

## Eva Srejber: How the Riksbank's financial assets are managed

Speech by Ms Eva Srejber, First Deputy Governor of the Sveriges Riksbank, at the Handelsbanken, Stockholm, 25 April 2006.

References and diagrams to the speech can be found on the Sveriges Riksbank website, [www.riksbank.com](http://www.riksbank.com).

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Let me begin by thanking you for the invitation to come here and speak about the Riksbank's financial asset management. The reason that I wish to take up this question is that, as you know, we recently changed the currency allocation in our foreign exchange reserve. This change is part of the general review of financial asset management that has been under way at the Riksbank for some time. In order to avoid any confusion with regard to what lies behind overall changes in our financial asset composition, it is important to explain the principles for our asset management.

On a general plane, the Riksbank does not differ from other asset managers. Like them, we endeavour to generate earnings for our owner, in our case the general government. It is instead the way our management is limited that makes the Riksbank, like other central banks, different. Central banks exist ultimately to carry out a number of tasks crucial to the economy, which are linked to monetary and exchange rate policy and the functioning of the payment system. For us at the Riksbank it means that we are to ensure that inflation is low and to promote the safe and efficient functioning of the payment system. Both of these tasks make far-reaching demands on how our assets should be managed.

In concrete terms, it means that I and my colleagues on the Executive Board must achieve a balance between the requirements our task place on asset management and the goal of generating earnings. In this balance it is obvious that the possibility to carry out our statutory tasks takes precedence. Earnings are only taken into account if they are attained without jeopardising the Riksbank's central policy functions. The result of this balance is perhaps most easily described with the aid of the Riksbank's balance sheet (see Figure 1).

### The Riksbank's balance sheet

Our financial assets are dominated by foreign government bonds<sup>1</sup>, which can be sold if necessary to intervene in the foreign exchange market. In other words, these assets have a direct link to our task concerning monetary and foreign exchange policy. Historically, the gold holding has been justified for similar reasons. However, nowadays it has become more common to regard gold as a financial asset like any other. This also applies to the Riksbank, whose gold holding partly is adapted according to its contribution to the diversification of the total asset portfolio<sup>2</sup>. This adjustment is made within the framework of an agreement with other central banks<sup>3</sup>. Other important assets are monetary policy repos, which comprise a central part of the steering interest rate system<sup>4</sup>. For earnings reasons, part of the repo transactions has been extended by means of FX swaps<sup>5</sup>.

The Riksbank has the sole right to issue banknotes and coins in kronor. This comprises the single largest item on the liability side of the balance sheet. The size of this item is governed entirely by the general public's demand for cash.

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<sup>1</sup> The currency assets in the foreign exchange reserve are invested in foreign fixed-income securities. Just over 90 per cent of the capital is invested in government bonds and the remainder in US agencies.

<sup>2</sup> For further reading on the role of the gold reserve, see Henriksson (2002).

<sup>3</sup> With the aim of counteracting a fall in gold prices, 15 European central banks agreed in September 1999 that they would regulate the sale of their gold holdings during a five-year period. This agreement was renewed in 2004.

<sup>4</sup> For a detailed survey of the Riksbank's steering interest rate system, see Otz (2005).

<sup>5</sup> This works by means of the Riksbank selling kronor for euro on the spot market and investing the euro on deposit. At the same time, a forward agreement is made to repurchase the kronor up to six months later. Forward agreements are signed to eliminate currency risks. The average duration in the swap portfolio should be three months.

We also need our own capital in order to cover losses that may arise in our activities. This capital should be sufficiently large to cover losses that might arise if the Riksbank needed to provide emergency liquidity assistance in connection with a bank crisis. As we, like most other financial institutions, regularly market value our financial assets, we also need to have capital to cover losses that may arise in the day-to-day management of these assets. Finally, we need capital that reflects assets, whose purpose is to generate income to pay the day-to-day running of the bank, that is, wages, property costs, etc<sup>6</sup>.

