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*Tomas Ernhagen and Fredrik Olsson*

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*Magnus Georgsson*

Legal risks are prevalent in financial asset management but seldom feature in overall risk calculations, where the emphasis is rather on financial risk. One reason for this is probably that legal risks seldom materialise, besides being difficult to measure and evaluate. But if they do materialise, the damage can be considerable. There is therefore every reason to take legal risk seriously.

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The value of the krona in terms of another currency is known as a bilateral exchange rate. The information in a number of bilateral exchange rates can be combined into a variety of weighted averages, known as effective exchange rate indices. This article describes alternative ways of calculating an effective exchange rate index, the bilateral rates to include and how to weigh them together.

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# ■ Financial asset management at the Riksbank

BY TOMAS ERNHAGEN AND FREDRIK OLSSON

Tomas Ernhagen works at the Financial Stability Department, Fredrik Olsson at the Market Operations Department.

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*At end 2005 the Riksbank's financial assets were valued at approximately SEK 200 billion. Foreign fixed-income securities made up the major item and the other items included gold, monetary policy repos and currency swaps. In this article we describe the principles and considerations that underlie the long-term direction of investment in these assets.*

The question of how financial assets are managed by central banks has traditionally been veiled in secrecy. More information has been forthcoming, however, as central banks become more open about their operations. An example is the central bank in Denmark, which has published its view of the financial risks it takes in order to achieve various objectives.<sup>1</sup> This article is a first step towards a similar openness on the part of the Riksbank in that we present the basic principles and points of view behind the management of the Bank's financial assets.

Financial management at the Riksbank is divided into two levels: strategic and tactical. The strategic matters, which concern the long-term direction of financial management, are decided by the Riksbank's Executive Board. The tactical management is decided by the Head of the Market Operations Department (MOP) within deviations mandated by the Executive Board.<sup>2</sup> The Head of MOP in turn delegates a mandate for short-term positioning by the investment division.

This article sets out to explain the considerations that apply at the strategic level. We refer to the tactical level of management only when this is motivated for pedagogic reasons. First we review the major items in the Riksbank's balance sheet in order to clarify the links between asset management and the Riksbank's various assignments. Then we go

Financial management at the Riksbank is divided into two levels: strategic and tactical.

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<sup>1</sup> Danmarks Nationalbank (2004).

<sup>2</sup> Mandated deviations provide a specified scope for deviating from the management's long-term direction. They can be used to increase or reduce exposure to a particular type of risk.

through the various financial risks the Executive Board has to decide about when laying down the management's long-term direction. The article ends with a summary discussion.

## Starting points

As in all financial management, the Riksbank's objective in this context is to generate return. However, the Executive Board also has to consider how the financial management is to be arranged so that the Riksbank is in a position to perform its statutory assignments as a central bank as regards monetary policy and the stability of the financial system. It is obviously the statutory duties that have preference here; return can be a consideration only to the extent that it does not jeopardise the Bank's central policy functions. In general terms, the balance sheet, which is presented in a stylised form in Figure 1, represents the view of the Executive Board in this respect.

## Liabilities

The Riksbank's assignment as regards financial stability is formulated in the requirement that the Riksbank shall promote a safe and efficient payment system. The functions this assignment entails are reflected in the balance sheet's liabilities. The Riksbank's statutory function of ensuring the supply of banknotes and coins can be linked in a wider sense to this

Figure 1. The Riksbank's balance sheet

Assets	Liabilities
Gold and foreign exchange reserve	Banknotes and coins in circulation
Foreign exchange swaps	Capital
Monetary policy repos	– Emergency liquidity assistance
Other assets	– Operating costs
	– Financial risks

Source: The Riksbank.

assignment. The public demand for cash, which is influenced in the short run by, for example, interest rates and in the longer run by, for example, the cash market's structure, determines the volume of banknotes and coins in circulation. Demand also varies with seasonal factors, peaking in connection with major public holidays and pay-days, which lead to increased public demand for cash.

The other main liability, equity capital, is linked to the Riksbank's independent status, which presupposes that the Bank has the financial strength to cope with losses and costs that arise in its operations. Inadequate capital could weaken public confidence in the Riksbank's capacity to fulfil its statutory functions. If the Riksbank were to be dependent for its operations on capital contributions from the state, there would be a potential risk of this lack of financial independence leading to speculation that such contributions will be accompanied by specific demands from the Government and the Riksdag (parliament) concerning the direction of the operations. It could then be more difficult for the Riksbank to fulfil its functions.

Losses can arise in connection with the Riksbank's emergency liquidity assistance, which may be provided so that a disruption of the payment system does not result in a financial crisis. The assistance is conditional on the bank or financial enterprise being solvent and supervised by Finansinspektionen (Sweden's Financial Supervisory Authority) but problems in the affected bank or enterprises may get worse. There is ultimately a risk of the enterprise or bank failing, which means that the Riksbank can incur financial losses. To avoid the Riksbank having to request capital contributions from the state, its capital needs to be large enough to cover such losses.

The capital requirement is not solely linked to losses that may arise in connection with emergency liquidity assistance. In order to safeguard financial independence in the long run, capital is also needed to finance the Bank's operating costs, such as wages, real estate expenditure, etcetera.<sup>3</sup> Moreover, the Riksbank may need capital to cope with losses incurred in the day-to-day management of its financial assets. The background to losses of this type is that the Riksbank's assets are marked-to-market. Losses then arise when the Swedish krona appreciates against the currencies in the foreign exchange reserves or from changes in market interest rates or the price of gold. A certain amount of capital may also be needed to cover credit risk in the holding of securities, as well as operational risk.

The Riksbank is responsible for the supply of banknotes and coins, a function that is linked to the promotion of a safe and efficient payment system.

Capital is linked to the Riksbank's independent status.

Losses can arise in connection with the Riksbank's emergency liquidity assistance.

In order to safeguard financial independence in the long run, capital is also needed for financing current operations.

<sup>3</sup> This and other issues concerning the Riksbank's capital requirement are discussed in Ernhagen, Vesterlund & Viotti (2002).



## Assets

The dominant item on the asset side of the balance sheet is assets denominated in foreign currency.

The dominant item on the asset side of the balance sheet is assets denominated in foreign currency.<sup>4</sup> The basic purpose of these assets is to provide for the contingency that exchange market interventions are needed for reasons to do with monetary policy. In a crisis, these assets can also be used for emergency liquidity assistance in foreign currency.

The Riksbank, like most other central banks, also owns gold. This is primarily a consequence of the historical importance of gold but the holding can also be seen as an ultimate safeguard for a crisis in which other assets are not acceptable.<sup>5</sup> Nowadays, however, the main justification for holding gold is that it contributes to diversification of the total portfolio of financial assets. However, agreements with other central banks limit the possibility of adjusting the size of the gold reserve for this purpose.<sup>6</sup>

When balance-sheet liabilities exceed the holding of gold and foreign exchange reserves, the banking system has a structural deficit vis-à-vis the Riksbank.

When balance-sheet liabilities exceed the holding of gold and foreign exchange reserves, the banking system has a structural deficit vis-à-vis the Riksbank. The banking system then needs to borrow kronor from the Riksbank. This borrowing requirement varies in the short run with public demand for cash. A part of the requirement is handled by means of weekly repo transactions,<sup>7</sup> which are a component of the Riksbank's monetary policy steering of interest rates.<sup>8</sup> Return considerations have led the Riksbank to use foreign exchange swaps to extend the duration of the remaining requirement.<sup>9</sup>

The item "Other assets" consists mainly of holdings in the form of claims on the International Monetary Fund (IMF) and equity in the Bank for International Settlements (BIS).

Strategic decisions by the Executive Board are primarily explained by the Riksbank's assignments.

From this brief account of the balance sheet it will be clear that the primary explanation for the Executive Board's strategic decisions about the direction of asset management lies in the Riksbank's assignments. In summary, a part of the assets has to consist of foreign reserves for the purpose of intervention. Monetary policy repos are needed as another part in order to manage interest rates. In addition, in order to safeguard the Riksbank's financial independence, risks must be taken in balanced

<sup>4</sup> The currency assets in the foreign reserves are invested in foreign fixed-income securities. Over 90 per cent of the capital is held in government bonds issued in a range of six countries; the remaining capital is invested in US agencies, that is, institutions associated directly or indirectly with the US state.

<sup>5</sup> The role of the gold reserves is considered in more detail in Henriksson (2002).

<sup>6</sup> In order to counter a fall in the price of gold, in September 1999 fifteen European central banks agreed to regulate a disposal of gold reserves over a period of five years. The agreement was renewed in 2004 and runs for another five years.

<sup>7</sup> A repo transaction meets the banks' borrowing requirement by the Riksbank purchasing securities from them and simultaneously agreeing to sell back the securities after a specified time.

<sup>8</sup> For a detailed account of the Riksbank's monetary policy steering of interest rates, see Otz (2005).

<sup>9</sup> This is done by the Riksbank selling Swedish kronor for euro in the spot market and depositing the euro, accompanied by a forward agreement to buy back the kronor up to six months later. The forward contract serves to eliminate exchange risk. The swap portfolio is to have an average duration of three months.

forms so that the danger of capital being eroded is minimised. Not until these asset requirements are met can the management consider taking financial risks in order to generate return.

In order to ensure that assets are invested in accordance with these needs, the Riksbank has internal rules<sup>10</sup> with a clear specification of which financial risks are acceptable and why they may be taken. The rules state that asset management is to be reviewed annually by the Executive Board to ensure that its direction agrees with the stated objectives. The review clarifies which risks are taken in order to fulfil the statutory assignments and which are taken in order to generate return. This distinction is essentially a matter of deciding the Riksbank's exposures to risks of three types: currency, interest rate and credit risks. The considerations behind the Riksbank's choice of exposures to these risks are outlined below.

The Riksbank has internal rules that specify acceptable financial risks.

## Currency risk

In accordance with the Currency Rate Policy Act (1998:1404, § 2), the system for establishing the value of the krona in relation to foreign currencies is decided by the Government. The application of the exchange rate regime decided by the Government is then, in accordance with the Sveriges Riksbank Act (1988:1385, Chapter 7, § 1), the Riksbank's responsibility. It follows that the Riksbank must be in a position to intervene in the foreign exchange market in order to defend the exchange rate regime and this in turn requires that the Riksbank holds assets denominated in foreign currency. With a fixed exchange rate regime, the Riksbank is responsible for maintaining the value of the kronor in relation to one or more other currencies. This entails the Riksbank intervening in the foreign exchange market with a varying frequency and that in turn calls for a holding of foreign currency assets that are readily traded.<sup>11</sup>

The size of this holding is primarily determined by the needs associated with the current exchange rate regime. Besides requiring reasonable knowledge of how the financial markets are functioning at the time of an intervention, gauging these needs calls for an opinion about the extent to which the exchange rate regime is likely to be tested by market participants. It would be hazardous to attempt an exact assessment but it is reasonable to assume that the need for liquid foreign currency assets is greater with a fixed than with a variable exchange rate regime. Even if a

The size of the foreign currency holding is primarily determined by the needs associated with the current exchange rate regime.

<sup>10</sup> The Riksbank's rules for financial asset management were revised in the autumn of 2005. The revised version, which is available as "Rules for the Riksbank's financial asset management" on the Riksbank's website, entered into force on 1 January 2006.

<sup>11</sup> The tradability (liquidity) of an asset is defined by the Riksbank in terms of the amount that can be sold within the requisite time limit in order to perform the Riksbank's tasks without exerting an considerable influence on the asset's market price.

variable exchange rate makes the need less pronounced, interventions may still be called for to promote price stability.<sup>12</sup> Moreover, the Riksbank may have occasion to participate in interventions together with other central banks (concerted interventions). To secure the capacity for interventions, a large part of the Riksbank's assets is held in government bonds denominated in the probable intervention currencies (the euro and the US dollar).

Currency risk arises when the krona exchange rate moves relative to currencies in the foreign reserve.

Currency risk lies in kronor exchange rate movements relative to currencies in the foreign reserve. This is a consequence of the Riksbank's accounts being expressed in kronor. An appreciation of the krona reduces the value of the foreign reserve, just as a depreciation has the opposite effect. In this context, an appreciation of the krona is a negative event that generates exchange losses which show up on the Riksbank's balance sheet. There is a risk of these losses being so large that they have to be covered with the capital the Riksbank has intended to use in the event of financial crises and for financing day-to-day operations. There are therefore grounds for limiting a krona appreciation's effect on the Riksbank's earnings. At the same time, the Riksbank needs to have foreign exchange assets for interventions. In other words, a change in the currency composition of the foreign currency reserve must take into account both the intervention aspect and the risk of capital erosion.

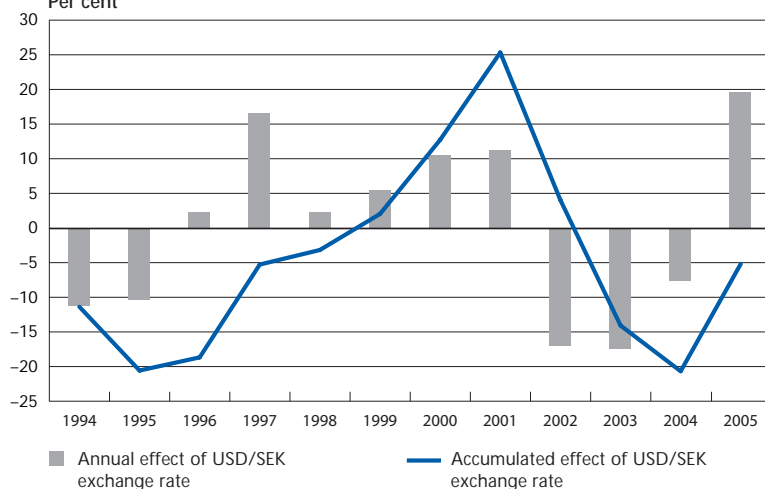
The foreign currency exposure can lead to large fluctuations in the market value of the assets in kronor and thereby in the annual result.

For a capital manager that, like the Riksbank, mainly holds foreign government-backed fixed-income securities, the dominant risk is currency risk. The foreign currency exposure can lead to very large fluctuations in the market value of the assets, measured in kronor, and thereby in the annual result. An illustration of this is presented in Diagram 1, which shows the annual and accumulated exchange rate effect between the US dollar and the Swedish krona in the period 1994–2005.

Short-run fluctuations have to be accepted, however, because the Riksbank holds assets in foreign currency primarily for the purpose of intervention. Such fluctuations could admittedly be avoided by covering the currency risk but that would function like an intervention and could thereby have an undesirable effect on the krona's exchange rate. In practice, short-run fluctuations need not be a major problem because the Riksbank's foreign currency holding is of a long-term nature. In the countries whose currencies are included in the foreign reserve, monetary policy is much the same as in Sweden, so in principle it is only real economic differences that lead to trendwise exchange rate movements. If real economic developments are similar in these countries, it is reasonable to

<sup>12</sup> For a fuller discussion of the Riksbank's intervention policy, see Heikensten & Borg (2002).

Diagram 1. Annual and accumulated effect of USD/SEK exchange rate; 1994–2005  
Per cent



Note. Annual effect is the percentage difference between quoted exchange rates at one year-end and the next.

Source: The Riksbank.

assume that short-term fluctuations will cancel out in the longer run.<sup>13</sup> Diagram 1 suggests that this may be the case.

## The Riksbank's foreign exchange exposure

The currency composition is decided by the Executive Board on the basis of a quantitative analysis that starts in turn from frameworks specified in the rules. The purpose of the frameworks is to cater to the statutory assignments' specific asset requirements and to limit risks by ensuring a minimum level of currency diversification (see Table 1).<sup>14</sup>

The intervention aspect is handled by stipulating that US dollar and euro holdings must each be equivalent to a minimum of 10 per cent of the currency portfolio. The risk of capital erosion is handled in turn by rules that ensure a certain degree of currency diversification in the foreign reserve. The purpose of this is to avoid an extreme allocation that entails exposure to just a few currencies. The starting point for the diversification is that the co-variations between price movements for particular assets (the correlations) are not always perfectly positive. This implies that movements in a total portfolio (its volatility) are smaller. In connection with large exchange market movements, a one-sided currency composi-

The Riksbank's rules ensure a certain degree of currency diversification in the foreign reserve.

<sup>13</sup> See e.g. Dimson, Marsh & Staunton (2005), who studied exchange rate effects over long time horizons.

<sup>14</sup> The basic requirements for Riksbank investment in a currency are the credit rating of the country in question and reasonable liquidity. The currencies listed in the rules fulfil these requirements.

TABLE 1. THE RIKSBANK'S FRAMEWORK FOR HOLDINGS OF DIFFERENT CURRENCIES

Currencies allowed	Holding allowed; per cent
EUR (euro)	10–60
USD (US dollar)	10–60
<i>Aggregate for EUR and USD</i>	<i>20–70</i>
GBP (Pound sterling)	0–20
JPY (Japanese yen)	0–20
<i>Aggregate for GBP and JPY</i>	<i>0–40</i>
AUD (Australian dollar)	0–10
CAD (Canadian dollar)	0–10
CHF (Swiss franc)	0–10
DKK (Danish krone)	0–10
NOK (Norwegian krone)	0–10
NZD (New Zealand dollar)	0–10
<i>Aggregate for AUD, CAD, CHF, DKK, NOK and NZD</i>	<i>0–40</i>
<b>Total</b>	<b>100</b>

tion can result in sizeable negative changes in value, which can lead in turn to a marked reduction of equity capital.

A relatively low ceiling for smaller currencies is motivated by liquidity considerations. Moreover, correlations between currencies tend to rise in periods of financial turbulence,<sup>15</sup> which means that these currencies' contribution to diversification is liable to diminish when the need is greatest. It is also in such situations that the Riksbank is most likely to need to dispose of assets for the purpose of intervention. Holding an unduly large proportion of assets in less liquid currencies is therefore undesirable. That is not to deny that under normal circumstances these currencies do contribute to diversification; it simply underscores the importance of not having holdings of them that are too large.

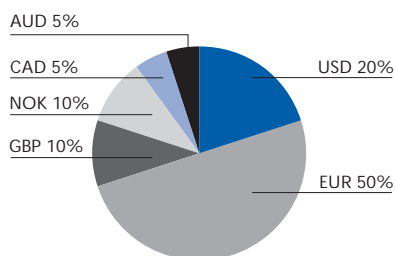
The quantitative analysis the Riksbank uses when deciding the currency composition, subject to the frameworks in the rules, is based on fundamental and standard portfolio theory.<sup>16</sup> The Riksbank's purpose with such an analysis is to arrive at the composition of currencies that, while safeguarding the capacity for intervention, minimises the effects of exchange rate movements as measured in Swedish kronor. The expected return from foreign currency is not considered, only the estimated volatility and correlations of the currencies. These are estimated on time series

The quantitative analysis behind the currency composition is based on fundamental and standard portfolio theory.

<sup>15</sup> See e.g. Dimson, Marsh & Staunton (2002), who studied how correlations tend to develop in periods of financial turbulence.

<sup>16</sup> This refers to the mean variance analysis that was originally presented in the 1950s by Harry M. Markowitz. On account of this model's sensitivity, the analysis is supplemented with Value-at-Risk (VaR) calculations, risk contribution analyses and stress tests. VaR is an estimate of the risk of a potential loss, defined as the expected maximum loss of value in an asset or portfolio of assets that will occur with a specified probability over a specified period of time; see e.g. Jorion (2001).

Diagram 2. Currency composition of the foreign exchange reserve  
Per cent



Source: The Riksbank.

for the direct exchange rate effect between the currencies and Swedish kronor. The current currency composition is shown in Diagram 2.

Expected returns from the currencies could, in principle, also be taken into account in the analysis. This would require an estimation of “risk premia” for each currency; as that is difficult to do and also somewhat arbitrary, these premia are usually assumed to be zero or constant in the long run.<sup>17</sup> So the analysis does not include an assessment of potential changes in the values of the currencies in terms of the krona. Neither does the analysis allow for the currency reserve being held in fixed-income instruments.<sup>18</sup> That is not done because the effect on the outcome of the analysis would be marginal since bond returns are normally considerably less volatile than exchange rates.

As the Riksbank’s view on the currency composition is based on historical risk, there is no reason to delegate an active mandate for the purpose of speculation in short-term exchange rate movements. Minor changes as a consequence of exchange rate movements are permitted, however, in order to curb the transaction costs associated with foreign reserve adjustments designed to maintain the currency composition. This operating mandate amounts to  $\pm 3$  percentage points per currency.

## Interest rate risk

As mentioned earlier, the Riksbank’s currency risk is a direct consequence of its tasks of being capable of intervening in the foreign exchange market and of providing emergency liquidity assistance in connection with a

<sup>17</sup> Such an assumption implies that the expected return on an open (that is, un-hedged) currency position with a given short duration is the same as for an equivalent domestic investment.

<sup>18</sup> The expected return does play an important part in the analysis of the composition of fixed-income assets. The main concern is the term premia that it is reasonable to expect but also the risks in particular fixed-income markets and the correlation between these. As the currency composition is analysed separately from the analysis of the market distribution of fixed-income assets, they may result in different portfolio weights. Such a mismatch in the holding between currencies and fixed-income markets is known as currency overlay and can be managed with derivative instruments.

In so far as the Riksbank chooses to take interest rate risk, the reason is to increase the expected return on its assets.

The Riksbank uses modified duration to handle interest rate risk.

financial crisis. There is no such direct link between interest rate risk and the Riksbank's statutory assignments. In so far as the Riksbank chooses to take interest rate risk – by investing in securities with an average duration that extends beyond the accounting period – the reason is to increase the expected return on its assets. The background to this is that interest rate risk does not clearly threaten equity capital in the way that currency risk does. The considerations behind the Riksbank's view of interest rate risk are described in the following.

Interest rate risk lies in changes in the yield curve, which represents the market rates for different maturities. Analysis of the yield curve usually focuses on three factors: parallel shift,<sup>19</sup> slope and curvature.<sup>20</sup> A parallel shift is when the entire curve moves to the same extent up or down. Historically, it is such shifts that have contributed the largest part of the variation in the yield curve. The dominance of parallel shift has led many asset managers to focus their choice of interest rate exposure on various measurements connected with this shift. This is also true for the Riksbank, where interest rate risk is managed by using the measure modified duration. As this measures the effect of parallel shifts in the yield curve, it provides only an approximate estimate of how the market value of a bond portfolio reacts to a change in market rates of interest.<sup>21</sup> But as duration is the Riksbank's basic measure of interest rate risk, the following account concentrates on the choice of duration.<sup>22</sup>

The choice of duration is often discussed on the assumption that the yield curve normally slopes upwards – interest rates are assumed to increase with their duration. So the choice of a longer duration can be expected to give a higher return on an investment.<sup>23</sup> This is accompanied by a higher risk because the volatility of returns increases as a rule with duration. A longer duration is therefore associated with larger fluctuations in a portfolio's market value and return.

