RIKSGÄLDS KONTORET
THE SWEDISH NATIONAL DEBT OFFICE

2004:1

Central Government Borrowing:

Forecast and Analysis

Larger borrowing requirement

The Swedish central government borrowing requirement in 2004 is expected to reach SEK 68 billion, which is equivalent to about 2.5 per cent of Gross Domestic Product (GDP). This forecast implies a deterioration of SEK 12 billion compared to our estimate in October. This deterioration is mainly due to lower tax revenues.

During 2004, the borrowing requirement will be funded to a greater extent than previously by Treasury bills. This means that the issue volume of bonds will remain at SEK 4 billion every two weeks, despite a higher borrowing requirement. Depending on the development of the borrowing requirement and the duration of the debt, a slight reduction in volume may be considered. Our projection of the borrowing requirement and the duration of the debt in the months ahead will determine the course of action. In March we will introduce a new five-year bond loan and in September a new ten-year loan.

Demand for inflation-linked bonds is good, and we will thus continue to issue such bonds at the current pace of about SEK 20 billion per year. Since the beginning of 2004, it has also been possible for private individuals and small investors to buy inflation-linked bonds via the Internet directly at the Debt Office's auctions.

Inflation-linked bonds have unique risk characteristics and are consequently treated by most asset managers as a separate asset class. One of the articles in this issue analyses inflation-linked bonds from a portfolio perspective. According to its findings, a portfolio of equities and nominal bonds that is supplemented with inflation-linked bonds provides a higher expected return at the same risk level as a portfolio only containing equities and nominal bonds. Conversely, the same expected return can be achieved with lower risk-taking if inflation-linked bonds are included in the portfolio.

The Debt Office pursues active management of the foreign currency debt. This means that we take positions in international fixed income and foreign exchange markets. During 2003, these operations yielded a gain of about SEK 900 million, which helped lower the interest expenses of the Swedish central government. Also viewed over a five- or ten-year horizon, our foreign currency management has yielded positive results. An article in this issue describes the Debt Office's active management.

In the guidelines for 2004, the Government removed the rule on how large a percentage of the debt could fall due within twelve months. It was not considered needed to manage central government debt risks. Instead we have a mandate to measure the debt's Cost-at-Risk. This measure captures the risk of increases in the costs of the government debt. A large share of maturing loans increases the risk, but Cost-at Risk also detects the risk of a large share of foreign currency debt. The last article in this first Central Government Borrowing report of 2004 discusses the Cost-at-Risk measure.

Thomas Franzén
Director General

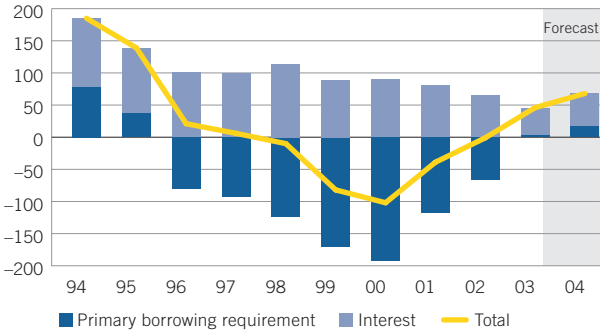
The central government borrowing requirement

The Swedish National Debt Office's revised forecast of the borrowing requirement in 2004 indicates a deficit in central government payments of SEK 68 billion, which is SEK 12 billion more than in the October forecast. The increased borrowing requirement is largely explained by weaker expected tax revenues than previously forecasted.

Because of Sweden's low economic growth rate during 2003, combined with a slower than expected cyclical recovery, central government finances have proved weaker than previously estimated. The deterioration is mainly due to smaller tax revenues. Only minor adjustments have been made among disbursements. The trend towards shrinking sickness benefit disbursements, which was apparent during the second half of 2003, has stabilised around the lower level. For the first time since 1997, sickness benefit payments are now projected to decline on an annual basis. The decrease is relatively small, however, considering that sickness benefit payments have climbed in nominal terms by 65 per cent since 1997.

Central government borrowing requirement, 1994–2004

SEK billion



Forecast for 2004

The central government is expected to run a payments deficit of SEK 68 billion, which is SEK 12 billion more than in our previous forecast. Although an economic upturn is expected during 2004, the borrowing requirement will rise compared to 2003. Adjusted for nonrecurring payments, however, central government finances will improve by SEK 8 billion from 2003 to 2004. During 2003, nonrecurring payments reduced the central government borrowing requirement by SEK 30 billion, while in 2004 the borrowing requirement is not affected by nonrecurring payments. A more detailed description of how nonrecurring payments affect the borrowing requirement is found in the section entitled *Borrowing requirement adjusted for nonrecurring payments*. The table contains a summery of forecasts for the borrowing requirement and central government debt, as well as the outcome for 2003.

Central government borrowing requirement and debt, 2003-2004

SEK billion	2003	2004 (forecast)
Primary borrowing requirement	4	17
Interest payments on debt	42	51
Net borrowing requirement	46	68
Debt adjustments	–28	11
Re-evaluation, foreign currency debt etc	–18	6
Short-term investments	7	–7
Change in central government debt	25	72
Debt at year-end	1,229	1,301

The primary borrowing requirement (all central government payments excluding interest on the debt) is estimated at SEK 17 billion. This is SEK 13 billion more than in our October forecast. The larger borrowing requirement is primarily explained by smaller tax revenues. Owing to a lower rate of wage and salary increases and weaker employment, payroll-based taxes will be smaller than we had previously anticipated. Incoming payments of corporate taxes have also been revised downward due to weaker earnings growth. In addition, incoming supplementary and back tax payments to date have been smaller than expected. However, this is expected to be offset to some extent by larger payments later in the spring.

Disbursements for transfer payments and central government consumption are relatively unchanged, compared to the October forecast. However, unemployment payments are expected to rise by SEK 3 billion, due to the weak employment. Sickness benefit disbursements work in the opposite direction. During the second half of 2003, sickness benefit disbursements declined, partly due to the introduction of the third employer-financed sick pay week and lower benefit levels. During early 2004, disbursements stabilised around the lower level prevailing in late 2003. The downward revision means that sickness benefit disbursements on an annual basis are now expected to shrink for the first time since 1997. Compared to the increase of nearly 65 per cent since 1997, however, the decrease is relatively small. The Debt Office's net lending to central government agencies, state enterprises and state-owned companies is projected to total SEK 19 billion. This is SEK 2 billion less than in the October forecast.

According to forecasts from the Swedish National Financial Management Authority (ESV) and the National Institute of Economic Research (NIER), the central government will exceed its budget expenditure ceiling by SEK 5 billion and SEK 3 billion, respectively, if the Government takes no steps to prevent this. Some of the steps that the Government is expected to take are projected to result in savings on a cash-flow basis. We anticipate SEK 2 billion worth of reductions in cash expenditures. In addition, we are assuming that there will be no divestments of state-owned property during 2004. This is SEK 15 billion lower than the Government's estimate in its budget bill, but the same as in our previous forecast and in line with the experiences of recent years, when such divestment revenues have not materialised.

Interest payments on the central government debt will amount to an estimated SEK 51 billion. In principle, this is unchanged from the previous forecast. Compared to the outcome for 2003, it is an increase of SEK 9 billion. The main reason is that premiums on Treasury bond issues are decreasing and that capital losses associated with buy-backs are increasing. These capital losses are a result of the introduction of three new bond loans during 2004. These introductions will occur through exchanges, with old bonds being bought back and new ones being issued. The buy-backs will give rise to capital losses, since the buy-back loans are traded at a premium. At the same time, new loans will be issued that have a coupon more in parity with current market interest rates.

Sensitivity analysis

All forecasts include elements of uncertainty. The Debt Office does not produce any overall uncertainty analysis for the borrowing requirement, but presents a partial analysis of the impact on the borrowing requirement that changes in some important macro variables, roughly estimated, will have in a one-year perspective. If one wishes to make an assessment of an alternative scenario in which several variables develop differently, their effects must be added together.

Sensitivity analysis, SEK billion

One per cent/percentage point increase	Effect on borrowing requirement
Total wages and salaries [1]	–6
Household consumption, current prices	–2
Registered unemployment	4
Swedish interest rates	3
International interest rates	1
Exchange rate	0.5

[1] *Local taxes based on working income are disbursed to the local governments with a one-year time lag. As a result, the effect on the central government borrowing requirement in a one-year perspective – the time horizon in the table – is larger than the permanent effect.*

Conditions behind the forecast: The Debt Office bases its forecast work on the macroeconomic picture presented by the NIER. In its latest issue of *The Swedish Economy* in December, the NIER predicts a relatively slow cyclical recovery during 2004. Based on developments in recent months, however, the Debt Office is making the assessment that the recovery in the labour market will be somewhat weaker than the NIER anticipates. In our judgement, private consumption will also grow somewhat more slowly. Outcomes for the primary borrowing requirement until mid February have been weighed into the forecast. The Debt Office's forecast of interest payments on the central government debt is based on the interest rates and foreign exchange rates prevailing on the forecast date. The cut-off date for the current forecast is February 16, 2004.

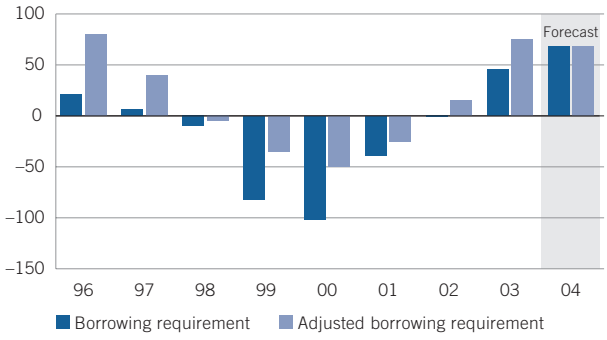
Borrowing requirement adjusted for nonrecurring payments

In a long-term analysis of central government finances, the borrowing requirement adjusted for nonrecurring payments provides a more correct picture of developments. During the period 2000 to 2004, the deterioration in underlying central government finances is SEK 120 billion. This is SEK 25 billion more than we estimated in October, which is mainly explained by the increased borrowing requirement. The Debt Office has also changed the calculation principal to exclude loans to infrastructure investments from the nonrecurring payments. This increases the underlying borrowing requirement by SEK 6 billion in 2004.

The borrowing requirement during 2004 is forecasted at SEK 68 billion. Adjusted for nonrecurring payments, calculations indicate the same borrowing requirement this year. Nonrecurring disbursements are thus projected to be as large as nonrecurring payments to the central government. Compared to 2003, the adjusted borrowing requirement will shrink by SEK 8 billion, even though the actual borrowing requirement will increase. The expected, albeit weak, cyclical upturn in the economy is the most important reason why the underlying borrowing requirement will decline.

Reported and adjusted borrowing requirement

SEK billion



The year's nonrecurring payments mainly consist of the Debt Office's net lending. Of total net lending, SEK 11 billion is projected to be of a nonrecurring nature. Most of this is study loans. Study loans are defined as nonrecurring disbursements, since the loans will eventually be repaid to the central government.

Nonrecurring payments to the government will decline because SEK 4 billion worth of mortgage bonds will mature, which is SEK 10 billion lower than during 2003. In addition, premiums related to bond issues are expected to be lower. The following table shows the borrowing requirement adjusted for nonrecurring payments during 2000–2004.

Borrowing requirement adjusted for nonrecurring payments

SEK billion	2000	2001	2002	2003	2004
Borrowing requirement	–102	–39	–1	46	68
Divestments of government property	76				
Extra dividend from the central bank			20		
Transfers from National Pension Funds	45	42	7	14	4
Net lending to state agencies	–56	–25	–9	–3	–11
Interest payments	–14	–5	–1	15	7
Other	1	2	–2	4	0
Adjusted borrowing requirement	–50	–25	14	76	68

Comparisons to other forecasts of the borrowing requirement

The Debt Office's forecast for the current year indicates a borrowing requirement of SEK 68 billion, which is SEK 4 billion less than ESV's forecast. The Government and the NIER anticipate a borrowing requirement of SEK 42 billion and SEK 58 billion, respectively. Also adjusted for known differences in divestment and interest rate assumptions, the Debt Office's forecast indicates a higher borrowing requirement than the NIER and the Government forecasts, but somewhat lower than that of ESV. The NIER and ESV presented their forecasts of the central government borrowing requirement in December and the Government in September.

Comparison between borrowing requirement forecasts, 2004

SEK billion	Debt Office	Government	NIER	ESV
Primary borrowing requirement	17	–6	6	19
Interest payments	51	48	52	53
Borrowing requirement	68	42	58	72
Borrowing requirement including Debt Office interest payments and divestment revenues	68	60	57	70

The Government's lower forecast is largely due to its assumption that there will be SEK 15 billion in divestment revenues and higher tax revenues. The Debt Office also anticipates higher interest payments on the government debt.

