

Central Government Debt Management – Proposed Guidelines



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Summary

In this memorandum, the Swedish National Debt Office submits to the Swedish Government its proposal for guidelines for the management of central government debt. The proposal is based on the legally mandated goal of government debt management, which is to minimise long-term costs while taking into account the risks inherent in such management and the constraints imposed by monetary policy.

Long-term cost minimisation should be based on debt management guidelines that state a more strategic direction for the structure of central government debt. The Debt Office therefore proposes that in this year's decision, the Government should state guidelines that extend several years ahead. Due to the size and nature of the debt, any large-scale changes must be implemented in stages over a number of years. It is therefore essential to have a strategic direction for central government debt policy as a source of guidance for the annual Government decisions, for the Debt Office's actions in its day-to-day debt management and for market participants. This proposal is based on assessments of what is an appropriate long-term central government debt policy. Consideration of short-term movements in the Swedish krona (SEK) exchange rate or domestic interest rates should not influence either the guidelines or the actions of the Office in managing the debt.

The main points of the proposal can be summarised as follows:

- The share of *foreign currency loans* in Sweden's total central government debt should be reduced in the long term. Over the next few years, the foreign currency debt should be amortised at SEK 35 billion per year, with an interval of SEK ± 15 billion around this benchmark.
- The share of *inflation-linked loans* in the total central government debt should increase in the long term. The pace of this increase should be decided with due consideration to the trend of demand.
- The remainder of the central government's gross borrowing requirement should be covered by *nominal krona-denominated (SEK) loans*.
- *The maturity* (measured as duration) of total nominal SEK and foreign currency debt should be kept unchanged at 2.7 (± 0.3) years. Inflation-linked borrowing should occur in long maturities.
- *The maturity profile* of central government debt should be such that a maximum of 30 per cent of the debt falls due within the next twelve months.

The important change that the Debt Office is recommending is a long-term reduction in the foreign currency share of the government debt. The Office also recommends that the share of inflation-linked loans in the total debt should increase. The increase in the share of inflation-linked debt must take into account the growth in the market. Since the Debt Office is proposing that

foreign currency debt should decrease at a faster pace than inflation-linked debt can probably increase, the proposal implies a certain long-term increase in the proportion of nominal SEK debt. The proposal refers to the direction of changes in the structure of the debt, since the Office believes it would not be appropriate at this stage to try to fix a percentage target for the structure of the debt.

There are several reasons for this shift from foreign currency debt to nominal and inflation-linked SEK debt. First, by decreasing the share of foreign currency debt when its finances are good, the Swedish central government can renew the option of enlarging its foreign currency loan portfolio again if the borrowing requirement should increase. Second, foreign currency debt is more risky than SEK debt. One reason is that central government revenues are SEK-denominated, so that foreign exchange losses in government debt are not offset by gains elsewhere in the central government. Another reason is that in a stable economic environment, SEK interest rates will conceivably follow the movements of the Swedish economy in a way that makes SEK debt relatively cheap when the economy is growing slowly and the government's finances are therefore strained. If the krona also tends to be weak during these periods, a large foreign currency debt may help amplify the swings in government finances. Foreign currency debt is thus more risky, while in the long term there is no reason to expect systematic differences in the costs of SEK or foreign currency debt.

The proposal to amortise SEK 35 billion per year should be seen in light of the significant increase in the foreign currency share of central government debt at the beginning of 2001, due to the transfer of SEK-denominated government and mortgage bonds from the National Pension Fund (AP Funds). With a reduction of SEK 35 billion per year, the foreign currency share will not drop below 30 per cent, its initial level, until 2002. The SEK ± 15 billion interval around the benchmark is intended mainly to allow scope for adjusting the pace of amortisation to changes in the borrowing requirement.

As for the maturity of government debt, the Debt Office proposes no change. A shorter maturity would probably mean lower long-term costs, but in the view of the Debt Office, the savings are minor in the maturity intervals that are reasonable, given that management risk must not increase too much. Excessively short-term debt is also unfavourable if government finances should suddenly deteriorate, since the borrowing requirement would then climb while the government has large refinancing needs. Weighing costs against risks, there is thus no reason to change the maturity of the debt.

1 Introduction

In this memorandum, the Swedish National Debt Office presents its proposed overall guidelines for the management of central government debt, as provided by the instruction for the Debt Office (1996:311). This proposal is based on the goal formulated in 5 § of the Act (1988:1387) on State Borrowing and Debt Management. This says that central government debt shall be managed in such a way as to minimise the long-term cost of the debt while taking management risk into account, and that management shall occur within the constraints imposed by monetary policy.

The memorandum is organised as follows. In Section 2, the Debt Office discusses the goals of government debt management. The main question is how to interpret the concept of risk as formulated in the goal. Section 3 deals with the direction of central government debt management, with an emphasis on the principles for managing SEK-denominated debt. In Section 4, the Debt Office presents quantitative analyses of the association between the costs and risks of the government debt and the structure of this debt. The Office presents its proposed guidelines in Section 5. At the end of the memorandum, the Office raises some issues concerning the control and evaluation of government debt management.

2 The goal of government debt management

2.1 Background

Finding the right points of departure and mechanisms for controlling and evaluating government debt management is a long-term process. Approaches and methods must be tested in practice and reassessed in light of lessons learned. New ideas and analyses must also be allowed to influence the organisation of the guidelines and of debt management. This open attitude is expressed in the Government bill (1997/98:154) which laid the groundwork for the new governance system for government debt management. It has also permeated both of the previous guideline proposals as well as the Government's decisions on these guidelines.

One area in which no final position has been adopted is the issue of how to interpret the concept of *risk*. When stating its goal as long-term cost minimisation while taking risk into account, the Government noted that a *real-term* approach to costs and risks seemed the most correct from the standpoint of economic principles. In its bill, however, the Government noted that methods for measuring risk in real terms are relatively undeveloped. The Government reached the conclusion that it is too early to express its goal in real terms, but that it is conceivable to switch to real-term measures of risk in the future. The Government also announced that it would initiate a special study to analyse the definition and measuring of risk in central government debt management. While awaiting further analysis, the guidelines for

government debt management have been based, in principle, on a *nominal* approach, i.e. risk has been viewed synonymous with variations in the direct nominal costs of the debt.

The Government has not appointed a study commission on how to approach risk in central government debt management. The Debt Office thus finds reason in this year's proposed guidelines to present certain new thoughts concerning the risk concept in government debt management. These arguments have emerged within the Debt Office, partly inspired by reports from the World Bank and the IMF (to which the Debt Office also contributed) that discuss general principles for organising central government debt management.¹ The analysis indicates that risk in central government debt management should be defined in terms of how the debt contributes to variations in central government finances, measured in terms of both the budget balance and the central government's balance sheet.

2.2 Definition of risk in government debt management

2.2.1 Real-term risk concepts in government debt management

According to the Act (1988:1387) on State Borrowing and Debt Management, government debt shall be managed in such a way as to minimise its long-term cost, while taking into account the risk inherent in management. As noted above, the preliminary point of departure has been that cost shall be measured in nominal terms. The primary risk concept has thus been the risk that the cost, measured in nominal terms, will deviate from the expected outcome. In last year's proposed guidelines, the Debt Office argued that the nominal cost should be measured as a (weighted) average of the yields to maturity at which the debt was incurred, also referred to as "running yield". The question of how to define analogous real-term cost and risk concepts has not been analysed in detail by the previous proposed guidelines and Government decisions on guidelines. Certain observations can be made, however.

Expected real cost can be defined as expected nominal cost minus expected inflation (according to a yardstick). Given that government debt policy does not affect the inflation yardstick that is used, the choice between nominal and real-term measurement does not determine the ranking of debt portfolios in terms of expected cost, but only the risk yardstick. The risk is related to the variance in the cost. For the real-term measure, the variance depends on the co-variation between nominal cost and inflation, which cannot be assumed *a priori* to be zero. A measure of real-term risk can thus conceivably lead to different assessments of how debt should be structured, even though the debt portfolio that minimises expected nominal cost also minimises real-term cost.

It is not obvious what price index should be used to measure real-term costs of central government debt. It is probably not reasonable to use the consumer price index (CPI). The CPI is designed as a "compensation index" to measure how the consumption capacity of a representative household is affected by

¹ See "Draft Guidelines for Public Debt Management", IMF and World Bank, August 2000.

general price changes. If the purpose is to measure in a corresponding way how the central government's real costs are affected by inflation, the relevant index must have a structure equivalent to that of the government's price level-dependent expenditures. One alternative would be a yardstick equivalent to the public sector consumption deflator in the National Accounts. However, when assessing risks, it would be misleading merely to take into account how inflation affects the costs of central government consumption. First, the central government has other expenditures that are dependent on price levels, especially transfer payments. Second, central government income, especially tax revenues, is also affected by inflation.

The Debt Office believes that this argument indicates that real-term risks in central government debt management must be interpreted in a more comprehensive way than by using an inflation yardstick to adjust the nominal costs of government debt. A broader approach is necessary in order to find an economically meaningful risk concept. Debt management must be placed in the context of government finances. Other sources of uncertainty about government finances besides inflation must also be taken into account.

2.2.2 Government financial risks in an ALM perspective

In the financial literature, one source of inspiration in the search for an adequate risk concept for government debt management is found in the analysis of principles for handling financial risks, which were developed primarily for such financial service companies as banks and insurance companies. The point of departure there is that risks can be minimised by matching the characteristics of a company's debts with those of its assets. This fundamental observation has been developed and refined as part of a system called "asset and liability management" (ALM), which analyses the characteristics of assets and liabilities as part of an integrated framework.

To a bank, for example, this means that its portfolio is protected from market risk if the bank makes sure that the maturity profile and currency structure of its assets and liabilities are identical. In addition, banks take credit risks. A complete ALM analysis takes into account how credit and market risks are related. Based on an ALM analysis, a bank may choose to take certain risks by deviating from matching. The difference between the value of the bank's assets and liabilities determines the value of its shareholders' equity.

An ALM analysis enables a company to gain an overall picture of the risks in its balance sheet. Both assets and liabilities are viewed as magnitudes that can be influenced, within the limits of the strategic objectives of company operations. One current Swedish application is that the four new buffer funds in the Swedish National Pension system (the AP Funds) will each perform an ALM analysis as the basis for decisions on their respective structures. The aim of this analysis is to develop an asset portfolio that matches the AP Funds' obligations as buffer funds in the pension system.

The Swedish central government differs from a company in important respects. An ALM approach is nevertheless applicable as a conceptual

framework for analysing government finances and debt management. For the government, too, the point of departure is that a risk arises when there is a mismatch between the characteristics of assets and liabilities. The assets of the government consist primarily of future tax revenues. Aside from the debt, its liabilities consist of other financial obligations in the form of guarantees etc. as well as future expenditure obligations.

Government income and expenditures depend on overall economic developments, both in terms of growth and economic cycles, and on how this influences interest and exchange rates. There is great uncertainty about such events. In principle, the government can try to decrease its risks by choosing a debt portfolio with such characteristics that costs are affected in the same way by economic fluctuations as its primary surpluses. Such associations are not stable over time, however. Consequently, ALM thinking cannot be regarded as a ready-made solution that answers questions which could not be answered before.

Instead, the strength of an ALM approach is that it forces the decision maker to obtain a more comprehensive picture of government finances and thereby ask other questions. Clearly, risk administration as part of government debt management is not exclusively or even primarily a matter of decreasing the risk that government debt costs will rise. What is important from the standpoint of government finances is the risk that debt costs will be high during periods when government finances are strained for other reasons, or that the value of the debt will increase due to re-evaluations at times when the debt is already large and growing.

In practice, it is difficult to construct a complete balance sheet for the central government. Interest will thus probably focus mainly on the government's budget (or its financial savings, since national and EU-related budget policy targets are defined in terms of financial savings). In concrete terms, this means that a government debt portfolio that typically has low costs at times when the government's primary borrowing requirement (budget deficit excluding interest on debt) is large should be regarded as associated with low risk. Interpreted in balance sheet terms, a central government debt portfolio that typically keeps government debt from growing in value during periods when the borrowing requirement is large (thereby contributing to an increase in debt) is associated with low risk. Since exchange rate movements are the most important factor aside from borrowing requirements that change the value of the debt, a portfolio including a large share of foreign currency debt is thus relatively risky, to the extent that the value of the Swedish krona is assumed to be low in periods when the government debt is large.

Another interesting implication of the ALM approach is that it becomes clear that obligations in addition to the government debt must also be factored into the analysis. One example is government guarantees. Guarantees may be interpreted as contingent government debt, since if a guarantee must be honoured, money must be raised by means of increased government borrowing, which is added to government debt. Guarantees thus differ from conventional government debt only in that their future disbursement depends

on whether specific events occur. If one compares this with government foreign currency debt, where the disbursement in SEK terms is dependent on the exchange rate at maturity, it becomes clear that there is a difference in degree, rather than a difference in type, between loans and guarantees. When evaluating guarantees in an ALM perspective, it also becomes clear that a guarantee which is more likely to be honoured during periods when the government's borrowing requirement can be expected to be high, for example during a recession in Sweden, is more risky than a guarantee on behalf of an international organisation whose creditworthiness is presumably less affected by specifically Swedish conditions.

An integrated approach to government debt and guarantees also has implications for the management of the debt and guarantee portfolios. One example is that in a situation with such strained government finances that the risk level must be lowered, the government may consider correcting its risk exposure by changing the structure of its debt or by reducing its guarantee obligations. Co-ordination of explicit and deferred liabilities thus creates the prerequisites for more effective management. This approach also makes it even clearer that decisions to issue guarantees must be weighed against the collective resources that the government has at its disposal.