There is empirical support for this. Historical analyses show that the

<sup>19</sup> This factor is often referred to in academic literature as "level".

<sup>20</sup> Changes in slope are when the short and/or long end of the curve move, making the slope steeper or flatter. Changes in curvature are when the long and short ends move in the same direction and the middle segment moves in the opposite direction or is unchanged. For a detailed description of the yield curve, see e.g. Golub & Tiltman (2000).

<sup>21</sup> Modified duration is a linear description of a bond portfolio's market value in relation to the development of interest rates. This relationship is in fact not linear but convex, so it is only for marginal interest rate movements that modified duration gives a good picture of the risk (the change in market value). For larger interest rate movements, modified duration should be supplemented with "convexity", which takes non-linear effects into account. Modified duration is often used to indicate the approximate extent to which a fixed-income portfolio changes when the market rates of interest rise 1 percentage points. The value of a portfolio with a modified duration of 4 is assumed to fall 4 per cent.

<sup>22</sup> At the Riksbank, the management of changes in slope and curvature is handled as a tactical issue.

<sup>23</sup> Note that the yield curve defined as quoted market interest rates for different maturities is not the same as the total expected return from bonds with these maturities. The difference is partly due to the size of bond coupons. The theoretical account in this article refers to the total return.

slope of the yield curve is normally positive.<sup>24</sup> In general, interest rates for different maturities are determined by supply and demand. Assuming that the supply is given, demand and hence the interest rates can be determined by the investors' horizons, risk propensity and expectations of future interest rates. A curve that slopes upwards can then be explained as a short-term preference among investors, who want to reduce the accounting risk. With an accounting period of one year, for example, investors may prefer to place a relatively large proportion in one-year securities. Another explanation may be that short-term securities are preferred for reasons to do with liquidity. If this is the case for many investors, the high demand for these securities will depress interest rates for the durations in question. At the same time, longer bonds carry a positive risk premium to compensate for the higher volatility of their return. But although the slope of the yield curve is therefore normally positive, it may be unwise to take this for granted. Moreover, an upward sloping yield curve does not necessarily imply that the return increases along with duration.

As shown in Diagram 3, the return on US Government bonds with different maturities has varied markedly over time. The main explanation for this lies in market expectations of future inflation and the general interest rate trend. As a rule, in periods with low inflationary pressure the return from long-term bonds has been positive in relation to shorter bonds, while the opposite has applied with high inflationary pressure and a rising interest rate trend.<sup>25</sup> Another effect on the appearance of the yield curve probably comes from structural phenomena. For investors with a long horizon and long-term liabilities, e.g. pension funds and life assurance companies, bonds with a duration that matches the liabilities are seen as the alternative that minimises risk. These investors are therefore prepared to pay for immunity to the interest rate risk between assets and liabilities. This may partly explain the recent inversion of the UK yield curve.

The Executive Board's annual review provides the Riksbank with an opportunity of considering this type of structural change in the development of the yield curve. In the shorter run, the question is dealt with by the Market Operations Department. Although the appearance of the yield curve is liable to change, the discussion below focuses on the Riksbank's view of interest rate risk in the normal case, that is, when the yield curve is sloping upwards.

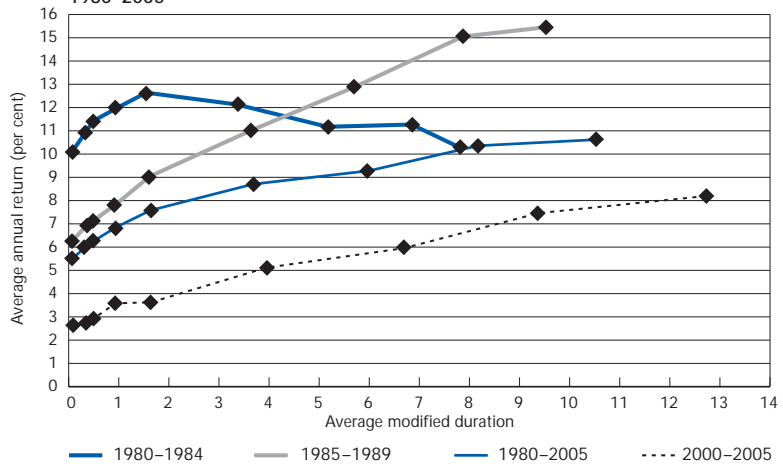
Structural changes in the yield curve can be considered by the Riksbank in the Executive Board's annual review.

<sup>24</sup> The most common theoretical explanations for the appearance of the yield curve are usually summarised in the expectations hypothesis, liquidity preference theory and market segmentation theory; see e.g. Fabozzi (2000).

<sup>25</sup> See e.g. Ilmanen (1996).



Diagram 3. Average annual return on US Government bonds with different duration: 1980–2005



Note. In chronological order the maturities are: 1, 3, 6 and 12 months and 1–3, 3–7, 7–10, 10–20 and >20 years.

Source: Citigroup/Yieldbook.

## The Riksbank’s choice of interest rate exposure<sup>26</sup>

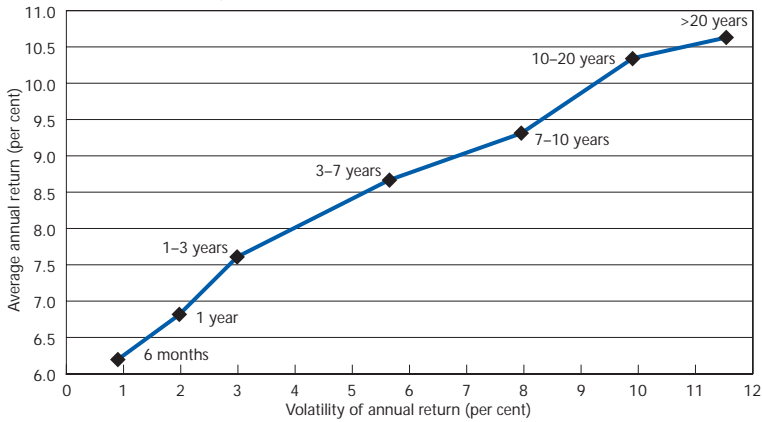
Having a clear investment horizon simplifies the choice of a portfolio’s duration. For the pension funds and life assurance companies we mentioned above, it is natural to try to obtain immunity to market risk by matching the interest rate sensitivities of assets and liabilities. An interest rate movement that increases the value of the liabilities will then be neutralised by the corresponding increase in asset values. In the absence of such a self-evident investment horizon, an investor has to arrive at the choice of duration from other starting points. The reasonable approach is to look at the relationship between returns and risks.

Average returns and return volatilities for US Government bonds with different durations are presented in Diagram 4. For an investor who is relatively insensitive to short-run fluctuations in earnings, it has evidently paid to choose a longer duration.

The return from bonds with no credit risk is broken down as a rule into effects from reinvestment of coupon payments (direct return) and effects of interest rate movements on bond prices (price effect). Diagram 5 demonstrates how the duration-related increase in volatility shows up in these two components. Interest income in the period for the portfolio with the longer average duration (3–7 years) is higher than for the shorter duration (1–3 years), in keeping with the discussion above. At the same

<sup>26</sup> For a fuller discussion, see Ragnartz (1999).

Diagram 4. Average annual return and volatility of US Government bonds with different durations; 1980–2005



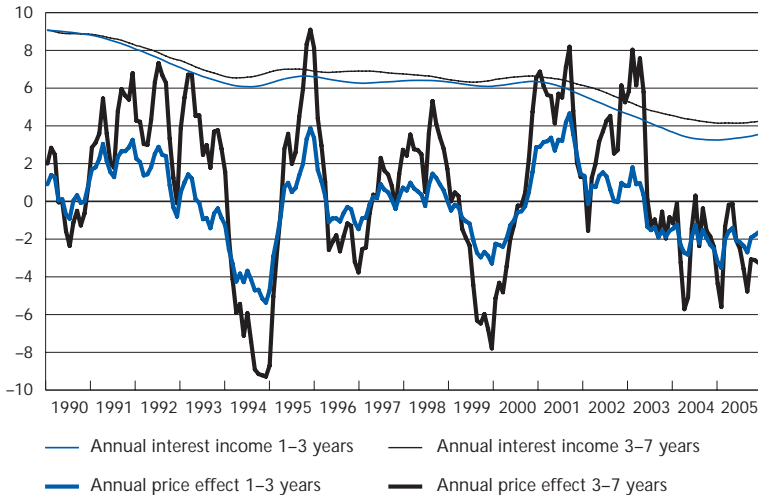
Source: Citigroup/Yieldbook.

time, the price effect, positive as well as negative, is considerably larger for the long durations. The circumstance that volatility increases with a portfolio's average duration accordingly leads not only to an increasing expected return but also to an increasingly negative price effect in years with sharply rising interest rates.

As the Riksbank has no fixed-income liabilities, there is no self-evident horizon for investment. The Executive Board therefore has to decide how to formulate the trade-off between return and risk. If the purpose were to consistently avoid negative effects on earnings, the logical basis for duration would be the accounting period, which for the Riksbank is one year. There would then be little difference between expected and actual earn-

The Executive Board's decision is that the fixed-income assets are to have an overall modified duration of 4.

Diagram 5. Moving annual interest income and price effect of US Government bonds with different durations; 1989–2005  
Per cent



Source: Citigroup/Yieldbook.

ings. However, such a short strategic investment horizon entails an increased reinvestment risk<sup>27</sup> as well as a lower expected return. As a central government agency, the Riksbank starts instead from a sovereign's long-term perspective on assets, where a good long-term return is preferred despite larger short-run variations in the annual result.<sup>28</sup> With such a long-term perspective on assets, the Riksbank avoids the extra liquidity premia for shorter securities that market players seem to find acceptable. Against this background, the Executive Board's decision is that the fixed-income assets are to have an overall modified duration of 4, with a tactical mandate for deviations of  $\pm 1.5$ . This choice is based on an assessment that price risk<sup>29</sup> is not considered to be a threat to equity capital.

In deciding the duration of the Riksbank's krona assets, the Executive Board has chosen a balance between return and clarity in the practical work of managing interest rate formation in the economy. As discussed initially, the Riksbank manages the shortest market rates by means of weekly repo transactions. As the return on these repos is comparatively low, the Executive Board has chosen to minimise the size of monetary policy repos.

Other assets (see the section on the balance sheet), which are neither foreign fixed-income securities nor gold, can then be managed with a view to generating higher return.<sup>30</sup>

## Credit risk

Thus, as indicated above, the choice of a relatively long duration has no link to the Riksbank's statutory assignments. It rests solely on the assumption that the state prefers a high return to minor fluctuations in the annual result. The same assumption lies behind the Riksbank being prepared to consider investment in securities other than government bonds and thereby take a credit risk in order to obtain a higher risk-adjusted return.<sup>31</sup>

The Riksbank's fixed-income assets are currently dominated by government bonds and the same is generally true of other central banks.

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<sup>27</sup> Reinvestment risk arises when capital is invested over more than one period, the reason being that the reinvestment rate in future periods is not known in the current period. Investing in assets (with no credit risk) with the same duration as the accounting period confines exposure to the reinvestment risk and the annual outcome will be given from the beginning of the year.

<sup>28</sup> In view of the principle for transferring Riksbank profits to the Treasury, it is reasonable to assume that priority is accorded to the return in the long run. The principle is that 80 per cent of the average annual profit in the past five years is to be transferred annually to the Treasury; this does not include the share of the result that is due to exchange rate movements vis-à-vis the Swedish krona.

<sup>29</sup> Price risk is the risk that interest rates and hence bond prices move unfavourably, with a direct effect on earnings. This risk grows with the average duration of the investments.

<sup>30</sup> The Riksbank does this by using foreign exchange swaps to extend the duration from one week to three months.

<sup>31</sup> Risk-adjusted return is the return on an investment in relation to its risk. A higher risk-adjusted return can accordingly be achieved by either increasing the return for a given risk or by reducing the risk for a given return.

However, increased possibilities of managing and monitoring financial risks, together with less frequent interventions as more and more countries switch to a variable exchange rate, have made central banks around the world<sup>32</sup> increasingly interested in investing in assets that carry a credit risk. Capital markets, above all in the United States and Europe, provide a number of alternatives for fixed-income investment that give a higher interest rate than government bonds. The interest rate is higher because the issuer represents a higher credit risk<sup>33</sup> and liquidity as a rule is somewhat lower than for government bonds. These two components are mirrored in the risk premium (in the form of a higher interest rate) the market requires for investment in these assets.

The Riksbank's fixed-income assets are currently dominated by government bonds.

As a rule, converting a certain portion of a fixed-income portfolio from government bonds to credit bonds has positive diversification effects. This is because the returns on government and credit bonds seldom show a perfect positive correlation. A certain portion of credit bonds can accordingly increase the risk-adjusted return. It should be underscored, however, that investing in credit bonds introduces an additional type of financial risk in the form of credit risk. It therefore places greater demands on risk management, analysis and capital, over and above what is caught in risk measures such as volatility calculated from historical returns. It is therefore also important to maintain a high degree of diversification in the segment with credit risk by spreading the investments over an adequate variety of issuers and sectors.

A certain portion of credit bonds can increase the risk-adjusted return.

## The Riksbank's credit exposure

As shown in Table 1, the rules stipulate that at least 20 per cent of the foreign reserve is to be held in US dollars and euro. As this currency exposure is intended to suffice for the most acute intervention requirements under the current flexible exchange rate regime, US and European government securities are to make up 20 per cent of the underlying spot assets. It follows that other assets do not need to be as liquid, which enables the Riksbank to invest in other asset categories than government paper. As discussed above, spreading capital over more categories of asset probably gives a better relationship between risk and return, assuming a less than perfect co-variation between asset returns. A greater degree of diversification is therefore likely to have a positive effect on the risk-adjusted return. The limit to altering the composition of assets in this way is ultimately set by provisions in the Sveriges Riksbank Act (1988:1385,

An increased degree of diversification is likely to have a positive effect on the risk-adjusted return.

<sup>32</sup> See The Royal Bank of Scotland (2003) and (2006).

<sup>33</sup> Credit risk refers here to the risk of an issuer suspending payment commitments on issued debt securities.

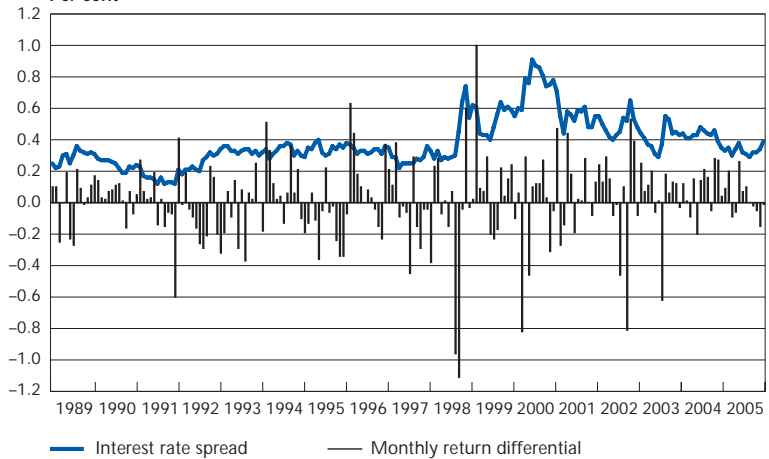
In 2001 the Executive Board decided to invest a minor part of the foreign reserve in bonds issued by US agencies.

Chapters 6 and 7) to the effect that the Riksbank may trade and invest in various fixed-income securities, with the attendant rights and obligations.

In 2001 the Riksbank took a first step in this direction when the Executive Board decided to invest a minor part of the foreign reserve in bonds issued by US agencies, i.e. American institutions with a direct or indirect link to the US Federal Government.<sup>34</sup> On account of a higher credit and liquidity risk, these bonds normally pay a higher interest rate than equivalent government bonds. The historical interest rate spread between US agencies and equivalent Government bonds is shown in Diagram 6. While the interest rate spread between US agencies and Government bonds was clearly positive throughout the period, there were single months in which the difference in return was negative. This is because of the negative relative price effect on investment that comes from widened spreads.

The current rules for risk management make it possible to take diversification even further by investing in additional asset categories. Given a secure legal foundation and adequate risk management, the Riksbank is entitled to invest not only in government bonds, gold and US agencies, but also in the following fixed-income securities: securities with a govern-

Diagram 6. Interest rate spread and monthly return differential between US agencies and US Government bonds; 1989–2005  
Per cent



Note. The differences refer to indices for 3–7 year durations.

Source: Citigroup/Yieldbook.

<sup>34</sup> The Riksbank invests in the following US agencies: Tennessee Valley Authority and three mortgage institutions – Federal Home Loan Bank, Fannie Mae and Freddie Mac.

<sup>35</sup> Debt securities under loans or issuers with a government guarantee.

<sup>36</sup> Debt securities issued by supranational or international institutions (e.g. the IBRD).

<sup>37</sup> Mortgage-Backed Securities, e.g. German "Pfandbriefe", which are debt securities backed by loans that are backed in turn by residential property.

<sup>38</sup> Asset-Backed Securities, debt instruments backed by assets other than those referred to in the preceding footnote.

ment guarantee,<sup>35</sup> supranationals,<sup>36</sup> MBS,<sup>37</sup> ABS<sup>38</sup> and corporate securities.<sup>39</sup> However, the holding of government bonds must never fall below 50 per cent of the value of total assets. The upper limit on holdings of assets with a relatively higher credit risk is also comparatively low. A ceiling of 15 per cent of total asset value applies to each of US agencies, MBS and ABS, while the limit for corporate bonds is 10 per cent. The rules also stipulate far-reaching rating requirements. Following the introduction of US agencies in 2001, however, there have been no changes in the Riksbank's strategic long-term credit holding.

## Summary and conclusions

The long-term direction of the Riksbank's financial asset management is decided by the Executive Board and reviewed once a year. The decision is to ensure that the management is conducted in a way that is in line with the Riksbank's statutory assignment and also leads to a good return. In the event of a conflict between these two objectives, the statutory assignments invariably have priority.

In order to safeguard the statutory objectives, the Riksbank is to hold highly liquid assets in the probable intervention currencies, i.e. government bonds in US dollars and euro. In other respects, the Executive Board limits currency risk by choosing a currency composition that minimises fluctuations in the value of the foreign reserve measured in Swedish krona. This is expected to reduce the fluctuations in the Riksbank's annual profit and thereby also the risk of equity capital being eroded. This focus on equity capital follows from the importance of equity capital in the arrangements for the Riksbank's independence as a central bank. These arrangements require sufficient equity capital for the Riksbank to be in a position to cope with losses and finance its current operations without being directly dependent on the state.

The other objective – a good return – can be fulfilled by taking interest rate and credit risks and by using diversification to reduce the potential negative impact of those risks. The level of interest rate risk has been decided by the Executive Board so that a high long-term return has preference over small negative effects on annual results. This is the implication of the relatively high duration, 4, the Executive Board has chosen for the fixed-income investments. The Board accepts this risk because it does not have the same dignity as currency risk and is therefore not such a direct threat to equity capital as the foreign currency exposure.

The Riksbank can increase the risk-adjusted return on its investments

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<sup>39</sup> Corporate debt securities other than those referred to in footnotes 35–38.

by holding categories of asset with credit risk, i.e. fixed-income securities other than government bonds. This is because the actual return from assets with a credit risk can be higher and the returns on assets of two types normally do not co-vary perfectly. However, a larger element of credit risk in the portfolio does increase the demands on risk management, analysis and capital compared with a portfolio consisting entirely of government bonds. As the Riksbank, as a central bank, may need to sell securities at relatively short notice for the purpose of intervention, the proportion of credit securities must be limited.

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# ■ Controlling legal risks in financial asset management

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*Legal risks are prevalent in financial asset management but seldom feature in overall risk calculations, where the emphasis is rather on financial risk. One reason for this is probably that legal risks seldom materialise, besides being difficult to measure and evaluate. But if they do materialise, the damage can be considerable because these risks reside in the legal conditions for limiting credit risk. There is therefore every reason to take legal risk seriously. This is done by creating the best possible conditions for controlling risk. Just as in the case of other types of risk, controlling it aims to provide predictability and thereby a possibility of taking calculated risks.*

Besides being common in an activity that manages financial assets,<sup>1</sup> seldom materialising and thereby difficult to measure and evaluate, legal risk is a concept that is difficult to define. Still, this article will first try to construct a picture of the legal risks that can occur in financial asset management. In the light of that picture, the aim is to describe some basic conditions for achieving sound control of the legal risk. Control in this context stands for the identification, analysis and limitation of the legal risks.

A discussion of the concept of legal risk is followed an account of the principal conditions for controlling the legal risks in asset management and, finally, of the practical conditions for such control.

## Legal risk in financial asset management

Legal risk in financial asset management occurs primarily in the legal conditions for limiting credit risk.

In the management of financial assets, legal risk occurs primarily in the legal conditions for limiting credit risk. Some examples of arrangements for limiting credit risk that have a particularly clear foundation in important legal conditions are asset protection through right of reclamation and

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<sup>1</sup> In the following, the phrase *activity that manages financial assets* is abbreviated in most cases to various forms of the word *activity*.

transfer of title, netting of outstanding transactions (i.e. settlement), and guarantees.

The terms may require some clarification. Right of reclamation means that instead of being included in the insolvent estate, the assets are held separately from the counterparty's own assets in favour of the owners. Netting, or settlement, is similar to but not the same as offsetting. The main rule for offsetting is that payment shall be due for an offsettable claim, whereas settlement concerns claims that are not due for payment and is usually arranged by agreement. A case in point is standard agreements for derivative transactions, e.g. ISDA.<sup>2</sup> Simplifying somewhat, in settlement under ISDA, the transactions of a defaulting party cease to exist and the market values of outstanding transactions are netted out. Thus, the residual claim on or liability to the counterparty consists in the net value of all outstanding transactions. Given that this can be presumed to function, the day-to-day calculation of credit risk can use the same settlement arrangement – as if a counterparty has defaulted – and result in a lower exposure to that counterparty.<sup>3</sup> With an arrangement for transfer of title, credit risk can be further reduced by, in principle, transferring securities to match the net value of those with a positive value. Guarantees are used, for example, when a counterparty or instrument (strictly speaking, the issuer) does not meet the solvency standard that the activity has set, often by specifying the level of a counterparty's external credit rating. This can be resolved by requiring a guarantee from a more solvent associate – usually the parent company – or a sovereign.

A feature that arrangements for limiting credit risk have in common is that they will not function as intended if the legal conditions are not in place. In other words, they involve a large element of potential legal risk: perhaps a country's insolvency rules do not support the expected asset protection, for instance right of reclamation, or the agreed form of netting of outstanding transactions and perhaps the guarantee is either ruled out by the guarantor's statutes or national law or has other deficiencies that prevent it from working as intended.