Monthly forecasts

The Debt Office publishes annual forecasts three times per year. At the same time, we publish monthly forecasts for the intervening months. Between regular publications, the Debt Office only makes revisions of annual and monthly forecasts in exceptional cases. In these cases, the revised forecast is presented in conjunction with the presentation of the monthly borrowing requirement outcome, which occurs five working days after the end of each month. The forecast for the February 2004 borrowing requirement is SEK –14.9 billion, which is SEK 9.8 billion more than the previous forecast. The explanation is that aid to agriculture from the European Union will be paid to the central government later than we anticipated in the October forecast and that tax revenues will be lower.

Monthly central government borrowing requirement, 2004

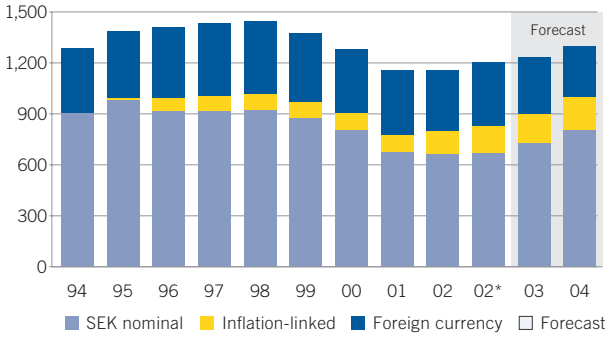
SEK billion	Feb	Mar	Apr	May	Jun
Primary borrowing requirement	–22.7	–1.8	–4.6	–18.1	–4.9
Interest payments	7.8	4.5	2.1	8.5	0.7
Borrowing requirement	–14.9	2.7	–2.5	–9.6	–4.2

The central government debt

At the end of 2003, the central government debt was SEK 1,229 billion. Compared to the previous year-end, this represented an increase of SEK 25 billion. During January 2004 the debt rose to SEK 1,265 billion. January is normally a deficit month for the Swedish state, due to disbursements to the Premium Pension Authority. The debt is affected by the borrowing requirement, but also by debt-related transactions. Examples are re-evaluations of foreign currency loans, which affect the size of the debt but not the borrowing requirement. The Debt Offices makes no forecast of debt-related transactions. This means that the central government debt is expected to change as much as the borrowing requirement during the remainder of the year. At the close of 2004, the debt is projected to total SEK 1,301 billion.

Government debt 1994-2004

SEK billion*



** A new measure of central government debt was introduced in the beginning of 2003. The comparisons in the text are made using the new measure, which is marked by * in the chart.*

Funding

Issue volumes of nominal Treasury bonds will be unchanged at SEK 4 billion per auction. A limited reduction may be considered early in the autumn. The forecast for the net borrowing requirement for 2004-2005 will be decisive. In March, the Debt Office will introduce a new five-year bond loan and in September a new ten-year loan. The Debt Office estimates that there will continue to be potential to issue inflation-linked bonds at an annual pace of approximately SEK 20 billion. Foreign currency borrowing is expected to total SEK 11 billion.

Gross borrowing

As indicated in the preceding sections, the *net borrowing requirement* will be an estimated SEK 68 billion in 2004. In addition, the Debt Office needs to fund maturing bond loans and buy-backs. The total funding requirement will be an estimated SEK 172 billion, which is marginally lower from the October forecast. The funding requirement in bonds and foreign currencies is largely unchanged at SEK 112 billion.

Funding, 2003 and 2004, SEK billion

	2003	2004
Net borrowing requirement	46	68
Changes in cash equivalent holdings [1]	13	15
Maturing bonds, plus exchanges and buy-backs	93	89
Maturing Treasury bonds	10	16
Maturing foreign currency loans [2]	30	22
Buy-backs and exchanges of bonds to bills	54	52
Total	153	172
Net funding with Treasury bills [3]	20	60
Bond issues, gross	133	112
Foreign currencies [2]	10	7
Inflation-linked bond issues [4]	18	18
Nominal Treasury bond issues [5]	105	87
Funding	153	172

[1] *Change in outstanding deposits, liquidity bills and repos. Retail borrowing (mainly from private individuals) is assumed to be unchanged during the year.*
[2] *Direct foreign currency loans, spot market, valued at acquisition prices.*
[3] *Change in the stock of Treasury bills.*
[4] *Average issue volume per auction.* *1.1* *0.9*
[5] *Average issue volume per auction.* *4.6* *3.8*

The above table also presents an assessment of the allocation of bond issues during 2003 and 2004 among nominal Treasury bonds, inflation-linked bonds and foreign currency borrowing. During 2004 funding with Treasury bills will increase at the same time as funding with Treasury bonds will decrease. The main reason is that otherwise the duration would be longer than our benchmark.

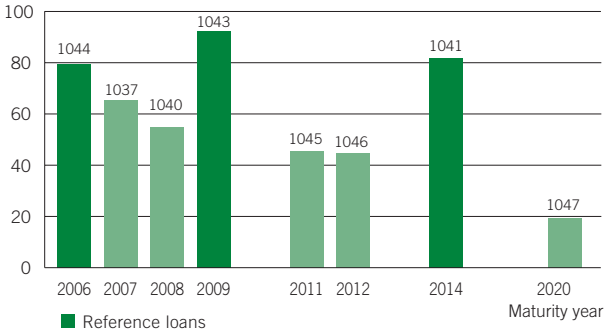
Nominal krona borrowing

Nominal borrowing in Treasury bonds

Three new bond loans this year

In January the Debt Office introduced a new Treasury bond, loan 1047, with a maturity of about 17 years and the same maturity date as inflation-linked loan 3102, that is, December 1, 2020. This long bond loan will make it possible to control duration with minor changes in issue volumes. By selecting the same maturity date as for the inflation-linked bond loan, it should be possible to strengthen liquidity in both markets. For investors, the long bond will make it easier to match obligations on the liability side with corresponding nominal interest-bearing assets in Swedish kronor. To date, the Debt Office has issued nearly SEK 20 billion of the new loan.

Nominal Treasury bonds (benchmarks), SEK billion



A new five-year Treasury bond, loan 1048 maturing on December 1, 2009, will be introduced on March 10, 2004. This loan will fill a gap between loans 1043 (January 2009) and 1045 (March 2011). During the four banking days after the issue, it will be possible to exchange loan 1043 for the new loan. The terms of these exchanges can be found in a press release from December 4, 2003 (see the Debt Office's web site, www.rgk.se). The coupon interest rate will be announced in the customary way one week before the first auction day.

On September 1, the Debt Office will introduce a new ten-year Treasury bond, loan 1049, maturing either in late 2015 or early 2016. A separate article on page 10 discusses the possibility of introducing a standardisation of due dates for nominal bonds. We welcome a dialogue on this discussion.

The maturity date for the ten-year bond will be announced in the Central Government Borrowing report published in June. During the four banking days after the auction, it will be possible to exchange loan 1041 (May 2014) for the new ten-year loan. The terms of these exchanges will be announced in a press released on August 19. The coupon rate will be announced one week before the first auction day.

New bond issues – maturities and issue dates

Loan	Maturity	First issue
Five-year (1048)	Dec. 1, 2009	Mar. 10, 2004
Ten-year (1049)	2015 or 2016	Sep. 1, 2004

Important dates

Date	Activity
Mar. 3, 4.20 p.m.	Issue terms for 1048 announced (coupon fixing)
Mar. 10	Issuance of new five-year bond loan 1048
Mar. 11-16	Exchanges of 1043 for 1048
June 16	*Central Government Borrowing: Forecast and Analysis*
Aug. 19, 9.30 a.m.	Press release on exchanges of 1041 for 1049
Aug. 25, 4.20 p.m.	Issue terms for 1049 announced (coupon fixing)
Sep. 1	Issuance of new ten-year bond loan 1049
Sep. 2-7	Exchanges of 1041 for 1049

Four loans to be included in planned issues

The Debt Office's bond issues have ordinarily consisted of its reference ("super-benchmark") loans with maturities of two, five and ten years that are traded in the electronic interbank market.[1] At the same time, the Debt Office's policy is to maintain good liquidity in all benchmark loans. Now that loan 1047 has been introduced, this bond loan will also be issued. These loans thus enjoy what is usually referred to as "on the run" status.

Loan 1043 is currently being traded as a five-year loan in the electronic system. The new bond loan 1048 will be traded as a five-year super-benchmark in the electronic system beginning on June 16, 2004. However, loan 1048 will already be issued in March.

Loan 1041 is currently being traded as a ten-year loan. The new ten-year loan 1049 to be issued early in the autumn will become a reference loan on December 15, 2004.

During the year, issues will be allocated relatively evenly among the two-, five-, ten- and 17 year loans – with a certain emphasis on the three longer maturities. An occasional issue of other benchmark loans may also occur if needed to maintain good liquidity.

During the year, the Debt Office will issue bonds in more maturities than usual. On some occasions, there may be reason to issue two loans at the same auction to create more opportunities to submit bids on the various maturities.

Issue volume unchanged
– a reduction may be considered in the autumn

The Debt Office expects borrowing in nominal bonds to total nearly SEK 90 billion during 2004. The increase of SEK 12 billion in the net borrowing requirement compared to our October estimate will be allocated among Treasury bills, direct foreign currency borrowing and inflation-linked bonds.

Issue volume in nominal bonds was decreased to SEK 4 billion per auction in September 2003. The Debt Office is maintaining the current issue volumes for the time being.

A continued cyclical recovery of the economy with an accompanying improvement in the central government budget may lead to a slight reduction in issue volume early in the autumn. The borrowing plan has assumed a lowering of the issue volume to SEK 3.5 billion per auction from early autumn. The size of issue volumes during the autumn will depend on developments during the spring and on the net borrowing forecast for 2004 and 2005 that will be published in the next Central Government Borrowing report.

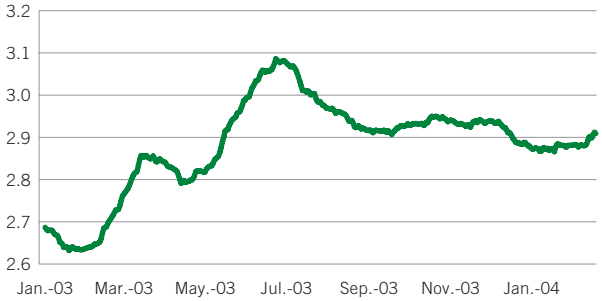
Net borrowing in Treasury bills

The stock of Treasury bills is projected to increase, both in kronor terms and as a percentage of the central government debt, during 2004.[2] To ensure than the nominal krona debt will not have too long an average maturity, it will be necessary to increase borrowing in Treasury bills. How large the increase in the stock of Treasury bills will be depends on various relatively uncertain factors.[3]

As the chart indicates, duration is now in line with the Debt Office's duration target of 2.9 years for nominal krona

Duration of nominal krona debt, 2003-2004

Year (one month moving average)



[1] *The loans treated as benchmark loans in electronic trading are determined by which loans are closest, in terms of maturity, to two, five and ten years. However, benchmark loans change only on IMM dates (the third Wednesday in March, June, September and December), with the criterion that in terms of maturity, the loans should be closest to two, five and ten years on the following IMM date. With this change, an underlying loan in forward contracts will always be the same as a benchmark loan during the last three months of the contract.*

[2] *The table on page 6 also presents changes in cash equivalent holdings. This item includes changes in outstanding short-term funding (i.e. liquidity management instruments such as liquidity bills, overnight loans and repurchase agreements=repos), which mainly arise as a consequence of cash flows around the turn of the year that are difficult to predict. The item is included in order to achieve consistency in reporting. The net change in Treasury bill borrowing is of greatest interest when discussing longer-term funding.*

[3] *The short-term funding requirement and how much Treasury bills are outstanding at the turn of the year will affect the size of the change. The scale of the planned exchange of a short-term bond to bills and the terms for exchanges when introducing new bond loans will also be an important factor. The change is measured between the last banking day of each respective year, which means that the change does not necessarily provide a correct picture of how the average size of the stock of Treasury bills changes.*

Borrowing instruments and swaps

Somewhat simplified, the guidelines for central government debt policy imply that the Debt Office shall achieve a given exposure in short-term and long-term borrowing, respectively, and between kronor and foreign currencies (in terms of a given pace of amortisation of foreign currency debt), respectively. These targets can be achieved by allocating government borrowing between Treasury bills, Treasury bonds and foreign currency borrowing. We also use derivatives (mainly interest rate and currency swaps) in order to achieve the desired exposure.

In order to create a short-term interest rate exposure via the swap market, the Debt Office issues a bond in Swedish kronor. Then it carries out an interest rate swap in Swedish kronor, in which we receive fixed interest and pays floating interest (Stockholm Interbank Offered Rate, STIBOR). The gain on this transaction is that the interest rate on the bond is lower than the interest rate that the Debt Office receives in the interest rate swap (the difference is called swap spread). Meanwhile we pay a somewhat higher interest rate (STIBOR) than the Treasury bill interest rate. This borrowing technique leverages the central government's relative strength as a borrower in long maturities, enabling it to reduce its borrowing costs.