The Debt Office notes that the existing regulations do not make this connection between central government borrowing and guarantees. The Office is admittedly responsible for both government debt management and key portions of government guarantee management, but it handles them in separate systems and under distinct regulations. One important difference in these rules concerns their approach to risk. By law, government debt management must take risk into account. The main rule for the pricing of guarantees, in contrast, is that the fee shall cover the expected cost, which implies that risk should not be taken into account. Given that loans and guarantees are perceived as negative items in the same balance sheet, where costs must ultimately be covered by funds from the same source – future tax revenues – this difference is hard to justify.

For the reasons mentioned, guarantees are not formally part of the Debt Office's proposed guidelines on government debt management. The above arguments are aimed at illustrating an important consequence of broadening one's perspective in the analysis of government debt management, which in the view of the Debt Office also shows the strength of the ALM approach. Guarantee questions are, however, essential in themselves. The Debt Office may therefore approach the Government at a later date to discuss a change in the rules concerning guarantees, partly depending on how the continued discussion of an ALM-based approach to government debt management develops.

2.2.3 Connection to earlier analyses and discussions

The ALM approach as applied to government debt policy is similar to the analysis that led the Commission on Government Debt (STUP) to propose in its report (SOU 1997:66) tax rate smoothing as a goal of government debt

management. The Commission's analysis of "growth bonds", whose interest payments are positively correlated with the growth rate, can easily be translated into a call for matching, since such a connection means that government interest payments tend to be high during periods when tax revenues are high and vice versa.

One difference is that STUP went one step further by focusing on variations in tax rates rather than in budget balances and the size of government debt. This, in turn, is probably partly due to the fact that STUP was mainly inspired by a public finance approach. In the literature of fiscal theory, there are findings that point towards distortion effects – and thus macroeconomic costs – from variable tax rates. These findings may, from a theoretical standpoint, be more robust than the connections that can be made between variations, for example, in the budget balance and fundamental preconditions for macroeconomic efficiency. From a pedagogical standpoint, however, tax rate smoothing is not an especially successful concept.

For example, it is not self-evident that one can respond to a weakening of government finances with tax increases, since this would lead to the disappearance of tax bases, thereby counteracting attempts to restore order to government finances. In such a case, there is no adjustment in the formal tax rates, but instead in the level of public services and transfer payments. One can argue from a theoretical standpoint that many transfer payments function as negative taxes and that distortion effects are the same regardless of what instrument the government uses. However, the concreteness of the argument is partly lost.

It is also noteworthy that tax rate smoothing unequivocally focuses interest on avoiding variations in tax rates. With this as a goal, the costs of achieving the lowest possible risk are secondary. An ALM approach helps the decision-maker to define where the risks lie and to analyse what strategy would minimise these risks by indicating how to achieve a matching of assets and liabilities. However, the analysis *per se* provides no guidance about whether it is appropriate to choose a debt portfolio that minimises risks. To that extent, the approach is consistent with the goal of government debt management as currently formulated, which is to minimise costs while taking risks into account. The question of trade-offs between these considerations must, however, be assessed with the help of other criteria.

As in the case of tax rate smoothing, viewing risk minimisation as a principal goal of government debt management is a strong conclusion but it is also based on strong (not unobjectionable) assumptions. For example, taking into consideration constraints in the financial markets, it may prove unreasonably costly for the central government to issue debt instruments of a kind that will lead to minimal risk in the government debt portfolio. In that case, it is still not possible to avoid trade-offs between cost against risk. In practice, the decision maker thus ends up in the same decision making situation as when an ALM analysis is used as the starting point.

In light of this, a frame of reference that focuses interest on such financial magnitudes as budget balance and government debt seems more appropriate. Whether an ALM-based approach to risk in government debt management should be classified as “real-term” is primarily a semantic question, and as such is of limited interest in this context. The assumption that risk arises due to a deviation from matching is, however, self-evident in real economic terms. A development of the analysis in the direction sketched here could thus be said to agree with the preliminary arguments presented earlier, for example in the Government bill which introduced the current formulation of the goal (see Government bill 1997/98:154, especially pages 23–25).

2.3 Conclusions and implications for future work

In the view of the Debt Office, an ALM-based approach to central government finances provides an interesting and developable framework for the analysis of government debt management (as well as guarantee issues, for example). The question of how to formulate a relevant definition of risk for decisions on the structure of government debt may conceivably find an adequate answer here.

There is reason to emphasise that ALM should be perceived as a conceptual framework, rather than as an analytic tool. In an ALM application, analyses of the long-term trend of other budget components must be added to future interest rates and exchange rates. The question is how, aside from the costs of government debt, government income and expenditures can be assumed to co-vary – cyclically and structurally – with financial variables. With this broadening of perspective, the structure of government debt will thus be weighed as part of an analysis that, in principle, should include all factors affecting the budget balance and government debt. Given the long-term nature of the debt, both structural factors and characteristics that extend over one or more economic cycles should be taken into account, along with the possibility that unexpected shocks will appear. Meanwhile, the long planning horizon means that the analysis will be fraught with great uncertainty. Observed associations often turn out not to be valid in the future. This should not, however, be perceived as a shortcoming in the approach. These difficulties are fundamental and influence the characteristics of government debt regardless of whether they are taken into account or not. At the same time, a realisation of this complexity underscores the importance of humility when it comes to ambitions to use quantitative analytical methods to determine how government debt should be structured.

It is not possible to foresee how an ALM-based model of Swedish government finances should be organised or how far one can go in quantifying the relevant mechanisms. The simulation model that the Debt Office presents in Section 4, however, provides an opportunity to reflect portions of the relevant perspective. The model illustrates the costs of a government debt portfolio with a particular structure, given certain associations between how GDP, interest rates, exchange rates and borrowing requirements change over an economic cycle. By creating a model of GDP, it

is possible to study how the costs of debt as a percentage of GDP are affected by the structure of the government debt.

The Debt Office believes that the ALM approach can and should be developed further. It provides a conceptually reasonable framework for analysing government debt management. How far it is possible to carry this analysis in modelling terms is difficult to judge. There is genuine uncertainty regarding certain crucial relationships, and this means that no definite answers can be given. Yet models can be employed to organise and discipline one's thinking. The Office therefore intends to continue providing increasingly in-depth analyses in both qualitative and quantitative terms in its future proposals for guidelines.

3 Direction and organisation of debt management

3.1 Background

For a long time, the Debt Office has engaged in active position taking in the management of the foreign currency debt. For this purpose, its Board has established a benchmark portfolio. The Debt Office takes positions by deviating within stipulated limits from the debt structure – in terms of currencies and maturities – indicated by the benchmark portfolio. By measuring the results (in market value terms) of these deviations, the benchmark portfolio can also be used as a basis for evaluating this position taking. In their respective evaluations of government debt management, both the Government and the Riksdag (Parliament) have noted that this control and evaluation system works smoothly in all essential respects.

Formally, the Debt Office has – also for a long time – had, in principle, the same control and evaluation system for SEK debt management. However, targeted position taking has never occurred in practice here. The reason is that it has been regarded as inconsistent with the role of the Debt Office as a dominant market participant to take positions in the SEK bond market. The Debt Office might be suspected of taking positions for rising or falling interest rates based on a knowledge of, for example, its own issue, exchange or repurchase plans. This might lead to short-term gains, but investors that believe they are dealing with a counterparty that possesses better information would withdraw from the market and/or demand a higher return as compensation for greater risk-taking. Instead the Debt Office has employed predictability and transparency as its guiding principles for both borrowing and debt management in the SEK market. In practice, this rules out position taking. This may be regarded as a means of market maintenance, aimed at lowering the government's long-term borrowing costs.

Since the new governance system went into effect, the Debt Office has used the benchmark portfolio to control its SEK debt. The goal is to try to replicate the benchmark portfolio as well as possible. However, the Debt Office has,

for example in its earlier guideline memorandums, expressed an ambition to gradually shift SEK debt management closer to the principles that apply to foreign currency debt management. The latter has thus served as a kind of ideal for targeted debt management, partly with reference to how conventional asset management is pursued. The Debt Office and the Government have also both stated that deviations from the benchmark portfolio for SEK debt should be evaluated in terms of market values, i.e. according to the same premises as foreign currency debt. In this respect, too, the assumption is that deviations from the SEK benchmark should be viewed as expressions of deliberate position taking.

However, there is no position taking in the management of SEK debt. To this extent, the current method for evaluating SEK debt management is not meaningful; it aims at measuring the results of an activity that the Debt Office, in practice, does not engage in. This is also mentioned in the report of the Riksdag's Standing Committee on Finance (1999/2000:FiU30) on government debt management. The committee observes that the question of how the Debt Office should act in managing SEK debt needs further study.

The Debt Office concurs that there are unclear points in the existing control and evaluation system for SEK debt and that evaluation principles and actual operations should match. The Debt Office also finds reason to further examine its previously stated ambition to adapt SEK debt management to the principles applied to foreign currency debt. These questions are discussed in the following section.

3.2 Management of krona-denominated (SEK) debt

3.2.1 Preconditions and effects of position taking

The starting point for discussing the organisation of government debt management is that the overall characteristics of this debt are what decides its costs and risks. Consequently, the Government's decision on guidelines is the most important thing, since it determines the basic features of the government debt structure, for example whether its maturity will be three years or five years. With the guidelines as a basis, operative benchmarks are then defined. A subsequent decision to deviate by, say, 0.2 years from the maturity stated in the benchmark is less important to the total result than the choice of a benchmark duration of three or five years. This is true even if the Debt Office is successful in its position taking.

In addition, a positive management outcome is not sufficient to ensure that debt management can be viewed as having fulfilled the legally mandated goal of minimising absolute costs. Evaluation against a benchmark measures relative costs, and if the benchmark is poorly chosen from the standpoint of the overall goal, the total outcome is still unsatisfactory. A good management outcome in relation to a benchmark of five years, for example, is no genuine success if the optimal choice would have been a three-year maturity.

Too strong a focus on position taking thus risks distorting the perspective of government debt management. Excessive resources may be invested in position taking, both when it comes to actual management and evaluations of management. This is unfortunate if it happens at the expense of ill-considered borrowing and debt administration, or of evaluations that focus on the less essential aspects of management. Since position taking leads to measurable outcomes, while debt and market maintenance cannot as easily be evaluated, this danger should not be underestimated. See also Section 3.2.2.

Thus position taking is neither a necessary nor a sufficient precondition if government debt management is to achieve its goal. This does not rule out the possibility that successful position taking may lead to sizeable gains, measured in absolute figures. If these savings can be achieved with little investment of resources, this activity may be financially profitable to the government. For example, this is the approach that guides the central government's direct borrowing in the household market. There the outcome is measured by comparing it with the alternative of financing the equivalent borrowing by means of conventional debt instruments in the securities market. An analogous criterion is applied to foreign currency debt management. Like borrowing from households, this has fulfilled its profitability requirement. The conditions are different from borrowing in the household market, however. In the latter case, profitability is based on unique products, efficient distribution etc., without actual differences in risk-taking. Foreign currency debt management, on the other hand, is based on the Debt Office's ability to assess and interpret information about future developments in financial markets.

The ability to assess future interest rate movements is also crucial when taking positions in SEK debt, but other aspects must also be taken into account. Of particular importance is the Debt Office's dominant position in the SEK bond market. This means that the Office's own plans, for example related to borrowing, exchanges and repurchases, may affect markets. This problem never arises in foreign currency debt management. In the course of its work, the Debt Office may occasionally also hear information from the Government Offices before it becomes public knowledge.

The fact that the Debt Office is not merely one market participant among others is illustrated by the events surrounding the Swedish government's divestment of shares in the telecommunications group Telia. Most obvious was the powerful effect on interest rates after the Office announced that it would use a portion of the proceeds from Telia to repurchase bonds. If the Debt Office had positioned itself for a downturn in interest rates before unveiling its repurchase plans, the repurchases would have been cheaper. However, this would have been the equivalent of starting the repurchases in advance, which would have violated the transparency principle and generally accepted practices in the securities market. Such an action on the part of the Debt Office would damage the credibility of the Swedish government securities market and raise the return requirements of investors, thereby harming the government in the long term.

The point of departure must therefore continue to be that the Debt Office must not take advantage of such specific information for position taking. Theoretically, it is conceivable that the Debt Office could abstain from acting in situations where it has unique knowledge, but still engage in position taking based on publicly available information. In practice, however, it is problematical to prevent certain information from being used as a basis for decision making in day-to-day operations. First, it is difficult to classify information in this way beforehand. Second, decisions on position taking (or decisions not to close an existing position) cannot always be tied to specific information. There is consequently a risk that unclear points will arise, both in management and evaluation of this management. In borderline cases, the Debt Office may conceivably be criticised either for having been too aggressive if positions are taken or for having missed opportunities to save money by not acting. Even if the Debt Office succeeded in maintaining internal firewalls, its credibility might be damaged if other market participants suspected that the Debt Office was using (or would use) its unique situation for position taking. In addition, given the size of the government debt, large transactions are required to create any significant deviation from a benchmark. Position taking in SEK debt would thus entail large transaction costs, thereby reinforcing the contention that this would be inconsistent with the goal of long-term cost minimisation.

The Debt Office therefore believes that the arguments leading to the conclusion that there should be no position taking in SEK debt management remain valid. The surpluses that this activity may conceivably generate do not outweigh the disadvantages, especially with regard to the government's long-term borrowing terms in the SEK bond market. The Office thus feels that the above-stated ambitions to shift the principles for SEK debt management closer to those applied to foreign currency debt should be reconsidered. The special role of the Debt Office in the Swedish bond market is so clear that such plans should be deferred for the time being.

It is possible that external conditions may change over time. One key factor is the Economic and Monetary Union. If Sweden joined EMU, one outcome would be to link the Swedish government bond market with the bond markets of the other EMU countries. More active management would thus be possible without excessive transaction costs, since the transactions the Debt Office needed to carry out would be small in relation to the overall market volumes in the EMU area. The Debt Office's ability to influence general euro interest rates would be small, though Swedish government bond yields might still be affected to some extent compared to other EMU yields. The degree of integration between EMU national sub-markets remains an open question, however. It is also worth noting that none of the current EMU countries have chosen to adopt position taking in the management of euro-denominated debt. Attention has focused on various forms of market maintenance aimed at ensuring the liquidity of spot trading in each country's government securities. This practice may change, once the integration process has moved further, but in this overall perspective the current Swedish system seems to fit nicely into the pattern that would set the standard if Sweden joined EMU.