Another approach to controlling legal risk involves reviewing the division of responsibility between the parties and ensuring that it is sufficiently clear to as far as possible avoid unnecessary and costly legal disputes and that it represents what the activity allows for and can accept responsibility for in reality.

A feature arrangements for limiting credit risk have in common is that they will not function as intended if the legal conditions are not in place.

<sup>2</sup> International Swaps and Derivatives Association, Inc.

<sup>3</sup> In corresponding repo agreements published by ICMA (International Capital Market Association), netting is closer to offsetting in that the buy-back is accelerated, i.e. the transaction still exists but is concluded – allowed to mature, as it were – in advance, whereupon the market values of the transactions are calculated and netted out. All these arrangements for securing credit involve a large element of potential legal risk because they do not work as intended if the legal conditions are lacking.

Then there is, of course, an operational risk in the actual execution of the control of legal risks. There is an operational legal risk if, for example, documents are faulty due to ignorance, carelessness or omission, or if the conditions have not been examined carefully enough.

In the light of these examples, the following definition or summary and subsequent description can help to indicate where legal risks are to be found in financial asset management:

*Legal risk is a risk of loss being occasioned primarily by assets being unprotected due to uncertainty about or shortcomings in the legal conditions for protecting these assets, and to inadequate control of these legal conditions.*

#### THE CRITERION OF LOSS

The first part of the definition can be called “the criterion of loss”. It stipulates that a risk of loss exists because assets are unprotected. Some ways in which loss can arise are as follows:

Assets can be lost because registration, reclamation, etc. lack support in an agreement or in current legal rules or because the assets are not otherwise properly protected.

Assets in the form of claims that are secured by agreement may be lost if the agreement is not enforceable or invalid (e.g. the counterparty's guaranteed commitments).

Agreed settlement, offsetting, etc. do not function either due to an imperfect agreement or because the relevant jurisdiction does not support bilaterally agreed settlement or offsetting.

The division of responsibility between the contracting parties is either not commensurate with the responsibility the activity has deemed acceptable or is unclear, with an increased risk of costly and time-consuming legal disputes.

#### THE CRITERION OF CAUSE

The other part of the definition can be called “the criterion of cause” because it specifies the causes of loss which make the risk of loss one that is deemed to have a legal origin. This is made up of three partial definitions:

##### **Uncertainty about the conditions**

The first of these partial definitions – uncertainty about the legal conditions – implies that control has been exercised as well as possible, or at

least in keeping with the activity's objective, but that legal risk of an unknown or uncertain nature still exists. Such risk naturally tends to be difficult to calculate but, provided the activity has opted for the appropriate level of control, in many cases the risk should be something the activity is prepared to take or at least consider. If the activity has no idea about the risk and this turns out to be substantial, either the level of control is at fault or it is a matter of legal risk that overlaps some other category of risk (see below).

### Shortcomings of conditions

The second partial definition concerns cases where the level of control is adequate (as in the previous partial definition) but where the risk is recognised and the probability of loss can be calculated and included in the overall estimation of risks and earnings.

### Inadequate control of conditions

The third partial definition states that control is inadequate due e.g. to ignorance, carelessness or performance errors, i.e. an operational legal risk.

Briefly, then, there are risks that are either accepted or not, depending on the activity's aversion to risk; in such cases, control has been exercised, at least up to the level set by the activity, and under these conditions there is nothing more to do. Then there are risks inside the bounds of control, i.e. operational risks in the control function as such. The latter originate inside the activity and are easier to limit – at least in theory – with internal measures. The following can serve as an illustrative example of the former risks, those that can be either accepted or not:

*It is not unusual to require a counterparty to present documentary evidence of internal authority to be a party to a particular agreement and type of transaction. However hard one tries, the point may be reached where such documentation is simply not procurable. Perhaps the counterparty's structure or the national rules under which it operates does not require such documentation. There is then no operational risk as defined in this article – control has been exercised to the full. But there is still a legal risk to consider.*

*Another example of doing everything possible or complying with control requirements and still being left with legal uncertainty is when an external legal opinion has been obtained and turns out to be incomplete or too vague.*

As regards the first – and perhaps to some extent the second – partial definition, there is a notion that any matters beyond the influence of indi-

First, there are risks that remain after control has been exercised and that are either accepted or not, then there are operational risks in the exercise of control.

vidual market participants, e.g. unexpected changes in the law or legal decisions, do not constitute legal risks. It can no doubt be argued that it is possible to avoid countries with a reputation for uncertainty in these respects. That ought to reduce the risk of being caught by such surprises. Moreover, as the risk has a legal origin, it ought to be included in the concept whether it is a question of legal uncertainty or a perceived legal risk. But it can also be argued that as the risk lies in the unpredictability of the legislative power of a foreign state, it borders on *political risk*. Another borderline case – verging on operational risk – can be said to lie in a counterparty's operational risk, i.e. handling errors on the part of a counterparty's personnel, etc. In most cases, however, such risks no doubt belong to counterparty risk, which in turn can be seen as subordinate to credit risk. In the absence of a legal origin, it can be argued that such risk does not belong, any more than ordinary own operational risk, to legal risk. At the same time, the effect of a counterparty's operational risk can be limited by a judicious division of responsibility in the agreement.

The above attempt at a definition is intended to be a guide or test matrix for obtaining a clearer picture of the legal risks in the activity. Once again, however, the dividing lines from other risk categories are diffuse and in striving for a definition it is all too easy to get lost in a line of reasoning that is rather academic and thereby equally difficult to turn to practical account.

Even so, this picture of risk can serve a purpose in the work of providing the activity with good conditions for controlling legal risk. This issue will be considered in principle and then more practically in the following sections. But first some words about the difficulties in measuring and evaluating legal risk.

#### MEASURING AND EVALUATING LEGAL RISK

Legal risk is difficult to measure separately from other risk categories.

As indicated, legal risk is difficult to measure separately from other risk categories. Methods are often available for calculating credit risk, for example, in addition to the credit ratings from competent institutions. Such methods are seldom directly applicable to legal risk, with the possible exception of assessments of judicial systems.<sup>4</sup> Moreover, legal risk is characterised, as mentioned, by low probability but a high degree of damage if the risk were to materialise. Furthermore, the probability of a legal risk materialising is often dependent on the probability of other risks, primarily credit risk. If a counterparty does become insolvent, the proba-

<sup>4</sup> For an attempt by Carolyn Jackson at a regression model with 14 critical variables, see Risk.net, September 2002/Vol. 15/No. 9.

bility of a legal risk coming to light and materialising grows with the risk that the arrangement for limiting credit risk (e.g. a guarantee) will be utilised. The result of the work on limiting legal risk will then show up. But not until then. The effect or some confirmation of the quality of the control of legal risk is often not evident until it is too late. All one can try to obtain in advance is a measure of the loss to the activity if a guarantee, agreement, right of reclamation, offsetting, settlement, etc. were not to function. It is not hard to understand that such a loss could be substantial.

## Control conditions in principle

### PRINCIPLES FOR CONTROL

Legal risks were described above as belonging to one of two categories: (*i*) risks that, after control (identification, analysis and limitation), remain as an element in a decision to either take or refrain from a business opportunity, for instance, and (*ii*) risks in the performance of control that have to do with ignorance, carelessness or omission, i.e. legal operational risks. The level of adequate control should be set for each activity so that when control has been carried out, only risks in category (*i*) above remain (or, to be realistic, these risks plus some degree of operational risk – as defined in this article – that can be expected to remain despite good intentions). The management of risks in this category then depends on the activity's level of risk aversion. I shall enlarge on this in the following and then devote the rest of the article to how an activity can achieve adequate control of the legal risks.

### Identification

The control of legal risks starts from an understanding of the legal structures (the national legal system as well as foreign legal systems and agreements) that affect the activity's assets, claims and obligations. When this has been achieved, it is possible to obtain a good picture of the implications of acting or of refraining from action in accordance with these legal structures. That picture is then assessed in relation to the activity's administrative conditions, level of risk and other requirements. Legal risks in the activity have then been *identified*.

### Analysis and limitation

When these legal risks have been *analysed*, a decision can be made on the extent to which limiting them is justifiable in terms of strategic and business considerations. The third step is to *limit* risks in so far as this is

required by the activity, is commercially justifiable or actually feasible. The remaining legal risks (category *i* above) are either those the activity has decided to take or, if limitation is judged to be too costly or unfeasible, those that contribute to decisions to refrain from business opportunities, etc.

### The purpose of control

A proper understanding of what control of legal risk is intended to achieve can start from the activity's objective: to manage financial assets with a view to maintaining and if possible increasing their value. Seen from this angle, legal risk is on a par with other risks in asset management. Control, moreover, serves the same purpose, namely to ensure that the basic premises for a decision on, for example, a business transaction hold and that each transaction proceeds and is concluded in accordance with the initial assumptions.

If it materialises, a legal risk can lead to costs, missed profits and loss of assets that were not allowed for and which can make the transaction, for example, unprofitable. This is precisely what control of legal risk – as of most other risks – is about: creating predictability and possibilities of taking calculated risks with a limited amount of uncertainty.

As indicated, the ambition need not be to render the activity completely free from legal risk (apart from operational risk). The effort to minimise risk is not meant to go so far that the activity misses business opportunities unnecessarily or incurs unnecessary costs. Obtaining the agreement that is most risk-free can take time and meanwhile business may be lost. It is a matter of achieving an expedite negotiation without this entailing a division of risk that is unacceptable for the activity. Risks are a normal feature of most activities and in certain cases the probability of a feared outcome actually happening is so small that, provided the activity's risk profile is met, the risk is worth taking, assuming that this is calculated to improve earnings. In other words, the level of protection should be weighed against the probability of loss and potential profit (see the example below). This task is usually beyond the legal function on its own and therefore calls for close cooperation with other functions in asset management. This brings us to the division of the performance of and responsibility for control of legal risk, which is considered in the next section.

The ambition need not be to render the activity completely free from legal risk.

## THE LEGAL FUNCTION AND RESPONSIBILITY FOR LEGAL RISK

The activity's legal support is central to the task of controlling legal risk. The value of legal support in financial asset management lies in the scruti-

ny of legal conditions for the activity. This work should therefore be done by a legal function together with other parts of the activity but the legal function should direct it. Given a sufficiently competent and properly dimensioned legal function (see below), the most suitable summary description of a legal function's task concerning legal risk therefore seems to be the following: legal risks are *those risks that a legal function is most suited to help to control*.<sup>5</sup> Here there is a natural limitation both in the levels of training and experience normally to be found in a legal function and in the expression "help to" – the legal function is not ultimately accountable for the legal risk as such. Product responsibility naturally rests with the producer but the formal responsibility is often located outside the legal function. In most cases this is also the most appropriate arrangement: the legal risks have to be considered together with other risks in relation to expected costs and earnings.

Consider the following example:

*A new counterparty is to be used for a particular type of transaction in which the credit risk is customarily limited by means of the combination of a netting agreement, let us say an ISDA agreement, and title transfers equivalent to the exposure after all outstanding transactions have been netted out. The legal function points out that it is uncertain whether or not the counterparty's national legal system supports the intended transfer of title. In the light of that information, the risk control function can adjust its calculations of risk exposure and the limits on the counterparty in question. The new picture of risk results in an increased risk exposure to just this counterparty, so that a larger part of the limit is utilised. The business function then has to calculate the benefit of carrying out the planned transactions even so. Perhaps the decision is to go through with the transactions but with maturities that are shorter than planned initially in order to reduce risk exposure over time.*

A legal function can certainly be of assistance by making its contribution to this estimate of a business opportunity but is not best suited to make the overall assessment. That task and the attendant responsibility should lie with the part of the activity that undertakes the object of legal risk control, for example a transaction, the procurement of a depositary, etc.<sup>6</sup> At the same time, cases may arise where the legal risk applies to the activity as a whole, not just to an estimated profit. The legal risk can be so large that doing anything along the planned lines is perceived as haz-

Directing and, together with the rest of the activity, performing control of legal risk is the task of the legal function.

A legal function can assist in the calculation of a business opportunity but is not best suited to make the overall assessment.

<sup>5</sup> See Whittaker, A. M., (2003), Lawyers as risk managers, *Journal of International Banking and Financial Law*, Vol. 18, No. 1, January.

<sup>6</sup> At the Riksbank, the Market Operations Department is accountable for investment, while responsibility for the procurement of depositaries and other intermediaries is shared with the Administration Department, which includes the Financial Administration Division (the Riksbank's back office).



ardous, for example because that would considerably damage the activity's reputation. In such cases it is important that the general counsel has a right of escalation, that is, a possibility of referring matters directly to the executive management.

## Practical conditions for control

### FUNCTION OF THE ACTIVITY

We turn now to the control of legal risk in the activity as a whole and the role of the lawyers in this respect. To make control of legal risk as effective as possible, all relevant branches of the activity should participate in the entire process. It is also important that everything is properly documented for the collective memory and that procurers have – and take – the overriding responsibility throughout the process. This applies not least to the negotiation of agreements and other “project-like” items of control. Likening the negotiation of an agreement to the construction of a vehicle, for example, it is more suitable for the parts to be assembled into a finished product by a single team than to have an assembly line. The team typically consists of the procurer (usually the dealer or front office function when a transaction agreement is being negotiated, or the administrative or back office function if the agreement has more to do with administrative matters),<sup>7</sup> the back office function, the risk-control support function<sup>8</sup> and the legal function. The optimal situation is for all functions to have a proper picture of each other's fields of responsibility and a clear understanding of the purpose of the agreement. It is likewise important that, instead of being confined to the legal function, knowledge of the agreement's content is acquired to a relevant extent by every function. That also serves to limit the operational risks when the agreement is used (see below).

An example of how administrative routines can facilitate such an approach is the formalisation of cooperation, both to assemble the basis for a business decision to ensure that every aspect has been considered and to preserve the basis as an aid for the collective memory. The Riksbank, for example, applies a standard model for cooperation – an “application procedure” – with respect to a counterparty, a market or an instrument that is new to the activity. The competent department distributes an application to use the counterparty, market or instrument and this is annotated by each department and signed by the department head (the

<sup>7</sup> For example, agreements on depositories, correspondent banks and clearing.

<sup>8</sup> The risk control function is sometimes referred to as *middle office*; strictly speaking, however, a middle office monitors results, while the risk control function focuses on levels of risk.

departments note the conditions the object of the application should fulfil, seen from their perspectives, the risks involved, the measures and steps they recommend, etc.). The information in the application then serves as a basis for the applicant department head's decision as to whether or not the counterparty, for example, is to be accepted and under what conditions. Once a counterparty, instrument or market has been "approved", a new – perhaps less exhaustive – application has to be made as soon as a change of some weight occurs, for instance a new agreement or type of transaction with an approved counterparty, additional activity in an approved market, etc.

The Riksbank applies a standardised model for cooperation with respect to a new counterparty, a new market or a new instrument.

#### AWARENESS OF LEGAL RISKS

It may happen that other functions in an activity see an agreement as an out-and-out legal product which therefore does not concern them. Such an attitude is deleterious not only for a proper negotiation of the agreement but also for its future use. For the lawyers, control of the legal risks presupposes sound knowledge of the activity in general and in particular, of course, of what the agreement is about. It is equally important that those who are to act under or administer a completed agreement really understand how the agreement works. In the final analysis, an agreement documents what has been agreed with a counterparty, that is, what one wants from the counterparty, what one has promised to do for the counterparty and, not least, how the risks are to be shared. For the day-to-day business activity it is therefore highly important that each function in an activity is continuously clear about relevant aspects of the content. This is necessary, for instance, in order to evaluate information from the market in the light of what the agreement has to say about the rights and possibilities of limiting risks (insolvency rules, etc.). The legal function seldom follows the daily management of financial assets and seldom has the market contacts that are needed for a reaction to improprieties and disturbances. Moreover, transactions and confirmation of them need to be carried out in accordance with the agreement in order to be covered by this. To promote uniformity, another good idea is to use standard agreements as far as possible and to try to limit the number of standards as well as the number of judicial systems involved. Such an attitude facilitates the

Those who act under or administer a completed agreement must understand how the agreement works.

organisation's understanding of and ability to react to counterparty failure (see below), besides contributing to the aim of restraining costs and the possibilities of limiting risks.<sup>9</sup>

Awareness of the agreement and the division of risks between the parties also means that credit exposure can be adjusted accordingly.

If the activity is aware of the agreement and thereby of the division of risks between the parties, credit exposure can be adjusted accordingly. Given a sound comparison of costs and receipts, in which the former include legal risks (i.e. calculated risks) and the collective is continuously aware of the risks that have been taken, there is as mentioned nothing wrong about taking a risk, even of a legal nature. But continuous awareness of these risks is a precondition for a calculation that holds.

## READINESS

As legal risks seldom materialise, a readiness exercise is liable to have less priority relative to day-to-day activities.

It is not sufficient, however, for the activity's entire organisation to be aware of agreed relationships, divisions of risk and rules for responsibility, though this is indeed a precondition for the organisation's readiness to cope with crises, e.g. counterparty failure. The activity should also perform exercises, as in all other crisis readiness, be prepared to trigger the available protective mechanisms, for instance in agreements, rearrange transactions, cancel payments, notify counterparties and so on. Here, too, the nature of legal risk can be an obstacle: as legal risks seldom materialise, a readiness exercise concerning counterparty failure, for example, is liable to have less priority relative to day-to-day activities. Such an attitude is about as logical as refraining from fire-drill because fires are so infrequent. Much of the work on limiting legal risk is about providing the activity with a tool-kit to use in the event of a crisis. Once a crisis, e.g. a counterparty failure, is at hand, there is often no time to spare. If, for example, the front office has to get hold of a lawyer who in turn has to peruse the agreement before informing the back office that it must notify the counterparty that a time limit is being set and the formulation of such a notification then has to be worked out, time will be lost unnecessarily and this may well lead to losses. In this respect, too, it can be advanta-

<sup>9</sup> It is better to build up internal competence in English law, for example, and strive to write agreements on this basis than to give counterparties a free choice. The activity is then in a better position to cope internally because it is easier to focus on acquiring internal experience of and competence in one judicial system. If it then proves impossible to gain acceptance for the chosen judicial system in a particular case, greater use can be made of external specialist competence but there is no reason why this should be a common occurrence. Most international banks can consider using English as well as New York law because they are often represented in both London and New York, with the possible exception of parent company guarantees, which are preferably drawn up for the judicial system in which the parent company is domiciled. For matters to do with insolvency, on the other hand, the judicial system is dependent on the choice of counterparty. In the case, for example, of netting claims under a standardised transaction agreement, e.g. ISDA or ICMA, the organisation in question publishes legal opinions for particular judicial systems. In other cases it is advisable to request such an opinion.

geous for the legal function to initiate training, organisational structures for crisis management and exercises.

### LEGAL SUPPORT

The dimension and competence of legal support for an organisation depend on the nature of the latter's activities and conditions. Bearing that in mind, one can still point to some issues to consider when an activity reviews its legal support with a view to providing optimal conditions for good control of the legal risks.

The lawyers should work closely with other support functions as well as with procurement functions. That does not mean that the lawyers should belong to the same department as the procurers. On the contrary, it is important that lawyers can express an opinion without being influenced by the procurer (the person responsible for the business or process) also being their superior. Another important reason is that a separate assembly of lawyers facilitates advice and discussion between them, which in turn enhances the reliability and quality of their opinions.<sup>10</sup>

It need hardly be said that legal consultants should be used as cost-effectively as possible. Financial asset management frequently involves foreign judicial systems and the questions that arise tend to require such a variety of specialist knowledge that it is not sufficiently cost-effective to dimension internal legal support so that it could cope with every imaginable issue. Expert specialist assistance is almost invariably needed.

Regardless of the extent to which external consultants are used, it is important that the internal legal support is at least dimensioned so that it has procurement competence for every occasion and can handle the internal coordination of different parts of the activity for the control of legal risks. But such a dimension is to be seen as a minimum requirement because the more one out-sources to consultants, the more difficult it becomes to maintain the collective memory of different agreements when it comes to the future use of agreements and future negotiations on agreements. For each activity there is no doubt an optimal balance between internal and external inputs that it is advisable to identify and uphold. A solution in the normal case would be to restrict the use of consultants to ensuring quality, providing a dialogue and meeting the need of specialist competence in foreign law, with the proviso that the internal

The internal legal support needs to be dimensioned so that it has procurement competence for every occasion and can handle internal coordination.

<sup>10</sup> In a sizeable organisation, a legal function can, of course, be created where a number of lawyers are responsible for financial asset management only, while the more general legal function is as a rule a function at a central administrative level. The more specialised function for financial asset management can then be headed by a general counsel equal in rank to the head of the business side, which upholds the integrity of the legal function. The right to refer matters to the executive management is, of course, no less important with such a division of the legal resources.

legal support directs the work and undertakes the main contacts and negotiations with the counterparty. Such a solution helps to maintain the collective awareness in a long-term supportive way at the same time as the activity itself receives further training, which contributes to cost-effectiveness in the longer run.

# ■ How do large current-account surpluses co-exist with a weak international investment position?

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*In the past ten years the current account for Sweden has shown large surpluses without this leading to a corresponding improvement in the international investment position. A major explanation lies in valuation changes to external financial assets and liabilities. The gross stocks that make up the international investment position have grown dramatically in the past fifteen years and currently total SEK 13,400 billion. The parts played by exchange rate fluctuations, equity price movements in Sweden and abroad and the market value of direct investment entities are factors that we discuss in this article. We also consider the extent to which the statistics on Sweden's international investment position are reliable.*

## What is the problem?

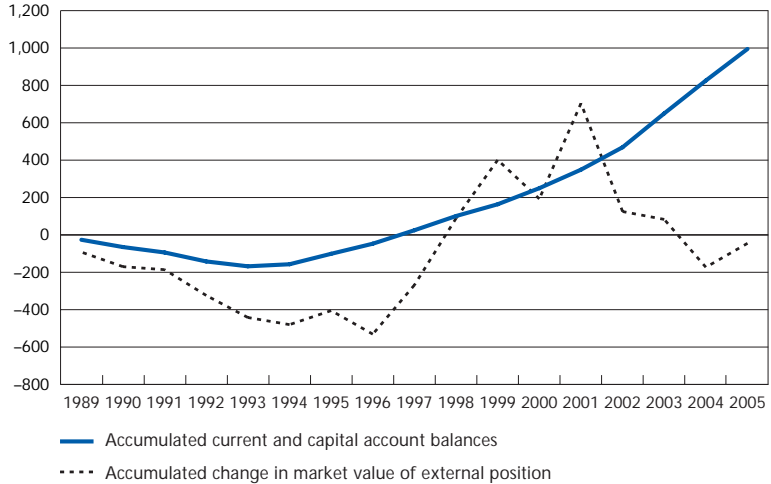
The net of surpluses and deficits on Sweden's current and capital accounts represents saving abroad (see the box "Balance of payments – some concepts") in terms of the real transactions. The accumulated net surplus for the period since 1989 is SEK 995 billion, while the reduction of external liabilities at market values amounts to around SEK 50 billion – very much less than the improvement one might expect in the light of the current-account surpluses.