This quick survey of the balance sheet shows that it is consideration of the Riksbank's various tasks that is the most important explanatory factor behind the focus of our asset management. It is only when we have reasonably ensured that we can carry out these tasks that we take financial risks in order to generate earnings. In the following I shall describe in more detail how this balance is attained. In practice it is a question of the Riksbank's exposure to three different types of risk; currency risk, interest rate risk and credit risk.

## Currency risk

Currency risk is by far the largest risk in our balance sheet. It arises when the krona appreciates or depreciates in relation to the currencies in the foreign exchange reserve. This means that the Riksbank's profit and loss account and balance sheet are valued in kronor. An appreciation of the krona reduces the value of our foreign exchange reserve and a depreciation increases it. When the krona appreciates it is thus a negative event to the extent that it leads to exchange losses that are booked in the Riksbank's balance sheet. If these losses are too large, there is a risk that they must be covered by the capital the Riksbank has allocated for use in potential financial crises and to cover the Bank's day-to-day operations. There is therefore reason to limit the impact of a krona appreciation on the Riksbank's results. However, the possibility to do so is limited by the fact that we must have currency assets in order to intervene in the foreign exchange market.

The need for intervention capacity in the form of foreign assets is determined by the prevailing exchange rate regime. Under a fixed exchange rate regime the central bank may need to intervene relatively often, which means that the need for intervention assets is considerable. This need is usually much lower with a floating exchange rate regime<sup>7</sup>. However, according to law, the Riksbank must be able to implement the exchange rate regime that the Government has stipulated for the krona, regardless of whether this is fixed or floating. This means that the currency holding is ultimately determined by the needs of a fixed exchange rate regime. At present, however, we have a floating exchange rate regime, which gives us scope to limit the currency risk. We do this by ensuring that our holdings of the important intervention currencies, i.e. euro and US dollar, are no larger than can be justified for reasons of intervention or diversification. Diversification is the possibility we have to reduce the currency risk. The assumption of the diversification is that the covariation between individual assets' price movements is not always perfectly positive. This means that a portfolio's total movement, that is, volatility, will be less. In connection with large movements in the foreign exchange market, an overly narrow currency composition might lead to large declines in value, which could in turn lead to a heavy fall in capital.

Given this, we quite simply try to achieve a currency allocation that will minimise the currency risk measured in Swedish kronor, given the currencies we can hold and given our intervention need. Our choice is based on a quantitative analysis using fundamental and standard portfolio theory<sup>8</sup>. Our analysis does not take into account the expected earnings in currency, but merely the currencies' estimated volatility and mutual correlations. The result of our analysis is illustrated in the following diagram (see Figure 2).

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<sup>6</sup> This and other questions regarding the Riksbank's need to have its own capital are discussed in Ernhagen, Vesterlund & Viotti (2002).

<sup>7</sup> For a more detailed discussion of the Riksbank's intervention policy, see Heikensten & Borg (2002).

<sup>8</sup> This refers to what is known as the mean-variance analysis that was originally produced by Harry M. Markowitz in the 1950s. Because of the sensitivity of this model, the analysis is supplemented by Value-at-Risk calculations, risk contribution analyses and stress tests. Value-at-Risk is an estimate of potential loss risk and is defined as the largest expected decline in value of an asset, or an asset portfolio, with a specific probability and over a specific period of time.

As you can see, our largest holding is in euro. This is not surprising, as the relationship between the euro and the krona has remained relatively stable. Historically, the currency risk attributable to our euro holding has thus been less than that attributable to other currencies in the reserve. The dollar, on the other hand, has been one of the highest risk currencies. The fact that we nevertheless have a relatively large dollar exposure is due to its importance as intervention currency.

It is reasonable to wonder why we do not choose to convert some of the currency assets into Swedish assets as long as we have a floating exchange rate regime. In this way the currency risk on these assets would disappear completely. In practice, however, this is not so easy as such a conversion would mean that we intervened in the foreign exchange market. In addition, when and if the Government decides that the krona should be part of a fixed exchange rate regime, we would be forced to intervene again to build up the foreign exchange reserve. We would then sell kronor to buy currencies, which would mean that we acted in a way that weakened the krona prior to transition to a fixed exchange rate regime. This is not the way to proceed.