3.2.2 Control and evaluation of SEK debt management

As noted above, there is a discrepancy between the principles for management of SEK debt and the evaluation of this management. Evaluation against a benchmark in terms of market valuation is meaningful only if position taking occurs. The conclusion of the Debt Office in the last section is that position taking in domestic currency debt would not be appropriate at present. Given this conclusion, evaluation principles must be adjusted to create a consistent system. In this section, the Debt Office discusses some features of such a system. As background, it presents the experiences of benchmark-based control of SEK debt in recent years.

Experiences of benchmark-based control of SEK debt

During 1999, the Debt Office worked with a transaction-based benchmark. It was so stylised that it was relatively easy to ensure that the debt matched the benchmark. The Office therefore reported a zero result in the evaluation of its 1999 management in relation to the benchmark portfolio.

During 2000 as well, the Office is aiming primarily at replicating the benchmark. This year's benchmark is expressed in terms of average portfolio duration. The benchmark is more detailed than the previous one, since it includes all portions of the SEK portfolio. Among other things, this means that temporary fluctuations in the government's liquidity position may result in deviations from the benchmark. In many cases, countering such deviations is not justified, since the transaction costs would be large. Major revisions or errors in the borrowing requirement forecast that has provided the basis for planning the Office's borrowing may also have an impact on the debt position in relation to the benchmark, in a way that is costly to counter. For example, they may require interest rate swaps in the range of SEK 10 billion, which must then be reversed after a week or so.² In addition, swap rates fluctuate significantly in the short term, so that short-term investments in interest rate swaps involve significant risk.

When the costs of correcting duration are unreasonable, technically speaking this creates a position. In an evaluation in market value terms, a (positive or negative) management result may thus be reported, although there has been no decision to take a position. To decrease the risk of such random effects in the accounts, the benchmark portfolio includes a rule that only deviations above a certain threshold must be included in calculating management results. In spite of this, the benchmark portfolio had to be revised during the year, since the preconditions for the decision had changed, for example in terms of the expected borrowing requirement. The difficulties of managing the SEK debt were greater than the Debt Office foresaw when the SEK benchmark was crafted. This year's SEK benchmark thus does not fulfil the requirement of being replicable.

² By way of comparison, it can be noted that during 2000 the Debt Office expects to carry out a total of SEK 30 billion in long-term interest rate swaps as part of its foreign currency debt management.

Control and evaluation without position taking

A complete benchmark functions both as a means of control and as an evaluation instrument. The view that position taking should not occur does not, in itself, alter the need to control SEK debt. The magnitude that determines the expected cost and risk of SEK debt is the maturity (duration) of this debt. It is therefore also natural to continue specifying what duration the SEK debt should have.

One consequence of the decision to avoid position taking is that exact day-to-day control and measurement of debt duration is not required. What is essential in determining the long-term costs of the debt is how its maturity changes over time. It should be possible to apply a duration interval, even as part of operative control. This enables the Office to lower its ambition to keep the duration close to the benchmark in the short term, for the purpose of avoiding an impact on management outcome. This should help lower transaction costs. The vagueness that can be said to characterise this year's benchmark, since minor fluctuations in duration against the benchmark are not taken into account in calculating outcomes, also disappears if it is made clear that daily market valuation is not a relevant measure of the outcome of SEK debt management. In Section 6, the Debt Office will present more detailed comments on how it will organise the control of its SEK debt management.

Assuming that a decision is made to focus SEK debt management on achieving the lowest possible cost by means of debt and market maintenance, it is logical to design evaluation instruments that examine how the Debt Office discharges its duty in this respect. Debt and market maintenance should be regarded as including the choice of debt instruments, the efficiency of the primary market, the Debt Office's contribution to the efficiency of the secondary market and any derivative markets etc. It is clear that debt and market maintenance is a multidimensional concept, which cannot be translated into any unambiguous quantitative measure. However, these difficulties should not be used as an excuse for not following up this portion of the Office's operations. It must be possible to assess qualitative conditions using qualitative methods.

In light of this, the Debt Office believes there is reason to let an outside consultant study the Swedish government bond market and try to assess how it functions, in absolute terms and compared to other countries. In its 1997 report, the Commission on Government Debt (STUP) noted that such studies may be one way to follow up developments in the Swedish government bond market as well as inspire improvements. In this introductory stage, it would also be valuable to obtain help in more precisely defining what dimensions are most important to effective market maintenance. The Debt Office therefore intends to initiate such a study of its actions and market maintenance measures.

3.3 Resources for analysis and management

The Debt Office also wishes to raise an overall issue concerning the preconditions for government debt management as a whole, as well as the various sub-goals established for its operations. Generally speaking, good goal fulfilment presupposes that the Debt Office has sufficient resources, primarily in terms of staff, to perform the economic and financial analyses required for successful debt management. This applies both to the task of proposing guidelines and subsequent management within the limits of these guidelines.

The new governance system implies a substantial increase in the analytic ambitions of government debt management. The Debt Office believes that continued development of the governance system is essential. In Section 2 above, for example, the Office points to the need for more in-depth analysis of the role of government debt in a broader government financial perspective: put simply, developing an ALM-based approach to government debt management. This work demands a good grasp of macroeconomics and finance, combined with a thorough understanding of the preconditions for government debt management. In the opinion of the Debt Office, there must be a knowledge of these matters within the Office, and development work must be pursued internally. The findings of an outside research study or consultant report cannot be integrated in the other work of the Debt Office in the same way. This expertise thus has to exist within the Debt Office.

Working in a policy-making organisation such as the Debt Office is attractive. This is one important reason why the Office has been able to recruit people with the proper expertise and focus of interests. However, the gap in salaries and other employment conditions compared to institutions with similar operations cannot be permitted to become too large if the Debt Office is to ensure sustained goal fulfilment. In the labour market, competition for people with relevant expertise has intensified. If the Debt Office is unable to offer its employees competitive conditions, there is a risk that its analysis and debt administration work will stagnate. This situation must be taken into account during the on-going budget process.

4 Models for analysing the structure of the debt

4.1 Background and assumptions

In last year's memorandum on proposed guidelines, the Debt Office reported quantitative results from a model that had been developed to examine the choice of duration in the SEK debt. In its decision on guidelines, the Government requested further quantitative background on the effects of the structure of government debt, especially the choice of the share of foreign currency debt in the overall debt. In this section, the Debt Office presents a number of analyses, with an emphasis on the effect of the foreign currency share.

Like last year, the Debt Office has based its quantitative analysis on a stochastic simulation model. The model used this year may be viewed as an refinement of last year's model. It has been further developed in two main ways.

First, it now includes two additional economies, EMU and the United States. This means that exchange rates are now part of the model, making it possible to examine the issue of the relative size of foreign currency debt, not merely the choice of duration in the SEK debt. Second, the structure of the model has been simplified in some respects. When adding further economies that are linked to each other via exchange rate mechanisms, the number of free parameters becomes very large. There is a risk that the model will become excessively complex, thereby clouding the intuition of its results. It has therefore been necessary to simplify the model, but in order to make a virtue out of a necessity, one can argue that it is doubtful whether the degree of detail found in last year's model is necessary in an analysis intended to describe debt portfolio costs and risks with a broad brush. In certain other respects, especially as regards the short-term interest rate process, this year's model has been made more complex, hopefully without a loss of intuition.

Inflation-linked bonds are not included in the current version of the model. Since inflation is modelled, however, future development efforts will make it possible to add inflation-linked borrowing to the analysis and thereby obtain a more complete picture of the choices the central government has.

It should be emphasised that this is a matter of a simulation model. Its purpose, based on certain stated assumptions, is thus to examine stylised characteristics of the economy and government debt. In such models, *sensitivity analyses* are important, among other things in order to examine how alternative assumptions affect the results. In the following sections, the Debt Office is therefore presenting both a basic parameterisation of the model and a sensitivity analysis. There is limited scope in this memorandum to present results based on different assumptions. Nor has the Debt Office had time to test all the parametric combinations that might conceivably be of interest. However, the model is built in a user-friendly format, making it relatively easy for others besides the designers of the model to insert their own assumptions. The model is thus at the disposal of the Ministry of Finance. For a more detailed description of the model and its results, the reader is referred to the technical report that the Debt Office has drafted in connection with its work on these proposed guidelines.

Like last year, the Debt Office has worked together with outside consultants, this year mainly Salomon Smith Barney (SSB), London. The analytic model presented below was developed by the Debt Office's own analysts. However, as part of this process SSB served as a conversation partner and provided valuable comments during the course of the work. In addition, SSB drafted a report based on models that SSB had developed, which focus especially on the issue of the relative size of the foreign currency debt. The results of the consultant reports are summarised and discussed below.

4.2 The National Debt Office simulation model

The simulation model consists of two parts. One is referred to below as the strategy portion, which controls how the structure and maturity of government debt change over time. The other is a macro simulation portion, which controls changes in macro factors that influence the portfolio and its costs. These two portions are described in turn below.

4.2.1 The strategy portion of the simulation model

The strategy portion of the model controls how the central government finances its day-to-day borrowing requirement and refinances maturing loans (or repurchases loans in cases where the borrowing requirement is negative). The strategy portion also estimates the costs and risks associated with different strategies. These strategies are expressed, first, as a target distribution between SEK, EUR and USD and, secondly, as a duration target (this year) for each of these currencies. The total duration of the portfolio will therefore be determined by a weighted average of the duration of these debt categories.

The simulation of the various strategies is based on an initial portfolio, specified as a number of cash flows in different currencies. All flows are grouped periodically, by month. The initial portfolio may be the actual government debt portfolio, but it may also be any other portfolio. Since their purpose is to analyse long-term cost and risk characteristics of overall strategies, rather than seeing how these could be implemented, the simulations have been based on portfolios with a total size equivalent to the Swedish government debt, but with characteristics that fulfil the strategy target right from the beginning.

During each period, there is an external net borrowing requirement from the simulated economy, which is assumed to include interest payments. Debt that matures during the period in question, translated into SEK using simulated exchange rates, is then added to this borrowing requirement, resulting in a total borrowing requirement for the period. In most cases, this is positive. The total borrowing requirement is allocated among the various currencies according to the allocation target of the strategy in question. Then the duration of the outstanding portfolio is estimated, by currency, after the maturities during the period have occurred, but before any new borrowing is undertaken.

Given these duration figures and the borrowing requirement in each currency, it is then possible to estimate what duration the new borrowing must have in order to achieve the duration target. The required duration is achieved by issuing two new bonds in each respective currency. In the model, all new borrowing occurs in par bonds, that is, bonds with coupon interest rates equal to current market rates, with maturities of between one and ten years. The simulated period is ten years throughout.

It is important to note that the strategy simulation is not rigged in such a way that the debt allocation target is fulfilled during every period. The reason is that this would systematically discriminate against the foreign currency debt,

since a weakening of the krona leads to a larger foreign currency debt share, which in turn makes it necessary to repurchase foreign currency debt since it is expensive, and vice versa. However, on average the portfolios are at their respective allocation targets.

The costs calculated in the model are mainly debt costs, that is, those costs that have an impact on the government budget. This means that short-term fluctuations in market interest rates have no impact in the form of *unrealised* exchange rate gains and losses. However, *realised* exchange rate gains and losses on repurchases are always included. The definitions of costs and risks are of great importance to the results and their interpretation. To make the presentation somewhat more concrete, the discussion of cost and risk measures has been placed in the section that discusses the results.

4.2.2 Simulation of macroeconomic variables

To be able to evaluate different strategies, it is necessary to model the macroeconomic variables that control costs and risks. The macroeconomic model consists of six building blocks for each of three currencies (SEK, EUR and USD). There is an additional, seventh building block for the SEK portion: the borrowing requirement. The common building blocks are models for:

- Economic cycle regime
- Inflation
- GDP
- Short-term interest rates
- Spread between long-term yields and short-term interest rates
- Exchange rates

Each of these sub-components is briefly described below. Most have in common that they are modelled with the aid of an auto-regressive (AR) process, which has the following appearance for an arbitrary time series, y

$$y_t = \alpha + \beta y_{t-1} + \varepsilon_t$$

where ε is a random component normally distributed with constant variance and an expected value of zero. The beta coefficient controls the size of the dependence on values from previous periods.³ This process is a simple but flexible way of modelling time series of economic macro data.

The economic cycle regime

The economic cycle regime is an essential underlying variable in the model. It can only assume two values: boom or recession. The regime then affects the processes in the other variables, since these may have a separate set of alpha

³ If beta is close to one, it will take a very long time for the series to return to its expected value. One can show that this expected value is

$$E[y_t] = \frac{\alpha}{1-\beta}$$

If beta should equal one, the series will be non-stationary, that is, it will entirely lack the tendency to return to any mean value.

and beta coefficients for the two regimes. In this way, one can obtain different expected values in boom and recession regimes for such variables as GDP.

The actual regime is modelled in such a way that the probability of being in a given regime during the next time period is determined only by what regime is prevailing during the current period. The variable that determines the cyclical regime is then said to follow a Markov chain. A typical parameterisation of such a model is that the probability of a boom quarter being followed by another boom quarter conditions is 90 per cent. The stated probability is equivalent to saying that an average boom lasts ten quarters; $(1/(1-0.9)) = 10$.

GDP

Real GDP growth is assumed to follow a regime-dependent AR process. The basis for fundamental parameterisation has been empirical data. Potential real GDP is also modelled as a weighted average of expected growth during boom and recession periods, respectively, weighed against the probability of being in each respective regime. Nominal GDP is then modelled by adding simulated inflation to real growth. In the basic parameterisation, Sweden and the EMU area have been assigned economic cycles with similar characteristics. The US is assumed to have somewhat higher potential growth, as well as booms that last somewhat longer on average.