Creating foreign currency exposure via the swap market involves using the domestic bond market as a source of borrowing (krona/swap borrowing). First, a bond is issued and swapped to short-term interest (see above). Then a "basis swap" is carried out, which involves changing a floating interest rate in kronor for a floating interest rate in a foreign currency. Meanwhile the Debt Office buys the foreign currency in the spot market when it enters into the transaction and sells the foreign currency when closing it. The basis swap has the same maturity as the interest rate swap. In the basis swaps, the Debt Offices receives floating STIBOR and pays floating interest in e.g. euro at the European Interbank Offer Rate (EURIBOR). Using this technique, the Debt Office can take advantage of the swap spread minus a smaller cost for implementing the swap. In principle, the borrowing cost is thus the floating EURIBOR rate minus the swap spread.

Foreign currency borrowing can thus be implemented as borrowing in a foreign currency (direct foreign currency borrowing) or via krona/swap borrowing. *Short-term borrowing* can be implemented by issuing Treasury bills or by first issuing a Treasury bond and then carrying out an interest rate swap.

In practice, the room for interest rate swaps is limited by the fact that the Debt Office is a large player in this market. The total amount of interest rate swaps can be used to replace Treasury bills or as a part of foreign currency borrowing. In the trade-off, the costs of direct foreign borrowing are important.

For an extended discussion on the Debt Office's use of swaps, see Holmlund, A. [2002], "Swaps in central government debt management", Central Government Borrowing: Forecast and Analysis, 2002:3, pp. 17-20. How borrowing needs are allocated between different funding instruments is discussed in Olofsson, T. *[2002], "How Central Government Debt is Funded", Central Government Borrowing: Forecast and Analysis,* 2002:3, pp. 13-16.

debt. The planned allocation of borrowing between Treasury bills and nominal Treasury bonds is affected not only by the net borrowing requirement but also by interest rates. The downturn in interest rates since late 2003 implies a somewhat longer duration than previously forecasted.

The Debt Office may also create short-term borrowing by issuing bonds and then using interest rate swaps in order to shorten the interest rate refixing period.[1] Provided that the difference between the swap interest rate and the Treasury bond interest rate is sufficiently large, this technique lowers central government borrowing costs. We expect to create short-term borrowing using interest rate swaps equivalent to about SEK 25 billion.

Interest rate swaps equivalent to about SEK 4 billion are expected to be used as a part of the foreign currency funding, see below. The total scale of interest rate swaps, with and without a connection to foreign currency borrowing, should continue to be limited to an annual pace of approximately SEK 30 billion. If market conditions change, however, the actual scale may deviate from this estimate.

Swaps will be carried out at a relatively uniform pace during the year and at maturities that are cost effective.

[1] *See the box on "Borrowing instruments and swaps".*

Inflation-linked borrowing

Issue policy

Unchanged pace of issues

The demand for inflation-linked bonds has remained good. During 2003, the Debt Office issued about SEK 18 billion in inflation-linked bonds, or an average of more than SEK 1 billion per auction. During the autumn, issues of such bonds averaged about SEK 1.3 billion per auction.

Inflation-linked bonds provide investors with unique protection against inflation. The interest rate difference between nominal and inflation-linked bonds has been in line with inflationary expectations and inflation targets. As the market for inflation-linked bonds develops, there is reason to assume that the liquidity premium will decline.

The Debt Office expects to issue inflation-linked bonds at the same pace as during 2003. This implies an annual pace in the range of SEK 20 billion or SEK 1 billion per auction. This annual pace provides only an approximate estimate of what market conditions allow.

Predictability with some flexibility

Since the beginning of 2004, the Debt Office has switched to issuing inflation-linked bonds every two weeks instead

of once a month. This should help reduce uncertainty and provide a shorter period until the next opportunity to bid at an auction. Dependence on interest rates during limited periods will also diminish. Inflation-linked bond auctions will be held on Thursday during the weeks, but not all the weeks, that the Debt Office issues Treasury bills.

The Debt Office has reduced the variations in issue volumes between auctions, although it still makes some adjustments to market conditions. However, larger deviations cannot be ruled out at times when market conditions are very special. The announced issue volumes will thus normally be about equally large at each auction, which will increase predictability for investors.

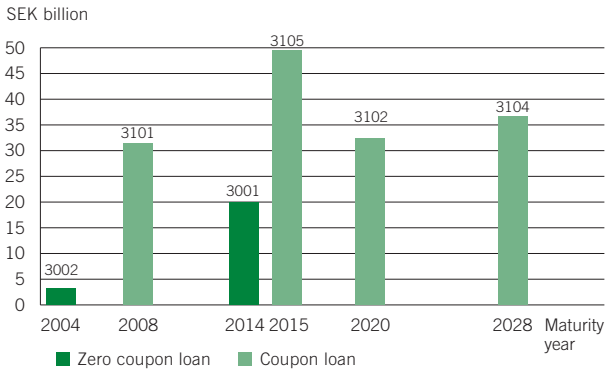
At times when demand is deemed good, the Debt Office will use flexible issue volumes. This flexibility means that the issue volume can be increased by an amount stated in advance. One precondition is that this can occur at a reasonable interest rate and without significant impact on the interest rate. If the auction is carried out with flexible volumes, the volume being offered is announced as an interval.

Even if the issue volume does not vary so much from one auction to another, to some extent the Debt Office takes into account the prevailing demand situation and pricing picture. The choice of loans, issue mechanisms and volume on individual issue dates is announced one week before the auction after the Debt Office has gathered suggestions from primary dealers and investors. Both dealers and investors are welcome to pursue a continuous dialogue with the Debt Office concerning inflation-linked bonds and to submit suggestions before individual issues.

Loans to be included in planned issues

Loans 3105, 3102 and 3104 will be issued during 2004 (see the chart for information on maturity years and outstanding volumes).

Inflation-linked Treasury bonds



Loan 3101 (December 2008) is too short to be included among the loans in which there will be issues, but the loan is currently deemed to have good market prerequisites and to be capable of contributing to liquidity and pricing in the short segment of the inflation-linked yield curve. During 2005, the Debt Office expects to give investors the opportunity to begin changing to longer loans. A phase-out plan for loan 3101 was discussed in *Central Government Borrowing 2003:2* and *2003:3*. In brief, the thought is that a maximum volume of SEK 10 billion, for example, could be exchanged for one or more longer loans during each year that the phase-out is under way. Such a timetable would imply that the outstanding volume would be reduced at the pace that investors want to change to longer inflation-linked bonds, but no faster than SEK 10 billion per year. In this way, the phase-out of the loan can occur in a predictable way. As exchanges to longer loans arise, it may be justified to introduce a new loan that is shorter than loan 3105. A more detailed phase-out plan will be announced later.

Foreign currency borrowing

At present, the Debt Office is amortising foreign currency debt at an annual pace of SEK 25 billion.

The borrowing requirement in foreign currencies consists of the difference between maturing loans and the pace of amortisation. During 2004, loans (including exchange rate losses) equivalent to SEK 37 billion will fall due. In order to achieve the targeted pace of amortisation, the Debt Office thus needs to borrow the equivalent of SEK 11 billion in foreign currencies. This is a marginal increase compared to our estimate in the October report.

Foreign currency borrowing in 2003 and 2004, SEK billion

	2003	2004
Gross foreign currency borrowing requirement	21	11
Benchmark for foreign currency borrowing	–25	–25
Maturing foreign currency loans [1]	30	22
Maturing currency swaps	11	11
Realised exchange rate differences	5	4
Gross foreign currency borrowing	20	11
Direct foreign currency borrowing [1]	11	7
Net short-term foreign currency borrowing [2]	–1	0
Gross foreign currency swaps	11	4

[1] *Direct foreign currency loans in the spot market, valued at present exchange rates.*
[2] *Commercial paper (Treasury bills in foreign currencies).*

Foreign currency loans can be funded by issuing Treasury bonds, which are swapped to foreign currency exposure (krona/swap borrowing) or by means of direct borrowing in foreign currencies. The allocation of foreign currency loans between direct foreign currency borrowing and krona/swap borrowing will depend on what interest rate conditions can be achieved.

So far during 2004, the Debt Office has issued direct foreign currency loans equivalent to SEK 3.6 billion. The remaining borrowing requirement during the year has been allocated in a standardised way evenly between direct foreign currency borrowing and krona/swap borrowing. The actual allocation may, however, end up deviating substantially from this scenario.

Summary

The Debt Office will keep its issue volumes of nominal Treasury bonds unchanged at SEK 4 billion per auction. A limited reduction of issue volume may be considered in the early autumn. The size of issue volumes during the autumn will depend on developments during the spring and the forecast for 2004 and 2005 that will be published in the next Central Government Borrowing report.

A new five-year bond loan will be introduced at the auction on March 10, 2004. On September 1, a new ten-year Treasury bond loan will be introduced.

During the year, issues will be allocated relatively evenly between the two-, five-, ten- and 17-year loans – with some emphasis on the three longer maturities.

The Debt Office will carry out interest rate swaps at an annual pace of about SEK 30 billion. Most of these will replace borrowing in Treasury bills.

The demand for inflation-linked bonds has remained good during 2004. During 2003, the Debt Office issued nearly SEK 20 billion worth of such bonds. The Debt Office estimates that there will be continued prerequisites for issuing inflation-linked bonds at about the same pace.

The Debt Office amortises the foreign currency debt at an annual pace of SEK 25 billion. This year, foreign currency borrowing will amount to an estimated SEK 11 billion.

Common maturity dates for nominal bonds

The Debt Office is considering the introduction of common maturity dates for nominal bonds. Common maturity dates will mean that some or all bonds will fall due and pay coupon interest on the same dates. Opinions from all market participants are welcome.

Swedish nominal government bonds almost all have different due dates. Sweden deviates from a number of other countries on this point. The trend is towards grouping loans around a few maturity dates. Another example is the Debt Office's inflation-linked coupon bonds, which all fall due on December 1.

Customary maturity dates in some markets

France	Apr 25 and Oct 25
Germany (Bund)	Jan 4 and Jul 4
Belgium (OLOs)	Mar 28 and Sep 28
United States (T-bonds)	Feb 15, May 15, Aug 15 and Nov 15
United Kingdom (Conventionals)	Mar 7, Jun 7, Sep 7 and Dec 7
The Netherlands	Jan 15 and Jul 15
Denmark	Nov 15

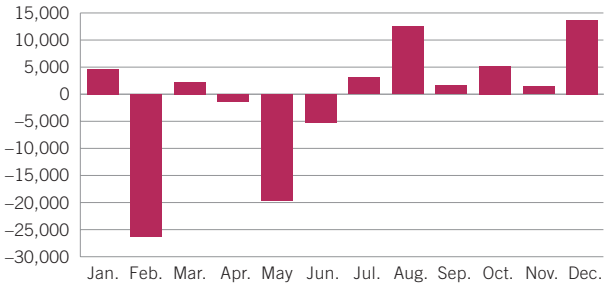
Common maturity dates have a number of advantages

- *Loans with suitable maturities.* There will be exactly one year between two adjacent bonds. There will consequently always be loans with maturities close to the points on the curve where liquidity is increasingly being concentrated, i.e. two, five and ten years. Given today's irregular maturity dates, loans may sometimes seem too short or too long. Benchmark periods will also be of different lengths, which may generate excessively large volumes in certain loans.
- *Predictability.* Common maturity dates create predictability about when new loans will fall due and be introduced.
- *Matching of central government cash flows.* From the central government's standpoint, it is an advantage if interest payments and redemptions can be steered to periods of the year when the government has large surpluses.
- *Potential for future stripping.* Common maturity dates will mean that the door to stripping of nominal bonds will be kept open. In Sweden, there is no demand for this now, but if things change in the future, it is an advantage if loans fall due on the same dates.

But common maturity dates also pose a few potential problems. The system will be less flexible than today's, since the Debt Office will not be able to choose maturity dates and introduction dates as freely. In periods of low borrowing requirements, this may lead to a greater need for exchanges and/or buy-backs.

If the Debt Office decides to move towards common maturity dates, a number of dates are conceivable. From the Debt Office's perspective, it is an advantage to choose a month when the central government's other cash flows are positive. This is one argument for February. A stronger connection with the inflation-linked market is an argument for December, but on the other hand this is a poorer alternative from the standpoint of the borrowing requirement. Connections to international markets may serve as arguments in favour of other months. Another conceivable choice is two due dates per year to make the system more flexible.

Borrowing requirement excluding interest payments, 2003



In the judgement of the Debt Office, a system of common maturity dates has clear advantages. However, it would mean a major change that will also take a long time to introduce. It is thus important that any decision be carefully considered.

For this reason, the Debt Office would like to invite all market participants to submit their opinions on this issue.

Please send opinions to **anders.holmlund@rgk.se**

Inflation-linked bonds – an instrument for risk diversification

Portfolio calculations based on market data show that inflation-linked bonds can substantially lower the risk in an asset portfolio. The results indicate that inflation-linked bonds have better diversification characteristics than nominal bonds. Inflation-linked bonds therefore tend to crowd out nominal bonds from an efficient portfolio. These results are reinforced if we look at real return.

Inflation-linked bonds are a relatively new instrument in the fixed income market. Aside from Sweden, a number of other countries have chosen to issue inflation-linked bonds to finance part of their central government debt. These include the United Kingdom, the United States, France, Canada, Australia, Italy and Greece. The UK, which was the first to introduce this instrument, began issuing such bonds in 1981.