Figure 1 presents accumulated saving abroad (the current and capital account balances) since 1989 together with the accumulated changes in the international investment position at market values. In an ideal case where the net outcome of the financial transactions matches saving abroad in terms of the current and capital account balances and the international investment position is unaffected by valuation changes, the two curves would not diverge from one another. For some years in the early and mid 1990s there was relatively little difference between the current-

The development of accumulated saving abroad is becoming increasingly independent of the changes in the international investment position.

account surpluses and the reduction of external liabilities. The late 1990s and early 2000s, on the other hand, are characterised by a notably weaker correspondence. In the last three years, the statistics give a relationship that is actually negative (see Figure 1).

Figure 1. Accumulated current and capital account balances and accumulated change in market value of international investment position; 1989–2005  
SEK billion



Source: The Riksbank.

So why has saving abroad apparently become increasingly independent of the changes in Sweden's international investment position in recent years?

We approach this question by describing the real and financial flows in the balance of payments and the factors that affect the investment position. The period described is 1989–2005. The reason for starting with 1989 is that the abolition of exchange controls in that year fundamentally altered the conditions for financial flows to and from Sweden. Cross-border financial transactions were no longer restricted.

### Record current-account surpluses

Sweden's current account for 2005 shows a surplus of SEK 163 billion, equivalent to about 6 per cent of GDP. A long series of years with current-account deficits came to an end in the mid 1990s. For the period since 1989 the current account shows an accumulated surplus of SEK 1,065 billion. Never before in the modern era has Sweden had such large surpluses for so many years.

The current-account surpluses come mainly from a strong balance of trade (the net of exports less imports). Net exports have developed very favourably since the beginning of the 1990s. The surplus on trade in

The surpluses come mainly from a strong balance of trade.

### THE BALANCE OF PAYMENTS – SOME CONCEPTS

The balance of payments for a country is a compilation of that country's real and financial transactions with the rest of the world. These transactions are divided into three main components:

- The current account, which covers current transactions in goods and services, income from financial assets and liabilities, and current transfers.
- The capital account, which covers assistance provided for real capital formation, transfers of rights and debt forgiveness agreements. Prior to 2002 this account was called "Capital transfers, etc." to avoid confusion with the financial account.
- The financial account, which covers cross-border transactions in financial assets and liabilities. Foreign exchange reserves are included in the financial account. Prior to 1997 this account was called "Capital account".

The balance of payments covers transactions with the rest of the world. It does not include changes in value arising, for example, from exchange rate fluctuations. The sum of the current and capital account balances is defined as net saving abroad.

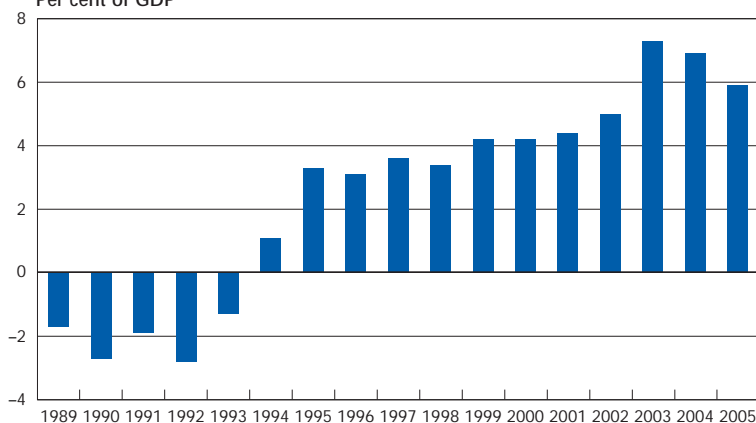
goods has grown from SEK 15 billion in 1989 to over SEK 142 billion in 2005.

Apart from negligible surpluses in 1993 and 1994, trade in services resulted in deficits throughout the 1990s and early 2000s. From 2002 onwards, however, the balance of services has generated surpluses; these have come mainly from transportation as well as from merchanting. The latter item, which is included in business services, refers to goods that are both purchased and resold abroad by firms in Sweden. Merchanting services are defined as the trade margin, for instance on Swedish firms' acquisitions and subsequent sale of goods produced abroad. In 2005, merchanting contributed 12 per cent of Sweden's total exports of services.

Trade in services has swung to a surplus.

Net capital income has improved in connection with the reduction of external liabilities and this is another factor behind the stronger current-account balance.

Figure 2. Sweden's current-account balance; 1989–2005  
Per cent of GDP



Source: The Riksbank.



## The capital account is in deficit as a rule

A complete picture of the real exchange between Sweden and the rest of the world also includes the capital account. This is a minor item that covers immaterial rights such as licences and patents, debt forgiveness, etc., and it normally shows a deficit. It should not be confused with the financial account, which covers the financial flows between Sweden and the rest of the world. For the period 1989–2005 the capital account shows an accumulated net deficit of SEK 70 billion.

## Factors that affected financial integration

Deregulations in Sweden since 1989 ...

The abolition of exchange control in 1989 altered the conditions for cross-border financial transactions. The earlier bans on buying/selling various financial instruments were lifted, as were the restrictions on cross-border lending and direct investment, and capital was free to move into and out of Sweden.

Investment in foreign assets has also been facilitated by changes to guidelines and regulations in the 1990s. For example, the successive relaxation of investment rules for insurance companies in the 1990s has made foreign assets eligible for a larger share of investment. The introduction of the premium pension system (PPM) in 2000 and more liberal investment rules for some national supplementary pension funds (AP funds) has also led to increased investment in foreign assets.

... have contributed to international financial integration.

Changes of this kind were not confined to Sweden. Similar moves had already been made in many other countries. Some aspects of the changes in Sweden were a consequence of EU membership in 1995 and the common rules adopted by the Union.

The technical infrastructure and new financial instruments have also contributed.

The liberalisation accordingly paved the way for increased outward as well as inward investment. Together with the introduction of new financial instruments and technical infrastructures that facilitated cross-border trading, this resulted in rapidly growing financial flows between Sweden and the rest of the world. Sweden became increasingly integrated with the European and global financial markets.

## Saving surplus and capital outflow – two sides of the same coin

Since 1989 the combined balance on the current and capital accounts – the real flows – has given an accumulated inflow of SEK 995 billion. This represents Sweden's financial saving surplus for this period.

The other side of this real surplus is the outflow or export of capital.

The surplus has been used for, for example, Swedish financial investment abroad. The statistics show that in this period Sweden has, for instance, repaid foreign loans and purchased bonds, equity and foreign enterprises to a greater extent than entities abroad have done in Sweden.

There has been a lively discussion about causal connections between the current-account surplus and these capital outflows. However, the question of whether the large export surplus has driven the capital outflow or whether it is high saving in Sweden that has restrained domestic consumption and provided scope for high net exports (e.g. via the exchange rate) is not considered in this article.

According to the balance of payments, in the period 1989–2005 the accumulated deficit on the financial account was only around SEK 557 billion. In principle, the net of the financial flows should equal the net balance on the current and capital accounts and both these results should represent Sweden's net saving abroad, measured with different methods. A discrepancy is not uncommon and as a general rule, the sum of the balances on the current and capital accounts – saving measured from the real side – is then defined as net financial saving abroad.

The reasons why the financial balance so seldom agrees with the combined balance on the current and capital accounts lie in the statistical bases, mainly because of difficulties in measuring the financial flows correctly. The discrepancy is booked as a residual item for net errors and omissions.

The disagreement between financial flows and net saving is due to statistical deficiencies.

TABLE 1. THE BALANCE OF PAYMENTS, ACCUMULATED VALUES 1989–2005

	SEK billion
Balance on current account (a)	1 065
Balance on capital account (b)	-70
<b>Net financial saving (a + b)</b>	<b>995</b>
<b>Balance on financial account (c + d + e + f)</b>	<b>-557</b>
Direct investment (c)	-214
Portfolio investment (d)	-1 040
Other financial flows (e)	780
Foreign exchange reserve (f)	-84
<b>Net errors and omissions*</b>	<b>-438</b>

\* The discrepancy between net financial saving and the balance on the financial account.

As shown in Table 1, the accumulated residual for the period 1989–2005 implies an unexplained outflow of around SEK 438 billion. This has a bearing on the international investment position and is considered further on.

## Portfolio investment has resulted in large net outflows

Portfolio investment has generated considerable capital outflows ever since exchange controls were removed. In Figure 3, the gap between the two curves indicates that the accumulated net outflow in the period 1989–2005 is SEK 1,040 billion.

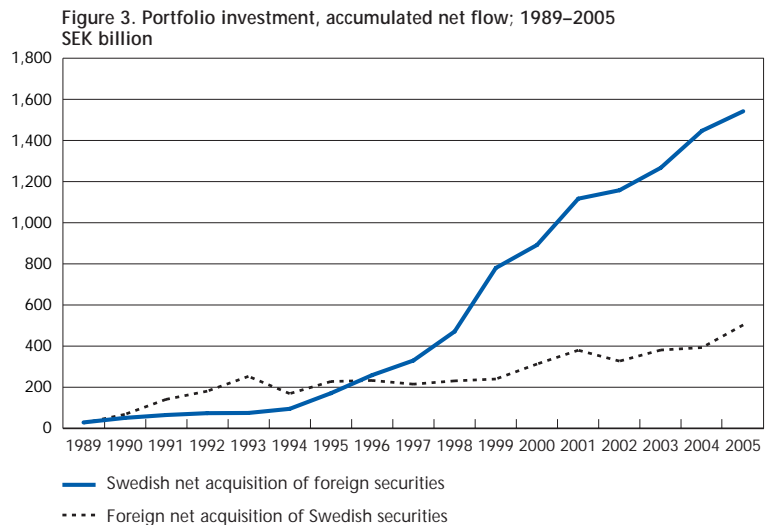
Swedish portfolio investment took off in the mid 1990s.

In the early years after the deregulation, foreign investment in Swedish securities predominated and portfolio investment resulted in a net capital inflow. The inflow reflected portfolio rearrangements by foreign investors to include Swedish securities when exchange controls were lifted in the summer of 1989. Meanwhile, Swedish investment abroad was slack on account of the economic slowdown and low saving in those years. This has changed since the mid 1990s, when Swedish portfolio investment took off and foreign investment in Sweden remained at a much lower level.

The largest item in the outflow is investment in foreign equity securities, which has risen very rapidly.

## Small net outflows from direct investment

Direct investment differs from portfolio investment in that it concerns a more lasting interest in and greater control of enterprises in other countries. A direct investment is defined as financial transactions with an enterprise in which the investor holds at least 10 per cent of the voting rights or equity; it includes, for example, contributions to the establish-



Source: The Riksbank.

ment of an enterprise, the acquisition of the whole or part of an enterprise and both short and long-term loans to an enterprise.

The direct investment transactions in the period 1989–2005 generated an accumulated net outflow of about SEK 214 billion (see Figure 4). Inward and outward direct investments are considered separately below.

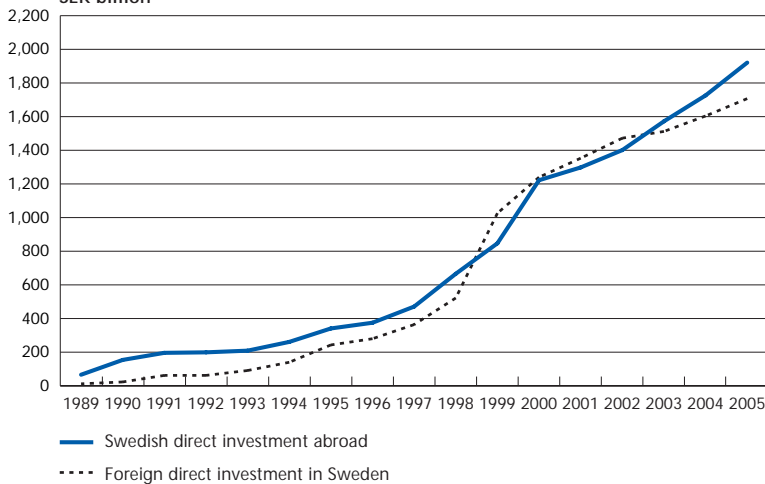
### OUTWARD DIRECT INVESTMENT WAS SUBDUED AFTER THE IT BOOM

In the 1980s Sweden was one of the countries where direct investment outflows were largest in relation to the size of the economy. The conditions for such investment were largely unaffected by the abolition of exchange control in 1989, except that long-term external financing was no longer required. A majority of the direct investment transactions concerned acquisitions and investments in what were then the EEC countries. In the period 1987–90, for example, Stora acquired Feldmühle in Germany, SCA purchased Reedpack in the United Kingdom and Asea merged with Brown Boveri in Switzerland.

In the 1980s Sweden had one of the largest direct investment outflows.

In the early 1990s (1991–93) the international economic slowdown reached Sweden and investment abroad came to a halt. There was a general decline in direct investment flows in the global economy. Reckless lending to Swedish investors to finance the acquisition of real estate abroad added to the crisis in the financial system. Sweden’s application for EU membership in the summer of 1991 also probably tended to weaken the investment propensity for a time because there was no longer a risk of being left out in the cold.

Figure 4. Direct investment, accumulated net flow; 1989–2005  
SEK billion



Source: The Riksbank.

In the latter part of the 1990s, the economic recovery contributed to a strong increase in outward direct investment.

Swedish investment abroad picked up again during 1994. In the latter part of the 1990s, the economic recovery and high corporate liquidity then contributed to a strong increase in outward direct investment. Moreover, direct investment transactions were inflated by high equity prices during the IT boom.

When the global slowdown early in 2001 led to lower profits, falling equity prices, above all in IT companies, and rationalisation, outward direct investment decreased in the following years. In the past two years there has been an increase.

#### DEREGULATION AFFECTED INWARD DIRECT INVESTMENT

In the 1980s the inflow of direct investment to Sweden was modest compared with the outflow. A number of rule changes then facilitated inward investment. The abolition of exchange control in 1989 was followed by amendments to the law on corporate acquisitions, making it more possible for nonresidents to make sizeable purchases of Swedish enterprises without requiring government approval.

In the late 1980s and early 1990s inward direct investment picked up and 1993 was the first year ever in which the level exceeded outward direct investment. The statistics were greatly affected by a few major transactions, such as Tetra Pak's acquisition of Alfa-Laval, the Volvo-Renault business, Akzo's purchase of Nobel, and Al Amoudi's of OK Petroleum.

The late 1990s saw a sharp increase in inward direct investment.

In the late 1990s inward direct investment rose strongly. Factors behind the interest from abroad included a weak exchange rate, high economic activity and the IT boom. In 1999, moreover, Zeneca purchased Astra, the largest merger ever in Sweden; together with a number of other foreign acquisitions of large listed companies, this raised that year's inflow of direct investment capital to a record level.

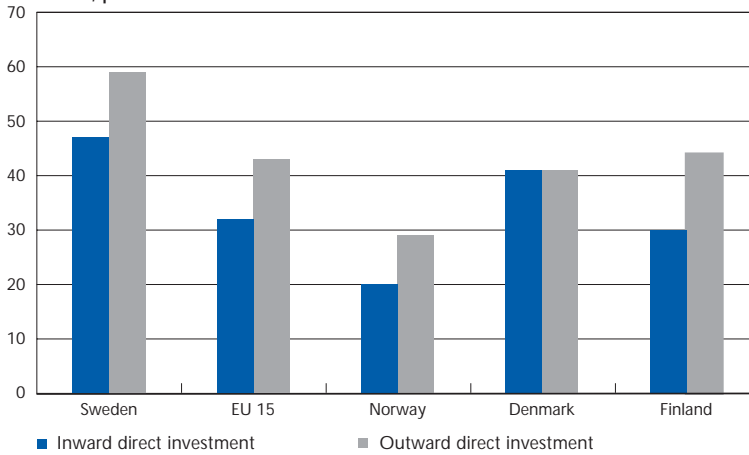
#### HIGH LEVEL OF INWARD DIRECT INVESTMENT

Since 2001 the inflow of direct investment to Sweden has stabilised at a lower level.

The decreased direct investment inflow is partly a structural phenomenon. The value of nonresidents' assets in the form of direct investments in Sweden is now high in both a Nordic and a European perspective. Relative to GDP, the level of direct investment assets in Sweden is about 47 per cent, which is considerably higher than in other Nordic countries (see Figure 5).

At the same time, a growing global share of direct investment is

Figure 5. Direct investment; 2004  
Stocks, per cent of GDP



Source: World Investment Report 2005 (WIR), Unctad

flowing to emerging market countries. The OECD area's share of international direct investment has been falling since 2000, with a particularly marked decline to EU countries. Direct investment in global terms has tended to flow instead to regions such as Southeast Asia.<sup>1</sup>

A growing global share of direct investment is flowing to emerging market countries.

This suggests that the portfolio imbalances created by the earlier regulations and the need for adjustments in favour of increased foreign ownership in Sweden's corporate sector should largely belong to the past. Together with the growing tendency to channel direct investment to emerging market countries, this points to the conclusion that inward direct investment's lower level in recent years is a trend that will continue.

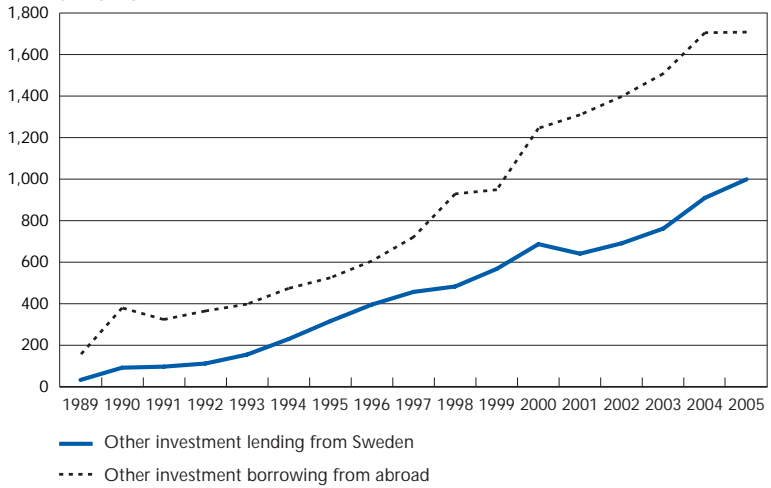
## Large inflows from other financial items

Other financial flows comprise loans, deposits, trade credits, derivatives, etc. In the period 1989–2005 the total item generated an accumulated net inflow of about SEK 780 billion, thereby partly offsetting the outflows for direct and portfolio investment. The dominant component is borrowing and lending abroad by MFIs (monetary financial institutions). One explanation for the occasionally large inflows is that the MFI sector borrows abroad to finance lending in Sweden. Swap agreements are used to convert the foreign currency loans into SEK holdings that can then be used to finance SEK loans to enterprises and households in Sweden.

The MFI sector's borrowing abroad has been used to finance lending in Sweden.

<sup>1</sup> Source: Invest in Sweden Agency, ISA.

Figure 6. Other investment, loans, etcetera, accumulated net flow; 1989–2005  
SEK billion



Source: The Riksbank.

## Sweden's external assets and liabilities

The next question is how Sweden's assets and liabilities, which make up the international investment position, have developed in the period from 1989 to 2005. We have chosen to describe this in terms of the international investment position at market values (see the box "Two ways of presenting the international investment positions").

### TWO WAYS OF PRESENTING THE INTERNATIONAL INVESTMENT POSITION

The international investment position is a compilation of the value of a country's total external assets and liabilities. In accordance with international recommendations (the IMF's Balance of Payments Manual, Fifth edition), the Riksbank presents two versions of the international investment position: the traditional position and the position at market values.

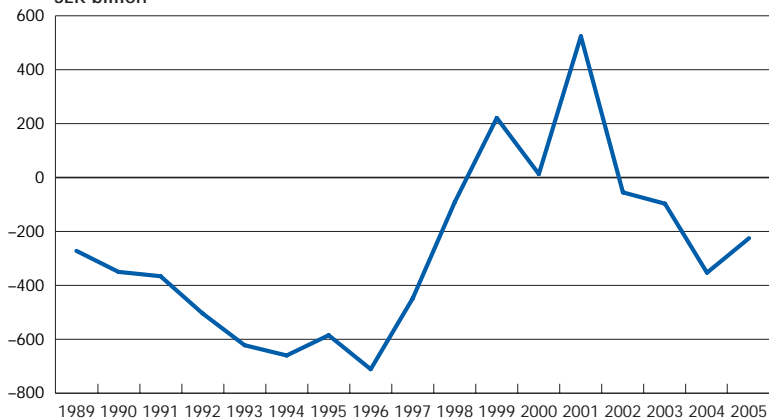
In the traditional version, some items (e.g. direct investment, loans, deposits and miscellaneous) are included at book or nominal values, while market values are used for other items (e.g. portfolio investment and derivatives). Valuations are invariably made at current exchange rates and include accrued interest.

For the position at market values, the direct investment item is also valued by the Riksbank at market values (see the box on p.54) and the other items are valued as in the traditional version.

The international investment position has weakened.

The market-values version of the international investment position fluctuates markedly from year to year. In the period 1999–2001 the position was actually positive but in recent years it has weakened appreciably again. The position at the end of 2005 was negative, representing a net liability with the rest of the world (see Figure 7).

Figure 7. Sweden's net international investment position at market values; 1989–2005  
SEK billion



Source: The Riksbank.

An international investment position in which market values are also used for direct investment gives a fairer picture of national wealth or net worth and has therefore been chosen here.

## How is the international investment position connected to saving abroad?

As mentioned initially, in the period since 1989 the combined balance on the current and capital accounts has accumulated to a surplus of over SEK 995 billion, whereas the international investment position has not improved nearly as much. In December 2005 Sweden's net external liabilities at market values totalled SEK 225 billion, a reduction of around SEK 50 billion since 1989, which is far less than one might expect from the surplus on saving abroad.