Inflation

Inflation follows an AR process that is parameterised in such a way that the (perhaps implicit) inflation targets of the central bank are fulfilled. During certain periods, inflation will deviate from target, sometimes substantially, but on average the target is expected to be fulfilled.

Short-term interest rates

Short-term interest rates are modelled on the basis of a "Taylor rule". This means that the central bank raises its key interest rate if inflation is expected to exceed a certain target and if there is a shortage of production resources in the economy. In the model, the latter is reflected in the "output gap", defined as the difference between potential and actual real GDP. Short-term interest rates follow an AR process that gradually adjusts to the Taylor interest rate. Central banks thus do not set their key rates at exactly the short-term interest rate that the Taylor rule implies during each period, but practice so-called interest rate smoothing.

The slope of the yield curve

The difference between long-term yields and short-term interest rates follows an AR process with different parameters for each regime. A typical yield curve in the model is flatter during recessions and steeper during booms. In addition, the yield curve anticipates the regimes observed in economic growth by six months. This means that the curve begins to flatten towards the end of booms and becomes steeper towards the end of recessions.

Exchange rates

Real exchange rates are modelled as AR processes with trends that reflect differences in long-term potential growth rates. Their adjustment to these equilibriums occurs slowly, and in the short term, real exchange rates are affected by differences between the rates of growth in each country and between their long-term yields. Nominal exchange rates are created by adding or subtracting differences in inflation rates. The basic parameterisation makes no assumption about real exchange rate trends, except those that follow from the differences in potential GDP and inflation. Given these assumptions, the structure of the model implies a certain strengthening of the krona against the dollar, while the krona weakens against the euro.

Borrowing requirement

The modelling of the borrowing requirement (for the Swedish portion of the model) is based on the fiscal policy target of a given surplus in public finances viewed over one economic cycle. Given a target surplus of 2 per cent of GDP in financial savings, while taking into account the pension system, a borrowing requirement of 0.5 per cent of GDP over one economic cycle is a reasonable assumption. This implies that the debt will grow in nominal terms, while nevertheless shrinking as a percentage of GDP.⁴

The length of the economic cycle is determined by regime probabilities. Based on this information, it is then possible to deduce a rule of thumb about how much should be amortised or borrowed during each period. Depending on the economic growth rate during a given period, the simulated borrowing requirement will then be larger or smaller than the borrowing requirement implied by the rule of thumb.

The key assumptions of the basic parameterisation are otherwise presented in the table below. The values stated are the expected values of the variables. Variables that are regime-dependent have two expected values, one for booms (b) and one for recessions (r). In the case of real exchange rate, the expected value follows a trend, and the stated value of the real equilibrium exchange rate is the initial value. This subsequently changes in view of differences in potential GDP, which can be said to reflect differences in productivity growth. Correspondingly, the expected value of the nominal exchange rate is affected by differences in the expected value of inflation. Further details on parameterisation, volatility assumptions etc. are found in the technical report.

⁴ Given that the target is expressed in terms of financial savings, an analysis based on government financial savings would provide a better description of the budget policy restriction. Government debt is, however, affected by the budget balance. Since the purpose of the model is to describe the trend of government debt over time, the budget balance is assumed to correspond to financial savings.

Basic parameterisation assumptions			
Variable	Sweden	EMU	US
Short-term interest	5.0%	4.5%	5.5%
Spread, 10yr-3m (b)	100bp	100bp	75bp
Spread, 10yr-3m (r)	-25bp	-25bp	-25bp
Real exchange rate	–	SEK 8.00	SEK 9.00
Inflation	2.0%	1.5%	2.5%
Real growth (b)	3.6%	3.4%	4.0%
Real growth (r)	-2.2%	-1.3%	-1.9%
Duration, months (b)	57	57	62
Duration, months (r)	15	15	11

4.3 Results of the National Debt Office model

4.3.1 Strategies investigated

The goal of the analysis is to examine the effects of different duration choices and shares of foreign currency debt in rough terms. The strategies investigated should therefore be clearly differentiated and extend over a relatively large area. It is also sufficient to have a small number of strategies. The share of foreign currency debt in total government debt has thus been allowed to vary between 0 and 45 per cent, in 15 per cent steps. The shares of EUR and USD debt have been set at 70 and 30 per cent, respectively, approximately equivalent to the current structure of the foreign currency debt. The duration figures are two, three and four years, respectively. In all strategies, the duration target is the same for all three categories of debt. This leads to the following twelve strategies.

Share of foreign currency debt	Duration of foreign currency debt (years)	Duration of SEK debt (years)
0%	2	2
15%	2	2
30%	2	2
45%	2	2
0%	3	3
15%	3	3
30%	3	3
45%	3	3
0%	4	4
15%	4	4
30%	4	4
45%	4	4

4.3.2 Cost measures

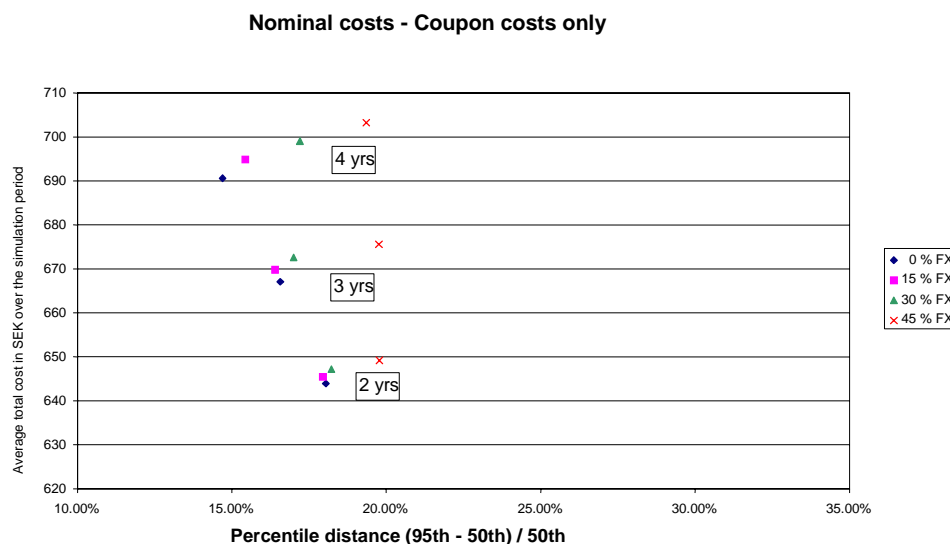
In the analysis, the Debt Office used two cost measures, a *nominal* one where costs are measured in SEK, and a more real-term one where costs are expressed as a share of GDP, called the *debt cost ratio*. For both measures, risk is expressed as the percentile distance between the 50th and 95th percentile in the simulated cost allocation. A 95 per cent percentile range of, say, 20 per cent, can be interpreted as meaning there is a 5 per cent probability that the portfolio in question will turn out to have a cost more than 20 per cent above the median. If the percentile distance is 40 per cent, there is a 5 per cent probability that the outcome will deviate by more than 40 per cent from the average. The larger the percentile distance, the higher the risk of the portfolio. Expressing risk in this way rather than in terms of standard deviation in allocation makes it possible to focus on the side of the risk that is relevant, namely that government debt costs will be significantly higher than expected.

4.3.3 Nominal costs

With this cost measure, debt costs are estimated in SEK terms, period by period. In other words, all coupon payments are translated using the simulated exchange rate for each period, plus any realised exchange rate gains or losses on loans that have been repurchased.

The chart below shows the results from the simulations of the twelve strategies, using the assumptions in the basic parameterisation. Roughly speaking, costs are primarily affected by the choice of duration, while the choice of the share of foreign currency debt mainly affects risk. A portfolio with borrowing denominated only in SEK and with a shorter duration has a lower expected cost but a somewhat higher risk, which is consistent with the results that the Debt Office presented last year. This result is mainly dependent on the assumption that on average, yield curves have an upward slope, plus the fact that a more short-term portfolio is refinanced more frequently and is therefore more affected by interest rate volatility.

The effects of exchange rates on interest payments are somewhat less than the effects from the choice of duration. Based on the given parameterisation, there is no cost advantage in foreign currency loans either. The somewhat lower EMU interest rates are eaten up by the depreciation of the krona against the euro that results from the lower inflation rate in EMU. Even if there is a corresponding effect from an appreciating dollar, the euro effect dominates, since 70 per cent of the foreign currency debt is EUR-denominated. From a risk standpoint, however, there is a minimum at 15 per cent foreign currency debt for portfolios with a duration of 2 or 3 years.



It is worth noting that the risk picture that emerges when only taking into account coupon payments is based on strong assumptions.⁵ Ignoring the exchange rate effects on the face value of bonds implies that the government is issuing perpetual bonds in foreign currencies which may then remain outstanding forever. Since the stock of foreign currency loans will then, in principle, be unchanged, this also implies that the current debt level is optimal, not as a share of total debt, but in terms of nominal foreign currency amounts.

Since it is difficult to believe that the current stock of foreign currency debt could be optimal in any sense, and that it moreover could be expected to remain optimal over time, this measure underestimates actual risk. It may therefore be essential to include changes in market values when assessing the risks of foreign currency loans. In qualitative terms, taking into account the effects of exchange rates on face values implies a substantial increase in the risk of foreign currency loans, since these are far larger than the coupon amounts in foreign currency. In simulations where market values have a full impact, foreign currency loans are so risky that the optimal share of such loans would be 0 per cent. Letting market values have a full impact does not provide a realistic picture of the risk either, however, since it will probably never become necessary to repurchase foreign debt within a short time interval. In other words, this approach overestimates risk.

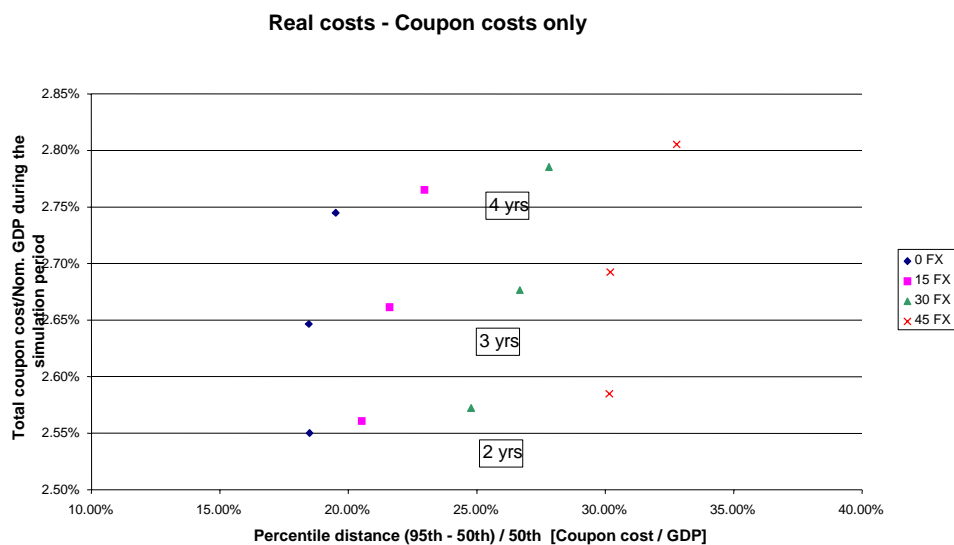
⁵ Exchange rate fluctuations have an impact on the size of the debt and there is thus a secondary effect on coupon costs. This effect arises because a depreciating krona would lead to a larger refinancing requirement, which in turn would lead to a larger gross borrowing requirement and thereby to larger future coupon costs. However, the effect is limited to the impact of the size of the debt on coupon costs. For technical reasons, in the model the exchange rate gains and losses that arise in connection with the refinancing of foreign currency loans are not added to the coupon costs. As a result, the measure is not directly comparable with the budget item *Interest on government debt*. Using a yardstick that more closely resembled *Interest on government debt* would mean that a larger portion of the variability of exchange rates would have an impact on costs, which would lead to the perception that foreign currency debt was more risky, all else being equal. This effect would thus reinforce the finding that having a large share of foreign currency debt increases risk. In the future, the Debt Office intends to develop a cost measure in the model that includes the exchange rate effects of maturing loans.

By way of summary, nominal cost measures indicate that exposure to foreign currencies results in sizeable risks and that diversification gains can only justify a limited foreign currency exposure. Even with a partial focus on coupon costs from a risk standpoint, it is difficult to justify a larger share of foreign currency debt than 15 per cent. The bigger an emphasis one then places on the effects of exchange rates on face value, the smaller the optimal proportion of foreign currency debt will be.⁶

4.3.4 Costs expressed as a share of GDP

The *debt cost ratio*, where nominal coupon costs are stated as a share of GDP, can be justified by the fact that budget balance can be assumed to be correlated to growth and that lower debt costs as a proportion of GDP thus imply a smaller need for adjustments in the government budget in order to meet interest payments. This cost measure, in all its simplicity, is a step towards a more ALM-based approach, in keeping with the discussion in section 2.2.2. From this standpoint, the debt cost ratio seems like a more interesting measure.

As above, the risk measure is a percentile distance in the allocation of debt cost ratios across the entire simulation horizon. The results are presented in the figure below.