The Swedish market for inflation-linked bonds has existed since 1994 and has gradually developed, becoming larger and more liquid. The outstanding stock of inflation-linked bonds today is about SEK 170 billion[1] (compared to about SEK 560 billion in nominal bonds). A number of major institutional investors have begun to purchase inflation-linked bonds, but most such investors devote only a very small share of their portfolio to this instrument or hold no inflation-linked bonds at all.

Inflation-linked bonds are known primarily as an instrument that makes it possible to manage inflation risk. However, knowledge of the portfolio characteristics of inflation-linked bonds is not as widespread. There are several studies[2] that deal with this topic, based on data from the US, the UK and France.

These studies show that inflation-linked bonds may be viewed as a unique asset and that they improve the risk and return characteristics of a portfolio when they are included. The reason is that the correlation with return from equities is lower for inflation-linked bonds than for nominal bonds. At the same time, inflation-linked interest rates are less volatile than the corresponding nominal interest rates.

We have examined whether the same conclusion applies to Swedish inflation-linked bonds in portfolios of Swedish and foreign securities during the period 1996 to 2003.

Structure of the portfolio

Aside from Swedish inflation-linked bonds, we have included the following asset classes in our study: Swedish nominal bonds, Swedish equities, foreign bonds and foreign equities. We have chosen to use indices to simplify the analysis.[3]

We have looked at four different types of portfolios in this study, to which we have added inflation-linked bonds.

- Swedish nominal bonds only
- Swedish nominal bonds and Swedish equities
- Swedish nominal bonds and foreign bonds
- Swedish nominal bonds, Swedish equities, foreign bonds and foreign equities.

Characteristics of assets

We have compared return in a one-year perspective with rolling 12-month periods. The Swedish National Debt Office has issued inflation-linked bonds since April 1994. In February 1996, a market value-based index of Swedish index-linked bonds was started. It is now maintained by OM. The first 12-month figure is thus for February 1997. Our study provides data for 79 rolling 12-month periods ending in August 2003.

As documentation for statistically certain conclusions, this is a rather short time period. Our results should therefore be interpreted cautiously. This is especially true since this has been a relatively turbulent period (especially in the equities market). However, our results are in line with international studies, giving them greater credibility.

The statistical characteristics that are the most interesting from a portfolio choice standpoint are average return, standard deviation and the correlation between different asset classes. This correlation is perhaps the most

[1] *Including accrued inflation from the issue date.*

[2] *Richard Roll (2003), Khothari and Shanken (2002), Chen and Terrien (1999), Lucas and Quek (1998).*

[3] *Each index in itself represents a portfolio containing different assets. We have used the following indices in our study. Swedish nominal bonds: OMRX T-Bond Index. Inflation-linked bonds: OMRX Real Index. Swedish equities: OMX Index. Foreign bonds: Salomon Smith Barney World Government Bond Index. Foreign equities: S&P Global 1200 Index. The indices for foreign bonds and equities have been recalculated from USD to SEK. Source: EcoWin.*

important of all, since it determines how much risk can be diversified away.

As Table 1 indicates, the returns on inflation-linked bonds are somewhat higher on average than returns on nominal bonds. There are several reasons for this. Firstly, inflation-linked bonds were purchased with a relatively large liquidity premium at the beginning of the period, a premium that has later fallen. Secondly, excessively low inflationary expectations in the late 1990s may have resulted in a certain excess return. The opposite is true for the latter part of the period. According to our calculations, this has no major effect on the structure of effective portfolios.

Table 1.
Statistical characteristics of the index in the study

Nominal return	Nom. bonds	IL bonds	Equities	Foreign eq.	For. bonds
Average	7.81%	8.08%	10.33%	9.42%	9.28%
St. deviation	5.06%	5.05%	38.77%	25.55%	7.97%

Real return	Nom. bonds	IL bonds	Equities	Foreign eq.	For. bonds
Average	6.56%	6.79%	9.26%	8.30%	8.01%
St. deviation	5.61%	4.83%	38.87%	25.91%	8.30%

In nominal terms, the risk is equally high for nominal bonds and inflation-linked bonds. In real terms, the situation is different. For nominal bonds, the risk then increases, while the risk decreases for inflation-linked bonds. For an investor with a real return requirement, inflation-linked bonds thus carry lower risk. This might not be unexpected as the main purpose of inflation-linked bonds is precisely to protect against inflation.

To make the role of risk more concrete, it can be described as a confidence interval around the expected return. With 95 per cent certainty, return on inflation-linked bonds will turn out between –0.2 and 16.4 per cent. Foreign bonds carry a risk nearly 3 percentage points higher. For them, return ends up between –3.8 and 22.4 per cent. In other words, the confidence interval for foreign bonds is nearly 10 percentage points wider.

We have chosen to represent foreign equities with a broad index in which companies from the whole world are included. During the period, foreign equities have shown rather low return relative to the other asset classes.[4] Foreign bonds have instead had relatively high return, at the same time as they show considerably lower risk. As a consequence, foreign equities have not been included at all in our calculated efficient portfolios.

[4] This is not due to the choice of this particular index. We compared a number of indices of the same kind and found that the S&P Global 1200 index was the one that had the highest return during the period. The other indices we looked at all had lower returns than the index for foreign bonds (the Salomon Smith Barney World Government Bond Index).

The correlation matrix in Table 2 shows that inflation-linked bonds have a low correlation with all other asset classes (except nominal bonds). This means that inflation-linked bonds are very suitable for diversifying away risk in portfolios containing these asset classes. Inflation-linked bonds also have a lower correlation with other asset classes than nominal bonds do.

Table 2.
Correlation matrix for return on assets in nominal terms

	Nom. bonds	IL bonds	Equities	Foreign eq.	For. bonds
Nom. bds.	1.000	0.665	–0.079	0.195	0.424
IL bonds	0.665	1.000	–0.322	–0.253	0.029
Equities	–0.079	–0.322	1.000	0.832	0.187
For. eq.	0.195	-0.253	0.832	1.000	0.576
For. bonds	0.424	0.029	0.187	0.576	1.000

An extreme period

It is important to bear in mind that during the period being examined, financial markets were characterised by extreme upturns and downturns, especially the equities market (see Chart 1). But it is no less interesting to see how inflation-linked bonds affect the risk characteristics of the portfolio during extreme periods.

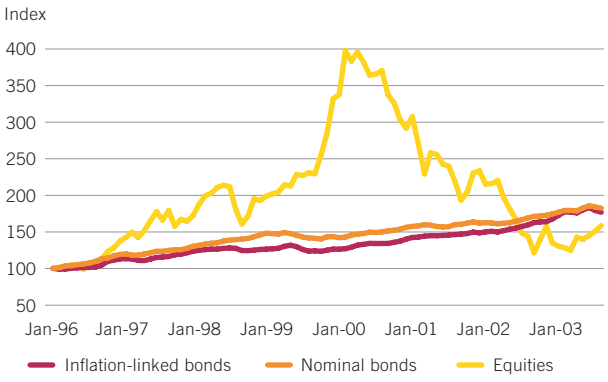


Chart 1. The period examined in the study was characterised by extreme upturns and downturns in financial markets, especially in the equities market.

Average return was unusually high for all asset classes during the period. It is unreasonable to believe that bonds should yield a real return of more than 6.5 per cent in the long term (see Table 1). It should instead be around 2-3 per cent.

In calculating efficient portfolios, it is nevertheless relative return on assets that is of interest, not the absolute level. From this perspective, the differences seem rather reasonable. The excess return on equities vs. bonds should perhaps be somewhat larger than 2.5 per cent. Longer historical series instead point to between 3 and 4 per cent.

Meanwhile return on equities was more volatile than it has been historically. It is always possible to discuss how it

will look in the future. It is reasonable to assume that excess return on equities will be somewhat higher and that their volatility will be somewhat lower than in the period that we have studied.

To see how this affects our results, we have conducted a test in which we assume that excess return on equities is 4 per cent and standard deviation is 25 per cent (instead of 38). What happens is that equities become more attractive compared to bonds. We get efficient frontiers with steeper slopes. Otherwise our conclusions are not affected to any great extent.

Inflation-linked bonds lower risk

It is possible to lower risk substantially by using inflation-linked bonds in the portfolio. In a portfolio containing nominal bonds (75 per cent) and equities (25 per cent), risk is 10 per cent and return is 8.4 per cent. By adding inflation-linked bonds to the portfolio, risk can be lowered to 6 per cent with unchanged return (i.e. a risk reduction of 40 per cent).

The magnitude of the difference can be partly explained by the flat slope of the efficient frontiers. To obtain a slightly higher return, the investor is forced to accept much higher risk. This makes the horizontal distance between the two frontiers large (see Chart 2).

Efficient frontiers (nominal return)

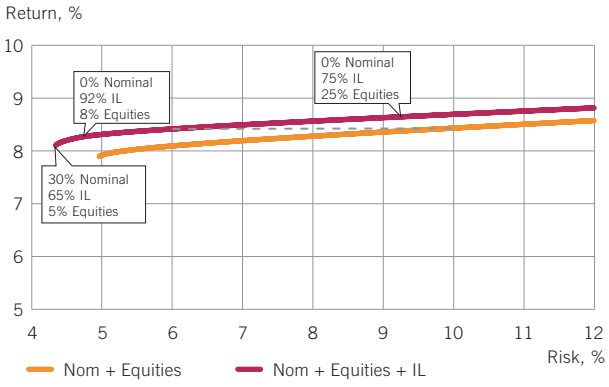


Chart 2. Efficient frontiers for portfolios containing nominal bonds and equities, as well as for portfolios also containing inflation-linked bonds. As the dotted line shows, it is possible to achieve the same return at far lower risk if inflation-linked (IL) bonds are added to the portfolio.

The above argument presupposes that the investor has a certain return or risk requirement. For investors interested in risk minimisation, it is also possible to make large gains by using inflation-linked bonds. The largest gains occur in portfolios that are already well diversified. In portfolios that contain all asset classes except inflation-linked bonds, the minimum risk is 4.9 per cent (return: 8.1 per cent). If we add inflation-linked bonds, the minimum risk ends up at 4.1 per cent (return: 8.4 per cent). This is a 15 per cent risk reduction.

Inflation-linked bonds can also lower the risk in a purely Swedish bond portfolio. The reduction is about 0.4 percentage points. This effect is not so sensitive to assumptions about return on nominal and inflation-linked bonds. The risk reduction is about the same. Only the asset shares of the portfolio will change. With higher return on inflation-linked bonds, these bonds will represent a somewhat larger percentage of the portfolio, and vice versa if nominal bonds are assumed to have a higher return.

Inflation-linked bonds crowd out nominal bonds

As mentioned earlier, inflation-linked bonds have a lower correlation with the other asset classes than nominal bonds do. As a result, inflation-linked bonds tend to crowd nominal bonds out of efficient portfolios. At minimum risk, nominal bonds represent between 0 and 30 per cent of the various portfolios.[5] The percentage of nominal bonds then rapidly declines, giving way to inflation-linked bonds and equities if we permit greater risk.

Percentage of total portfolio

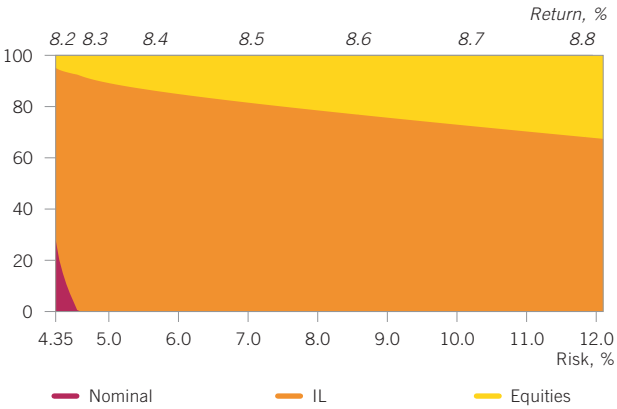


Chart 3. Inflation-linked bonds crowd out nominal bonds from effective portfolios. Nominal bonds are included only in portfolios close to minimum risk.

It is no surprise that inflation-linked bonds are better, relatively speaking, for investors who are interested in real return. It is more remarkable that inflation-linked bonds turn out to be superior to nominal bonds even in nominal terms. In principle, only if the goal is risk minimisation is it meaningful to have nominal bonds in the portfolio. But even then, the proportion is small.

Results are reinforced by a real return approach

For investors with a real return requirement, inflation-linked bonds have even more superior portfolio characteristics. In our study we have found that nominal bonds represent a very limited share of efficient portfolios, or in some cases zero per cent (see Chart 4).

