

The exchange rate and imported inflation

Swedish inflation has been unusually low recently, mainly due to low imported inflation. This box discusses the determinants of imported inflation, with a particular focus on the impact of exchange rate developments. The pass-through from exchange rate changes to prices in Swedish currency of imported goods is discussed as well as conceivable reasons for why these changes are not passed through completely in the short term. In the long term, however, most factors indicate that changes in the exchange rate pass through completely to imported inflation.

The inflation rate in Sweden has recently been unusually low. To illustrate the forces driving this trend, inflation can be divided into two components, one that reflects domestically generated inflation and one that mirrors imported inflation:

$$\text{inflation} = \text{weight} \times \text{domestic inflation} + (1 - \text{weight}) \times \text{imported inflation},$$

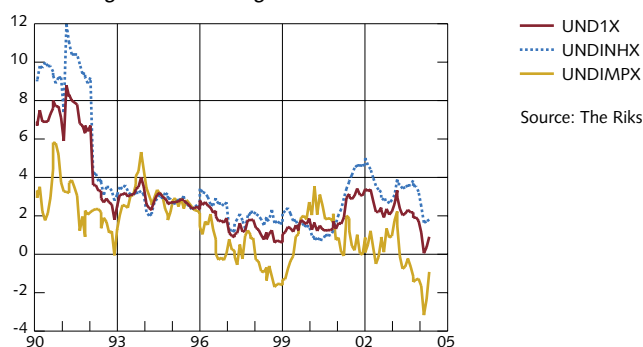
where *weight* is domestic inflation's share of total inflation. Figure B14 shows underlying inflation (UND1X) and its components, domestic and imported inflation (UNDINHX and UNDIMPX, respectively), since 1990.⁹ As can be seen from the Figure, the low inflation rate seen lately has been a result of both a drop in domestic inflation and falling prices of imported goods. However, it is particularly increases in the prices of imports that have been unusually low in the historical perspective depicted in Figure B14.

Price changes in general are determined by developments in firms' costs and by changes in demand. Thus, domestic inflation is affected mainly by domestic economic conditions and developments in the cost situation of Swedish producers. Imported inflation is governed partly by corresponding conditions abroad, which

determine the prices of the goods we import in foreign currency in the world market, and partly by how the value of the Swedish krona changes in relation to other currencies. For certain products, however, there is no uniform price in the world market; rather, exporters may choose to set different prices when selling to different countries. As a result, conditions in Sweden will also affect imported inflation, not only via the exchange rate but also through an impact on foreign exporters' prices for Swedish importers. The relative significance of the exchange rate and world market prices for Swedish import prices is difficult to determine, however, since it is rare that data is available that would enable a comparison of the price of a certain product in the Swedish market, expressed in kronor, with the price of the exact same product in the world market, expressed in foreign currency.¹⁰

Figure B15 shows the krona's value in terms of the TCW index and a measure of price developments in the world market since 1982 (four-quarter changes in both cases). The latter series is a weighted average of producer price indices (PPI) in other countries measured in national currencies.¹¹ As can be seen from Figure B15, international inflation in the past twenty years has been moderate, averaging 1.5 per cent and peaking at around 5 per cent (1984, 1989 and 2000). In the past two years international price pressures have been weaker

Figure B14. Different measures of inflation.
Percentage 12-month change



Source: The Riksbank.

⁹ UNDINHX comprises 67.1 per cent of UND1X, while UNDIMPX accounts for 32.9 per cent.

¹⁰ Oil products are an exception, however.

¹¹ The weighted average consists of 11 countries – the United States, Germany, the United Kingdom, Norway, Finland, Denmark, Belgium, Japan, Canada, France and the Netherlands – and has been done using relative TCW weights. Together these countries comprise approximately 85 per cent of the total TCW index.

than the historical average, though not as weak as price pressures on imported goods in Sweden. The rate of change in international producer prices has remained close to zero, while import prices in Sweden have fallen (see Figure B14). The difference could be partly due to the fact that Swedish imports have a somewhat different composition than the production pattern reflected in international producer prices.

Thus, while international price developments have been relatively stable the exchange rate has varied all the more. The krona's average value, expressed in terms of the TCW index, has fluctuated relatively sharply during the years in which Sweden has had a floating exchange rate. Figure B15 shows, for instance, the substantial weakening of the exchange rate when the krona started to float in late autumn 1992, the strengthening in 1996 that came about in conjunction with the improved confidence in both the economic

situation and economic policy in Sweden, and the weakening during 2001-2002 that was largely a result of international financial unease. Since reaching an historically weak level in the second half of 2001, however, the krona has strengthened considerably, and in comparison with the developments in international prices it appears natural to conclude that it is mainly the krona's appreciation in recent years that has contributed to depressing import prices.