It is worth noting, by way of introduction, that the trade-off between costs and risks that existed in the nominal results does not occur. A shortening of duration not only leads to lower costs, but also to lower risk. This perhaps counterintuitive result is explained by the interest rate process in the model. High growth leads to a closing of the output gap and to an increase in short-term interest rates, assuming that the Riksbank (Swedish central bank) follows

⁶ In accounting terms, exchange rate loss is reflected when a given loan matures, regardless of whether it is refinanced in the same currency or not, which in turn leads to an impact on the budget balance.

the Taylor rule. Since the yield curve on average has a constant slope for a given regime, parallel shifts in the yield curve mainly occur. Given a shorter-term portfolio, a relatively larger share of the debt will be refinanced during each period, which in turn leads to a higher correlation between coupon cost and the general interest rate situation during the simulation period. This, plus the fact that interest rates and GDP are highly correlated via the Taylor rule, results in a higher correlation between coupon cost and GDP for shorter-term portfolios. The consequence of this is a less volatile debt cost ratio with short-term debt. Lower costs for a shorter-duration portfolio follow, as earlier, from the assumption of upward-sloping average yield curves.

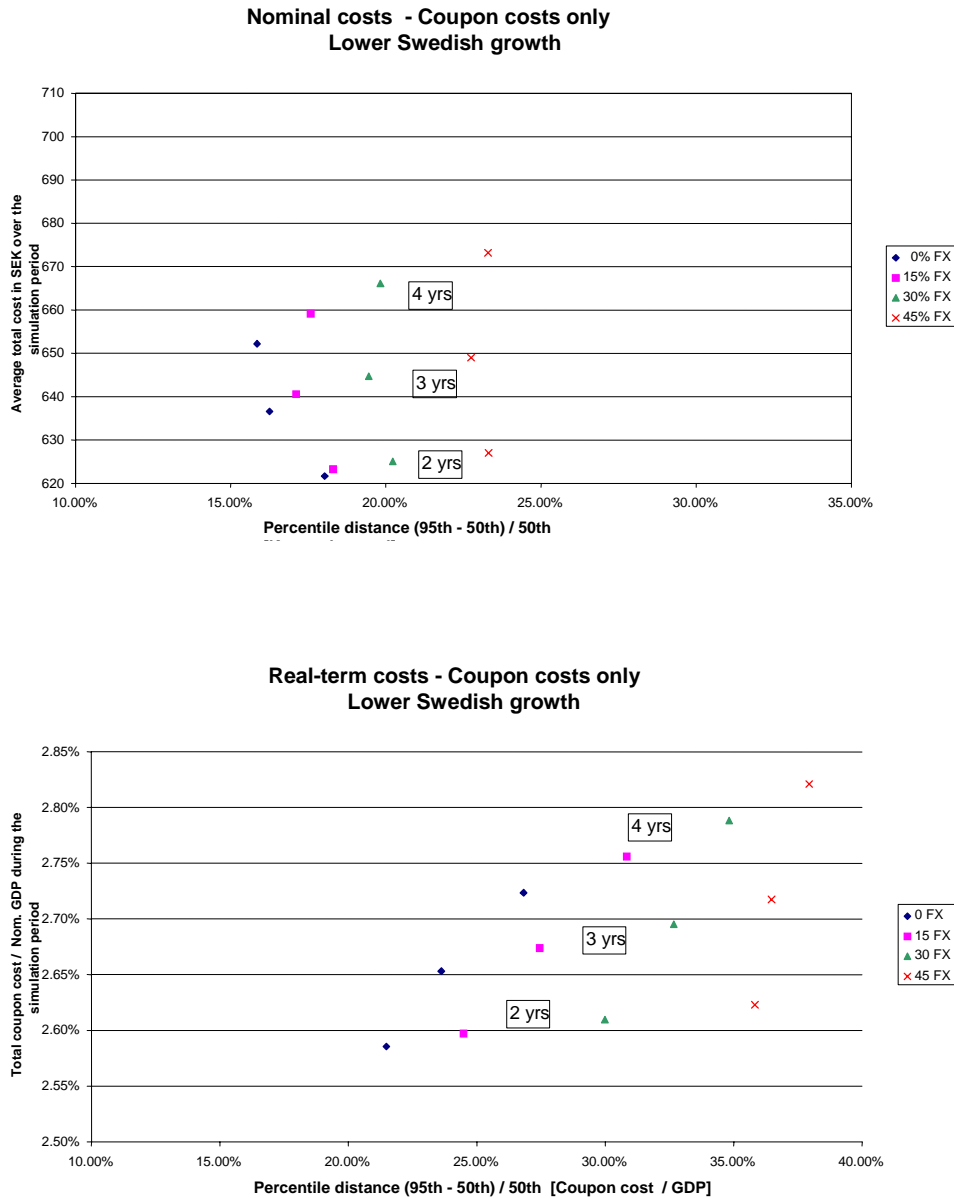
Enlarging the share of foreign currency debt means both higher risk and higher cost. Higher cost is mainly a product of the model's parameterisation, while higher risk is a product of the model's structure. Economic growth and thus interest rates in EMU and the US are independent of each other and independent of interest rates in Sweden. A large share of foreign currency debt thus contributes unequivocally to greater variability in the debt cost ratio, since the correlation between coupon cost and GDP decreases the larger the share of foreign currency debt is. If one compares the impact on risk level of longer duration with the impact of a larger share of foreign currency debt, the effect of foreign currency debt is substantially larger, based on the assumptions in the basic parameterisation. Saying that the economic cycle in Sweden is independent of the EMU and US economies is a strong assumption. The impact of foreign currency borrowing on the volatility of the real cost measure is a product of one's assumptions about the correlations between foreign interest rates and the Swedish economic cycle. Qualitatively, however, the finding that higher foreign currency debt leads to greater risk in this respect should still be robust, since no perfect correlation exists.

A more real-term approach thus implies that short duration and a small share of foreign currency debt leads to both lower costs and lower risk, given the model's assumptions. It is, however, appropriate to emphasise that this strong result is related to a rather strong implicit assumption in the model. In the model world, both fiscal policy and monetary policy *constantly* enjoy the full confidence of participants in the securities and foreign exchange markets. All explosive scenarios are excluded. All financial variables return, sooner or later, to their expected values. Above all, the result showing low real risk in short-term borrowing is sensitive to this assumption. Given a short-term borrowing strategy, a crisis of confidence in fiscal and monetary policy could lead to a need to refinance a large proportion of the portfolio at a time of unfavourable interest rates.

As for the risk inherent in foreign currency borrowing, it may be reasonable to imagine that a crisis of confidence could adversely affect the SEK exchange rate, which – all else being equal – would increase the risk of foreign currency debt. Easing the assumption of constant full confidence would thus weaken the result of low risk in short-term borrowing, while strengthening the result of higher risk due to a larger share of foreign currency debt.

4.3.5 Sensitivity analysis

As a simple sensitivity analysis, an alternative parameterisation is presented here, in which Swedish economic growth is substantially weaker than in the basic parameterisation. This is achieved by assuming that the boom and recession regimes are equally long. Given this parameterisation, average growth is only 0.7 per cent annually. The other parameters and mechanisms are identical to those of the basic model. The figure below presents both nominal and real-term cost measures.



Most of the qualitative results from the basic model remain. For both cost measures, a larger share of foreign currency debt implies higher cost. This is due to the relatively weaker economic growth in Sweden and the resulting general depreciation of the krona. The result that a short duration leads to a higher correlation with GDP is strengthened here. This is related to the fact

that the number of changes of regime is smaller and the correlation between interest rates and GDP generally larger. Again, the assumption of unwavering faith in economic policy is decisive. This assumption may be viewed as even stronger in the gloomy growth scenario above.

4.4 The Salomon Smith Barney report

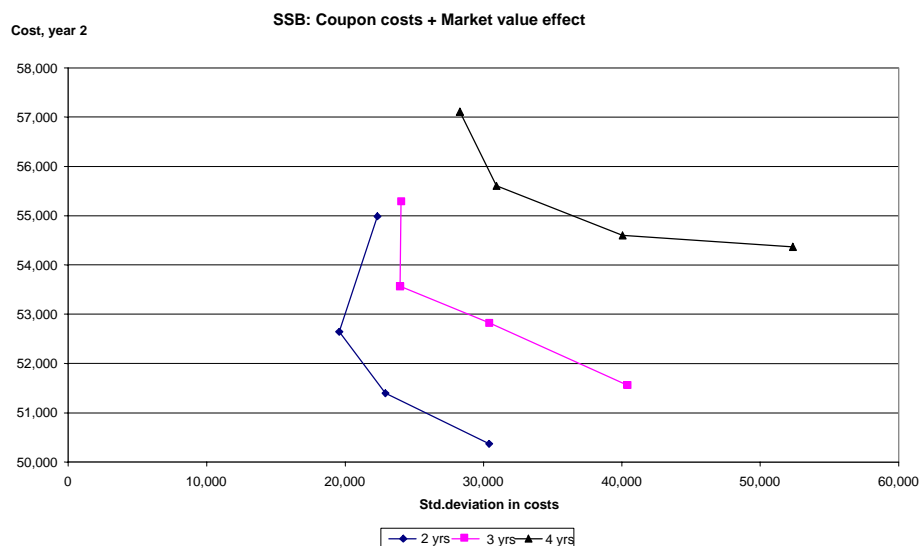
SSB worked with two models to illustrate the cost and risk characteristics of portfolios with different shares of foreign currency debt. It used traditional portfolio choice theory to illustrate how assumptions about cost differences, volatilities and correlation lead to different optimal shares of foreign currency debt. It also worked with a simulation model similar to the one that the Debt Office developed internally.

The first-mentioned analysis assumes that SEK and foreign currency borrowing, respectively, differ both in terms of costs and risks. In a cost/risk chart, both types of debt can then each be described as a point. Portfolios containing both types of debt will lie on a line connecting these two points. In portfolio contexts this line is called a *frontier*. The appearance of this frontier depends on the correlation between the costs of SEK and foreign currency debt. If the correlation is one, the frontier will be a straight line between the two points. The lower the correlation is, the more curved towards the origin the frontier will be and the more the risk can be decreased by including both types of debt in the portfolio. SSB investigates the correlations -0.5 , 0 and 0.5 . With a correlation of -0.5 , risk is minimised at a 24 per cent foreign currency debt, while 14 per cent foreign currency debt leads to the least risk if the correlation is zero. With a positive correlation, 0.5 , all foreign currency debt leads to an increase in risk and a purely SEK-denominated portfolio results in the lowest risk.

The decrease in risk that results from negatively correlated foreign currency debt must, of course, be related to the changed cost picture. If the cost of foreign currency debt is lower than the cost of SEK debt, the costs of the portfolio will decrease the more the foreign currency debt increases. A certain proportion of foreign currency debt is then clearly favourable, since both cost and risk decrease. Where the cost of foreign currency debt is higher, risk reduction occurs at the expense of a higher risk – whether a given share of foreign currency debt is then desirable depends on what trade-off one makes between cost and risk.

The second model that SSB has worked with is a simulation model of the same type as the Debt Office's internal model. The biggest difference compared to the Office's model is that the SSB model does not have the economic structure employing, for example, the Taylor rule as a connection between economic factors and interest rates. Instead, interest rates and exchange rates are directly simulated as stochastic variables based on a stated correlation matrix. SSB also uses a more advanced model for simulation of the yield curve.

The SSB simulation relies partly on correlations based on historical data from 1994 onward and partly on the correlations implied by the Debt Office's macroeconomic model. The fact that it uses correlations from the Debt Office's model does not, however, mean that it must lead to the exact same results, since the causal connections found in the Debt Office's model are still not found in the SSB model. A somewhat different portfolio simulation portion and cost measure also make it difficult to compare the results directly. The chart below presents costs and risks for the twelve strategies SSB investigates, grouped by duration.



This cost measure includes changes in market value, and the values on the vertical axis are the costs of the debt during the second year of the simulation. Given a duration of between two and three years, a share of foreign currency debt of up to 15 per cent entails a decrease in risk. Between 15 and 30 per cent, risk continues to decrease, but at a somewhat slower pace (especially for portfolios with short duration). Above 30 per cent, it is necessary to pay quite a lot to marginally decrease the risk. SSB looks at several other cost measures and a few alternative parameterisations. Their qualitative conclusion is that foreign currency debt as a share of total debt should be reduced significantly and should be somewhere in the 15–25 per cent interval.

4.5 Summary and conclusions of model analyses

The quantitative analysis that the Debt Office performed internally and the analysis done by SSB on behalf of the Debt Office in preparation for this year's proposed guidelines can be summarised briefly as follows:

- Given the assumption that yield curves slope upward on average, cost savings in nominal terms can be obtained by means of a relatively short duration, without allowing risk, expressed as variation in interest payments, to become unacceptably large. Given a real-term cost measure, the debt

cost ratio, this result is even stronger, since the interest costs in the model co-vary with central government revenues.

- Given a nominal cost measure, the analyses indicate that foreign currency debt leads to greater variation in costs and only limited diversification gains. Nor does foreign currency borrowing yield any expected cost advantage. The Debt Office model results can justify a foreign currency share of about 15 per cent based on a nominal cost measure. The SSB model points towards a somewhat higher share, between 15 and 25 per cent. Using a debt cost ratio as the measure, foreign currency debt appears to be a more risky alternative. Since the cost differences are small, this measure indicates that foreign currency debt should be brought down to zero.
- These results are based on the assumption that both monetary and fiscal policy enjoy full confidence. Easing this assumption would probably imply a longer duration, but a smaller proportion of foreign currency debt would also be appropriate, especially on the basis of a debt cost ratio.

It should be emphasised that the Debt Office model is an analytical tool that is still under development. Other assumptions can and should be studied in order to improve the understanding of the model's characteristics and the sensitivity of the simulation results. The structure of the model may also need to be reappraised and tested more thoroughly. Despite these qualifications, the Debt Office believes that in its current condition, the model illustrates essential characteristics and mechanisms of Swedish government debt and the underlying economy.

5 Proposed guidelines

5.1 Points of departure

The characteristics of Swedish central government debt are essentially determined by how the debt is allocated among the three basic types of debt – nominal SEK borrowing, inflation-linked borrowing and foreign currency borrowing. The level of costs and risks is also affected by the size of the debt; the larger the debt, the higher are the costs and the larger is the risk that the costs of the debt will contribute to a deterioration in government finances in already difficult situations. However, the question of the size of the debt is usually regarded as falling outside government debt policy, which is defined as a set of decisions concerning the financing of a debt of a given size.