[5] *Except for the portfolio containing only Swedish nominal bonds and inflation-linked bonds. There the allocation at minimum risk is about 50-50.*

Efficient frontiers (real-term return)

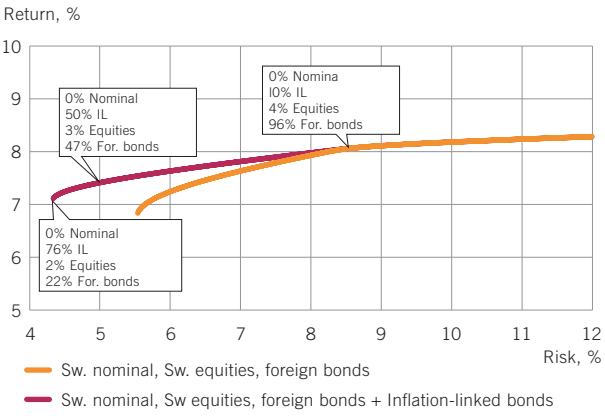


Chart 4. The figure shows the efficient frontier for portfolios containing Swedish nominal bonds, Swedish equities and foreign bonds, and how it changes when we add inflation-linked (IL) bonds. Here Swedish nominal bonds represent zero per cent of efficient portfolios.

The highest share is found in portfolios containing nominal bonds, Swedish equities and inflation-linked bonds. At the minimum risk (4.56 per cent risk) the share is then 11.7 per cent. But as soon as risk reaches 4.64 per cent, nominal bonds have disappeared completely from the efficient portfolio.

In a purely Swedish bond portfolio, risk is lowered by about 0.9 percentage points when we add inflation-linked bonds. This is because of the diversification effect and because inflation-linked bonds carry less risk in real terms. A 95 per cent confidence interval around the expected return not including inflation-linked bonds lies between –2.7 and 15.8 per cent. The equivalent confidence interval including inflation-linked bonds lies between –1.0 and 14.5 per cent. The width of the confidence interval thus decreases by 3 percentage points.

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Analyst

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Analyst

Summary

Inflation-linked bonds can substantially reduce the risk in a portfolio. This is mainly because they have a low correlation with other asset classes, which makes it possible to diversify away risk.They also have a low correlation with other asset classes compared to nominal bonds. As a result, inflation-linked bonds tend to crowd out nominal bonds from efficient portfolios.

The diversification characteristics of inflation-linked bonds are further reinforced if we look at real return.

The conclusion is thus that an efficient portfolio should contain inflation-linked bonds, with a rising proportion of equities or foreign bonds the more risk we are willing to accept.

References

- Roll, R (2003), "Empirical TIPs", October 2003, Anderson School of Management, University of California, Los Angeles, working paper.
- Kothari, S P and J Shanken (2002), "Asset Allocation with Conventional and Indexed Bonds", March 26, 2002, working paper.
- Chen, P and M Terrien (1999), "TIPS as an Asset *Class", November 1999, Journal of Portfolio Management, Summer 2001, Vol 10, No 2, pp 73- 82.*
- Lucas, G and T Quek, (1998), "A Portfolio Approach to TIPS", December 1998, Journal of Fixed Income.

Portfolio theory

In a portfolio containing different assets, expected return will be a weighted average of the expected return on these assets. Portfolio risk, however, will not be a weighted average of the risk of these assets. If the assets are not perfectly correlated with each other, part of the risk can be diversified away.

An efficient portfolio has the highest possible return for a given risk level (or vice versa). An efficient frontier shows all efficient portfolios for a given set of assets. This can be illustrated as a curve in a chart with risk and return axles. The end points of the curve are equivalent to the characteristics of assets with the lowest and highest return, respectively.

The risk preference of the investor determines the choice of portfolio on the efficient frontier.

Active management of the foreign currency debt – an asset on the liability side

The Swedish National Debt Office's active management of its foreign currency debt has its roots in the mid-1980s and the emergence of a global market for interest-bearing derivative instruments. Over the past twelve years, it has saved the Debt Office about SEK 12 billion. Active management also contributes to the professional administration of other portions of Swedish central government debt. The goal of active management is to minimise long-term costs while taking into account risks.

Today foreign currency debt accounts for more than one fourth of Sweden's total central government debt, or about SEK 330 billion. Historically, foreign currency debt has represented an even larger share of the total. To administer its foreign currency debt in the best way, the Debt Office uses a benchmark portfolio that specifies a debt structure that is deemed suitable in the long term with regard to risk minimisation. In passively oriented management, the Debt Office adapts the entire foreign currency debt to the currency allocation and interest rate structure that this benchmark portfolio specifies. However, in order to generate savings, the Debt Office pursues active management of SEK 200 billion of the foreign currency debt. The remaining portion of this debt, about SEK 130 billion, is not actively managed. Active management on this scale makes the Debt Office one of the largest market players in Scandinavia.

It should be emphasised that the overall characteristics of Swedish sovereign debt are what determine its costs and risk. The most important characteristics are choice of duration and allocation between nominal and inflation-linked bonds, as well as the percentage of foreign currency debt in the total central government debt. Also of importance are market development, management of Swedish krona debt and the structure of the benchmark portfolio for foreign currency debt. Costs and risks are, nevertheless, affected by active management of foreign currency debt, and these operations make sizeable savings possible.

The goal of active management

By actively taking positions in international capital markets based on assessments of future interest and exchange rate developments, the Debt Office endeavours to reduce its interest costs for the foreign currency debt. Concretely, this may mean that the Debt Office increases the share of the debt denominated in a currency that is expected to lose value, thereby leading to savings. One example of this during 2003 was that the Debt Office concluded that the US dollar would weaken and thus increased the share of debt denominated in dollars and reduced the share of debt in euros. In practical terms, the Debt Office achieves this by entering into a transaction in the foreign exchange market, where we sell dollars for euros in forward contracts. Successful management can lead to large absolute savings.

The entire risk mandate and the daily administration of the foreign currency debt has been delegated by the Director General to the head of portfolio management, who together with analysts and traders comprises a five-person debt management team that is responsible for what positions the Debt Office enters into in foreign markets. The time horizon for this active management is relatively long-term. The Debt Office often takes positions that are expected to yield a gain in a six to twelve month perspective. Reporting on active management occurs monthly in a debt management council including the Director General and the affected department heads.

Cost savings

The Debt Office has established a benchmark for the structure of the foreign currency debt aiming at risk minimisation in the long term. The allocation of currencies and interest rates is chosen with an eye to achieving the lowest possible volatility in the cost for the foreign currency debt. Viewed over a long period, the allocation that is chosen will produce an average return with regard to costs. The Debt Office has thereby ensured that a genuinely unfavourable outcome can be avoided. At the same time, it has reduced the likelihood that the choice of benchmark in itself will lead to major savings.

The Debt Office has instead chosen to adapt its debt management in a dynamic way to market conditions by pursuing active management of foreign currency debt and taking advantage of opportunities for savings there. Within the bounds of well-defined and limited risk-taking, the Debt Office has the possibility to deviate from the established long-term benchmark, based on more short-term assessments of how interest rates and exchange rates will develop. The magnitude of permitted deviations has been set by Board of the Debt Office. By actively taking positions in international foreign exchange and fixed income markets, the Debt Office endeavours to lower the Swedish government's foreign currency debt costs.

Dynamic effects

Active management also helps to increase expertise in other central areas of importance to the Debt Office. For example, defining a suitable benchmark portfolio for the foreign currency debt requires thorough analyses, and it is important that the Debt Office itself is able to carry out such an analysis. The knowledge that the Debt Office builds up through this long-term work can be used to improve the administration of the foreign currency debt by means of more active short-term management. Active management, in turn, provides valuable market knowledge and experience in the practical implementation of financial theories, which benefits its long-term work with the benchmark portfolio.

Another positive effect of active management of foreign currency debt is that the Debt Office has built up far-reaching expertise related to the use of derivative instruments. This has made it possible for professional use of derivatives to be introduced in conjunction with foreign currency borrowing and domestic debt management. It has led to greater cost-effectiveness in overall government debt management, both short-term and long-term.

The structure of active management

The active management mandate

The Debt Office pursues active management under a Value-at-Risk (VaR)[1] based mandate. The overall VaR of active management, set by the Board of the Debt Office, may never exceed SEK 220 million in 95 per cent daily VaR. This maximum permitted risk level is comparable to an expected tracking error[2] of about one per cent. The mandate is supplemented with more traditional absolute position limits. The positions in a given currency may not be larger than the equivalent of 6 per cent of the managed debt amount. Interest rate positions may not affect the total duration of the managed debt amount by more than 0.4 years in each individual currency and 0.6 years overall. The total actively managed debt amount has been fixed at SEK 200 billion.

The Debt Office uses derivative instruments

The Debt Office is a debt manager and as such has no financial assets in its balance sheet. It may thus not carry out debt management by directly buying and selling interest-bearing instruments. It is also difficult and costly to change the debt structure by buying up outstanding debt and issuing new debt. Instead, the Debt Office pursues active debt management with the help of various types of derivative instruments. The instruments it uses are interest rate futures, interest rate options, interest rate swaps, swap options, forward foreign exchange contracts and currency options. The foreign exchange and fixed income markets in which the Debt Office may operate are euros, US dollars, Japanese yen, British pounds, Swiss francs, Norwegian kroner and Danish kroner.

External managers

Since 1992, the Debt Office has worked with external managers, which manage a portion of its foreign currency debt. External management mainly fulfils the following purposes:

- *benchmarking,* a yardstick against which the Debt Office's own outcome can be compared and evaluated;
- *return,* the possibility of increasing return and lowering costs in the long term, as well as reducing the fluctuations in the cost;

[1] *VaR is a measure of the risk in the positions taken. It is calculated statistically with the help of historical data on volatility and correlation in fixed income and foreign exchange markets. A risk level equivalent to a daily 95 per cent VaR of SEK 200 million means, on 19 days out of 20, a return that does not exceed a loss of SEK 200 million; one day out of 20 will lead to a loss of SEK 200 million or more.*

[2] *Tracking error and information ratio are key figures to indicate risk levels in management. Tracking error is closely related to information ratio and is calculated by taking the standard deviation in returns over a given period and multiplying by the square root of the number of observations during the period.*

Risk limits for active management of foreign currency debt

Nominal amount of actively managed debt	SEK 200 billion
Maximum VaR allowed	SEK 220 million
Currencies allowed	Euros, US dollars, Japanese yen, British pounds, Swiss francs, Norwegian kroner, Danish kroner
Maximum position allowed in the foreign exchange market	Net +/– 6 percent of managed amount
Maximum position allowed in fixed income market related to duration	A net interest rate position in an individual currency may affect duration of the total debt by a maximum of 0.4 years. All net interest rate positions may affect duration of the total debt by a maximum of 0.6 years.

- *knowledge and information,* access to information and the possibility of transfer of external managers' experience and expertise.

According to a decision by the Board, today the Debt Office may engage up to six external managers, which may each manage up to SEK 8 billion. The total amount under external management may not exceed SEK 40 billion. The number of external managers should be at least three at any given time. In practice, external management follows the same guidelines as the Debt Office's own management.

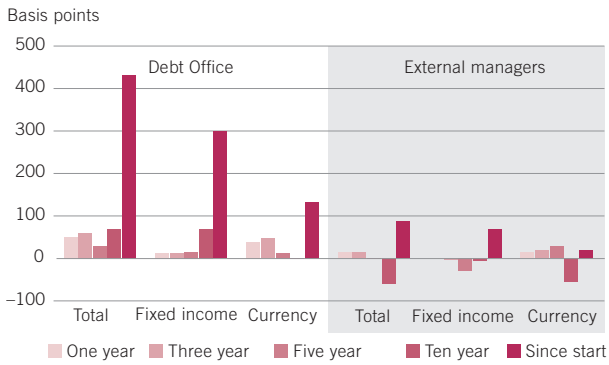
External managers may enter into transactions in the same currencies as the Debt Office. The instruments they may use are somewhat fewer. All transactions are carried out by the Debt Office's own traders, based on telephone instructions from the external manager.

The Debt Office is currently working with five external managers: ABN Amro, Blackrock, Goldman Sachs, Pimco and State Street Global Advisors. Two managers that did not live up to the Debt Office's return requirements were replaced during 2003. All five current managers carry out management based on a debt amount equivalent to SEK 6 billion. This externally managed sum, SEK 30 billion, reduces the amount of foreign currency debt that the Debt Office itself actively manages from SEK 200 billion to SEK 170 billion. The managers' and the Debt Office's performance is reported regularly to the Board. They are also presented in the Annual Report.

The return on active management

The return on active management in Swedish kronor is calculated in absolute terms according to international standards. It is also expressed in relation to the managed amount. It is then presented as a percentage of the managed amount, in order to make the connection to interest costs visible in a simple way and to make possible a comparison with the external managers.

Figure 1 Return on active management: totals for various periods in basis points



The Debt Office

Since the external management programme was started in 1992, the Debt Office has been able to show accumulated savings equivalent to 36 basis points on the managed amount per year. This is equivalent to about SEK 12 billion over the entire period. This positive outcome is mainly attributable to the first five-year period and to the past two years of management. The intervening period in the late 1990s showed a small negative return. The return in 2003 was a saving of SEK 880 million, equivalent to 51 basis points of the managed amount. Two thirds of the total saving came from positions in the fixed income market and one third from foreign exchange positions. Over the past three years, however, most savings have been generated in the foreign exchange markets. A presentation of annual returns since 1992 can be found in Table 1 below.