Basically, the discordance between the combined current and capital account balance and the change in the international investment position stems from factors of two kinds:

- Valuation changes are the primary reason for the discrepancies (see Figure 1). These changes now have such a marked impact on the investment position because in this period the gross stocks have become much larger.
- Measurement errors, e.g. in the international investment position, due to a systematic underestimation of certain assets abroad. This applies mainly to assets abroad that are owned by households and other economic agents and are not covered by the statistics on the

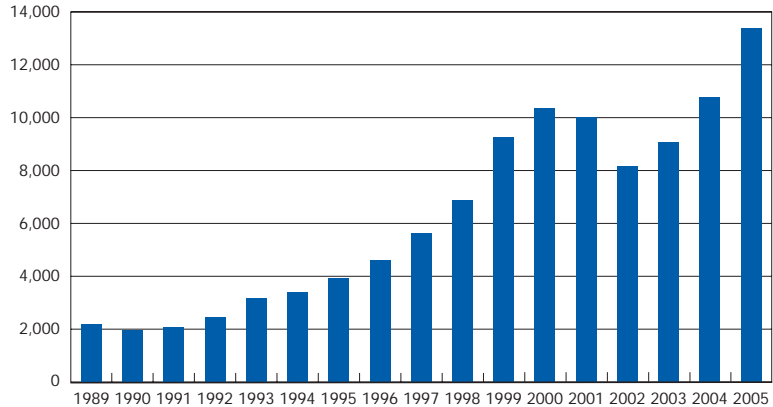


international investment position. Another factor is measurement errors in the current account. The importance of measurement errors is considered below.

## Much larger stocks in the international investment position

The expansion of cross-border capital flows has led to much larger stocks of assets and liabilities in the international investment position (see Figure 8).

Figure 8. Sweden's international investment position at market values, gross figures; 1989–2005  
SEK billion



Source: The Riksbank.

In 2005 these stocks were six times larger than in 1989 and at the year-end they totalled around SEK 13,400 billion, which is equivalent to around five times Sweden's GDP. For comparison it can be mentioned that in this period GDP doubled and the value of foreign trade in goods and services virtually trebled, all calculated in nominal figures.

The very marked increases in external assets and liabilities are the main reason why fluctuations in market values now have a considerably greater impact on the international investment position.

We shall now take a closer look at three kinds of change in value: exchange rate movements (changes in the value of the Swedish krona), equity price movements, and changes in the value of direct investment enterprises.

The marked expansion is the main reason why fluctuations now have a greater impact on the international investment position.

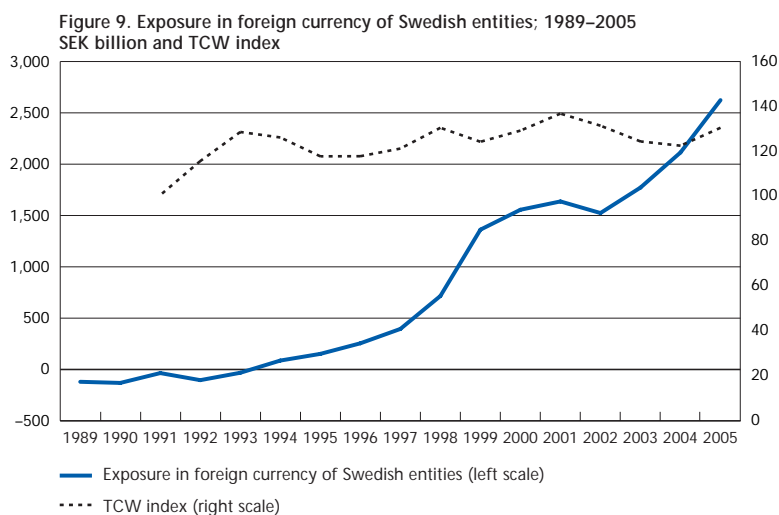
## EXCHANGE RATE MOVEMENTS HAVE A LARGE IMPACT

Since the abolition of exchange control, the aggregated foreign currency position of Swedish residents in the international investment position has become very much larger (see Figure 9). This foreign currency position is shown here as the net foreign currency assets of all Swedish residents. Net foreign currency assets are defined as total foreign currency assets minus total foreign currency liabilities.

An important cause of the growing foreign currency exposure is the larger stocks in the international exchange position. Assets abroad are denominated as a rule in a foreign currency, just as Swedish assets are usually denominated in Swedish kronor. A growing foreign currency exposure as a result of the larger stocks is then to be expected, in that Swedish assets held by nonresidents are predominantly in Swedish kronor and foreign assets held by residents are mainly in foreign currency.

In 1989, foreign currency liabilities outweighed assets, mainly because exchange controls had previously permitted extensive private borrowing in foreign currency. This borrowing exceeded the value of Swedish foreign currency assets, which at that time mostly consisted of direct investment abroad.

The Swedish krona's marked depreciation at the end of 1992 and during 1993 no doubt had a limited net effect on the overall wealth of Swedish residents because foreign currency assets were more or less balanced by liabilities.<sup>2</sup>



Source: The Riksbank.

<sup>2</sup> The Riksbank's extensive interventions in the forward market meant that debt exposure in foreign currency was transferred to the Riksbank but the interventions did not alter the total exposure of Swedish participants.

At the end of 2005 the net value of Swedish residents' foreign currency assets and liabilities was over SEK 2,600 billion.

Since then, the foreign currency position has become much larger; at the end of 2005 the net value of Swedish residents' foreign currency assets and liabilities was over SEK 2,600 billion. Exchange rate fluctuations accordingly have a considerable effect on wealth and hence on the international investment position. A 5 per cent weakening of the krona's exchange rate means that the value of the foreign currency assets of Swedish investors rises by about SEK 130 billion.

At the same time, nonresidents invest in SEK assets, which represent SEK liabilities for residents. In this respect, SEK exchange rate fluctuations have no direct effect on the international investment position. So the loss that foreign investors incur on these SEK assets in the example above does not affect Sweden's international investment position.

From Figure 9 it will be seen that in the period 2001–04 the Swedish krona's TCW index fell (the krona's average annual TCW value declined). This represented an appreciation of the krona by almost 12 per cent and a corresponding loss for Swedish investors in the region of roughly SEK 200 billion (12 per cent of the average foreign currency exposure in these years). During 2005 the exchange rate swung and weakened 6 per cent, which in turn should have had a positive effect on the international investment position.

A depreciation in the krona usually has an effect on the international investment position.

It must be underscored that this estimate is very approximate. The balance of payments statistics do not provide information about the foreign currency composition of external assets. The extent to which Swedish assets and liabilities abroad are affected by exchange rate fluctuations in a particular year depends on the mutual relationships between foreign currencies together with the currency composition of net foreign currency assets. The calculated impact of exchange rate fluctuations on foreign currency assets and liabilities is therefore bound to be approximate.

It will also be seen from Figure 9 that there were lengthy periods before 2001 when the krona weakened. This wholly or partly offsets the wealth effects of the krona's appreciation 2001–04, which probably limits the total wealth effects that fluctuations in the krona's exchange rate have had since 1992.

#### EXCHANGE COVER AFFECTS RESIDENTS' FOREIGN CURRENCY POSITIONS

The distribution of foreign currency exposures between residents and nonresidents is affected by forward cover in Swedish kronor. At present the Riksbank does not have comprehensive information about Swedish entities' forward cover in kronor with the rest of the world. Foreign cur-

rency positions are affected by straight forward transactions in the foreign exchange market as well as by swaps involving the krona and foreign currencies. Forward cover for foreign currency assets such as export claims, holdings in subsidiaries abroad and portfolio investment abroad reduced the foreign currency asset position of Swedish residents. On the other hand, banks and mortgage institutions are known to obtain extensive foreign currency loans that they swap into krona liabilities. Such swaps add to residents' net foreign currency positions because a proportion of the foreign currency liabilities is converted into a krona liability and thereby increases net foreign currency assets.

Swaps and forward exchange cover can thus involve foreign currency assets as well as liabilities, so that they partly cancel out. In the absence of comprehensive information, however, such cover cannot be allowed for in an account of residents' foreign currency position.

Such exchange cover cannot be allowed for in an account of residents' foreign currency position.

#### EQUITY PRICES ARE ONE EXPLANATION FOR THE WEAK INTERNATIONAL INVESTMENT POSITION

Another factor with a marked effect on the value of Sweden's international investment position is changes in equity prices in Sweden and abroad. Such price movements affect the item Portfolio equity.

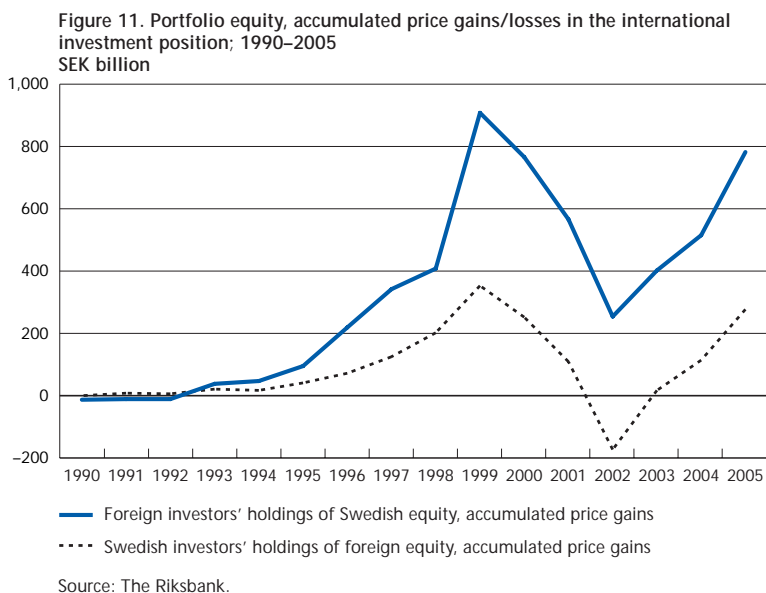
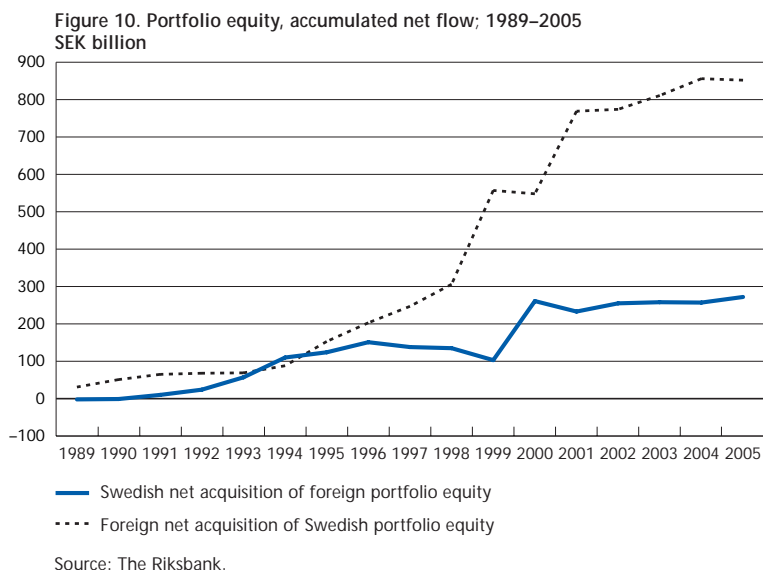
The magnitude of the equity price gains/losses incurred by Swedish and foreign investors is partly dependent on the distribution of cross-border equity investments over the period since 1989.

After the krona's depreciation in 1992, when Swedish equity was cheap and profit expectations were high, foreign investors were active net purchasers. In 1993 and 1994 foreign investors purchased Swedish equity for a net total of around SEK 90 billion, which was more than the accumulated net figure in the following five years, 1995–99 (see Figure 10).

The pattern of Swedish investment in foreign equity was different. The level rose in the mid 1990s and then took off around the turn of the millennium, when equity prices reached a high. In these years, Swedish investment abroad was appreciably higher than the equivalent foreign investment in Sweden.

So how have equity prices developed in Sweden and abroad? Developments in the 1990s favoured foreign investors who purchased Swedish equity. In every year except 1997 in the period 1992–99, the Swedish stock market, represented by the general index, was stronger than a weighted index for global stock markets (MSCI).

The differences in equity price developments between Sweden and abroad have affected price gains/losses on cross-border portfolio holdings of equity. A calculation of how the stock market fluctuations affected the



value of such portfolio equity holdings is presented in Figure 11. This shows the accumulated calculated annual effects of equity prices and thus provides a picture of the total price gains that foreign and Swedish investors made in this period.

Throughout the period, the price gains made by foreign investors on Swedish equity have been appreciably larger than the gains made by Swedish investors on foreign equity. One explanation is that foreign holders of Swedish equity benefited from the Swedish stock market's very

favourable development compared with stock markets elsewhere. Another explanation is that Swedish investors did not increase their foreign equity holdings markedly until the mid 1990s, when equity prices were at a high. According to this estimate, total price gains to foreign investors have been about SEK 500 billion larger than Swedish price gains on foreign equity.

It must be underscored that this calculation is very approximate. The extent to which annual equity price fluctuations affect the international investment position cannot be computed exactly because information is lacking about the size of holdings in particular equities. All calculations are based on a global price index and the Swedish general index. The actual compositions of foreign and Swedish holdings do not necessarily agree with these indices.

As a result of all this, equity price changes are an important factor behind the weak development of Sweden's international investment position in the past fifteen years.

It should be noted that the increase in net liabilities that is due to the different development of equity prices in Sweden compared with abroad does not say anything about how successful Swedish equity investors have been. The more positive equity price trend in Sweden leads in itself to a negative effect on Sweden's international investment position. At the same time, Swedish residents have made large equity investments in their domestic market and benefited from the favourable equity price trend there.

In addition to the profits on portfolio equity, foreign investors presumably made price gains on Swedish fixed-income securities in the 1990s. The sharp drop in the long-term interest rate from 1992 onwards generated considerable price increases on long-term fixed-income SEK securities. As the interest rate fell more in Sweden than elsewhere, it is reasonable to suppose that foreign investors gained more in Sweden than Swedish investors did abroad. However, no attempt has been made to estimate these effects.

Foreign investors' price gains on Swedish equity have exceeded those made by Swedish investors on foreign equity.

Foreign investors presumably also made price gains on Swedish fixed-income securities in the 1990s.

## Large fluctuations in the market value of direct investments

In the case of direct investment, the market value of the stocks of assets and liabilities is calculated by the Riksbank. For portfolio equity, for example, market values can be derived from stock-market prices but for direct investment this is usually not possible. Most of the enterprises that are owned or acquired by nonresidents are not listed on the stock exchange.

The Riksbank calculates the market value of direct investments with its own model.

Neither can information about the market value of subsidiaries be obtained from the enterprise.

The market value of direct investments is therefore calculated with a model. In the absence of international recommendations on the methods for such calculations, the Riksbank has developed a method internally. Direct investment stocks are also calculated at the book value of the equity in the subsidiary and included in this form in the traditional account of the international investment position.

The method developed by the Riksbank for calculating direct investment at market values uses stock-market data on P/E ratios, that is, the market values of listed companies divided by their trend-adjusted earnings (see the box "P/E method for market valuation of direct investments"). A capital valuation based on P/E ratios cannot measure market value exactly but compared with book values it does give a sounder picture of direct investment and thereby of the "proper economic value" of Sweden's international investment position.

#### P/E METHOD FOR MARKET VALUATION OF DIRECT INVESTMENTS

The calculation of market value starts from the assumption that the relationship between historical price and historical profits in direct investment enterprises is the same as the price/earnings ratio in listed companies. For the valuation of Swedish direct investment assets abroad, P/E ratios for a number of countries are weighted together in proportion to the book value of the direct investment assets. Market value is then calculated as the product of the weighted P/E ratio and the direct investment enterprises' combined earnings abroad, subject to the assumption that the market value cannot be less than the book value of the capital in the enterprises (the break-up value). As the long-term profit trend is, on average, a better approximation of the market's profit expectations than the most recent result, the P/E ratios used in these calculations are partly based on trend-adjusted earnings.

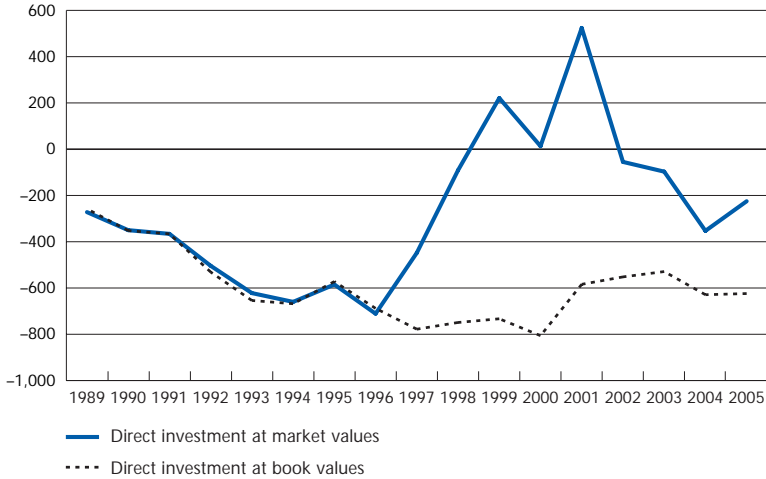
The increase in market value in the late 1990s had to do with a global increase in equity prices and high P/E ratios.

The effect on the international investment position of a market valuation of direct investment is shown in Figure 12. The gap between the two curves represents the effect of the Riksbank's calculation of direct investments at market values.

In the late 1990s the market value became notably higher than the book value on account of a global increase in equity prices and the high P/E ratios associated with peak expectations of future earnings. The subsequent fall in equity prices then led to a decline in the market value. This decline has been most marked for Swedish direct investment abroad. Between 2000 and 2002 the market value of outward direct investment dropped SEK 1,000 billion compared with a fall of SEK 650 billion for direct investment in Sweden.

So in recent years the market valuation of direct investment has given a loss of value for direct investment abroad that is greater than for foreign direct investment in Sweden. This is another reason why, despite

Figure 12. International investment position with direct investment at market and book values, respectively; 1989–2005  
SEK billion



Source: The Riksbank.

sizeable current-account surpluses, the international investment position has weakened since 2001.

## The international investment position does not cover all assets abroad

Statistical shortcomings lead to uncertainty about Sweden's international investment position. There are many indications that these shortcomings entail a systematic underestimation of assets abroad, so that the statistical picture of the position is unduly negative.

What, then, can be said about the magnitude of this measurement error in the international investment position? As shown earlier, in the period 1989–2005 net saving abroad as measured from the real side (the current and capital accounts) accumulated to SEK 995 billion. In the same period, the financial flows accumulated to a net outflow of around SEK 557 billion. It may then be asked whether the unexplained outflow of SEK 438 billion, which is booked as the residual, is entirely attributable to assets that ought to be included in the international investment position.

Statistical shortcomings result in an unduly negative picture of the international investment position.

## The residual is not a reliable yardstick of errors in the international investment position

There are reasons for supposing that the effect on the international investment position is smaller than the accumulated residual since 1989.

One reason is that the reported current-account balances have prob-



Comparisons of EU statistics show that net exports are systematically overestimated.

ably been on the high side. Bilateral statistical comparisons of trade in goods show unduly low values for imports and hence a systematic overestimation of net exports. These comparisons indicate that the overestimations could add up to about SEK 50 billion, in which case the accumulated current-account surplus for the period 1989–2005 may have been overestimated by the same amount. This overestimation of the current-account balance would help to explain the period's negative accumulated residual.

When this effect from the balance of trade has been subtracted from the residual, we are left with an unexplained outflow of around SEK 390 billion. This represents an underestimation of financial outflows (investment abroad) in this period.

The next question is whether this underestimation of financial outflows is a good measure of the asset stocks that do not show up in the international investment position.

The data for the international investment position are based to a large extent on bank and other corporate balance sheets. This makes it possible to compare the statistical foundation for external positions with the balance sheet data in corporate annual accounts. Checking and confirming statistics on transactions is considerably more difficult. Assuring their quality is complicated by the large volume of the transactions and the influence from fluctuating market prices and exchange rates. In the case of certain items such as equity and direct investment, it is also difficult to confirm transactions through comparisons with stocks and changes in value.

This leads to the conclusion that the data on the international investment position are more reliable than those on the financial transactions. The size of the accumulated residual for the period 1989–2005 is a very uncertain yardstick of the assets that are not covered by the international investment position.

Direct personal saving abroad is difficult to catch.

In some respects it is difficult or even impossible to measure assets abroad correctly. A case in point is direct personal investment abroad in shares, mutual funds, bank accounts, etc., where the holdings are deposited abroad. It is difficult to identify these assets in statistical studies.

To sum up, there are measurement errors in the international investment position and the balance on current account that work in the same direction. The overestimation of the current-account balance and the underestimation of Swedish assets abroad both contribute to the discrepancy shown in Figure 1 between the changes in the international investment position and the accumulated current-account balance.

## Value changes are the chief cause of the fluctuations in the international investment position

Prior to the early 1990s the balance on Sweden's current account matched the change in the international investment position relatively closely. The current-account balance used to be the main determinant of the investment position but this is no longer the case. The growth of cross-border financial flows has greatly increased the gross stocks that make up Sweden's international investment position. These stocks currently total SEK 13,400 billion, which is more than five times the size of Sweden's GDP.

As a result, since the mid 1990s fluctuations in market values have been increasingly important for changes in the international investment position. Today, changes in value arising from the fluctuations in market values have become the chief determinant of how the international investment position develops. The position is still affected by the current-account balance, which together with the capital account reflects financial saving abroad, but its relative importance has declined appreciably since the early 1990s.

The market values with the largest consequences for the international investment position are the Swedish krona's exchange rate, equity prices in Sweden and abroad and the market value of direct investment enterprises.

The krona exchange rate, equity prices and the value of direct investment companies have the most significance.

# ■ Effective exchange rates – theory and practice

BY JAN ALSTERLIND

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*The Swedish economy is affected by movements in the krona's exchange rates with a large assortment of currencies. The value of the krona in terms of another currency is known as a bilateral exchange rate. A common way of measuring the krona's value is to use an index that includes a number of currencies. Information from bilateral exchange rates is extracted to construct an index of the effective exchange rate. This requires decisions about the bilateral exchange rates that are to be included, the weight each currency is to have and how the bilateral exchange rates are to be weighted together. These decisions naturally depend on what the exchange rate index is to be used for and what it is intended to measure. Such an index is usually constructed to measure the impact of exchange rate movements on trade in goods and services – an index of competitiveness. This article describes what an effective exchange rate index is and alternative ways of calculating it. I conclude that at present there are no sizeable differences between a conventional TCW index, a TCW index with updated weights and an index with weights derived by the Swedish National Institute of Economic Research (NIER).*

## What is an effective exchange rate index?

An effective exchange rate index is a weighted average of bilateral exchange rates, that is, of the krona's value in terms of other currencies.