In order to study more clearly the relationship between, on the one hand, foreign prices and exchange rate developments and, on the other, imported inflation, the two series shown in Figure B15 can be combined into one - foreign producer prices expressed in Swedish currency. High international inflation does not automatically imply high imported inflation if the exchange rate strengthens at the same time (a stronger krona means a lower price in kronor for an imported good), and it is only when international prices are translated into kronor that the total price pressures from abroad can be measured. Figure B16 shows this conversion together with two measures of developments in Swedish import prices, both for producers (import prices of manufactured goods for producers) and for consumers (UNDIMPX excluding oil products).

Even though the price series display a clear relationship, Figure B16 shows that the change in foreign prices expressed in Swedish kronor varies appreciably more than changes in Swedish import prices. Figure B15 shows that exchange rate fluctuations account for most of the variation in foreign prices expressed in Swedish currency and it is therefore common to say that there is incomplete pass-through of exchange rate changes to Swedish import prices. That the pass-through to consumer prices is incomplete is due in part to the fact that these prices also include a large domestic component in the form of, for example, distribution costs. (This domestic component could also be the reason that UNDIMPX varies less than import prices for producers.) But also as regards producer prices,

Figure B15. Foreign producer prices (manufactured goods) in local currencies and the krona/TCW exchange rate. Percentage 12-month change

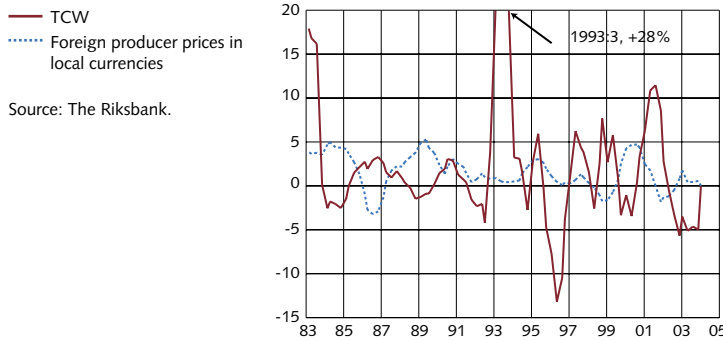
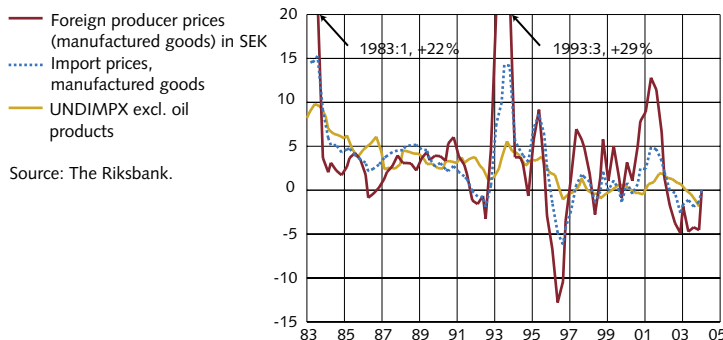


Figure B16. Foreign prices expressed in Swedish currency and Swedish import prices. Percentage 12-month change



the contemporaneous pass-through to import prices is incomplete.

What can explain this incomplete pass-through? The difference between the world market prices expressed in Swedish currency and Swedish import prices could partly be attributable to composition effects, but it is likely that it also reflects a desire on the part of foreign exporters to stabilise the prices charged to Swedish buyers (which follows from pricing to market). For example, the krona weakened during 2000 and 2001 but this did not have a particularly large impact on import prices either at the time or later on. Such price-setting behaviour could be due to exporters wanting to have stable customer relationships and therefore choosing to stabilise prices in their customers' currency, which consequently could lead them to charge different prices in different export markets. But it could also be because the prices (for consumers) are sticky for other reasons.

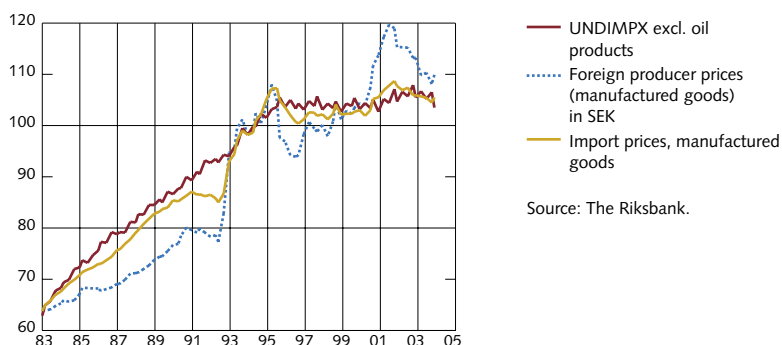
Another important factor is whether the change in the exchange rate is judged to be permanent or more temporary. Firms that seek stable developments in the prices of their goods will be more inclined to disregard changes in the exchange rate if these are considered to be temporary. This could explain why the krona depreciation in 1992-1993 appears to have passed through more to import prices in the short term than the weakening in 2000-2001. The krona depreciation that followed the introduction of the floating exchange rate regime was most likely perceived as being permanent, while the weakening during 2000 and 2001 was judged to be more temporary.