Table 1.
Return on active management during 1992-2003 in basis points

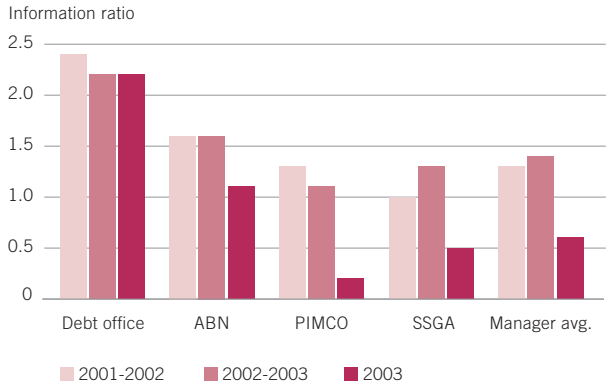
	Debt Office			External managers		
	Total	Fixed income	Foreign exchange	Total	Fixed income	Foreign exchange
1992	40	20	20	46	23	23
1993	324	212	112	102	51	51
1994	–60	–37	–23	–77	–46	–31
1995	51	58	–7	–4	36	–40
1996	37	19	18	27	1	26
1997	–2	–5	3	14	13	1
1998	14	19	–5	–19	20	–39
1999	–16	–1	–15	–34	–29	–5
2000	–16	3	–19	16	2	14
2001	–2	2	–4	–12	–4	–8
2002	11	–2	13	14	0	14
2003	51	13	38	14	0	14
Total period	432	301	131	87	67	20

In the financial market, a frequent way of reporting management performance is in basis points, or one hundredths of a per cent of the managed amount. A saving of 50 basis points thus means a saving of one half percentage point.

The external managers

Looking at the entire period, the external managers also showed a positive return, but not really on a par with the Debt Office's own management. Overall savings since 1992 amounted to 7 basis points on the managed amount per year, which is equivalent to about SEK 100 million. In external management, too, most savings came from positions in the fixed income market

Figure 2. Risk-adjusted return on active management during the period July 2001 to December 2003



Risk-adjusted outcome

The information ratio[3] is a widely used measure for reporting risk-adjusted return. It shows the relationship between the return on management and the risk taken to achieve this return. A high value means that the active risk that the manager took yielded a good positive return on average.

Figure 2 shows the risk-adjusted return over the past two and a half years for the Debt Office and the three external managers that were active throughout the period. As the figure indicates, the Debt Office has by far the best risk-adjusted return during the period July 2001 to December 2003.

Viewed over a ten-year period from 1994 until today, the risk level in active management (volatility in total return), measured only as annual standard deviation[4], has consistently been lower for the Debt Office than for the external managers. The monthly standard deviation in return has averaged 0.22 per cent for in-house management. The corresponding figure for external management is 0.30 per cent. One explanation for the lower risk level in the Debt Office's own management is the size of the managed amount. The Debt Office's very large portfolio makes it difficult to quickly establish and unwind large market positions, especially in small markets such as Norwegian kroner or Swiss francs. The external managers did not struggle with these limitations.

Lars Boman
Deputy Head of Portfolio Management

[3] *The information ratio is return divided by the volatility (standard deviation) in this return.*

[4] *Calculated on the basis of monthly data.*

New risk indicator for central government debt – Cost-at-Risk

The Swedish National Debt Office's calculations show that relative Cost-at-Risk for the central government debt, given its current size and structure and looking ahead one year, is around SEK 15 billion. This is equivalent to nearly one per cent of Swedish GDP. Every SEK billion in unexpected increase in the borrowing requirement will result in a cost increase of nearly SEK 100 million in a one-year perspective.

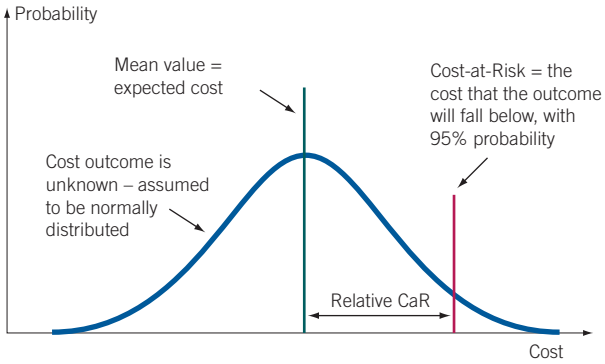
Relative Cost-at-Risk shows how much higher than expected the costs of the government debt may be one year ahead, with a certain probability. The expected costs are based on a situation in which interest rates and currency exchange rates are unchanged and the inflation rate is two per cent, in keeping with the target of the Riksbank (Sweden's central bank).

Cost-at-Risk can be regarded as a supplementary indicator to the Debt Office's duration target. The duration target states average maturity and reflects the long-term trade-off between costs and risks. CaR provides an estimate of the risk that costs will rise sharply in the short term.

During 2003, the Debt Office developed an analytical method for approximating relative Cost-at-Risk for Swedish central government debt. Conceptually, however, Cost-at-Risk is not new. Danmarks Nationalbank (the Danish central bank) has used CaR in its debt management for several years. Bank of Canada has recently conducted studies on CaR for Canada´s central government debt. The Debt Office's simulation model from 2000 also used CaR-based risk measures.

What is Cost-at-Risk?

Cost-at-Risk (CaR) is a statistical measure of risk. The method and assumptions for CaR are, in principle, the same as for Value-at-Risk (VaR), which the Debt Office – like many others – uses to govern active portfolio management. Both measures are based on statistical relationships and assumptions about normally distributed and correlated financial variables.



Cost-at-Risk is the cost below which the outcome will end up with 95 per cent probability.

The biggest difference between VaR and CaR is what outcome parameter they focus on. In its VaR calculations, the Debt Office measures the risk that the market value of the debt will climb. In its CaR calculations, the Debt Office measures the risk that the current interest costs of the debt will rise without regard to market value effects. Another difference is that CaR is usually calculated using a longer time horizon than VaR. For CaR, a normal time horizon is ten years, while for VaR it is usually shorter than one month. However, VaR and CaR are often stated using the same confidence level, 95 per cent.

Like VaR, CaR can be calculated in several ways. One common method for CaR is to simulate future trends in interest rates, exchange rates etc and calculate the costs of various borrowing strategies a number of years ahead for each scenario. CaR is then measured as the five per cent worst outcomes for a given period.

The method the Debt Office developed during 2003 is not based on simulations, but on an analytical approximation, which is described in the next section.

An analytical approximation of relative Cost-at-Risk

In principle, there are three risk factors for the cost of debt: the interest rate, the exchange rate and inflation. Changes in the interest rate affects the cost of all types of debt, while exchange rate changes and accelerating inflation only affect the cost of foreign currency debt and inflation-linked debt, respectively.

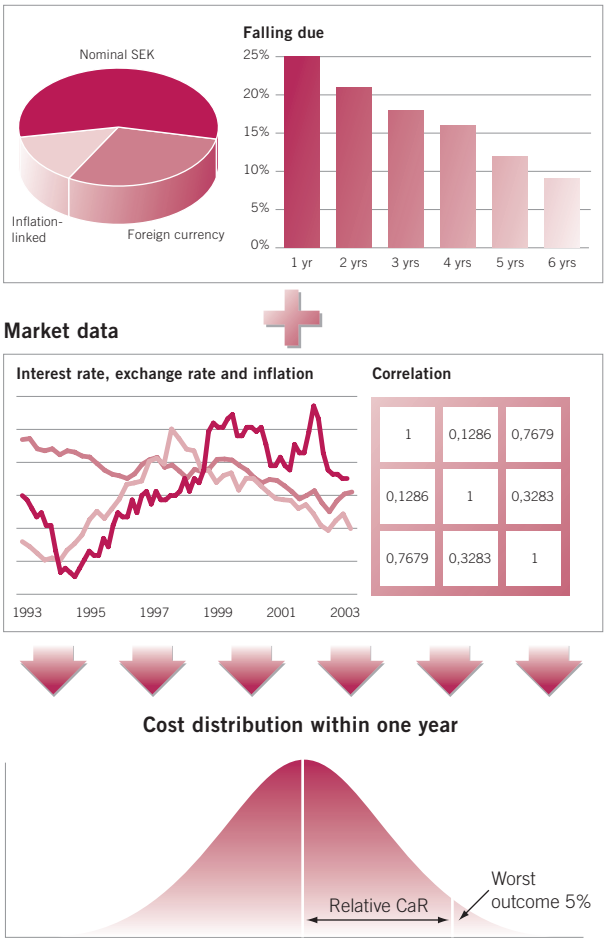
If the *interest rate* climbs, average interest on the debt rises by the increase in the interest rate multiplied by the portion of the debt whose interest rate is refixed. In this simple model, Swedish and foreign interest rates are assumed to be perfectly correlated, while real interest rates are assumed to vary half as much as nominal ones.

If the *krona* weakens during a year, coupon payments on the foreign currency debt rise, measured in Swedish kronor. In addition, the Debt Office realizes a larger (smaller)

exchange loss (exchange gain) on the portion of the foreign currency debt that falls due.[1]

If *inflation* is higher than expected during the year, coupon payments on inflation-linked debt rise. In addition, more inflation compensation is realised on the portion of inflation-linked debt that falls due.

On the basis of how much falls due during the coming year, the percentage of inflation-linked and foreign currency debt in the total debt and the average coupon on the debt, we can calculate how much the costs rise for one unit of increase in each risk factor. With the help of historical, option-implied or assumed variances and relationships between factors, we can then calculate confidence intervals for cost upturns. In other words, in this way we can arrive at an *analytical approximation* of relative Cost-at-Risk.



On top of financial variables, we can add unexpected increases in the primary borrowing requirement. Such increases are assumed to be financed according to how the debt is structured from the beginning.

[1] *By cost, we are referring here to economic costs. One difference compared to cash-basis costs is that exchange losses are considered realised when the loans fall due, regardless of whether the Debt Office refinances the loan or not. If the approach were instead cash-basis, we would instead look at the share that is repaid rather than the share that falls due.*

Relative Cost-at-Risk with various assumptions

The table below shows 95 per cent relative Cost-at-Risk (RCaR) looking ahead one year for the current debt portfolio, with various assumptions concerning risks and co-variations between interest rates, exchange rates and inflation. It also shows how an (unexpected) deterioration in the primary balance affects RCaR.

Relative Cost-at-Risk in a one-year perspective with 95 per cent confidence (SEK billion)

	Primary balance	
Based on	As expected	SEK 20 bn worse
Historical data		
1994 - 2002	13.7	15.2
1994 - 1997	16.3	18.1
1998 - 2002	10.6	11.8
Market data		
September 2003	14.1	15.5

Relative CaR for the central government debt is around SEK 15 billion. If we add the risk that finances will deteriorate, RCaR rises by about 10 per cent.

If the period 1994–2002 is assumed to be representative of the immediate future, there is a five per cent risk that costs will be just under SEK 14 billion *or more* higher than calculated. For example, if the forecast for interest costs on the government debt is SEK 50 billion, there is a five per cent risk that interest payments will instead be SEK 64 billion *or higher*.

Since the first half of the period 1994–2002 was more turbulent than the second, the equivalent figure based on the period 1994–1997 would be more than SEK 66 billion, if the expected cost is SEK 50 billion.

The market-based figure is derived from the market's expectation of future rate movements (measured via option prices) and correlations for the past year. The RCaR figure is largely the same as based on the period 1994–2002.

Effects of a larger primary borrowing requirement

If the primary balance is SEK 20 billion worse than expected, RcaR increases by between SEK 1.1 and SEK 1.7 billion in a one-year perspective. If an increase in the primary borrowing requirement comes at the same time as interest rates, exchange rates and inflation perform unfavourably, there is a five per cent risk that the costs of the debt will be SEK 18 billion or more higher than forecasted. Note that these calculations are not based on any analysis of the probability that the primary borrowing requirement will rise.

Relative Cost-at-Risk varies with the structure of the debt

The above section analysed how relative Cost-at-Risk varies with different assumptions about the variance and cor-

relation of risk factors. Cost-at-Risk is also affected by the structure of the debt. For example, RCaR increases with the percentage of debt falling due yearly. As a rule, shorter maturity thus leads to higher risk.

RCaR also rises with the percentage of foreign currency debt in the total debt. This is because a larger percentage of the debt is subjected to variations in krona exchange rates, in addition to variation in interest rates.

By increasing maturity and reducing the percentage of foreign currency debt, RCaR can thus be decreased. The table presents RCaR for the current debt portfolio and three alternative portfolios.

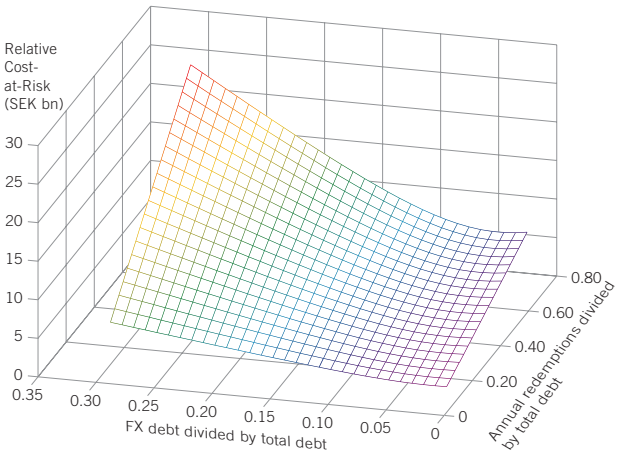
Relative Cost-at-Risk for different debt portfolios[1]

	% of debt falling due yearly		
FX debt as % of total	10%	14%	25%
10%			8.6
30%	6.7	8.8	**13.7**

[1] Based on the period 1994-2002.