Of course currency risk is a problem, but this applies mainly in the short term. We shall of course do what we can to limit this risk, but it should be remembered that our currency holding is long term and in this perspective currency exposure is probably a minor problem. As monetary policy in the countries whose currencies are included in the reserve is similar to that in Sweden, it is in principle only real economic differences that lead to any trend changes in exchange rates. If the economies of these countries develop similarly, it is thus reasonable to assume that short-term fluctuations will offset one another over a longer period of time<sup>9</sup>. The diagram below shows that empiric evidence supports this reasoning (see Figure 3).

At the same time, there is a clear advantage to keeping these assets in other currencies than the krona. Namely that they provide us with an opportunity to manage our assets actively in an entirely different way than would be possible if they were invested in kronor. This is because changes in the holdings could be perceived as monetary policy signals and because the size of our holding would mean that changes could upset the markets.

## Credit risk

One purpose of the method we use to determine the currency allocation is to limit the need for very liquid assets, for earnings reasons. It is not possible to exclude these assets entirely. This is because we need very liquid assets in the important intervention currencies if we are to be able to intervene. A fairly large part of our assets must therefore consist of US and European government bonds. As I mentioned earlier, our need of this type of asset is limited under the current exchange rate regime. This gives us scope to invest some of our assets in securities with credit risks<sup>10</sup>, which provide higher interest. Assuming that the assets' yield does not covary perfectly, this can raise the risk-adjusted earnings<sup>11</sup>. However, the Riksbank's possibilities to make use of this are limited, as we currently invest solely in fixed-income securities. The covariation between different fixed-income securities is relatively high, regardless of whether they contain different degrees of credit risk. It should also be emphasised that an investment in credit bonds makes considerable demands of risk management, analysis and capital adequacy, in addition to that captured in risk measures such as volatility calculated on historical earnings. It is therefore also important to maintain a high degree of diversification within the credit risk segment by spreading investment over several different issuers and sectors.

Our internal regulations give us relatively large scope to choose between different fixed-income asset types. Given that there is a secure legal basis and good risk management, we may invest in most types, from government bonds to corporate bonds. However, the holdings of government bonds should never be lower than 50 per cent of the total value of the assets. The upper limit for holding individual asset types with credit risks is also relatively low. For instance, corporate bonds should not comprise more than 10 per cent of the total asset value. Furthermore, our internal regulations make strict demands regarding credit rating.

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<sup>9</sup> See, for instance, Dimson, Marsh & Staunton (2005), who studied exchange rate effects over long time horizons.

<sup>10</sup> In this respect, credit risk means the risk that the issuer will default on payment of the debt issued.

<sup>11</sup> Risk-adjusted earnings here refer to the earnings on an investment in relation to its risks. Higher risk-adjusted earnings can thus be attained either through the earnings increasing while maintaining the same risk or by the risk declining while maintaining the same earnings.

So far, however, we have used the opportunity to increase credit risk very sparingly by investing a small part of the foreign exchange reserve in US agencies, that is, bonds issued by US institutions with direct and indirect links to the US government<sup>12</sup>.

### Interest rate risk

As with credit risk, the Riksbank can use interest rate risk to increase the expected earnings on its assets. Interest rate risk arises through changes in the yield curve, which is comprised of market rates for different durations. An analysis of this curve usually focuses on three factors; parallel shift, slope and curvature<sup>13</sup>. A parallel shift entails the entire yield curve moving up or down in a parallel manner. As such shifts have historically explained the largest part of the variation in the yield curve, many asset managers' choice of interest rate exposure focuses on different measures linked to these shifts. This includes the Riksbank, which on a strategic level governs the interest rate risk with the aid of the modified duration measure<sup>14</sup>.

The discussion of the choice of duration is often based on the assumption that the yield curve slopes upwards<sup>15</sup>. The interest rate is thus expected to increase with the duration. By choosing a longer duration, investors can expect to obtain higher earnings on their investments. At the same time, the risk increases, as the volatility of the earnings usually increases with the length of the duration. This means that a longer duration is connected with larger fluctuations in a portfolio's market value and earnings.