Economic development in Sweden is heavily dependent on global economic activity. Sweden is an open economy in which foreign trade (exports plus imports) is equivalent to almost 85 per cent of GDP. It follows that the economy is affected by changes in the krona's value in terms of other currencies. The value of the krona in relation to another currency is defined as the bilateral exchange rate. The information in a number of bilateral exchange rates can be combined into a single indicator by calculating a weighted average. Such a weighted average is usually called an *effective exchange rate index*. The construction of such an index varies with what it is intended to analyse. In most cases, the purpose is to measure the exchange rate's impact on total trade in goods and services. The weights are then set to mirror the relative importance of other coun-

tries for Sweden's foreign trade. Alternatively, the index can be constructed to measure the exchange rate's impact on either imports or exports. When calculating trade volumes, relative price differences have to be taken into account. Nominal exchange rates have to be combined with relative price movements. What one wants to construct, in other words, is a *real effective exchange rate index*. The original method for calculating this type of effective exchange rate index was developed by the International Monetary Fund (IMF), using Total Competitiveness Weights (TCW). The Swedish krona's real exchange rate mirrors the price of goods and services in Sweden relative to the rest of the world, expressed in a common unit.

The real exchange rate is defined as:

$$\text{real exchange rate} = \frac{E \times P^*}{P} \quad (1)$$

where  $P^*$  is the price of a representative basket of goods and services in the rest of the world,  $P$  is the price of the equivalent basket in Sweden and  $E$  is the Swedish krona's nominal exchange rate with the rest of the world. Thus, the nominal exchange rate is the conversion factor whereby two countries' relative prices are expressed in a common unit. The real exchange rate can be seen as an indicator of a country's international competitiveness. A weakening of the real exchange rate means that more domestic goods and services are needed to balance a given amount of foreign products. The less it costs foreign firms and consumers to purchase Swedish goods and services, the stronger is Sweden's competitiveness. A *real effective exchange rate index* for the krona accordingly measures Sweden's total competitiveness relative to our principal trading partners.

A real effective exchange rate index for the krona measures Sweden's total international competitiveness.

## Applications for a nominal effective exchange rate index

It is the *nominal effective exchange rate index* that is calculated most often in practice. This is because exchange rates are quoted from day to day, whereas price statistics are available only on a monthly or quarterly basis. In an analysis of competitiveness, however, the nominal exchange rate is liable to be misleading. This is the case for periods of some length and, above all, for countries that differ in terms of inflation. Using a nominal index as a proxy for a real index may then be less appropriate. That is because inflation is high as a rule in countries where the exchange rate is depreciating. Another consequence can be that two different indices which give different paths in nominal terms may show considerably more

similar developments in real terms. Countries with a currency that is depreciating/appreciating markedly and where inflation is high/low are sometimes excluded from an effective exchange rate index because they may dominate the outcome of the nominal index. A "narrower" index of this kind can be derived from a "broader" index in order to confine the calculation to countries with a similar development of inflation. That facilitates the analysis of a nominal exchange rate index.

## How many and which currencies?

The number of currencies in an exchange rate index is a matter of "enough" but not "too many".

The number of countries to include in an effective exchange rate index is an open question. Every currency that in some sense is "relevant" should be included. This applies, of course, to an index for measuring competitiveness with the rest of the world. An extreme case would be to include as many currencies as possible but such an approach is not self-evidently optimal. As exchange rate movements are often correlated, including additional currencies will not necessarily improve the analysis at all substantially. Sometimes, in fact, a large number of currencies may complicate the analysis. So in practice, there are no clear criteria for the number of currencies to include in an exchange rate index; this is rather a matter of "enough" but not "too many". The choice is also limited by the availability of data. For some countries it may be difficult to find the statistics that are needed to calculate the currency's weight in the index.

The choice of currencies for an effective exchange rate index is sometimes based on arbitrary rules. An example is the criterion that a country's share of exports or imports must be more than, say, 0.5 per cent. One problem with this approach, which is used by the US Federal Reserve, the ECB and others, is that the shares may change over time, so that a country which was an important trading partner some years ago may be of no consequence today. Another complication is that a country with a small share of the bilateral trade may be a major competitor in the world market. An alternative used by the Bank of England is to assess the situation annually and include or exclude countries in accordance with the rule. The set of countries will then vary over time. Another approach is to start from geographical areas or economic groupings. The OECD calculates an exchange rate index that is limited to its member countries and the Federal Reserve prefers one of the narrower indices, limited to currencies that are considered to be important. The (TCW) exchange rate index calculated by the IMF simply includes those currencies for which statistics are available for the computation of weights. Still, there is clearly no entirely acceptable way of selecting the currencies for inclusion in an index.

## Which types of goods and services?

An effective exchange rate index is used almost exclusively to measure the exchange rate's impact on trade in goods and services. The weights with which bilateral exchange rates are combined into an effective index are therefore based as a rule on trade statistics. The need for (real) effective exchange rate indices arose in the aftermath of the Bretton Woods system. These indices were designed for the simultaneous analysis of the impacts of a number of bilateral exchange rates (and relative prices) that were now free to fluctuate against each other. One of the earliest indices, the multilateral exchange rate model (MERM), was developed by the IMF and was subsequently replaced by the TCW system. The method was first described and presented in McGuirk (1987); updated versions have appeared in Zanello & Desruelle (1997) and, recently, in Bayoumi, Lee & Jayanthi (2005). In practice, the IMF's method is about constructing the weights that are used to calculate a weighted average of bilateral exchange rates.<sup>1</sup> Real effective exchange rate indices for many countries are calculated simultaneously in this system. Originally, a more disaggregated calculation was also made for some 20 countries, broken down into real exchange rates between different sectors of manufacturing. A majority of the exchange rate indices that exist today stem directly from this tradition. The method is reported in, for example, Zanello & Desruelle (1997) and in Bayoumi, Lee & Jayanthi (2005). As the latter authors, for instance, show, the method for calculating weights varies with the type of goods or services for which competitiveness is to be measured.

Simplifying somewhat, foreign trade can be decomposed into three main categories: commodities, manufactured goods and services. A common assumption is that commodities are homogeneous and are traded in a global market. Commodity competition between countries then occurs in a single market and a country's importance as a trading partner is determined by its share of the total market for that product. This makes the calculation of weights for homogeneous commodity groups relatively simple, as described, for example, in Zanello & Desruelle (1997).

Unlike primary products, manufactured goods and services are heterogeneous. Different makes of car from different countries, for example, are seldom perfect substitutes. Manufactured goods and services produced in Sweden for sale abroad compete in different, segmented, markets, not in a single global market. Seen from this angle, the German and the American markets are two separate markets. So in contrast to commodities, a number of markets have to be considered in the case of het-

The method for calculating weights varies with the type of goods or services for which competitiveness is to be measured.

In the case of commodities, countries often compete in a single global market.

Manufactured goods and services that are sold abroad compete in different, segmented, markets, not in a single global market.

<sup>1</sup> In an analysis in real terms, the same weights are used for prices as well.

erogeneous goods and services. Countries accordingly compete in many different markets and a country's importance as Sweden's trading partner therefore depends on its relative shares of these markets.

As countries compete in many different markets, it follows that the calculation of weights for an effective exchange rate index requires a large amount of data. Besides figures for each country's exports (or imports), data are needed that indicate a country's degree of openness.<sup>2</sup> Due to deficiencies in the availability and quality of statistics on services, weights for effective exchange rate indices are usually calculated excluding services. An exception, however, is the Bank of England's new exchange rate index, which does include trade in services.<sup>3</sup> While statistics on trade in services have had numerous deficiencies in the past, improvements are being made continuously, for example in far-reaching work by the OECD. As trade in services grows, so will the importance of taking this component into account.

## Calculating weights

The calculation of weights for manufactured goods and services is described below because these are the major items in Sweden's foreign trade. The starting point is that heterogeneous products compete in a number of different markets. A reasonably acceptable indicator of competitiveness therefore needs to cover all the geographical areas in which the products compete. Take, for example, the competition between Sweden and Japan. For one thing, Swedish products compete with Japanese direct imports to Sweden – import competition. Similarly, Swedish products compete with Japanese in the latter's domestic market – direct export competition in Japan. Lastly, Swedish and Japanese products compete in other markets – third-market competition. The weights need to reflect both the bilateral trade and the competition in other markets. The weight for country  $j$  as regards a heterogeneous product group, for example manufactured goods, can then be written:

$$W_j = \lambda^M MW_j + \lambda^{BX} BXW_j + \lambda^{TX} TXW_j. \quad (2)$$

<sup>2</sup> Given an accurate valuation of all flows, imports to a country are the sum of all other countries' exports to that country. So in theory it makes no difference which flow is measured. In practice, however, measurement errors from a variety of sources lead to a discrepancy between total exports and total imports. In order to obtain consistent results, the calculation of weights is usually based on only one of the flows; the usual choice is exports, on the common assumption that export flows are easiest to measure and value correctly.

<sup>3</sup> See Lynch & Whitaker (2004).

In this version, a country's total weight is made up of three components. The calculation of these component weights and the way in which they are weighted together are relatively complex, so further details are provided in an appendix. But an outline of the intuitive reasoning behind the formula may be of interest.

Swedish producers of manufactured goods compete in their domestic market with imports from other countries. The first weight,  $MW_j$ , measures the share for a country's producers of total sales in the Swedish market. This weight then represents a country's share of Sweden's total imports of manufactured goods.

The weight  $BXW_j$  is intended to measure a country's importance in terms of the competition Swedish producers encounter in that country's domestic market. Besides the share of Swedish exports that goes to that country, this importance has to do with the country's own producers' share of their domestic market. The importance for competitiveness of countries whose producers have a large domestic market share is greater than a weight based solely on export shares would indicate.

The last weight,  $TXW_j$ , is intended to measure a country's importance in terms of the competition Swedish producers encounter in markets abroad. This component is measured as the sum of a country's shares of total sales in these third-country markets. The weight aims to represent the importance of, for example, a country that takes a small share of direct exports from Sweden but has large exports to countries where exports from Sweden are substantial. A case in point is Japan: direct competition between Swedish exporters and Japanese producers is small in Japan's domestic market compared with the competition between Swedish and Japanese producers in third-country markets.

A country's relative importance as a competitor in Sweden's domestic market, the importance of the competition Swedish exporters encounter in that country's domestic market, and the importance of the country as a competitor in all other markets are determined by the weights  $\lambda^M$ ,  $\lambda^{BX}$  and  $\lambda^{TX}$ . The competition Swedish producers encounter in their domestic market from foreign producers,  $MW_j$ , is weighted with  $\lambda^M$ , which represents the domestic market's share of Swedish output. The two different types of export competition,  $BXW_j$  and  $TXW_j$ , are weighted with  $\lambda^{BX}$  and  $\lambda^{TX}$ , which represent the shares of Swedish output that go to markets abroad. Thus, as mentioned above, the calculation of weights is relatively complicated.

A country's total weight is made up of three components.

The first weight measures a country's relative share of Sweden's total imports of manufactured goods.

The second weight measures a country's importance in terms of the competition Swedish producers encounter in that country's domestic market.

The third weight measures a country's importance in terms of the competition Swedish producers encounter in third-country markets.



## Choosing relative prices

An analysis of competitiveness can use relative export prices as well as relative costs in terms of unit labour costs.

A real effective exchange rate index commonly serves, as noted earlier, as a summary indicator of a country's international competitiveness. However, real is a somewhat ambiguous term and there are different relative prices that may be relevant in different contexts. One form of relative prices that can be used to analyse competitiveness is relative export prices. They provide information about how Swedish exporters price their products relative to exporters in other countries. There is, however, a risk of obtaining too limited a picture of a country's relative price level. The measurements concern prices of products that are actually exported, while products that, for example, are potentially tradable but not competitive are ignored. This measure of competitiveness is also affected by pricing behaviour, such as pricing to market.<sup>4</sup> An alternative way of measuring competitiveness is to compare costs. This is commonly done by measuring relative costs in terms of unit labour costs. It may be worth mentioning that the IMF's original method for calculating real effective exchange rate indices was designed to measure the relative level of costs in terms of unit labour costs for different sectors on manufacturing.<sup>5</sup>

A comparatively common approach is to use relative consumer prices expressed in a common currency.

A comparatively common approach to constructing a real exchange rate index is, however, to use relative consumer prices expressed in a common currency. The reason is that consumer prices are based on a basket that is representative of the country's pattern of consumption. The real exchange rate deflated with consumer prices therefore gives a broad measure of the relative level of prices for a representative basket of consumption. However, consumer prices include a large element of items that are not exposed to competition. Weights calculated for competitiveness are therefore usually constructed from statistics that cover as broad an aggregate of goods and services as possible.<sup>6</sup>

<sup>4</sup> Briefly, this theory implies that exporters actively restrain profit margins in order to gain market share.

<sup>5</sup> See McGuirk (1987).

<sup>6</sup> See Zanello & Desruelle (1997).

## Choosing the index's form

One of the more fundamental issues when constructing an effective exchange rate index is what type of index to use. One of the most usual ways of constructing an index is to calculate a geometrically weighted average:<sup>7</sup>

$$I_t^G = \prod_{n=1}^N \left( \frac{E_{nt}}{E_{n0}} \right)^{W_n} \quad (3)$$

$$\sum_{n=1}^N W_n = 1, \quad \forall W_n \geq 0$$

The geometric form has a number of advantages, for instance that the percentage change in this form of index is independent of the particular base. The geometric form is also attractive for theory because the weights can be treated as elasticities; for a discussion, see e.g. McGuirk (1987). This is by far the most common form and is used by most central banks as well as other participants. The ECB, for instance, uses the geometric form but adjusts the weights at five-year intervals to catch any changes in competitiveness.<sup>8</sup> Time-varying weights can therefore be used to prevent the index from becoming increasingly out-dated. The index can then be written:

$$I_t^G = \prod_{n=1}^N \left( \frac{E_{nt}}{E_{n0}} \right)^{W_{nt}} \quad (4)$$

$$\sum_{n=1}^N W_{nt} = 1, \quad \forall W_{nt} \geq 0$$

where the weights ( $W_{nt}$ ) are now allowed to vary over time. However, this method introduces some complications. One complication with geometric weighting with variable weights concerns aggregation from daily quotations to, for example, monthly or quarterly data. Weighting the index geometrically on daily quotations and then aggregating to monthly data gives a result that differs from an index that is constructed directly on monthly averages for the bilateral exchange rates. The discrepancy, however, is usually very small. Another complication is that the value of the index may change even in the absence of a change in the ingoing

<sup>7</sup> An arithmetic index poses the problem that the size of a percentage change varies with the base. Take, for example, an index for two currencies that each have a weight of 50 per cent; an increase of one unit in both these currencies, from 5 to 6, raises the index 20 per cent, while a one-unit increase from 6 to 7 raises the index just over 18 per cent.

<sup>8</sup> Buldorini, Makrydakīs & Thiman (2002).

exchange rates.<sup>9</sup> This may not be incorrect but it is not unusual for this type of index change to be considered undesirable. A simple way of overcoming this problem is to construct a chain-linked index:

$$I_t^G = I_{t-1}^G \times \prod_{n=1}^N \left( \frac{E_{nt}}{E_{n,t-1}} \right)^{W_{nt}} \quad (5)$$

$$\sum_{n=1}^N W_{nt} = 1, \quad \forall W_{nt} \geq 0 \quad I_0^G \text{ given}$$

In this case, changes in weights evidently do not affect the value of the index as long as exchange rate movements are zero. This method is used by, for example, the US Federal Reserve.<sup>10</sup>

An exchange rate index can accordingly be constructed in various ways and there is no given way of telling which construction is most appropriate. The alternative constructions that have been presented here have different advantages and drawbacks. It can be noted, however, that most of the indices which central banks and other organisations publish are weighted geometrically. The most common reasons for this are that geometric weighting is better suited to a theoretical framework and that changes in an index are easier to interpret when the index is unaffected by the base in which the bilateral currencies are expressed. Still, the choice between a level-weighted and a change-weighted index is not self-evident. Different methods tend to give somewhat different effects, as illustrated by the following simple example, taken from Ellis (2001).<sup>11</sup>

TABLE 1. AN EXAMPLE WITH TWO COUNTRIES WITH VARYING WEIGHTS, USING DIFFERENT METHODS FOR CALCULATING THE INDEX

Exchange rate		Weight		Type of index	
Country B	Country C	Country B	Country C	Ordinary geometric	Chain-linked geometric
100.00	100.00	0.50	0.50	100.000	100.000
100*(1.05) <sup>1</sup>	100/(1.05) <sup>1</sup>	0.60	0.40	100.981	100.981
100*(1.05) <sup>2</sup>	100/(1.05) <sup>2</sup>	0.70	0.30	103.980	102.971
100*(1.05) <sup>3</sup>	100/(1.05) <sup>3</sup>	0.60	0.40	102.971	103.980
100*(1.05) <sup>4</sup>	100/(1.05) <sup>4</sup>	0.50	0.50	100.000	103.980

<sup>9</sup> This is evident as the change in an index for N currencies can be written:

$$\Delta \ln(I_t) = \sum_{n=1}^N \{ \Delta \omega_n^* \ln(vx_{n,t}^*) + \omega_n^* \Delta \ln(vx_{n,t}^*) \}.$$

The value of the index can then change even when the currency is unchanged.

<sup>10</sup> Loretan (2005).

<sup>11</sup> Ellis (2001).

Table 1 presents a simple arithmetical example for an effective exchange rate index for country A, with countries B and C included in the index. Country A's exchange rate with country B is assumed to undergo a 5 per cent trendwise depreciation, accompanied by a corresponding appreciation of the exchange rate with country C. The weights are equal initially. The index weight for country B increases to begin with and then returns to the initial level. As shown in the table, the alternative methods for calculating the index give different pictures of how the effective exchange rate index develops. In this example, a chain-linked index leads to the weighted sum of the changes in the exchange rates cancelling out in the final period. The change in the value of the index in the final period is therefore zero.<sup>12</sup> The conventional geometric index does not have this characteristic. In the final period, the changes in weights cause the value of the index to fall back to the initial level. The example shows that the different methods give different pictures of how the index develops but says nothing about which construction is closest to the mark. It is noteworthy, however, that as a rule, central banks and other participants use a form of chain-linked index when constructing an index with variable weights.

## Current indices and their purposes

As shown in Table 2, most central banks have an index that is based in some way on weights calculated internally. Moreover, time-varying weights are becoming increasingly common. The weights that most central banks calculate are akin to the IMF's principle of weighting for competitiveness but the calculations are usually simplified in certain respects.

Effective exchange rate indices for the Swedish krona are available in a number of forms and are provided by many participants, including the Riksbank. The earlier monetary policy regime with a fixed exchange rate required an official benchmark for the krona's external value. With a variable exchange rate, no such official index is needed. Under this regime, an effective exchange rate index for the krona simply serves as an instrument for economic analysis. A look at different types of index may be of interest in this context (see Table 3).

Krona indices tend to be competitiveness weighted. Weights are calculated internally by many participants, which leads to differences in how

Krona indices tend to be competitiveness weighted.

<sup>12</sup> Changes in a chain index mean that the change in an index for N currencies can be written:

$$\Delta \ln(I_t) = \sum_{n=1}^N \{\omega_n^t \Delta \ln(v_n x_n^t)\}$$

when a correction is made for the effect on the base of adjusting the weights.

**TABLE 2. SELECTED CENTRAL BANK'S EFFECTIVE EXCHANGE RATE INDICES**

Central bank	Name	Type of weighting	No. of currencies	Calculation of weights	Other comments
US Federal Reserve	BROAD*	Weighted for competition, time-varying	26**	Internal	Sub-groups calculated
Bank of England	ERI	Weighted for competition, time-varying	Varies	Internal	Weights also calculated for services trade
Norges Bank	TWI	Trade-weighted, time-varying	25	OECD	An import-weighted index is also calculated
Bank of Canada	C-6***	Trade-weighted, constant weights	6	Internal	The USD's weight is over 80 per cent
Reserve Bank of Australia	TWI	Trade-weighted, time-varying	24	Internal	Import- and export-weighted indices are also calculated
Reserve Bank of New Zealand	TWI***	Trade-weighted, time-varying	5**	Internal	The weights also mirror the countries' GDP
ECB	EER	Weighted for competition, updated every fifth year	12	Internal	Broader indices (23 and 42 countries) are also used
Riksbank	TCW	Weighted for competition, constant weights	20	IMF	

\* Two other indices (major currency index and other important trading partner (OITP) index) are also calculated.

\*\* Here the euro is treated as one currency.

\*\*\* An index based on total competitiveness weights is also calculated.

**TABLE 3. EFFECTIVE EXCHANGE RATE INDICES FOR THE SWEDISH KRONA**

Constructed by	Name	Type of weighting system	No. of currencies	Other comments
Goldman Sachs	TWI	Weighted for competition, time-varying weights	24	The euro area is treated as one currency
NIER (KI)	KIX	Weighted for competition, time-varying weights	29–32	Includes primary commodities
NIER (KI)	Trade-weighted	Weighted for trade, time-varying weights	14–28	Covers exports, imports and third-country effects
OECD		Weighted for competition, time-varying weights	28	
BIS	BIS index	Weighted for trade, time-varying weights	26	
IMF	TCW	Weighted for competition, constant weights	20–163	Updated weights also include commodities and services

many countries are included and in whether or not the weights are time-variable. A relevant question here is whether different indices point to different conclusions about the krona's external value. As mentioned earlier, it is real effective exchange rates that are of primary interest. For a comparison of two different indices, however, it may suffice to analyse the

path of the nominal index if both indices cover the same number of currencies/countries. The weights for the TCW index in accordance with the original definition are included in Table 4. The updated weights for the countries in the original TCW calculation and for an extended country set are from Bayoumi, Lee & Jayanthi (2005). The latest (preliminary) weights calculated by the Swedish National Institute of Economic Research (NIER) are also included for comparison.<sup>13</sup>

TABLE 4. WEIGHTS

Country	Original TCW	Updated TCW	Updated and extended TCW	NIER's latest KIX weights
Germany	22.28	17.56	15.43	16.97
France	7.15	8.29	7.29	6.85
Netherlands	4.24	5.44	4.78	5.24
Italy	6.05	5.90	5.19	4.74
Finland	6.69	5.16	4.54	4.71
Belgium-Luxembourg	3.55	3.81	3.35	5.24
Spain	2.48	3.25	2.85	2.93
Ireland	0.77	1.69	1.49	1.35
Austria	1.71	1.39	1.22	1.29
Portugal	0.93	0.81	0.71	0.64
Greece	0.27	0.72	0.64	0.39
UK	11.56	10.34	9.09	7.52
Denmark	5.60	5.42	4.77	4.87
Poland			1.54	2.06
Czech Republic			0.57	0.81
Hungary			0.44	0.66
Slovakia			0.18	0.29
Norway	5.58	5.36	4.71	5.11
Switzerland	2.74	2.10	1.85	1.71
Turkey			0.91	0.54
Iceland			0.12	0.09
Russia			0.88	1.66
Canada	1.16	1.70	1.49	1.86
Mexico			0.97	0.93
Brazil			1.06	0.77
Japan	5.20	6.07	5.33	3.49
China			3.52	3.35
South Korea			1.31	1.27
India			0.59	0.81
Australia	0.27	1.11	0.98	0.90
New Zealand	0.14	0.21	0.18	0.16
USA	11.63	13.67	12.02	10.81
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

<sup>13</sup> See Erlandsson & Markowski (2006). The preliminary calculations cover a total of 32 countries. The current KIX published by NIER includes 29 countries.

