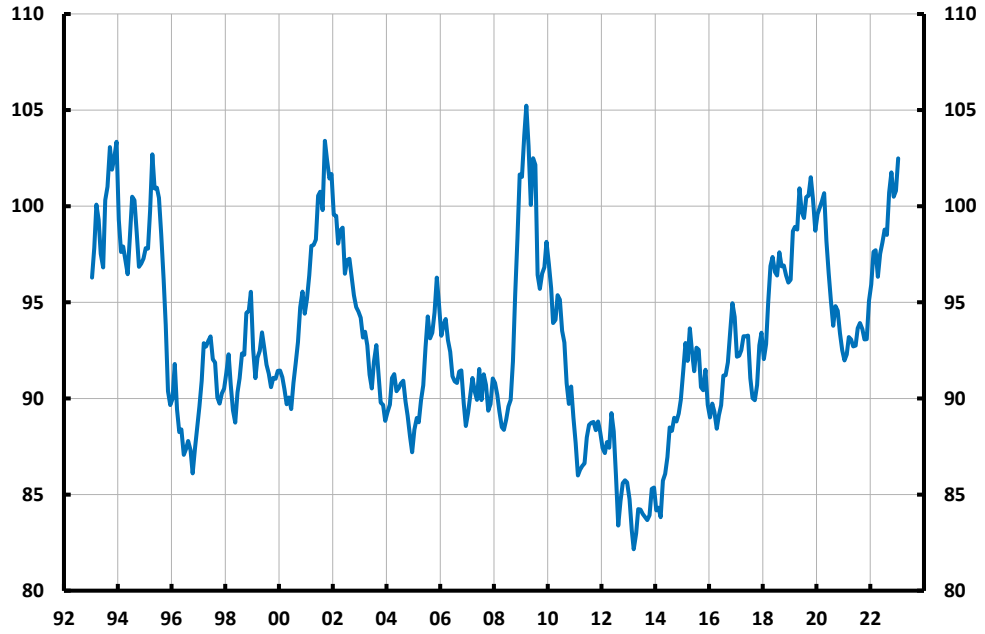
Monthly averages



Source: Sveriges Riksbank

Figure A3. Nominal effective krona exchange rate (KIX)

Index 1993 = 100



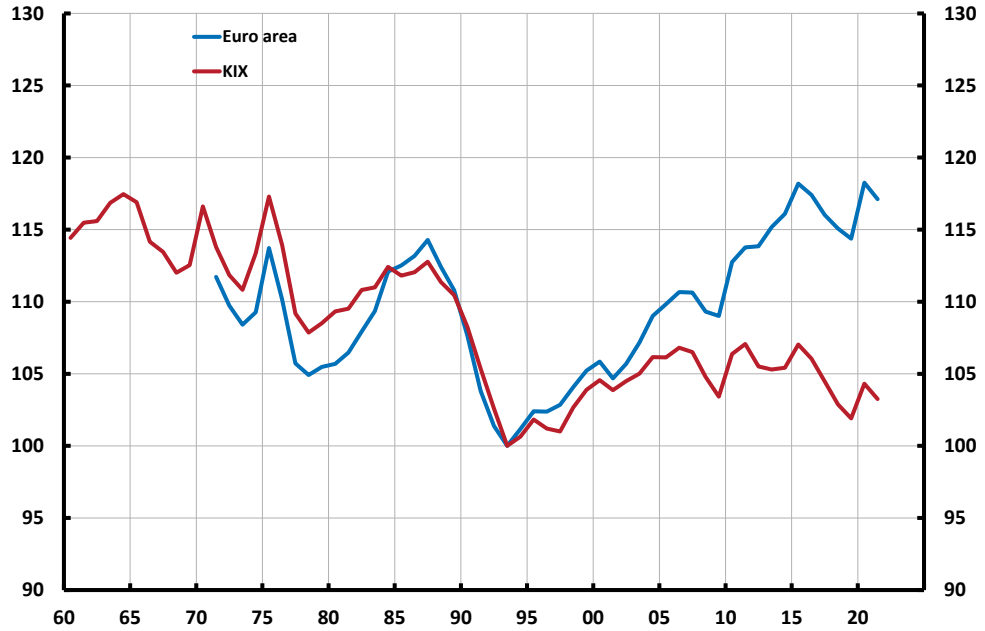
Note: To make it comparable with other diagrams, the indexation here differs from the indexation to 18 November 1992 that usually applies to the krona index (KIX) published by the Riksbank.