The choice of duration for a portfolio is simplified if the investor has a clear investment horizon. For instance, it is natural for pension funds and life assurance companies with long debt commitments to invest in bonds with a duration corresponding to their debt. In this way they try to immunise the market risk by allowing assets and liabilities to have the same sensitivity to interest rates. This means that a change in interest rates that leads to the debts increasing in value will be neutralised by a corresponding increase in the value of the assets. An investor that lacks this type of natural investment horizon must seek alternative points of departure when choosing duration. The relationship between risk and earnings then becomes a reasonable point of departure. This applies to the Riksbank, as we do not have any fixed-income liabilities.

My colleagues and I must therefore consider how to achieve a balance between risk and earnings. If the purpose is to avoid negative effects on the results in all situations, it would be logical to base the duration on the accounting period, which in our case is one year. Then the actual result would be close to the forecast result. However, this type of short-term investment strategy is at the cost of both increased reinvestment risk<sup>16</sup> and lower expected earnings. As a public authority under parliament, we have instead assumed that the general government prefers long-term good earnings at the cost of larger, short-term fluctuations in the annual result.

This type of long-term perspective in our assets enables us to avoid paying the extra liquidity premiums that market agent appear willing to pay for fixed-income securities with a shorter duration. Given this, the Executive Board has decided that the total fixed-income investment should have a modified duration of 4.00. This choice is based on a consideration where the price risk<sup>17</sup> is not assessed to offer a threat to the capital.

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<sup>12</sup> The Riksbank invests in the following institutions: Tennessee Valley Authority and the mortgage institutions Federal Home Loan Bank, Fannie Mae and Freddie Mac.

<sup>13</sup> Changes in the slope mean that the yield curve becomes steeper or flatter when the long or short end of the curve moves. Changes in curvature involve the long and short ends moving in the same direction, while the middle segment of the curve moves in the opposite direction or remains unchanged. For a detailed description of the yield curve, see for instance Golub & Tilman (2000).

<sup>14</sup> Modified duration is a linear description of the relationship between a bond portfolio's market value and interest rates.

<sup>15</sup> Although the yield curve normally slopes upwards, it would be risky to take this for granted. During different period of time, parts of the yield curve have been both horizontal and downward sloping.

<sup>16</sup> Reinvestment risk arises when capital is to be invested over several periods, as the reinvestment interest rate during the later periods is not known now. By investing assets with the same duration as the accounting period, one is only exposed to reinvestment risk and the annual result will be known at the beginning of the year (this applies to assets without credit risk).

<sup>17</sup> The risk of interest rates, and thereby bond prices, developing unfavourably and thereby having a direct impact on the results. This risk increases with the length of the average duration of the investments.

## Summary

To summarise, the decisions I and my colleagues make regarding the focus of the Riksbank's financial asset management ensure that the management complies with the Riksbank's statutory tasks as well as providing good earnings. These tasks require us to hold US and European government bonds to enable us to intervene in the foreign exchange market if necessary. However, we must also limit the financial risk in order to protect the capital allocated to cover potential losses in connection with a financial crisis. We try to limit currency risk, which is the entirely dominant financial risk, by choosing a currency allocation that keeps the fluctuations, as measured in Swedish kronor, low.

We endeavour to meet the requirement to generate good earnings by taking credit and interest rate risks and making use of diversification effects in order to reduce any negative impact from these risks.

By investing in asset types with credit risk, that is, other fixed-income securities than government bonds, we can increase the risk-adjusted earnings on our investments. This is partly because the actual earnings on assets with credit risk can be higher and partly because the earnings on different types of asset do not usually covary perfectly. When choosing the level of interest rate risk, we have given priority to long-term good earnings over small, annual negative effects on results. The fact that we have chosen to accept some interest rate risk and credit risk is because these are not of the same order as currency risk and thereby do not comprise the same direct threat to capital as currency exposure.

All in all, we are driven by the same fundamental endeavours as other asset managers, namely to generate earnings for our owners. The major difference concerns the limitations that our statutory tasks entail for our asset management activities.

Thank you.