For the original TCW countries, it seems that the updating of the IMF's weights reduces the importance of Germany, for instance, and increases the importance of the United States. On the whole, there is relatively little difference between the weights on which the Riksbank's TCW index is based and the updated weights presented in Bayoumi, Lee & Jayanthi (2005) (see Figure 1).<sup>14</sup>

Somewhat larger differences arise, however, when additional countries are included. The difference between a 32 country set and the 20 countries in the TCW index used by the Riksbank is shown in Figure 2.

In the expanded TCW index, the countries added to the original set are Poland, Czech Republic, Hungary, Slovakia, Turkey, Iceland, Russia, Mexico, Brazil, South Korea, China and India. A nominal index with this expanded set is about 15 per cent stronger than an index based on the original TCW countries. When the currencies in an index with a given country set are weighted together with weights from different sources, however, the differences are not particularly large. Figure 3 shows an expanded TCW index and an index weighted together with NIER's latest (preliminary) calculations of KIX weights. It will be seen that the paths of these two indices are very similar. The major effect on the nominal index comes from the number of currencies.

It does not follow, however, that the construction of weights is never important for the development of an exchange rate index. Still, trade flows and production conditions change slowly and very slightly compared with movements in relative prices and nominal exchange rates. As a rule, therefore, the choice of weights is of secondary importance for the path of an effective exchange rate index.

The developments presented in Figures 1–3 concern nominal effective exchange rate indices. As I have already mentioned a number of times, for economic analysis it is usually the real exchange rate that is relevant. The large differences that can occur between two nominal indices that include different numbers of currencies tend to become considerably smaller when changes in relative prices are also taken into account. Figure 4 presents real effective exchange rate indices based, respectively, on the original set of 20 countries in the TCW index and on the set of 32 countries in KIX. For both these indices, the weights have been taken from Bayoumi, Lee & Jayanthi (2005).

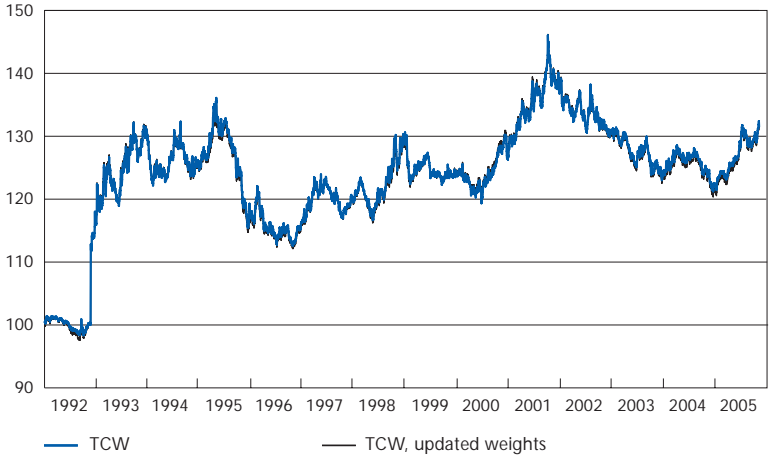
The picture in real terms does differ between these two indices but not all that much. One conclusion, therefore, is that the discrepancy between the nominal indices (see Figure 2) is mainly due to the high rate of inflation in the dozen additional countries in the enlarged set. The dif-

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<sup>14</sup> The weights used in the calculation of the TCW index were published in Zanello & Desruelle (1997).

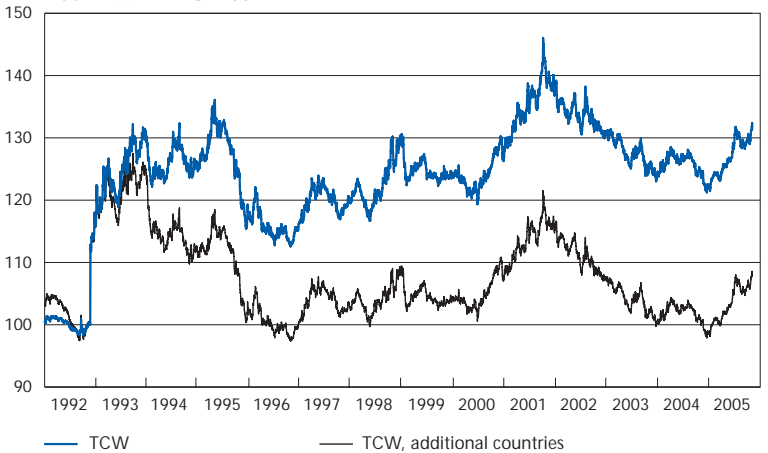
ference in real terms is therefore considerably less pronounced. It is then doubtful whether an enlarged country set in an effective index for the Swedish krona would lead to decisively different conclusions about the krona's external value.

**Figure 1. Nominal effective SEK index based on initial and updated TCW weights**  
 Index: 1992-11-18=100



Note. The underlying bilateral SEK exchange rates are calculated with the cross rates with USD.  
 Sources: Reuters, IMF and the Riksbank.

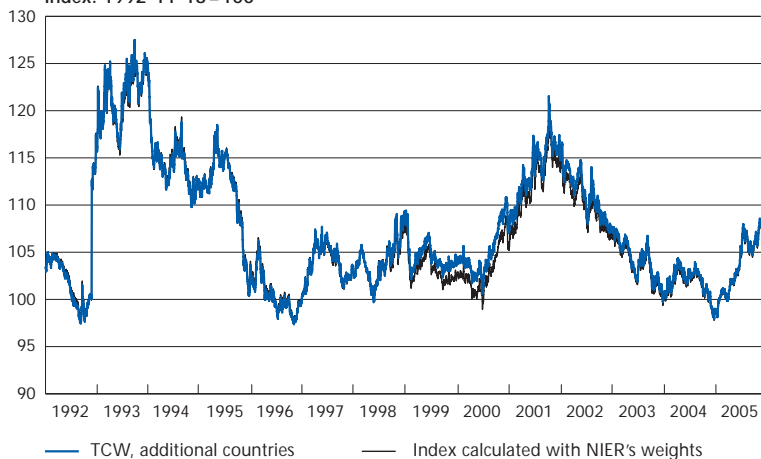
**Figure 2. Nominal effective SEK index based on updated TCW weights and different numbers of countries**  
 Index: 1992-11-18=100



Note. The underlying bilateral SEK exchange rates are calculated with the cross rates with USD.  
 Sources: Reuters, IMF and the Riksbank.



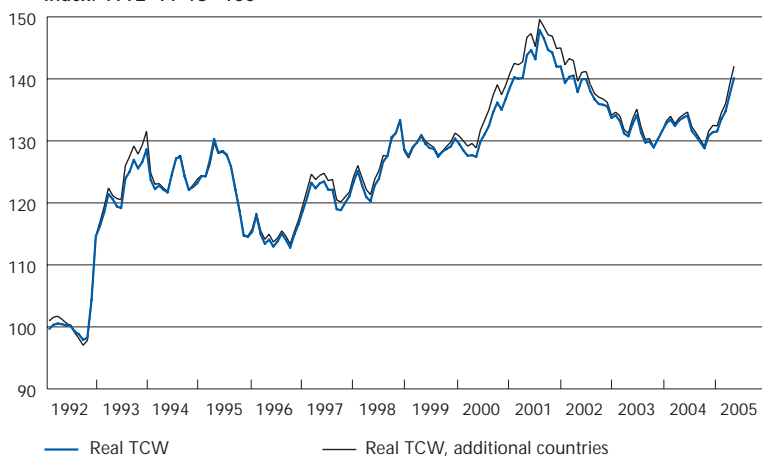
**Figure 3. Nominal effective SEK index based on updated TCW weights and on NIER's (preliminary) weights**  
 Index: 1992-11-18 = 100



Note. The underlying bilateral SEK exchange rates are calculated with the cross rates with USD. For the index based on NIER's weights the latest calculation has been used over the whole period.

Sources: Reuters, IMF, NIER (Swedish National Institute of Economic Research) and the Riksbank.

**Figure 4. Real effective SEK index based on updated TCW weights and different numbers of countries**  
 Index: 1992-11-18 = 100



Note. The underlying bilateral SEK exchange rates are calculated with the cross rates with USD.

Sources: Reuters, IMF, OECD and the Riksbank.

## Conclusion

Real effective exchange rate indices are calculated as a rule to obtain information about a country's international competitiveness. Bilateral exchange rates are therefore weighted together so that they mirror the importance of other countries as trading partners. It turns out that discrepancies can arise mainly in connection with the number of countries that are included in such an index. This seems to be due, above all, to differences in rates of inflation. The differences between real indices are therefore usually considerably smaller, regardless of how many countries are included. It can be of interest to work with a variety of indices, particularly in the event of large exchange rate movements for countries that are not currently included in the existing TCW index. At present, however, the picture of the krona's external value is not decisively affected by the choice of index for the analysis.

The picture of the krona's external value is not decisively affected by the choice of index for the analysis.

## Appendix: Calculating TCW weights

Most exchange rate indices use some form of the IMF's method – total competitiveness weighting (TCW) – for the calculation of weights. It may therefore be relevant to describe how the IMF constructs the weights. The method has been presented in, for example, Zanello & Desruelle (1997) and in Bayoumi, Lee & Jayanthi (2005) but some clarification may be needed. The starting-point in the IMF's method for calculating weights for heterogeneous merchandise is the construction of a matrix representing domestic output and demand as well as trade flows between  $k$  countries or markets. This can be done so that each row in the matrix describes country  $i$ 's output for the domestic market and for exports to other countries. The columns show country  $i$ 's demand for domestic products and imports from other countries. Clearly, demand for domestic products equals output for the domestic market. The elements in the matrix can then be normalised so that either exports and output for the domestic market or imports and domestic demand for domestic products sum to one. As a rule, normalisation of imports and domestic demand for domestic products is denoted  $s$  and normalisation of exports and output for the domestic market is denoted  $w$ . This can be represented as resulting in two matrices:

$$w = \begin{pmatrix} w_1^1 & w_1^2 & \dots & w_1^k \\ w_2^1 & w_2^2 & & \\ \vdots & & \ddots & \\ w_k^1 & & & w_k^k \end{pmatrix} \begin{matrix} \sum 1 \\ \vdots \\ \vdots \\ \sum 1 \end{matrix} \quad \text{and} \quad s = \begin{pmatrix} s_1^1 & s_1^2 & \dots & s_1^k \\ s_2^1 & s_2^2 & & \\ \vdots & & \ddots & \\ s_k^1 & & & s_k^k \end{pmatrix} \begin{matrix} \sum 1 & \dots & \dots & \sum 1 \end{matrix}$$

In the left-hand matrix the components on the diagonal represent each country's share of the output that is intended for the domestic market and all the other components represent the share of output (in the form of exports) that is intended for all other countries. In the right-hand matrix the components on the diagonal represent each country's share of demand in the domestic market and all the other components represent the share of demand that is met by imports from other countries. As we have normalised with different bases (the sum of rows does not necessarily equal the sum of columns), it is important to note that in the normal case,  $s_i^i \neq w_i^i$ .

There are various expressions for the TCW weights. The most com-

mon approach is to calculate each weight, for example country  $j$ 's weight for country  $i$ , as follows:<sup>15</sup>

$$W_{ij} = \lambda_i^M MW_{ij} + \lambda_i^{BX} BXW_{ij} + \lambda_i^{TX} TXW_{ij}$$

where

$$MW_{ij} = \frac{s_j^i}{\sum_{k \neq i} s_k^i}$$

$$BXW_{ij} = \frac{w_i^j s_j^i}{\sum_{k \neq i} w_i^k s_k^k}$$

$$TXW_{ij} = \frac{\sum_{k \neq i, j} w_i^k s_j^k}{\sum_{k \neq i} w_i^k (1 - s_i^k - s_k^k)}$$

To construct the weights, we can define  $s_i^k$ , which denotes country  $i$ 's share of market  $k$ , and  $w_i^k$ , which denotes country  $i$ 's share of the supply in market  $k$ . These definitions can be used to define the component  $MW_{ij}$  as:

$$MW_{ij} = \frac{s_j^i}{\sum_{k \neq i} s_k^i} .$$

This weight is country  $j$ 's share of market  $i$ . Country  $i$ 's share of output for market  $i$  (its share of output for its domestic market) is excluded, so that these weights (for  $j$  to  $k$  countries) sum to one.  $MW_{ij}$  is then this country  $j$ 's share of total imports to market  $i$ . Thus, this weight is designed to measure the competition domestic producers encounter in their domestic market in the form of imports.

The component  $BXW_{ij}$  is the share of output in country  $i$  that is sold in country  $j$ , taking into account country  $j$ 's relative share of sales in its domestic market.

$$BXW_{ij} = \frac{w_i^j s_j^i}{\sum_{k \neq i} w_i^k s_k^k} .$$

As previously, country  $i$ 's own output and own market shares are excluded from the calculations, so that the weights (for  $j$  to  $k$  countries) sum to one. Countries with a share of their domestic market sales that is small relative to other countries can be regarded as relatively more open, which makes them less important than a calculation based solely on export

<sup>15</sup> See Zanella & Desruelle (1997), p. 29.

shares would indicate. If all countries have the same degree of openness, this weight is the same as the simple export share.

The last component,  $TWX_{ij}$ , represents what is known as the third-country effect (or the double-export weight) and is defined as follows:

$$TXW_{ij} = \frac{\sum_{k \neq i, j} w_i^k s_j^k}{\sum_{k \neq i} w_i^k (1 - s_i^k - s_k^k)}.$$

This component measures the importance of the competition country  $i$  encounters in the form of exports from country  $j$  in all other markets, for example the competition Swedish exporters face from Japan in the German and American markets. The component is calculated as the sum of country  $i$ 's output that is exported to all other countries (except country  $j$ ), taking into account country  $j$ 's share of the total output (in the form of imports from country  $j$ ) that meets total demand in each country. The component is normalised by subtracting the share of demand that is met by a country's domestic output plus imports from country  $i$ .

These components then have to be weighted together with weights that are calculated as follows:

$$\begin{aligned} \lambda_i^M &= \frac{w_i^i (1 - s_i^i)}{\sum_k w_i^k (1 - s_i^k)} \\ \lambda_i^{BX} &= \frac{\sum_{k \neq i} w_i^k s_k^k}{\sum_k w_i^k (1 - s_i^k)} \\ \lambda_i^{TX} &= \frac{\sum_{k \neq i} w_i^k (1 - s_i^k - s_k^k)}{\sum_k w_i^k (1 - s_i^k)}. \end{aligned}$$

These three expressions have the same denominator, which represents the sum of country  $i$ 's shares of output in each country, taking into account the demand in a country that is not met by country  $i$ .

The numerator in  $\lambda_i^M$  can be read as the share of country  $i$ 's output that is sold in its domestic market, taking into account the share of demand that is covered by imports. In this way, the share is closely related to the proportion of total output that is sold in the domestic market. The numerator in  $\lambda_i^{BX}$  is the sum of the shares of output in country  $i$  that are sold to other countries, taking into account each country's total demand for its domestic products. It is then closely related to the exported share of country  $i$ 's total output. The numerator in  $\lambda_i^{TX}$  resembles that in  $\lambda_i^{BX}$ . Both these terms include the sum of the shares of output in country  $i$  that are sold in other countries. They differ in that  $\lambda_i^{TX}$  takes into account each country's share of the total demand that is not covered by either domestic products or by imports from country  $i$ .

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### *Riksbank initiates cooperation with external researchers on exchange rate determinants*

The Riksbank has initiated cooperation with a number of external researchers as a complement to the bank's regular research to make a broader, more in-depth analysis of the development of the Swedish krona and its determinants.

The results of the project will be reported during the second half of 2006. The external researchers recruited to the projects so far are: Nicolas Coeurdacier and Philippe Martin, Université Paris-I-Panthéon-Sorbonne; Richard Friberg and Fredrik Wilander, Stockholm School of Economics; Galina Hale, Yale University; Ethan Kaplan, UC Berkeley and the Institute for International Economic Studies at Stockholm University; Philip Lane, University of Dublin; and Dagfinn Rime, Norges Bank.

### *Commemorative coin issue in 2006*

At its meeting on 24 November 2005 the Executive Board of the Riksbank decided to issue a commemorative coin in 2006 to celebrate the 150th anniversary of the Swedish railway. The coin will be issued in silver with the denomination SEK 200 and in gold with the denomination SEK 2,000.

The design of the commemorative coin will be determined by the General Council. The number of editions, the sales price and the issue timetable for the coin will be set by the Executive Board of the Riksbank.

### *Riksbank exchanges EU payment*

Sweden's EU membership entails monthly contributions to the EU's budget. These payments are made in Swedish kronor by the Swedish government and exchanged into euro in the foreign exchange market by a recipient central bank within the EU. Around the end of the year, the EU amount tends to be unusually large, at the same time as market turnover is often low. For market reasons, therefore, the Riksbank has previously exchanged the EU flow around the end of the year. The payment at the end of 2005/beginning of 2006 amounted to SEK 3,369 billion. The Riksbank again exchanged the krona amount for euro. The transaction has no monetary policy significance. The Riksbank neutralised the effect of the exchange on liquidity in the banking system through an FX-swap.

### *Report on housing finance in the global financial market*

Various factors, such as an increase in the supply of financing opportunities and deregulation of loan markets, have contributed to a decline in costs for both lenders and borrowers in the global housing finance markets over the past ten years. This is revealed in a new report, "Housing finance in the global financial market". The report contains analyses of common development trends and driving forces over the past ten years in the housing finance market for owner-occupied housing in 17 countries, including Sweden.

The report was produced by a working group with participants from 17 central banks and headed by Lars Nyberg, Deputy Governor of the Riksbank. This work has taken place within the framework of the Committee on the Global Financial System, which is a sub-committee of the BIS (Bank for International Settlements). The report is available on the BIS website ([www.bis.org](http://www.bis.org)).

### *Decision on distribution of work within the Executive Board*

The Executive Board of the Riksbank made a decision on 2 February 2006 regarding the division of work between the members of the Board. Following the decision, the division is:

- Stefan Ingves is Governor of the Riksbank.
- Eva Srejber is First Deputy Governor and the Governor's alternate. She is responsible for presenting proposals for regulations regarding asset management.
- Lars Nyberg is Deputy Governor and responsible for presenting proposals for Financial Stability Reports and proposals on measures aimed at ensuring the stability and efficiency of the payment system.
- Kristina Persson is Deputy Governor and responsible for presenting proposals regarding strategic information and communication issues.
- Irma Rosenberg is Deputy Governor and responsible for presenting proposals for Inflation Reports and for decisions concerning monetary and exchange rate policy measures.
- Svante Öberg is Deputy Governor and responsible for presenting proposals regarding fundamentally important opinions and for making decisions in other matters relating to consultation documents.

As before, the Executive Board has collective responsibility for the Bank's activities.

### *The Riksbank's Annual Report 2005*

The Riksbank presented its Annual Report for 2005 to the Riksdag, the Swedish parliament, on 13 February 2006. The Riksbank reported a profit of SEK 3.3 billion. The profit is primarily attributable to interest income from the foreign currency reserve's bond holdings.



The Annual Report describes the changes that have occurred regarding the Riksbank's role in the cash management process during the period 1998-2005. The view of the Riksbank is that this restructuring process has cost just over SEK 500 million more than if the activities during the period 1999-2004 had continued to be managed in the same way as before and subsequently wound up. The change has led to a new, more rational structure for cash management seen from an economic perspective.

### *General Council's decision on allocation of net income*

The General Council of the Riksbank has, in accordance with the Sveriges Riksbank Act, presented a proposal to the Riksdag (the Swedish parliament) regarding the allocation of the Riksbank's net income for the financial year 2005. The General Council has proposed that SEK 5.3 billion be transferred to the Treasury.

According to the current guidelines, 80 per cent of the average income – after certain adjustments but before appropriations – over the past five years shall be transferred to the Treasury. A detailed account regarding the calculation of the allocation of profits is given in the written report containing the proposal for the allocation of the Riksbank's profits for the financial year 2005 and the General Council's account of activities for 2005 (2005/06:RB2).

### *Pernilla Meyersson new Director of Communications*

At its meeting on 17 February 2006, the Executive Board of the Riksbank appointed Pernilla Meyersson new Director of Communications. Pernilla Meyersson succeeds Leif Jacobsson, who will take up a post as adviser in the Secretariat of the Executive Board at the Riksbank.

Pernilla Meyersson first came to the Riksbank in 1996 and has most recently held a post as head of division in the Monetary Policy Department. She has previously worked as a journalist at Swedish Radio, on the Eko news programme, and at the business newspaper Affärsvärlden. Pernilla Meyersson takes up her new post on 13 March.

### *Riksrevision's scrutiny of the Riksbank's Annual Report 2005*

Riksrevisionen (the State Audit Institution) examines the Riksbank's annual accounts and annual report every year. The Riksbank has received Riksrevisionen's audit report of the bank's Annual Report 2005. The audit report was in the standard format, which means that Riksrevisionen has found that the Annual Report essentially provided a true and fair picture of the bank's activities. Riksrevisionen has also recommended that the management of the Riksbank be discharged from liability. The report can be downloaded in full (in Swedish) from Riksrevisionen's website ([www.riksrevisionen.se](http://www.riksrevisionen.se)).

### *Decision on three Inflation Reports a year*

At its meeting on 9 March 2006, the Executive Board of the Riksbank decided that in future three Inflation Reports would be published a year instead of the current four. The number of monetary policy meetings would not be affected; there would normally be seven or eight of these per year.

Besides providing a basis for monetary policy decisions, the Inflation Report aims to spread awareness of the Riksbank's assessments to a wider public, so that monetary policy is easier for outsiders to follow and understand. The reports are also intended to encourage a discussion on monetary policy issues.

### *Riksbank introduces new, more secure 50-krona and 1,000-krona banknotes*

On 15 March 2006, the Riksbank introduced new, more secure 50-krona and 1,000-krona banknotes. The new banknotes have largely the same appearance as the older versions, but are equipped with several new security features making them more difficult to counterfeit. The older versions of these banknotes will continue to be legal tender.

The new 1,000-krona banknote contains a security feature known as "motion". When the banknote is tilted, the picture in the striped band appears to move. In addition, both the 50-krona and 1,000-krona banknote have been equipped with a foil strip and see-through picture. Further information can be found on the Riksbank's web site ([www.riksbank.se](http://www.riksbank.se)).