Source: Sveriges Riksbank

Development of variables that help explain the development of the real exchange rate

Figure A4. Sweden's productivity relative to other countries

Sweden's GDP per inhabitant between the ages of 15–64, relative to the euro area and KIX-weighted countries, index 1993 = 100

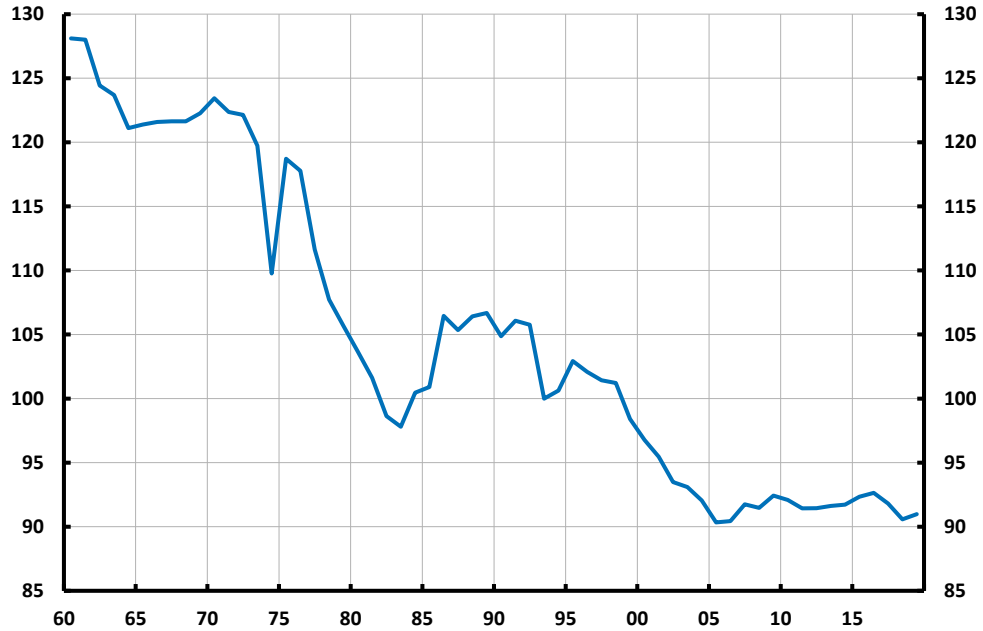


Note: Annual data. Up to and including 1994, KIX weights from 1994 have been used.

Sources: OECD, Penn World Table, World Bank

Figure A5. Sweden's terms of trade

Index 1993 = 100

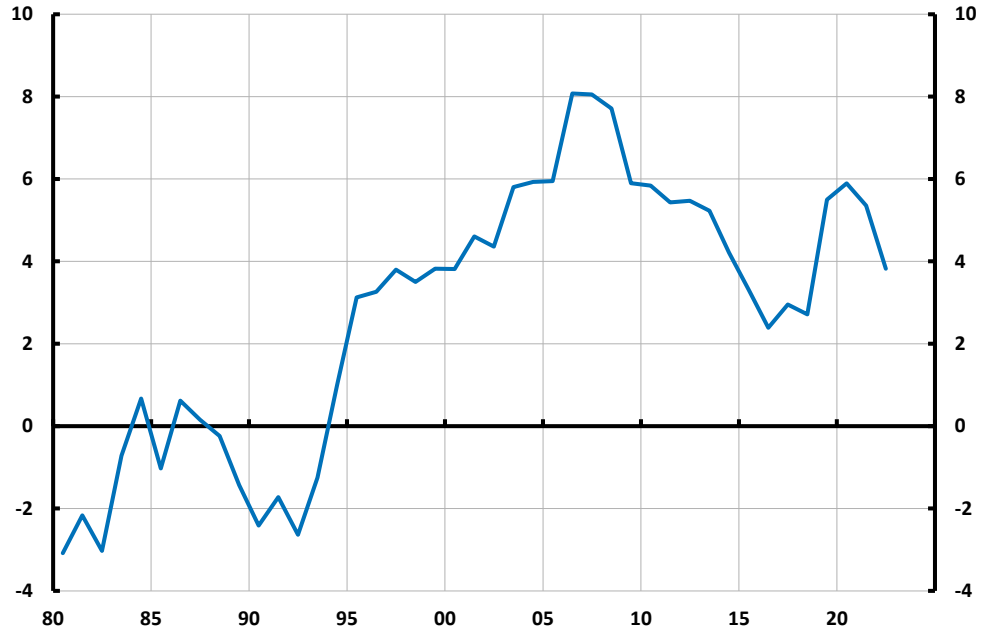


Note. Annual data. Ratio between export and import prices according to national accounts.

Sources: European Commission, DG ECFIN, AMECO

Figure A6. Sweden's current account

Percentage of GDP



Note: Annual data.

Source: IMF

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