Decreasing yearly maturities from 25 per cent to 14 per cent leads to a reduction of RCaR by one third. Decreasing the foreign currency debt to 10 per cent of total debt has the same effect, given an unchanged maturity profile. The table also shows that if the maturity profile is set as narrowly as 10 per cent per year, and foreign currency debt is kept at today's level, RCaR declines to SEK 6.7 billion.

The chart below shows relative Cost-at-Risk as a continuous function of foreign currency debt and yearly redemptions as percentages of total debt. Note that the percentages of redemptions and foreign currency debt have a mutually reinforcing effect on RCaR. The chart also reveals that the RCaR surface has a steeper slope the further from zero we move.



Larger foreign currency debt and larger yearly redemptions as a share of total debt have a mutually reinforcing effect on CaR. (Note: The chart is based on 12-month changes during the period 1997-2002.)

We can also note that, in principle, having foreign currency debt results in no diversification effect. This is partly because Swedish and foreign interest rates are assumed to be perfectly correlated in the model, which does not match reality. But another important explanation is that there is a significant exchange rate risk in foreign currency debt. In many cases, the exchange rate risk will overshadow the smaller diversification effect from interest rates.

Cost effects of reducing Cost-at-Risk via increased maturity

One way of decreasing Cost-at-Risk is thus to reduce annual redemptions as a percentage of total debt, which in principle is the same as lengthening the average maturity of the debt. Since the yield curve has a positive slope, longer borrowing maturity leads to higher expected costs.

In terms of borrowing, narrower maturity profiles require a larger percentage of long-term borrowing. For instance, the 14 per cent maturity profile in the example can be achieved if the Debt Office ceases to issue Treasury bills, but retains its current allocation between two-, five- and ten-year bonds. A ten per cent annual redemption requires that all borrowing occurs in ten-year bonds.

Duration and cost effects of changing the maturity profile[1]

	% of debt falling due yearly		
	10%	14%	25%
Duration increase (yrs)	1.1	0.4	0
Cost increase (SEK bn/yr)	3.2	1.0	0
Total cost 20 yrs	64	20	0

[1] The calculation is based on debt portfolios with stable maturity profiles and a linear yield curve with a one percentage point difference between a one- and ten-year maturity.

Decreasing the maturity profile from 25 to 14 per cent (increasing duration by 0.4 years) thus increases yearly interest payments by around SEK 1 billion. At the same time, RCaR decreases by SEK 5 billion. The yearly insurance premium against unexpected cost upturns thus looks relatively low.

But we must remember that the RCaR measure describes what will happen in an unfavourable situation that statistically (based on data from the period 1994–2002) occurs in one year out of twenty.

To be able to compare cost to risk, we must therefore add up the costs over the entire twenty-year period. The resulting picture is that a lengthening of duration by 0.4 years leads to a total cost increase of SEK 20 billion. When the risk scenario occurs, costs increase by approximately SEK 5 billion less than with the shorter maturity. In actuality, it is thus expensive to decrease risk by lengthening maturity.

Cost-at-Risk in relation to the budget balance

The current central government debt has a relative Cost-at-Risk of around SEK 15 billion in a one-year perspective. Is this a lot or a little? Ultimately, this is a question for the Government

and the Riksdag (Swedish Parliament) to address, based on how much risk they are willing to take in central government debt management. We can examine this risk by relating the figure to GDP and budget restrictions.

Fifteen billion kronor is equivalent to less than one per cent of today's Swedish GDP. According to European Union rules, the deficit in public sector financial savings may not exceed 3 per cent of GDP. The National Institute of Economic Research forecast in June 2003 for financial savings in 2004 is a surplus of 1.1 per cent of GDP. Based on this simple RCaR calculation, there is thus nearly a five per cent risk that the surplus will instead be close to zero, due to climbing interest payments and weaker krona exchange rates.

How will the Debt Office use the CaR measure?

The analytical RCaR measure should primarily be regarded as a simple, intuitive way of describing the financial risk in central government debt. We believe that RCaR will be a good point of departure for discussions on the (short-term) costs and risk characteristics of the debt and will make such discussions easier.

Relative Cost-at-Risk is also a good complement to the debt duration target that the Debt Office works with. The duration target reflects the long-term trade-off between cost and risk. However, it does not capture the risk that costs of the debt will increase in the short term. This is because duration cannot be connected unambiguously to debt allocation among various maturities and that no probability calculations are connected to the duration measure.

However, the long-term structure of the debt should not be based on the CaR measure presented here. This measure is based on simplified assumptions and has a short horizon. Furthermore, and perhaps most importantly, in its current form the measure is entirely nominal and does not take into account how the costs of the debt co-vary with the central government's revenues. Decisions on the structure of the debt should instead be based on analyses of the characteristics of the debt in a larger context and in a longer perspective.

Anders Holmlund
Head of Analysis

Equations for the analytical approximation of relative Cost-at-Risk

Effect on cost of an interest rate increase

$$\Delta c_r = \Delta r \times S(FP_{nom} \times (1 - w_{real}) + FP_{real} \times w_{real} \times 0{,}5)$$

where Δc_r = cost increase in SEK billion
Δr = change in interest rate
S = central goverment debt in SEK billion
FP = maturity profile
w = percentage (expresses as decimal)
nom = sub-index for nominal debt
$real$ = sub-index for inflation-linked debt

Note: Real interest rates are assumed to move half as much as nominal rates (thus the 0.5 factor in the equation).

Effect on cost of a weaker krona

$$\Delta c_{FX} = \Delta FX \times w_{FX} \times S \times (K_{FX} + FP_{nom})$$

where ΔFX = change in krona exchange rate (weakening)
K = coupon
FX = sub-index for foreign currency debt

Effect on cost if inflation is higher than expected

$$\Delta c_{\pi} = (\pi - \pi^e) \times w_{real} \times S \times (K_{real} + FP_{real})$$

where π = actual inflation
π^e = expected inflation (in Sweden´s case 2 per cent)

Standard deviations for cost variation per risk factor

$$\sigma_c^r = \frac{\Delta c_r}{\Delta r} \times \sigma_r$$

$$\sigma_c^{FX} = \frac{\Delta c_{FX}}{\Delta FX} \times \sigma_{FX}$$

$$\sigma_c^{\pi} = \frac{\Delta c_r}{(\pi - \pi^e)} \times \sigma_{(\pi - \pi^e)}$$

where σ_c^r = standard deviation in cost variation due to interest rate movements
σ_r = standard deviation in interest risk factor

Overall risk for the debt portfolio

$$\sigma_C = [\sigma^T \Omega \sigma]^{1/2}$$

where Ω = correlation matrix for risk factors

$$\sigma = \begin{bmatrix} \sigma_c^r \\ \sigma_c^{FX} \\ \sigma_c^{\pi} \end{bmatrix}$$

Please find more information and an example in *An analytical approximation of relative Cost-at-Risk,* the Swedish National Debt Office, 2003.

Market information

Source: The Swedish National Debt Office, unless otherwise stated

Swedish government debt

Nominal Treasury bonds, outstanding volumes, January 31, 2004

Maturity date	Coupon %	Loan. no	SEK M
2005-02-09	6.00	1035	69,294
2006-04-20	3.50	1044	79,597
2006-08-15	8.00	1037	65,300
2008-05-05	6.50	1040	54,783
2009-01-28	5.00	1043	87,417
2011-03-15	5.25	1045	45,532
2012-10-08	5.50	1046	49,853
2014-05-05	6.75	1041	84,082
2020-12-01	5.00	1047	13,999
Total benchmarks			**549,857**
Non-benchmarks			**2,403**

Treasury bills, outstanding volumes, January 31, 2004

Maturity date	SEK M
2004-02-18	33,683
2004-03-17	68,568
2004-04-21	25,018
2004-06-16	50,008
2004-09-19	45,004
2004-12-23	25,000
2005-03-16	10,001
2005-06-15	10,001
Total Treasury bills	**296,361**

Inflation-linked Treasury bonds (outstanding amount), January 31, 2004

Maturity date	Coupon %	Loan. no	SEK M
2004-04-01	–	3002	3,298
2008-12-01	4.00	3101	31,540
2014-04-01	–	3001	19,901
2015-12-01	3.50	3105	49,535
2020-12-01	4.00	3102	31,545
2028-12-01	3.50	3103	3
2028-12-01	3.50	3104	36,054
Total inflation-linked bonds			**171,878**

Rating

	Debt in SEK	Foreign currency debt
Moody's	Aaa	Aaa
Standard & Poor's	AAA	AAA

Nominal Treasury bonds, auction dates

Announcement date	Auction date	Settlement date
2004-02-18	2004-02-25	2004-03-01
2004-03-03	2004-03-10	2004-03-15
2004-03-17	2004-03-24	2004-03-29
2004-03-31	2004-04-07	2004-04-14
2004-04-14	2004-04-21	2004-04-26
2004-04-28	2004-05-05	2004-05-10
2004-05-11	2004-05-18	2004-05-24
2004-05-26	2004-06-02	2004-06-07
2004-06-09	2004-06-16	2004-06-21
2004-06-23	2004-06-30	2004-07-05
2004-07-28	2004-08-04	2004-08-09
2004-08-11	2004-08-18	2004-08-23

Treasury bills, auction dates

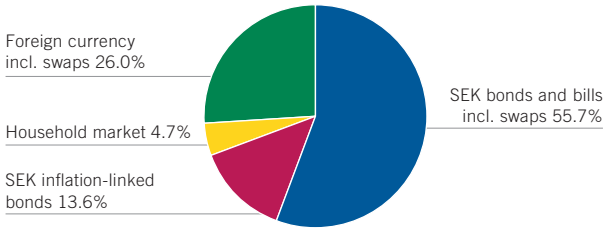
Announcement date	Auction date	Settlement date
2004-02-25	2004-03-03	2004-03-05
2004-03-10	2004-03-17	2004-03-19
2004-03-24	2004-03-31	2004-04-02
2004-04-07	2004-04-14	2004-04-16
2004-04-21	2004-04-28	2004-04-30
2004-05-05	2004-05-12	2004-05-14
2004-05-19	2004-05-26	2004-05-28
2004-06-02	2004-06-09	2004-06-11
2004-06-16	2004-06-23	2004-06-28
2004-06-30	2004-07-07	2004-07-09
2004-07-21	2004-07-28	2004-07-30
2004-08-04	2004-08-11	2004-08-13
2004-08-18	2004-08-25	2004-08-27

Inflation-linked Treasury bonds, auction dates

Announcement date	Auction date	Settlement date
2004-02-26	2004-03-04	2004-03-09
2004-03-11	2004-03-18	2004-03-23
2004-03-25	2004-04-01	2004-04-06
2004-04-08	2004-04-15	2004-04-20
2004-04-22	2004-04-29	2004-05-04
2004-05-06	2004-05-13	2004-05-18
2004-05-19	2004-05-27	2004-06-02
2004-06-03	2004-06-10	2004-06-15
2004-08-19	2004-08-26	2004-08-31

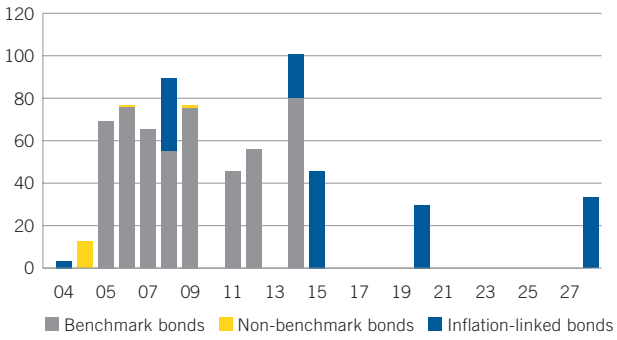
Debt structure

Total debt SEK 1,265 SEK billion January 31, 2004



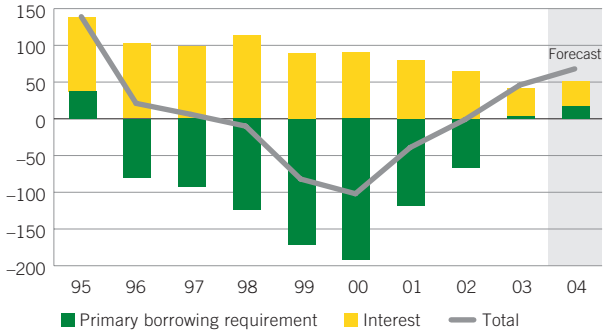
Maturity profile, SEK nominal and inflation-linked bonds