Many factors indicate therefore that the immediate pass-through of exchange rate changes is incomplete. But what is the picture in the longer term? The price series in Figure B16 are affected strongly by short-term movements which can conceal long-term relationships. If, instead, the long-run relationship between the price levels is examined it can be seen that the trends in the price level for imported goods for both producers and consumers essentially tracks

the trend in the international producer prices adjusted for the exchange rate (see Figure B17). This is also what one should expect. Consider, for example, a good that is imported to Sweden and that commands a certain dollar price in the world market, and assume that the krona weakens permanently against the dollar. In the long term a foreign exporter has no reason to charge a lower price in Sweden (with a view to limiting the consequences of the weaker krona for Swedish buyers) but will instead allow the change in the exchange rate to pass through fully to the price in kronor. The exporter could perhaps decide to temporarily lower its margins on sales to Sweden by reducing the dollar price for a period. The same ought to apply if it is the world market price (in dollars) that changes at the same time as the exchange rate remains unchanged. In the long run the price change in the world market will filter through fully in Sweden as well. So there are many indications that the long-run pass-through to Swedish import prices of changes in both foreign producer prices and the exchange rate is complete.

Together Figures B16 and B17 illustrate the importance of distinguishing between the short and long run when considering exchange rate pass-through to imported inflation. Figure B16 shows that this pass-through is incomplete (and that it can vary over time). Figure B17 provides informal support for the conclusion that the pass-through is complete in the long term. More

Figure B17. In levels: foreign prices expressed in Swedish currency and Swedish import prices. Index 1994=100



Source: The Riksbank.

formal support is given by a research paper that examines the relationship between foreign producer prices, exchange rate movements and imported producer price inflation in five open economies with inflation targets (Sweden, Australia, New Zealand, Canada and the United Kingdom).¹² The study finds support for complete pass-through of exchange rate changes in the long run for all countries except New Zealand. The method used also provides estimates of exchange rate pass-through in the short term. These differ somewhat from country to country, but indicate that between 35 and 70 per cent (40 and 50 per cent in Sweden's case) of an exchange rate change passes through to imported producer prices within one quarter. There are no corresponding systematic estimates for the pass-through to import prices at the retail level, but there is reason to expect a lower short-run pass-through than for producer prices given that consumer prices of imported goods also include a domestic component.

The discussion above indicates therefore that the price effects of an exchange rate change largely depend on how permanent the change is expected to be. The monetary policy regime is a crucial factor in this regard. Under a fixed exchange rate, a change (i.e. a devaluation or revaluation) is likely to be perceived to be permanent and the pass-through is thus faster. During the 1990s many countries went from pursuing a monetary policy targeted at maintaining fixed exchange rates to a policy with an inflation target and floating exchange rates. This has entailed greater stability for prices and less stability for exchange rates, which has also resulted in an apparent change in the correlation between exchange rates and prices.¹³ However, this does not mean that the long-term pass-through of exchange rate changes to prices has diminished. Unlike a fixed exchange rate, a floating exchange rate changes essentially all the time and a larger part of the changes can

therefore now be expected to be temporary. For this reason the short-term covariation between exchange rate changes and inflation will be smaller. But this does not mean that the pass-through to inflation from exchange rate changes that are judged to be permanent are smaller now compared with the period with a fixed exchange rate.

Summary

The low inflation outcomes seen recently are largely due to unusually low increases in import prices. It cannot be ruled out that this is partly a result of structural changes and stiffer competition in the world market. International producer price developments, however, have been fairly stable in recent decades. Price increases have indeed been small recently, but this could also be due to the level of business activity. Rather, the recent fall in import prices seems to be largely attributable to exchange rate developments. The krona has weakened in recent months, but is nonetheless considerably stronger today than a few years ago. However, this strengthening of the exchange rate has not passed through to Swedish import prices immediately; instead the effect has been protracted.

Thus, in the short term the pass-through from exchange rate changes to Swedish import prices appears to be limited. Foreign exporters and Swedish importers that want stable developments in the consumer prices of their goods may decide to disregard exchange rate changes that are perceived to be temporary. If this is the case, higher volatility in the foreign exchange market will not be reflected fully in import prices, which in turn could be perceived as a weakening of the relationship between exchange rates and prices. In the long term, however, changes in exchange rates (and changes in international price pressures) pass through completely to Swedish import prices.

¹² Adolfson, M. (2004), "Exchange Rate Pass-Through – Theory, Concepts, Beliefs and Some Evidence", unpublished paper, Sveriges Riksbank.

¹³ Note, however, that in cases where formal studies have found that the relationship between exchange rate changes and inflation has weakened it is seldom that this change is statistically significant. See Adolfson, M., and Söderström, U. "How is the economy affected by the inflation target?", Sveriges Riksbank Economic Review 2003:1.