In principle, it is thus easy to state what *magnitudes* control expected cost and risk. However, it is a major step to assess what debt share and maturity *values* will enable the government to achieve its debt policy goal – the lowest possible long-term cost while taking risk into account. As indicated by the arguments in the above sections, costs and risks are controlled by processes that only to a limited extent can be analysed and predicted. The ambition of broadening the risk concept to embrace the contribution of debt management to overall government financial risks further increases the complexity. It is

thus not enough to assess the possible changes in borrowing requirements, interest rates and exchange rates. It is also necessary to take into account how these variables relate to other magnitudes that affect government finances.

In keeping with the ambitions described in reports to the Government during preparations for last year's proposed guidelines, the simulations in Section 4 are based on a number of stylised and clearly differentiated debt portfolios. However, several of these portfolios are not realistic as a basis for decisions on the structure of the debt during 2001, since they deviate too much from the initial situation. The purpose of the analysis, however, is to seek to illustrate how the debt should be structured in a longer-term perspective. The simulations, together with qualitative deliberations, will thus provide background material for government debt policy decisions of a more strategic nature.

As the Debt Office has maintained previously, it is not possible to provide guidelines for the structure of the government debt that will lead with certainty to the achievement of the goal of the lowest possible cost while taking into account risk. Even disregarding the remaining unclear points about how to formulate an appropriate risk concept, the fact remains that future interest rate, exchange rate and government financial trends are uncertain. One can analyse different possibilities in qualitative terms and try to achieve more specific arguments in quantitative models, but decision must ultimately be based on carefully considered judgements that take into account both quantitative and qualitative aspects. This situation leads to two observations.

First, due to this unavoidable uncertainty, government debt management must be organised in a way that ensures that there are margins for dealing with negative surprises. Government debt management must never be based on taking chances. The consequences of a government debt crisis are too serious for this. Sweden's experiences of the early 1990s, when it nevertheless proved possible to turn around such a trend, demonstrate these dangers. The approach to risks that the Debt Office sketched in Section 2 also makes clear the importance of taking overall government financial risks into account when making decisions on debt management.

The second observation is that decisions on guidelines for the structure of government debt must always be made amidst uncertainty. Leaving the structure of the debt unchanged is associated with the same uncertainty as any other decision. There is no reason to regard the initial debt structure as less risky *a priori* than alternative structures. The ambition to preserve the status quo that characterised the 1999 and 2000 guidelines thus enjoys no real advantage over alternative approaches. On the contrary, there is reason to assume that the current government debt portfolio, which originated under financial circumstances other than those prevailing today and before the current governance system was introduced, has an inappropriate structure.

In light of this, the Debt Office believes that there is reason for this year's decision on guidelines to state in somewhat more long-range terms how the government debt should be structured. Given the size and nature of the debt,

any large-scale changes must be implemented in stages over several years. Government debt management is also a continuous process, in which planning is essential. Using guidelines that apply for one calendar year at a time, it may be difficult for the Debt Office to plan its borrowing in an appropriate way. The Government's decision on guidelines is made only 1½ months before it goes into effect. For market participants, such a short planning horizon may also create uncertainty. It is therefore essential for government debt policy to have a strategic focus that provides guidance for these annual decisions and for the debt management activities of the Debt Office.

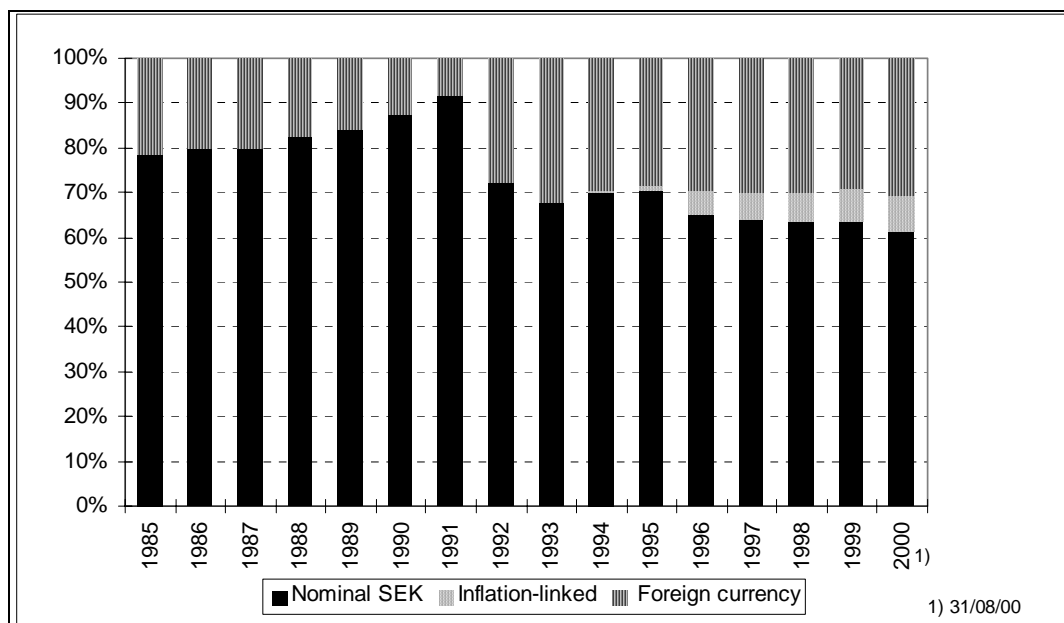
Given the existence of a long-term goal, it is possible to state the desired directions of movement. The pace of change may, however, need to be determined on the basis of more tactical considerations. This applies both to the decision on guidelines and the limits on the activities of the Debt Office established by this decision. A decision to choose a given strategic direction can automatically be reassessed in connection with the annual decision on guidelines. There is thus nothing to prevent changes in strategy due to new external circumstances or due to a changed understanding of how government debt policy should be organised. In the view of the Debt Office, however, the preconditions are now in place for the formulation of robust principles concerning the direction in which the government debt portfolio should change over the next few years. In the following sections, the Debt Office presents proposals concerning the structure of the debt and the respective maturities of the various categories of debt. Its concrete proposals are summarised in boxes at the end of each sub-section.

5.2 Structure of government debt

5.2.1 Structure of government debt during earlier periods

The allocation of the government debt among nominal, inflation-linked and foreign currency borrowing since 1985 is presented in the chart below. During the 1980s, foreign currency loans accounted at most for about 25 per cent of total government debt. The proportion had dropped to 8.5 per cent by early 1991. One year later, it had climbed to nearly 28 per cent, mainly due to loans related to the defence of the krona. Since then, the share of foreign currency debt has fluctuated around 30 per cent. In subsequent years, foreign currency debt thus increased approximately in proportion with the rapidly growing overall government debt. Likewise, when overall government debt began to decrease, foreign currency debt was proportionately reduced. At the end of August 2000, its share of total government debt was 30.6 per cent. The share of inflation-linked loans has gradually grown. In August, inflation-linked loans accounted for 8 per cent of total debt. The share of nominal SEK loans thus amounted to about 61 per cent of the total.

Structure of the government debt, 1985–2000 (August)



5.2.2 Foreign currency debt

General background on costs and risks of foreign currency debt

In its two previous memorandums on proposed guidelines, the Debt Office presented a number of qualitative arguments for a long-term reduction in foreign currency debt. Perhaps the most important is that foreign currency borrowing is a flexible instrument. Since the Debt Office can borrow in foreign currencies in markets where the Kingdom of Sweden is a small player, foreign currency borrowing can be increased rapidly if the borrowing requirement rises, without significant repercussions on interest rate conditions.⁷ The present share of foreign currency debt was built up during a period when the borrowing requirement was very large. Foreign currency loans functioned at that time as a safety valve and helped keep down borrowing costs in the SEK market, both for the government and other borrowers. To be able to take advantage of this upward flexibility, however, initial foreign currency debt must not be excessively large.

The risk that Sweden will again end up in a similar situation may seem small. However, no one foresaw the depth of the last government financial crisis. General risk considerations therefore point towards increasing the manoeuvring room of government debt policy by amortising the foreign currency debt when the government's payments show a surplus. By decreasing the foreign currency debt, the government may be said to be renewing a form

⁷ Greater borrowing in itself may raise the cost of loans if it leads to uncertainty about the general creditworthiness of the central government, but this refers to a direct influence on the supply. As a major borrower, the central government may influence general interest rates in SEK, but not in EUR or USD.

of insurance (or option) that will be valuable if the government financial situation should deteriorate.

Nor, in principle, is there any reason to believe that in the long term, there is any systematic difference between the costs of SEK or foreign currency debt. The expected cost of this insurance is thus low. In recent decades, foreign currency borrowing has admittedly been cheaper on average than SEK borrowing. This is because the yield spread between Sweden and other countries has more than offset the depreciation of the krona. This is typical of high interest rate currencies and may be interpreted as meaning that during periods of economic policy uncertainty, sizeable risk premiums arise which make domestic borrowing more expensive. In recent years, the stabilisation of Swedish government finances and the low rate of inflation have caused the previous yield spread between Sweden and the EMU countries, for example, essentially to disappear and occasionally even turn negative. The costs of EUR loans (at a given exchange rate) are essentially the same as for equivalent SEK loans. USD interest rates are higher than SEK rates.⁸

In addition, a large share of foreign currency debt makes the size and cost of Sweden's government debt highly dependent on the SEK exchange rate. Since the government debt is continuously measured and valued in SEK terms, shifts in exchange rates have a direct impact on the value of the debt and thus on the debt ratio. They also affect the costs of the debt. Measured in terms of direct costs and the total size of the debt, foreign currency debt is thus associated with higher risk than SEK debt.

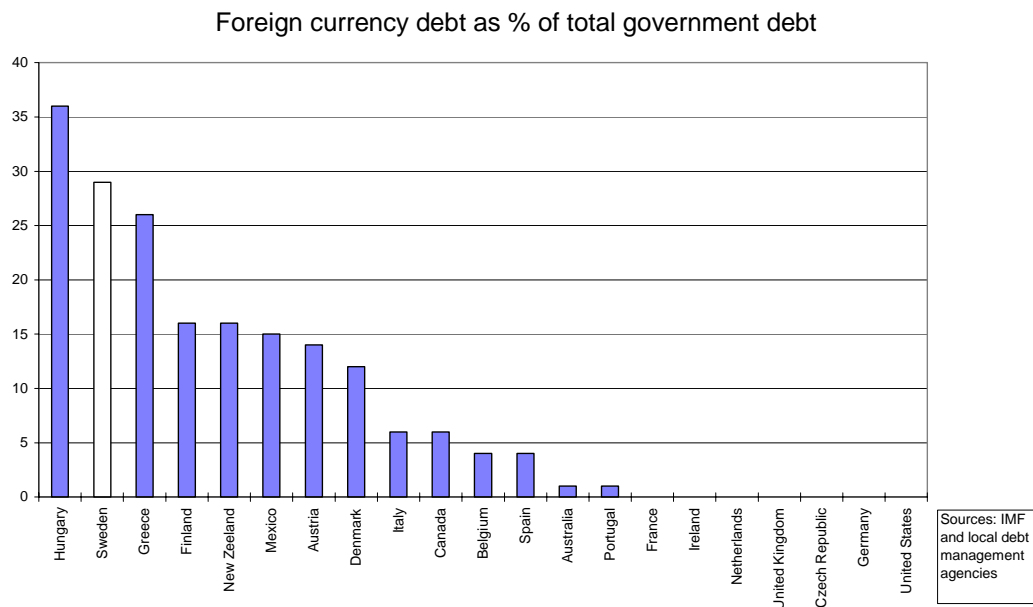
Whether foreign currency debt is also more risky in a broader government financial perspective is less self-evident. As for direct matching, however, it is clear that the Swedish government has only small assets and a small portion of its income in foreign currencies.⁹ The question is thus what co-variation between other expenditures and income (the primary balance) and the value of the krona can be expected. *A priori*, it is reasonable to assume that the krona is typically weak during periods when government finances are strained. In that case, foreign currency debt is also more risky than SEK debt in an ALM perspective. To the extent that the SEK exchange rate follows the borrowing requirement, it would also be appropriate, as during the crisis of the 1990s, to borrow in foreign currencies during periods of strained government finances and amortise particularly large amounts of foreign currency debt during periods of surplus. This is another way in which foreign currency borrowing might conceivably function as a kind of insurance in situations when

⁸ Low interest rates can be achieved by borrowing in such currencies as the Japanese yen or Swiss franc, but as the Debt Office maintained in last year's proposed guidelines, these low interest rate currencies are associated with larger exchange rate risks.

⁹ Since the Riksbank's foreign currency reserve must be regarded as belonging to the central government in its capacity as owner of the Riksbank, the foreign currency reserve could conceivably be viewed as an offsetting asset item. However, due to the strict accounting and cash flow separation between the Riksbank and the central government, in a short-term perspective the government cannot utilise any exchange rate gains in the foreign currency reserve to offset exchange rate losses in the foreign currency debt. From a risk standpoint, it is thus reasonable in the analysis to disregard the foreign currency reserve.

government finances are weak, even though the inherent unpredictability of exchange rates makes this mechanism uncertain.

It can also be noted that in Sweden, the government has a substantially larger share of foreign currency debt than most other industrialised countries. The chart below indicates, among other things, that in most EU countries foreign currency debt represents 5 per cent or less of total government debt. It is mainly developing and transitional economies that have a large share of foreign currency debt, as exemplified in the chart by Hungary.



If foreign currency debt had clear cost advantages, it would be natural and defensible for Sweden to deviate from this pattern. Since this is hardly the case, given Sweden's large share of foreign currency debt, its government finances may appear more sensitive to disruption than those of other countries. In a situation characterised by financial instability, this may be unfavourable to the valuation of Swedish government bonds.