SEK billion January 31, 2004



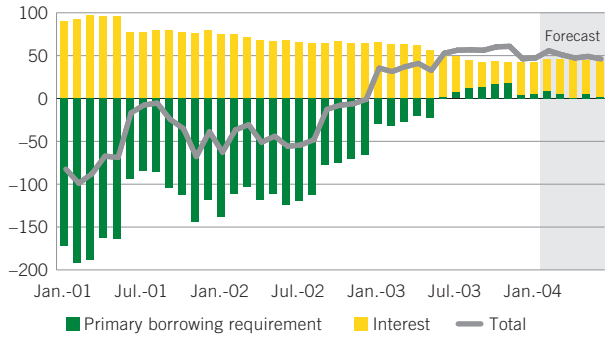
Central government borrowing requirement, 1995–2004

SEK billion



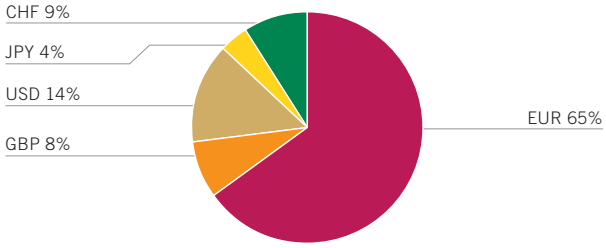
Swedish government borrowing requirement, 12 months

SEK billion



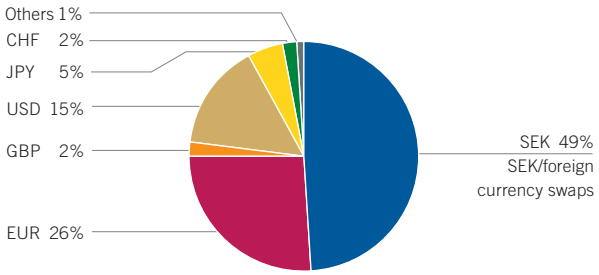
Benchmark, foreign currency debt

January 31, 2004



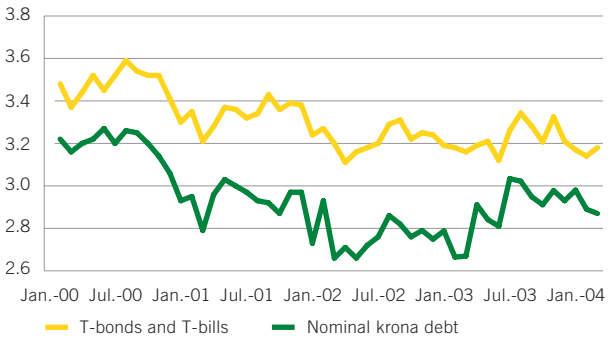
Funding in foreign currencies

January 31, 2004



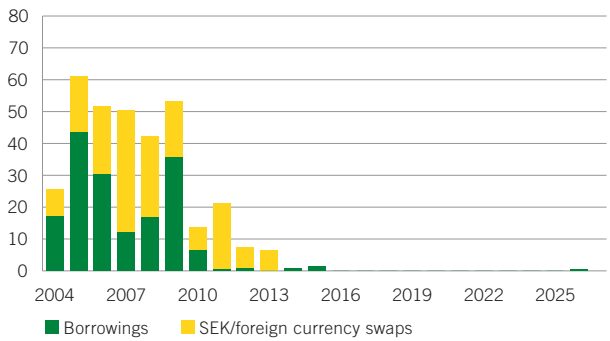
Duration of nominal debt

Years

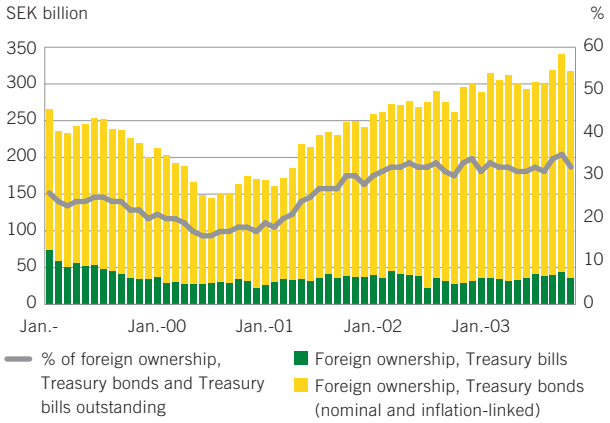


Maturity profile, foreign currency loans excl. callable bonds

SEK billion January 31, 2004

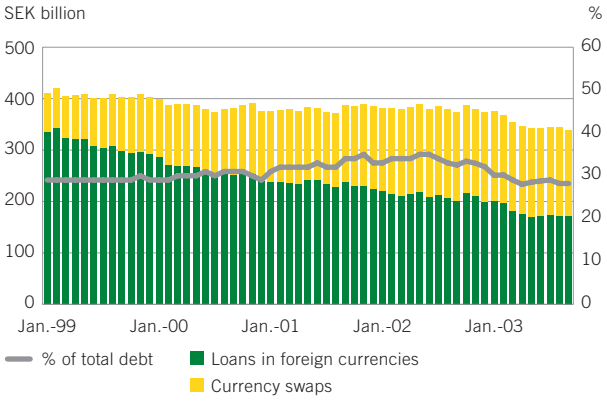


Foreign ownership of Treasury bonds and Treasury bills



Source: The Riksbank

Central government debt exposure in foreign currencies

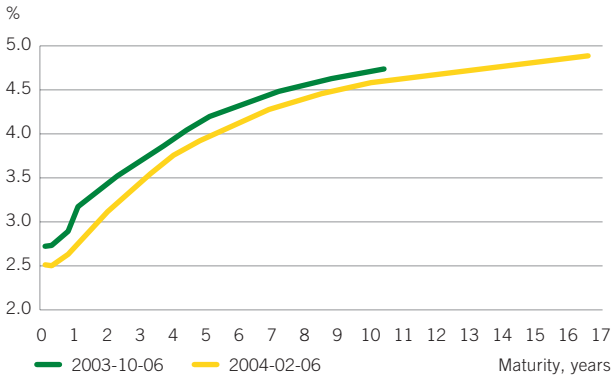


Source: The Riksbank

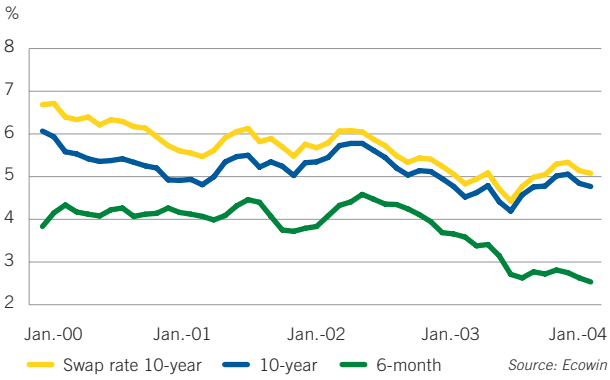
Financial markets

All values up to January 31, 2004

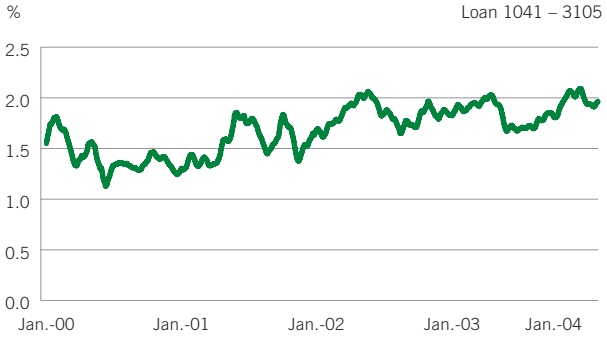
Yield curve, Swedish government securities



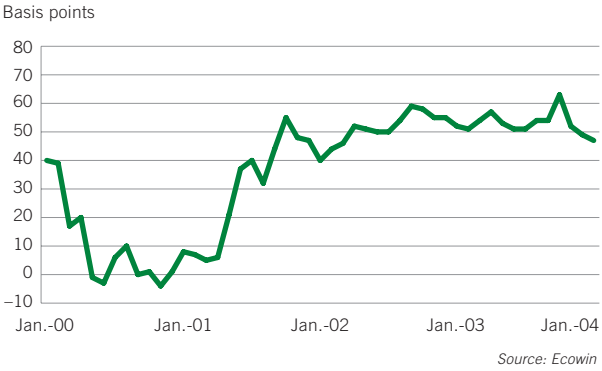
Interest rate developments



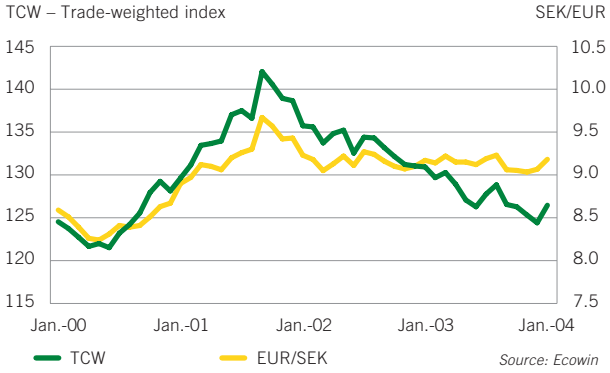
Break-even inflation



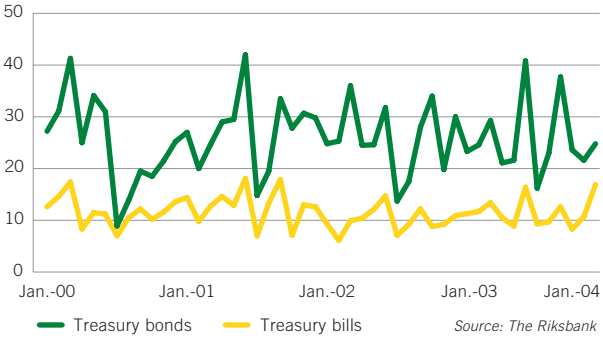
Interest rate spread vs Germany – 10-year



Historical exchange rates



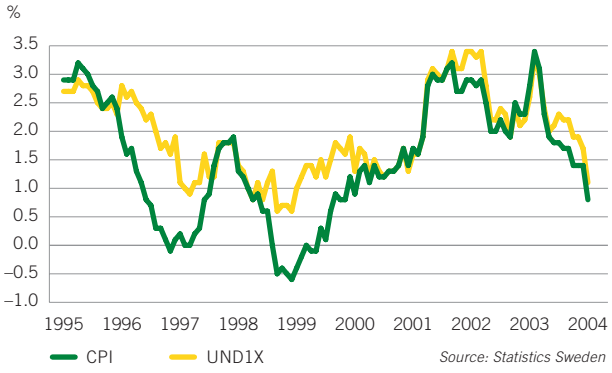
Trading volume, Swedish government securities



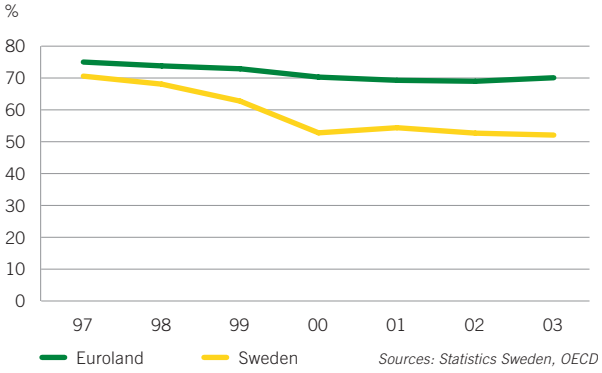
Swedish economy

All values up to January 31, 2004

Inflation indeces: UND1X and CPI in Sweden 1998–2004



General government debt in relation to GDP according to the Maastricht criteria



National accounts

Percentage change Supply and demand			2002	2003	2004	2005
Gross domestic product[1]			1.9	1.3	2.2	2.5
Imports			–2.5	4.7	5.7	7.6
Household consumption expenditure			1.5	1.9	2.7	3.0
Government consumption expenditure			3.2	0.9	0.2	0.3
Gross fixed capital formation			–3.0	–2.0	1.2	5.3
Stock building			–0.2	–0.1	0.2	0.0
Exports			0.2	5.7	5.9	6.5
Selected statistics	**Sep.-03**	**Dec.-03**	**2002**	**2003**	**2004**	**2005**
CPI, year-on-year		1.4	2.4	2.0	0.7	1.8
Unemployment rate		5.1	4.0	4.8	5.4	5.0
Current account	6.3		4.4	4.7	5.3	5.4

[1] *SEK 2,340 billion (current prices 2002).*

Sources: Statistics Sweden, The Riksbank. Forecasts: National Institute of Economic Research.

Primary dealers

	Telephone	Reuter-page
ABN Amro Bank NV	+46-8-506 155 00	PMAA
Danske Consensus	+46-8-568 808 44	PMCO
E Öhman J:or Fondkommission AB	+46-8-679 22 00	PMOR
FöreningsSparbanken	+46-8-700 99 00	PMBF
Nordea	+45-33-33 17 58	PMUB
SEB	+46-8-506 23 151	PMSE
Svenska Handelsbanken AB (publ)	+46-8-463 46 50	PMHD

The next issue of *Central Government Borrowing: Forecast and Analysis* will be published on Wednesday, June 16, 2004, at 9.30 am.

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