## ■ Monetary policy calendar

- 2002-03-18 The *repo rate* is increased by the Riksbank from 3.75 per cent to 4.0 per cent as of 20 March 2002. The *deposit rate* is accordingly adjusted to 3.25 per cent and the *lending rate* to 4.75 per cent.
- 04-25 The *repo rate* is increased by the Riksbank from 4.0 per cent to 4.25 per cent as of 2 May 2002. The *deposit rate* is accordingly adjusted to 3.5 per cent and the *lending rate* to 5.0 per cent.
- 06-28 The *reference rate* is confirmed by the Riksbank at 4,5 per cent for the period 1 July 2002 to 31 December 2002.
- 11-15 The *repo rate* is lowered by the Riksbank from 4.25 per cent to 4.0 per cent as of 20 November 2002. The *deposit rate* is accordingly set at 3.25 per cent and the *lending rate* to 4.75 per cent.
- 12-05 The *repo rate* is lowered by the Riksbank from 4.0 per cent to 3.75 per cent as of 11 December 2002. The *deposit rate* is accordingly set at 3.0 per cent and the *lending rate* to 4.5 per cent.
- 2003-01-01 The *reference rate* is confirmed by the Riksbank at 4.0 per cent for the period 1 January 2003 to 30 June 2003.
- 03-17 The Riksbank decides to lower the *repo rate* from 3.75 per cent to 3.50 per cent, to apply from 19 March 2003. Furthermore, the Riksbank decides that the *deposit* and *lending rates* shall be adjusted to 2.75 per cent and 4.25 per cent respectively.
- 06-05 The Riksbank decides to lower the *repo rate* from 3.50 per cent to 3.00 per cent, to apply from 11 June 2003. Furthermore, the Riksbank decides that the *deposit* and *lending rates* shall be adjusted to 2.25 per cent and 3.75 per cent respectively.
- 06-30 The *reference rate* is confirmed by the Riksbank at 3.0 per cent for the period 1 July 2003 to 31 December 2003.
- 07-04 The Riksbank decides to lower the *repo rate* from 3.0 per cent to 2.75 per cent, to apply from 9 July 2003. Furthermore, the Riksbank decides that the *deposit* and *lending rates* shall be adjusted to 2.00 per cent and 3.50 per cent respectively.

- 2004-01-01 The *reference rate* is confirmed by the Riksbank at 3.0 per cent for the period 1 January 2004 to 30 June 2004.
- 02-06 The Riksbank decides to lower the *repo rate* from 2.75 per cent to 2.50 per cent, to apply from 11 February 2004. Furthermore, the Riksbank decides that the *deposit* and *lending rates* shall be adjusted to 1.75 per cent and 3.25 per cent respectively.
- 03-31 The Riksbank decides to lower the *repo rate* from 2.50 per cent to 2.00 per cent, to apply from 7 April 2004. Furthermore, the Riksbank decides that the *deposit* and *lending rates* shall be adjusted to 1.25 per cent and 2.75 per cent respectively.
- 06-30 The *reference rate* is confirmed by the Riksbank at 2.0 per cent for the period 1 July 2004 to 31 December 2004.
- 2005-01-01 The *reference rate* is confirmed by the Riksbank at 2.00 per cent for the period 1 January 2005 to 30 June 2005.
- 06-20 The Riksbank decides to lower the *repo rate* from 2.00 per cent to 1.50 per cent, to apply from 22 June 2005. Furthermore, the Riksbank decides that the *deposit* and *lending rates* shall be adjusted to 0.75 per cent and 2.25 per cent respectively.
- 06-30 The *reference rate* is confirmed by the Riksbank at 1.50 per cent for the period 1 July 2005 to 31 December 2005.
- 2006-01-01 The *reference rate* is confirmed by the Riksbank at 1.50 per cent for the period 1 January 2006 to 30 June 2006.
- 01-19 The Riksbank decides to increase the *repo rate* from 1.50 per cent to 1.75 per cent, to apply from 25 January 2006. Furthermore, the Riksbank decides that the *deposit* and *lending rates* shall be adjusted to 1.00 per cent and 2.50 per cent respectively.
- 02-22 The Riksbank decides to increase the *repo rate* from 1.75 per cent to 2.00 per cent, to apply from 1 March 2006. Furthermore, the Riksbank decides that the *deposit* and *lending rates* shall be adjusted to 1.25 per cent and 2.75 per cent respectively.



## ■ Statistical appendix

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Statistics from Sveriges Riksbank are to be found on the Internet ([www.riksbank.se](http://www.riksbank.se)). Dates of publication of statistics regarding the Riksbank's assets and liabilities including foreign exchange reserves plus financial market and the balance of payments statistics are available on the website of the International Monetary Fund (IMF) ([dsbb.imf.org](http://dsbb.imf.org)). Dates of publication are also available on [www.riksbank.se](http://www.riksbank.se).



# 1 Riksbank's assets and liabilities

## ASSETS. PERIOD-END STOCK FIGURES. SEK MILLION

		Gold	Lending to banks	Fixed assets	Other	Total
2004	July	17 718	10 635	153 528	2 897	184 778
	Aug	17 718	10 801	150 035	2 800	181 354
	Sept	18 095	10 269	150 885	2 718	181 967
	Oct	18 095	10 405	147 908	2 807	179 215
	Nov	18 095	11 063	150 093	2 706	181 957
	Dec	17 392	17 002	145 256	5 935	185 585
2005	Jan	16 436	11 101	145 391	5 725	178 653
	Feb	15 952	10 210	147 097	5 575	178 834
	March	16 558	12 016	148 366	5 503	182 443
	April	16 558	11 042	155 500	5 858	188 958
	May	16 558	11 286	152 090	5 966	185 900
	June	18 730	4 955	165 709	3 158	192 552
	July	18 730	5 346	166 846	3 370	194 292
	Aug	18 730	4 781	167 749	3 107	194 367
	Sept	19 845	4 937	162 401	3 245	190 428
	Oct	19 729	5 194	163 605	3 359	191 887
	Nov	19 642	5 440	164 246	3 317	192 645
	Dec	22 235	9 601	173 158	3 594	208 588
2006	Jan	22 090	4 101	164 472	3 415	194 078
	Feb	21 916	3 521	168 897	3 256	197 590

## LIABILITIES. PERIOD-END STOCK FIGURES. SEK MILLION

		Notes and coins in circulation	Capital liabilities	Debts to monetary policy counterparties	Debts in foreign currency	Other	Total
2004	July	102 747	65 317	37	10 883	5 794	184 778
	Aug	102 979	65 317	280	6 821	5 957	181 354
	Sept	102 670	65 317	79	8 900	5 001	181 967
	Oct	102 821	65 317	25	5 326	5 726	179 215
	Nov	103 297	65 317	101	6 557	6 685	181 957
	Dec	108 894	65 317	613	7 448	3 313	185 585
2005	Jan	104 438	65 317	36	5 817	3 045	178 653
	Feb	103 557	65 317	94	6 453	3 413	178 834
	March	104 269	65 317	640	3 021	9 196	182 443
	April	103 876	65 317	31	10 138	9 596	188 958
	May	103 760	65 317	378	6 490	9 955	185 900
	June	105 489	55 813	153	5 421	25 676	192 552
	July	106 024	55 813	205	6 730	25 520	194 292
	Aug	105 600	55 813	117	6 864	25 973	194 367
	Sept	105 884	55 813	43	5 490	23 198	190 428
	Oct	106 063	55 813	17	6 367	23 627	191 887
	Nov	106 631	55 813	37	6 398	23 766	192 645
	Dec	111 075	55 813	250	12 956	28 494	208 588
2006	Jan	105 864	55 813	772	2 797	28 832	194 078
	Feb	105 083	55 813	47	6 785	29 862	197 590



## 2 Money supply

### END-OF-MONTH STOCK

		SEK million		Percentage 12-month change		
		M0	M3	MO	M3	
2003	Jan	90 122	1 085 994	Jan	0.4	5.3
	Feb	90 505	1 072 732	Feb	2.9	5.7
	March	91 966	1 092 435	March	2.2	5.8
	April	92 334	1 095 256	April	4.1	4.4
	May	92 346	1 097 622	May	4.0	7.0
	June	92 296	1 106 661	June	3.3	5.0
	July	91 608	1 090 284	July	3.4	5.1
	Aug	93 324	1 109 725	Aug	3.8	5.5
	Sept	92 451	1 113 021	Sept	3.2	4.9
	Oct	92 364	1 114 967	Oct	3.2	6.0
	Nov	93 070	1 107 251	Nov	2.9	3.6
	Dec	98 481	1 119 288	Dec	2.7	3.1
2004	Jan	93 087	1 109 798	Jan	3.3	2.2
	Feb	92 465	1 117 521	Feb	1.0	4.2
	March	92 399	1 116 429	March	0.5	2.2
	April	92 653	1 130 152	April	0.3	3.2
	May	93 032	1 132 356	May	0.7	3.2
	June	94 732	1 115 315	June	2.6	0.8
	July	92 962	1 115 774	July	1.5	2.3
	Aug	94 355	1 126 201	Aug	1.1	1.5
	Sept	93 992	1 147 965	Sept	1.7	3.1
	Oct	93 657	1 149 198	Oct	1.4	3.1
	Nov	95 163	1 161 091	Nov	2.2	4.9
	Dec	98 239	1 171 218	Dec	-0.2	4.6
2005	Jan	95 017	1 159 637	Jan	2.1	4.5
	Feb	94 810	1 165 401	Feb	2.5	4.3
	March	95 494	1 156 486	March	3.3	3.6
	April	94 646	1 171 692	April	2.2	3.7
	May	95 314	1 185 822	May	2.5	4.7
	June	96 426	1 220 530	June	1.8	9.4
	July	96 316	1 205 762	July	3.6	8.1
	Aug	96 670	1 196 390	Aug	2.5	6.2
	Sept	96 655	1 212 644	Sept	2.8	5.6
	Oct	97 446	1 246 357	Oct	4.0	8.5
	Nov	97 778	1 244 371	Nov	2.7	7.2
	Dec	100 479	1 286 682	Dec	2.3	9.9

### 3 Interest rates set by the Riksbank

**PER CENT**

	Date of announcement	Effective from	Repo rate	Deposit rate	Lending rate	Period	Reference rate <sup>1</sup>
2003	03-18	03-19	3.50	2.75	4.25	2003:1hä	4.00
	06-05	06-11	3.00	2.25	3.75	2003:2hä	3.00
	07-04	07-09	2.75	2.00	3.50	2004:1hä	3.00
2004	02-06	02-11	2.50	1.75	3.25	2004:2hä	2.00
	03-31	04-07	2.00	1.25	2.75	2005:1hä	2.00
2005	06-21	06-22	1.50	0.75	2.25	2005:2hä	1.50
2006	01-20	01-25	1.75	1.00	2.50	2006:1hä	1.50
	02-23	03-01	2.00	1.25	2.75		

<sup>1</sup> 1 July 2002 the official discount rate was replaced by a reference rate, which is set by the Riksbank at the end of June and the end of December.

### 4 Capital market interest rates

**EFFECTIVE ANNUALIZED RATES FOR ASKED PRICE. MONTHLY AVERAGE. PER CENT**

		Bond issued by:					
		Central Government				Housing institutions	
		2 years	5 years	7 years	10 years	2 years	5 years
2005	Jan	2.62	3.16	3.58	3.84	2.79	3.20
	Feb	2.53	3.10	3.51	3.76	2.70	3.12
	March	2.55	3.20	3.61	3.86	2.73	3.22
	April	2.43	2.97	3.35	3.58	2.61	3.31
	May	2.20	2.72	3.10	3.34	2.35	3.05
	June	1.93	2.44	2.85	3.11	2.06	2.76
	July	1.88	2.40	2.81	3.06	2.01	2.71
	Aug	2.06	2.57	2.93	3.14	2.20	2.87
	Sept	2.06	2.50	2.82	2.98	2.21	2.76
	Oct	2.40	2.87	3.01	3.17	2.33	2.98
	Nov	2.60	3.08	3.22	3.39	2.51	3.20
	Dec	2.76	3.16	3.26	3.37	2.70	3.33
2006	Jan	2.76	3.12	3.21	3.33	2.68	3.30
	Feb	2.74	3.17	3.27	3.42	2.65	3.33

## 5 Overnight and money market interest rates

### MONTHLY AVERAGE. PER CENT

	Repo rate	Interbank rate	Treasury bills			Company certificates		
			3-month	6-month	12-month	3-month	6-month	
2003	Jan	3.75	3.85	3.65	3.64	3.65	3.90	3.88
	Feb	3.75	3.85	3.61	3.53	3.50	3.85	3.79
	March	3.64	3.74	3.40	3.36	3.35	3.64	3.57
	April	3.50	3.60	3.42	3.39	3.40	3.62	3.59
	May	3.50	3.60	3.26	3.14	3.13	3.43	3.37
	June	3.16	3.26	2.80	2.71	2.70	3.03	2.94
	July	2.82	2.92	2.70	2.63	2.68	2.87	2.82
	Aug	2.75	2.85	2.70	2.77	2.86	2.88	2.90
	Sept	2.75	2.85	2.71	2.73	2.91	2.88	2.92
	Oct	2.75	2.85	2.73	2.74	2.92	2.89	2.93
	Nov	2.75	2.85	2.73	2.80	2.93	2.88	2.93
	Dec	2.75	2.85	2.69	2.69	2.84	2.86	2.87
2004	Jan	2.75	2.85	2.60	2.57	2.64	2.77	2.74
	Feb	2.59	2.69	2.46	2.45	2.48	2.59	2.59
	March	2.50	2.60	2.27	2.23	2.28	2.43	2.40
	April	2.10	2.20	2.02	2.05	2.19	2.15	2.18
	May	2.00	2.10	2.00	2.11	2.24	2.15	2.23
	June	2.00	2.10	1.98	2.07	2.38	2.15	2.24
	July	2.00	2.10	1.99	2.03	2.31	2.15	2.24
	Aug	2.00	2.10	2.02	2.13	2.25	2.15	2.25
	Sept	2.00	2.10	2.00	2.13	2.27	2.15	2.26
	Oct	2.00	2.10	1.99	2.10	2.38	2.16	2.27
	Nov	2.00	2.10	1.99	2.06	2.29	2.14	2.25
	Dec	2.00	2.10	1.99	2.05	2.18	2.12	2.16
2005	Jan	2.00	2.10	2.00	2.02	2.10	2.10	2.12
	Feb	2.00	2.10	1.97	1.98	2.04	2.06	2.08
	March	2.00	2.10	1.97	1.99	2.08	2.06	2.07
	April	2.00	2.10	1.99	2.00	2.03	2.06	2.08
	May	2.00	2.10	1.90	1.86	1.86	2.02	2.01
	June	1.85	1.95	1.65	1.62	1.64	1.80	1.78
	July	1.50	1.60	1.48	1.49	1.56	1.60	1.60
	Aug	1.50	1.60	1.48	1.49	1.65	1.61	1.65
	Sept	1.50	1.60	1.47	1.52	1.71	1.62	1.67
	Oct	1.50	1.60	1.49	1.57	1.83	1.68	1.78
	Nov	1.50	1.60	1.51	1.57	1.92	1.68	1.78
	Dec	1.50	1.60	1.69	1.93	2.24	1.68	1.78
2006	Jan	1.56	1.66	1.83	1.96	2.24	1.68	1.78
	Feb	1.75	1.85	1.93	1.97	2.17	1.68	1.78

## 6 Treasury bill and selected international rates

### MONTHLY AVERAGE. PER CENT

		3-month deposits				6-month deposits			
		USD	EUR	GBP	SSVX <sup>1</sup>	USD	EUR	GBP	SSVX <sup>1</sup>
2003	Jan	1.27	2.76	3.88	3.65	1.29	2.69	3.87	3.64
	Feb	1.25	2.63	3.65	3.61	1.25	2.51	3.59	3.53
	March	1.19	2.47	3.56	3.40	1.17	2.39	3.50	3.36
	April	1.22	2.48	3.54	3.42	1.20	2.41	3.48	3.39
	May	1.20	2.35	3.53	3.26	1.16	2.25	3.49	3.14
	June	1.03	2.09	3.55	2.80	1.00	2.02	3.48	2.71
	July	1.04	2.08	3.38	2.70	1.05	2.04	3.37	2.63
	Aug	1.05	2.09	3.43	2.70	1.11	2.12	3.52	2.77
	Sept	1.06	2.09	3.60	2.71	1.10	2.12	3.70	2.73
	Oct	1.08	2.09	3.72	2.73	1.12	2.12	3.87	2.74
	Nov	1.08	2.10	3.88	2.73	1.17	2.17	4.07	2.80
	Dec	1.08	2.09	3.93	2.69	1.15	2.13	4.08	2.69
2004	Jan	1.04	2.03	3.96	2.60	1.10	2.06	4.11	2.57
	Feb	1.03	2.02	4.08	2.46	1.09	2.03	4.19	2.45
	March	1.02	1.97	4.21	2.27	1.07	1.95	4.34	2.23
	April	1.06	1.99	4.30	2.02	1.19	2.01	4.45	2.05
	May	1.16	2.03	4.44	2.00	1.44	2.08	4.63	2.11
	June	1.41	2.06	4.69	1.98	1.72	2.13	4.91	2.07
	July	1.54	2.06	4.77	1.99	1.80	2.13	4.93	2.03
	Aug	1.66	2.06	4.86	2.02	1.87	2.11	4.98	2.13
	Sept	1.85	2.06	4.84	2.00	2.01	2.14	4.93	2.13
	Oct	2.01	2.10	4.80	1.99	2.15	2.13	4.85	2.10
	Nov	2.24	2.12	4.77	1.99	2.42	2.16	4.81	2.06
	Dec	2.44	2.12	4.76	1.99	2.65	2.16	4.78	2.05
2005	Jan	2.60	2.10	4.75	2.00	2.85	2.15	4.77	2.02
	Feb	2.76	2.09	4.79	1.97	2.98	2.13	4.84	1.98
	March	2.95	2.09	4.87	1.97	3.21	2.14	4.95	1.99
	April	3.07	2.08	4.83	1.99	3.31	2.11	4.88	2.00
	May	3.19	2.07	4.78	1.90	3.42	2.08	4.78	1.86
	June	3.36	2.05	4.72	1.65	3.54	2.05	4.69	1.62
	July	3.56	2.08	4.56	1.48	3.78	2.09	4.47	1.49
	Aug	3.74	2.09	4.50	1.50	3.96	2.10	4.49	1.49
	Sept	3.84	2.09	4.50	1.47	3.98	2.11	4.47	1.52
	Oct	4.11	2.14	4.49	1.49	4.29	2.21	4.48	1.57
	Nov	4.29	2.31	4.53	1.51	4.49	2.44	4.54	1.57
	Dec	4.43	2.42	4.56	1.69	4.61	2.54	4.53	1.93
2006	Jan	4.57	2.45	4.50	1.83	4.69	2.60	4.49	1.96
	Feb	4.69	2.54	4.49	1.93	4.86	2.67	4.48	1.97

<sup>1</sup> Treasury bills.

## 7 Krona exchange rate: TCW index and selected exchange rates

### MONTHLY AVERAGE

		TCW index	SEK				
			EUR	GBP	USD	JPY	CHF
2003	Jan	130.9609	9.1775	13.9590	8.6386	0.0727	6.2767
	Feb	129.7272	9.1499	13.6813	8.4930	0.0711	6.2358
	March	130.3167	9.2221	13.5031	8.5298	0.0720	6.2777
	April	128.9566	9.1585	13.2756	8.4370	0.0704	6.1248
	May	127.1076	9.1541	12.8520	7.9229	0.0676	6.0426
	June	126.3154	9.1149	12.9638	7.8108	0.0660	5.9211
	July	127.6987	9.1945	13.1295	8.0807	0.0681	5.9417
	Aug	128.9600	9.2350	13.2074	8.2825	0.0697	5.9957
	Sept	126.7679	9.0693	13.0143	8.0861	0.0703	5.8616
	Oct	125.3358	9.0099	12.9077	7.6966	0.0703	5.8195
	Nov	125.2370	8.9908	12.9783	7.6831	0.0703	5.7642
	Dec	124.3958	9.0169	12.8514	7.3632	0.0682	5.8001
2004	Jan	125.3707	9.1373	13.1985	7.2493	0.0681	5.8343
	Feb	125.9654	9.1814	13.5574	7.2599	0.0682	5.8367
	March	127.6783	9.2305	13.7500	7.5243	0.0694	5.8922
	April	127.6519	9.1711	13.7941	7.6501	0.0711	5.9008
	May	126.7383	9.1312	13.5751	7.6061	0.0679	5.9248
	June	127.0144	9.1422	13.7711	7.5332	0.0688	6.0193
	July	127.3590	9.1954	13.8041	7.4931	0.0685	6.0222
	Aug	127.3415	9.1912	13.7313	7.5444	0.0683	5.9753
	Sept	125.7140	9.0954	13.3500	7.4484	0.0677	5.8943
	Oct	124.8272	9.0610	13.1085	7.2557	0.0666	5.8730
	Nov	123.3656	9.0036	12.8863	6.9390	0.0662	5.9155
	Dec	122.4392	8.9786	12.9405	6.7030	0.0646	5.8495
2005	Jan	123.7464	9.0538	12.9620	6.8996	0.0668	5.8527
	Feb	124.4271	9.0839	13.1666	6.9778	0.0665	5.8614
	March	124.2160	9.0860	13.1189	6.8755	0.0654	5.8669
	April	125.8007	9.1650	13.4189	7.0796	0.0660	5.9230
	May	126.6878	9.1942	13.4357	7.2482	0.0679	5.9511
	June	129.1463	9.2585	13.8466	7.6079	0.0700	6.0170
	July	130.9115	9.4284	13.7113	7.8281	0.0699	6.0507
	Aug	129.3670	9.3426	13.6266	7.6002	0.0687	6.0158
	Sept	129.6486	9.3367	13.7798	7.6215	0.0686	6.0279
	Oct	131.0017	9.4231	13.8250	7.8368	0.0683	6.0845
	Nov	133.2427	9.5663	14.0761	8.1082	0.0685	6.1906
	Dec	131.1811	9.4372	13.8967	7.9524	0.0671	6.0984
2006	Jan	128.9783	9.3180	13.5773	7.6951	0.0667	6.0131
	Feb	129.6175	9.3405	13.6678	7.8190	0.0664	5.9948

Note. The base for the TCW index is 18 November 1992. TCW (Total Competitiveness Weights) is a way of measuring the value of the krona against a basket of other currencies. TCW is based on average aggregate flows of processed goods for 21 countries. The weights include exports, imports and "third country" effects.

## 8 Nominal effective TCW exchange rate

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Note: TCW (Total Competitiveness Weights) is a way of measuring the value of the Swedish krona against a basket of other currencies. TCW is based on average aggregate flows of processed goods for 21 countries. The weights include imports, exports and "third country" effects.

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