EMU aspects

The view taken on the management of the foreign currency debt over the next few years is affected by Sweden's relationship to EMU. All else being equal, it is less essential to change the structure of the government debt by amortising foreign currency debt if Sweden will soon be joining EMU. Upon EMU accession, the SEK debt and the portion of foreign currency debt on which payments are made in EUR will merge. The euro will become the domestic currency, and thus the currency in which the government receives most of its income. The direct exchange rate risk will thus be eliminated.

What might happen to risk in an ALM perspective is more difficult to assess. All else being equal, however, economic fluctuations can be expected to become larger if Sweden participates in EMU, since monetary policy will no

longer be governed by specifically Swedish conditions, but instead by the euro zone average. Variations in the cyclically sensitive portions of the budget may thus turn out to be larger.¹⁰ Given the larger impact on government finances from other sources, the level of risk in the government debt (all else being equal) should be decreased in order to ensure that the risk of deficits exceeding the limits specified in the EU treaty will be kept unchanged. Since EMU accession would affect both the correlation between government finances and economic growth and the characteristics of government debt instruments, however, it is difficult to draw any clear conclusions about how government debt should be structured.

On the other hand, for the time being it is obviously uncertain whether and when Sweden may adopt the euro as its national currency. In the view of the Debt Office, the date of this transition lies so far in the future that Swedish government debt should be managed on the basis of the euro being a foreign currency, associated with exchange rate risk. Another argument to this effect is that even assuming that Sweden will join EMU sooner or later, there is uncertainty about the SEK/EUR conversion rate. The Debt Office consequently believes that under the current circumstances, there is no reason to modify the perception of the foreign currency debt with reference to EMU.

Quantitative results

In Section 4, the Debt Office presents a number of quantifications of some of the relationships discussed above in qualitative terms. The results indicate that given a nominal cost measure, foreign currency debt leads to greater variation in costs and only limited diversification gains. Foreign currency borrowing leads to no expected cost advantage. In the Debt Office's model, a foreign currency share of about 15 per cent can be justified on the basis of a nominal cost measure. The SSB model points to a somewhat higher share, between 15 and 25 per cent.

Using the debt cost ratio as a yardstick, thereby taking into account how interest rates and borrowing requirements co-vary with economic growth, foreign currency debt appears to be an unambiguously more risky alternative. Since the cost differences are small, according to this measure the foreign currency debt should be reduced to zero. Even though the correlations are uncertain, the Debt Office believes that debt cost ratio provides a more interesting measure of cost and risk. It presumably reflects the way government finances are related to the rest of the economy in a better way than nominal costs, i.e., provides a foretaste of what a more ALM-based approach would imply.

It should again be noted that these results are based on the assumption of stable confidence in both monetary and fiscal policy. Easing this assumption would probably imply that foreign currency debt would appear riskier, especially if based on debt cost ratio. The insurance argument for having a

¹⁰ Likewise, the co-variation between interest rates and GDP will presumably become weaker. As the simulations in Section 4 indicate, this mechanism helps to decrease risks, measured in terms of debt cost ratio; see also the discussion of the model results below.

small foreign currency debt would then become relevant. Meanwhile it should be emphasised that the results are otherwise also based a number of specific assumptions. As the Debt Office has maintained above, model analyses should therefore be viewed as *illustrations* of essential mechanisms, rather than as predictions of what consequences a given decision on debt structure would have.

Proposals

In the above sections, the Debt Office has presented a number of qualitative reasons why the share of foreign currency debt in the overall government debt should be reduced. Quantitative results indicate that under certain assumptions, it may be suitable to have some foreign currency debt, but the percentages that emerge are substantially lower than the current figures. In light of this, and mainly with reference to qualitative arguments, the Debt Office does not believe that it is appropriate for nearly one third of Swedish government debt to be denominated in foreign currencies during periods when government finances are strong and the debt is decreasing, both in absolute terms and as a percentage of GDP. Given the current outlook for government finances and the Swedish economy, it is thus consistent with the goal of the best possible trade-off between cost and risk to specify decreasing the share of foreign currency debt in total government debt as a strategic guideline for debt management over the next few years.

In the view of the Debt Office, it is neither necessary nor appropriate at this stage to state a specific target which says that foreign currency debt should account for a certain percentage of debt on a certain final date. Under any circumstances, a reduction of foreign currency debt would occur gradually over a number of years, and decisions on a numerical target can wait. As the Debt Office has maintained in earlier proposed guidelines, control via a specified share of total debt may force the government to amortise more foreign currency debt when the krona is weak and less when it is strong, which would be costly. At this stage, the essential thing is therefore to state that the long-term ambition is to reduce the share of foreign currency debt.

The next question is thus at what pace this debt should be amortised. During 2000, the guidelines state that SEK 25±15 billion in foreign currency debt should be amortised. Deviations from this SEK 25 billion benchmark should occur primarily for the purpose of keeping the proportion of foreign currency debt in the government debt unchanged. If the surplus is smaller than expected, the pace of amortisation should thus be lowered.

In the view of the Debt Office, it is appropriate to state an approximate pace of foreign currency debt amortisations for more than one year at a time. This increases the predictability of government debt management and also facilitates the planning of Debt Office borrowing. Given the long-term ambition of reducing the share of foreign currency debt, the choice of amortisation pace should be seen in light of expected changes in the size and structure of government debt over the next few years.

In 2001, the National Debt Office anticipates a cash-flow surplus of SEK 40–50 billion. However, more important for the size of the debt – and with an impact on its structure – is the transfer from the AP Fund. According to a decision of the Riksdag, government and mortgage bonds with a market value of SEK 155 billion will go to the National Debt Office at the turn of the year. This will immediately reduce the government debt by an amount equivalent to the book value of the transferred nominal and inflation-linked government bonds. This portion of the transfer does not affect the borrowing requirement (budget balance), since it is not a matter of a cash-flow transaction. Transferred mortgage bonds will be held to maturity. As these mortgage bonds fall due, the government will receive payments that will reduce its borrowing requirement and the government debt in the same way as ordinary cash surpluses. The Debt Office's forecast of its borrowing requirement includes an assumption that SEK 30 billion worth of mortgage bonds will fall due during 2001.

The forecast is based on the proposal for the structure of the transfer submitted by the special investigator the Government had appointed. No decision has yet been made. In the opinion of the Debt Office, however, an analysis of the costs and risks of the government debt should disregard how the transfer from the AP Fund is allocated between government bonds and mortgage bonds. Based on fundamental matching principles, the effect of the transfer must be regarded – all else being equal – as increasing the wealth of the central government by SEK 155 billion and decreasing the government debt by the same amount.¹¹ In terms of costs and risks, the Debt Office's mortgage bond holdings thus cover a certain portion of the outstanding SEK debt. Given such an approach, the decision to include mortgage bonds in the transfer, which is not related to government debt policy considerations, does not affect the structure of government debt policy either.

Since foreign currency debt is unaffected, the transfer will lead to an increase in the share of foreign currency debt. Measured in terms of real government debt, i.e. debt minus the entire transfer, the proportion will increase to an estimated 33 per cent, or by the equivalent of 3.5 percentage points.¹²

The transfer from the AP Fund is an extraordinary event. It is not reasonable to immediately eliminate its effect on the structure of the debt, although it changes the debt in an undesired direction from the standpoint of government debt policy. Nor should the increase in the share of foreign currency debt be over-dramatised; a smaller government debt means that total risk level will decline, even though a higher share of foreign currency exposure will make the average krona of debt more risky. Under these circumstances, an attempt to quickly correct the share of foreign debt is uncalled for. On the other hand, given the proposal to lower the share of foreign debt in the long term, the

¹¹ This disregards the fact that the government debt will be reduced by an amount smaller than SEK 155 billion, since the accounts will report government bonds at their acquisition value, whereas the transfer will be calculated at market value.

¹² The difference compared to the above figures for August 2000 is due to the fact that the government debt will increase during the second half, primarily due to the disbursement of premium pension funds.

necessary steps to influence debt structure in this direction should not be postponed indefinitely.

In light of this, the Debt Office believes that the amortisation of foreign currency debt over the next few years should be at a somewhat faster pace than to date. The Debt Office therefore proposes that the benchmark for amortisation of the foreign currency debt be set at SEK 35 billion annually over the next few years. This is approximately equivalent to a 3 percentage point annual reduction in the share of foreign currency debt. Given the projections in the Government budget bill that the debt will be at a relatively unchanged level from 2002 onward, amortisation at this pace implies that by the end of 2003, the share of foreign currency debt would be about 25 per cent.¹³

The existing guidelines give the Debt Office an interval of SEK ± 15 billion around the benchmark for amortisation of foreign currency debt. Deviations from the benchmark should primarily occur if the borrowing requirement changes, i.e. for the purpose of avoiding a change in the share of foreign currency debt. This relatively broad interval is justified in part by the fact that forecasts of the borrowing requirement have shown considerable uncertainty in recent years. This is mainly due to large temporary payments, for example proceeds from divestments of government property, which are difficult to foresee both in terms of size and date.

In the view of the Debt Office, a corridor of SEK ± 15 billion around the annual benchmark will continue to be appropriate. One reason is that there is continued uncertainty about the borrowing requirement over the next few years. Given that any foreign currency borrowing will occur via swaps, the Debt Office's need to issue SEK securities is not affected by the way changes in the borrowing requirement are allocated between SEK and foreign currencies. Nevertheless, large changes in the quantity of SEK risk that the Debt Office adds to the market may conceivably influence SEK interest rates. For this reason, in certain situations currency swaps may be an attractive instrument, for example in order to allocate a larger borrowing requirement among several forms of borrowing. If an increase in the borrowing requirement coincides with a deterioration in swap market conditions, it may also be sensible to borrow directly in foreign currencies.

The guideline decision now in force states that the flexibility of the foreign currency mandate should also be utilised to improve goal fulfilment. The task of the Debt Office is clearly to fulfil the goal of government debt management. Since this goal is *long-term* cost minimisation, however, there are limits to the activities the Debt Office may undertake in the short term, for example when it comes to position taking.

¹³ Since the value of the foreign currency debt is influenced by exchange rate movements if forecasts of the borrowing requirement are uncertain, these projections should be regarded as rough estimates. Their sole purpose is to provide an indication of the change in the structure of the debt, given the proposed pace of amortisation. They are not intended to state a target for the share of foreign currency debt.

In last year's proposed guidelines, the Debt Office wrote that it may, for example, become justified to increase foreign currency borrowing if SEK yields are volatile and rising. The purpose would be to keep down costs, both for loans reallocated to foreign currencies and – by decreasing supply in the SEK market – for the Debt Office's SEK-denominated borrowing. However, the intention has not been for the Debt Office to engage in position taking in the SEK currency market by accelerating or delaying amortisations based on projections of SEK value trends. Although the problems are fewer than in the case of position taking in the SEK fixed-interest market – since the Debt Office is a small player in the foreign exchange market – there is a risk that other market participants may suspect that the National Debt Office is acting on the basis of information from the Government Offices or the Riksbank. The practice has thus been that the Debt Office shall not base its decisions concerning foreign currency loans and amortisations on projections of SEK trends. The Debt Office has followed this practice during 2000 as well. For the sake of clarity, this practice should be confirmed in the guideline decision.

The Debt Office also believes that in the future, there should also be flexibility to change the pace of amortisations based on new information about the borrowing requirement over periods other than the calendar year. Assume that during the second half, it becomes known that early the following year, the government will receive large proceeds from a divestment. In that case, the Debt Office should have the option of accelerating its amortisation of foreign currency debt before the end of the year in order to smooth out these amortisations over time. One precondition for this is the existence of strategic guidelines for long-term changes in the share of foreign currency debt, so that the Debt Office has background material enabling it to take steps, as in the example, to accelerate its amortisations if debt decreases more than expected.

Furthermore, it cannot be ruled out that there will be disruptions, where borrowing terms in the SEK market deteriorate sharply and there is a risk that these terms will deteriorate further if the Debt Office finances its entire borrowing requirement in the SEK market. In such situations, market maintenance considerations may justify channelling a larger proportion of borrowing to foreign currency markets. The risk of such disruptions is small, but the Debt Office should still have the option of taking such considerations into account.

Since decisions to deviate from the amortisation benchmark are not based on a projection of SEK exchange rate trends, they should not be evaluated in terms of whether it would have been cheaper or more expensive to exchange currencies at the pace indicated by the benchmark. The Debt Office will return to evaluation issues in Section 6.

Proposal: The National Debt Office proposes that the guidelines state that the share of foreign currency debt in the government debt shall be reduced. Over the next few years, this debt should be amortised at SEK 35 billion per year, with an interval of SEK ± 15 billion around the benchmark. This flexibility should be used mainly to smooth out amortisations over time, within the framework of a long-term ambition to reduce the share of foreign currency debt.

5.2.3 Inflation-linked debt

The guidelines for 2000 state that the stock of inflation-linked loans should not decrease. A reduction is allowable, however, for reasons of market maintenance. The proportion of inflation-linked government debt has grown somewhat during 2000, since the Debt Office has made certain new issues of such securities while overall government debt has diminished. From a cost standpoint, inflation-linked borrowing has, on the whole, been advantageous to the government. A large proportion of outstanding inflation-linked debt was issued when the spread between yields on nominal and inflation-linked bonds was wide, compared to the rate of inflation measured since then. In recent years, the spread has narrowed, since confidence in the Riksbank's price stability target has become stronger. Equally large savings can therefore not be expected on the inflation-linked bonds that are issued in the future.

In the view of the Debt Office, there is reason to increase the proportion of inflation-linked debt in the long term. By means of inflation-linked borrowing, the government can be expected to incur lower long-range borrowing costs than via nominal borrowing, since the inflation risk premium goes to the government. As the market expands, this may be wholly or partly offset by a liquidity premium, but the better the market functions, the lower this liquidity premium will be. Inflation-linked borrowing also helps diversify the government debt portfolio, in principle in the same way foreign currency borrowing does, since this borrowing derives from sources other than the nominal SEK market. Beyond this, inflation-linked loans have the advantage over foreign currency loans that their costs will presumably co-vary more closely with developments in the Swedish economy, and thus with the tax base. From a government financing standpoint, inflation-linked loans are thus less risky than foreign currency loans.

EMU membership may also affect the approach to inflation-linked loans. Since Swedish price changes will have less impact on monetary policy than when Sweden has a national inflation target, the direct costs of inflation-linked loans (all else being equal) will presumably be more variable. Assuming that the EMU inflation target will be achieved in the long term, however, the costs over time should not have to be higher.

In light of this, the National Debt Office believes that its long-term ambition should be to increase the share of inflation-linked loans in the overall government debt. In the Debt Office's judgement, however, it is inappropriate

to state any desired percentage or a specific rate of increase. Market conditions are so uncertain that such targets risk coming into conflict with the cost minimisation goal. During 2000, the Debt Office has issued inflation-linked bonds via a number of auctions, with relatively small volumes on each occasion. Subscription levels and auction prices have been satisfactory, but scope for increasing issue volumes without driving up inflation-linked interest rates, compared to nominal rates, will remain limited. As has been the case to date, the pace of increase should thus take into account the trend of demand. The Debt Office will continue to try to ease these restrictions by broadening the investor base for inflation-linked bonds, both nationally and internationally.

When formulating the guidelines, it must be borne in mind that the transfer from the AP Fund will probably include around SEK 10 billion in inflation-linked bonds and that an outstanding inflation-linked loan of more than SEK 2 billion will mature in 2001. An ambition to fully offset this presupposes that new issues of inflation-linked bonds will be more than double those of 2000. The Debt Office believes that such a sharp increase risks pushing up interest rates on inflation-linked bonds. Although the ambition should still be a long-range increase in inflation-linked borrowing, the wording of the guidelines for inflation-linked borrowing should thus be changed.

It is more appropriate to have a long-term target stating that the *share* (as opposed to the stock) of inflation-linked borrowing should increase. Such a formulation underscores the government's continued support for inflation-linked borrowing without generating any market fears that sharply increased new issues will drive up inflation-linked interest rates. Given current projections of the trend of debt, a certain increase in the share can be achieved during 2001 by new issues on approximately the same scale as this year.

Proposal: The National Debt Office proposes that the share of inflation-linked loans in the government debt shall increase in the long term. The pace of this increase should take into account the trend of demand.

5.2.4 SEK debt

Due to the focus on foreign currency debt in the guidelines, the SEK debt appears like a residual item. It may thus look less important. However, SEK borrowing is the government's most important source of financing, both in quantitative and policy terms. Since more than 60 per cent of the debt has been borrowed in the form of nominal SEK securities, the interest rate terms prevailing in the domestic bond and Treasury bill market are of great significance to costs. Interest rates are determined primarily by factors outside of government debt policy, such as monetary policy decisions, inflationary expectations and the government's financial situation. The government's borrowing costs are, however, also influenced by the Debt Office's choice of debt issue policies (for example the number of loans and their maturities) and debt management. As the largest single borrower in the Swedish bond market, the Debt Office has a special responsibility for maintaining and developing this market.

As long as the Debt Office creates foreign currency debt via SEK loans that are swapped into foreign currencies, the decision on the pace of amortisation of foreign currency debt is of no significance to the government's SEK issue requirements. All borrowing is then carried out in kronor. Any changes in the pace of amortisation merely affect the scale of SEK/foreign currency swaps. This debt management technique has thus – besides providing cheap foreign currency – helped keep up issue volumes in the SEK market, thereby probably benefiting liquidity and volume, and thus the government's borrowing costs.

The Debt Office has entered into currency swaps with a notional amount corresponding to about 10 per cent of the debt. This has been possible without visible effects on the government's terms in the swap market. It is impossible to say whether, in that case at what volume, market restrictions may conceivably occur. The scope for expansion is also affected by the size of the counterparty risks the Debt Office assumes as a consequence of swap agreements with private counterparties. Here, however, the Debt Office has reduced counterparty exposures in various ways, so this restriction should not be binding. The fact that the government has been amortising foreign currency debt for some years, i.e. that only a portion of the maturing foreign currency borrowing requires refinancing via SEK/foreign currency swaps, has facilitated the realignment. To this extent, the decision on foreign currency debt is important to the Debt Office's chances of continuing to focus its borrowing in the SEK market for the purpose of achieving the best possible borrowing terms there. In principle, there are thus also market maintenance reasons, related to SEK debt, for reducing the foreign currency debt.¹⁴

Proposal: The National Debt Office proposes that the remainder of the government's borrowing requirement be covered by means of nominal SEK borrowing. Given the target for reducing foreign currency debt and limited opportunities to expand inflation-linked debt, this proposal implies a certain long-term increase in the share of SEK debt.

5.3 Maturity of government debt

5.3.1 SEK and foreign currency debt

According to the guideline decision now in force, the maturity of aggregate SEK and foreign currency debt (measured as duration) shall amount to 2.7 years \pm 0.3 years at the end of 2000. This implies a reduction by 0.2 years during the year. The decision to shorten the debt followed a proposal by the Debt Office, which argued that over long periods, short-term borrowing is cheaper on average than long-term. Given that a large portion of the government debt will continue even in the long term, however, short-term borrowing means that loans will mature without being matched by budget surpluses and must therefore be refinanced. Lower expected costs must consequently be weighed against the fact that short maturities will result in

¹⁴ Since SEK/foreign currency swaps are the cheapest way to create foreign currency debt, the foreign currency debt would also become more expensive if the scope for using the swap market were exhausted.

greater sensitivity to current interest rates and larger variations in interest payments.

In its operative guidelines for debt management during 2000, the Debt Office has set its benchmark for SEK debt at three years and for foreign currency debt at two years. The shorter maturity for foreign currency debt is justified by the fact that foreign currency debt is obtained from a number of markets. Sensitivity to upturns in interest rates is thus smaller in the foreign currency debt than in the SEK debt, where all borrowing is obtained from one market. SEK borrowing also accounts for a larger proportion of the total debt.

The analysis behind last year's proposal included simulation results from a model designed for the purpose of studying the choice of maturities for SEK debt. The results from the Debt Office's new simulation model, which are reported in Section 4 above, essentially point in the same direction. More short-term borrowing leads to lower but more variable interest costs. When costs are set in relation to GDP, the model points to a mechanism that makes short-term borrowing appear both cheaper and less risky. As stated in Section 4, however, this mechanism assumes that credibility problems for economic policy never arise. Since crises of confidence are the situation that is most difficult for government debt policy to deal with, however, this mechanism should be utilised with caution in actual government debt management.

In the view of the Debt Office, it is likely that in the future, yield curves will continue to have a positive slope. In an environment characterised by low inflation and credible monetary policy, however, the spread between long-term and short-term interest rates can be expected to be relatively narrow. The expected gain from shortening the maturity period is thus small, at least as long as no drastic steps are taken, for example reducing average maturity by one year. In that case, however, the refinancing risk would be unacceptably large.

Another reason not to shorten debt further is that the diversification of interest rate risk achieved by having shorter maturity in the foreign currency debt will diminish in importance if the share of foreign currency debt is lowered in keeping with the Debt Office's proposal. All else being equal, this will increase the government's exposure to changes in SEK interest rates. In principle, this effect of borrowing in several currencies may be one reason to retain a certain foreign currency debt. In the view of the Debt Office, however, the diversification gains are not large enough to justify a foreign currency debt of the existing size, so that the conclusion that the share of foreign currency debt should decrease still stands.

Deliberations concerning the maturity of SEK and foreign currency debt are also influenced by the trend of inflation-linked debt. The larger the proportion of long-term inflation-linked loans, the less refinancing risk there is in other markets. The chances of significantly changing the share of inflation-linked debt are uncertain, however, so it does not seem suitable to propose, for these reasons, a change in the maturity of SEK and foreign currency debt.

In light of this, the Debt Office believes that the benchmark for the maturity of the SEK and foreign currency debt, measured in terms of duration, should be kept at 2.7 years. As heretofore, an interval around the benchmark should be stated. One reason is that an interval is needed in order to allow scope for separate position-taking in managing the foreign currency debt. Quantitatively more important, however, is that in the short term, the Debt Office cannot control the duration of the debt without assuming large costs for derivative transactions. Due to sharp fluctuations in the borrowing requirement during 2000, duration has varied significantly and has periodically been close to the outer limits of the current ± 0.3 year interval.¹⁵ The reason is that the SEK debt is too large for short-term control of duration to be possible.

There is a trade-off here between precision of control and the costs of high-precision control. These costs arise primarily from controlling the duration of the SEK debt. As the Debt Office emphasised in Section 3, the need for detailed control of the SEK debt is small as long as there are no ambitions to take positions in the SEK portfolio. In that case, the important thing is not the risk of variations in the market value of this debt, which is what duration affects in the short term, but how maturity changes over time. Consequently, the value of having precise control of the duration of SEK debt is small from the standpoint of government debt management policy. Meanwhile the interval should not be so wide that the duration of the debt can deviate sharply from the benchmark even in the longer term.

Given that in planning its borrowing, the Debt Office continuously aims at keeping duration close to the benchmark, in the view of the Debt Office, an interval of ± 0.3 years provides a controlling effect. Meanwhile, under normal circumstances, it provides sufficient scope for dealing with short-term fluctuations in duration. It cannot be ruled out, however, for example if the borrowing requirement changes unexpectedly, that swings in duration may be somewhat larger than ± 0.3 years. In the opinion of the Debt Office, small and short-term movements outside the interval need not cause corrective actions, since the transaction costs may be unreasonably high. The proposed interval should thus not be perceived as a binding limit that applies from day to day. Temporary deviations should be accepted. However, the Debt Office will record and make explicit decisions as to whether deviations will be accepted or corrected. Its reports to the Government should also describe such deviations and their causes. Information about major deviations should perhaps also be provided to the general public continuously during the year.

It should be noted that the ± 0.3 year figure is based on practical experience and assessments. The Debt Office intends to follow up developments during 2001 and will also try to quantify what importance this interval may conceivably have to variations in borrowing costs.

¹⁵ The guidelines formally state that the duration shall be 2.7 ± 0.3 years at the close of 2000. The Debt Office has, however, construed this to mean that there are limits on duration during the year as well. One simple interpretation is to draw a straight line between 2.9, the duration at the beginning of the year, and 2.7, the target duration at year-end, and assume that the guidelines specify a corridor of ± 0.3 years around this line.

Proposal: The National Debt Office proposes that the benchmark for the maturity (measured in duration) of aggregate nominal SEK and foreign currency debt shall be kept unchanged at 2.7 years. An interval of ± 0.3 years around the benchmark shall be applied.

5.3.2 Inflation-linked debt

Given the Debt Office's difficulties in controlling the maturity of its inflation-linked debt, combined with the difficulty of interpreting an amalgamation of inflation-linked and nominal debt duration, the guidelines for the inflation-linked debt specify that new inflation-linked borrowing shall occur in the form of long-term loans. Since the stock of inflation-linked borrowing is large in relation to on-going new issues, control of new borrowing functions better than control of the average maturity of the stock. The outstanding inflation-linked debt has an average maturity of nearly 13 years, or substantially longer than the nominal SEK or foreign currency debt.

The Debt Office believes that its inflation-linked borrowing should continue to focus on long-term maturities. Underlying this opinion is the general principle that long-term inflation-linked bonds provide maximum advantages – both to the government and to the investor – since uncertainty about inflation grows as the investment horizon expands. To the extent that the share of inflation-linked debt can be increased in the future, this will reduce on-going needs for refinancing. Inflation-linked loans are thus a complementary source of diversification for the government's risk exposure.

According to the existing guidelines, the maturity of newly issued inflation-linked bonds shall be at least eight years. The reason why the guideline decision states the maturity so exactly is that the Debt Office has an inflation-linked bond which falls due in 2008. In the opinion of the Debt Office, it is not justified in overall guidelines to single out specific bonds and change the maturity specification each year in this way. The Debt Office therefore proposes that the Government should state that inflation-linked borrowing will aim at long maturities and that this will be interpreted as meaning that most newly issued bonds should have at least ten years' maturity. In some cases, however, there may be reasons to issue somewhat shorter-term inflation-linked bonds as well. If so, the Debt Office should be able to make decisions to this effect.

Proposal: The National Debt Office proposes that the guidelines state that inflation-linked borrowing shall focus on long-term maturities.

5.4 Maturity profile of government debt

The guidelines now in force state that a maximum of 30 per cent of the entire debt may mature during the next twelve months. The Debt Office shall, however, structure its borrowing in such a way that no more than 25 per cent matures within one year.

The background of this rule is that, in principle, the refinancing risk in the government debt is not limited by a duration benchmark. A given average may be achieved by making one portion of the debt very short-term and another very long-term, which means that maturities are concentrated in time. Borrowing costs thereby become strongly dependent on interest rate terms prevailing on particular dates. Guidelines concerning the proportion of maturities during specified periods of time are thus a complement to the duration benchmark.

The Debt Office's borrowing principles, especially the allocation of nominal SEK borrowing among a number of benchmark bonds, give the government debt a relatively uniform maturity profile. The existing guidelines primarily set a limit on the share of Treasury bills. In this portion of the debt, controls have functioned well. In the view of the Debt Office, there is therefore no reason to change the guidelines on this point.

Proposal: The National Debt Office proposes that a maximum of 30 per cent of the government debt may mature within the next twelve months. The Debt Office should, however, aim at ensuring that no more than 25 per cent of its borrowing matures within one year.

6 Control and evaluation issues

6.1 Evaluating the work of the National Debt Office within the limits of its overall guidelines

6.1.1 Evaluating the choice of benchmarks

In preparation for last year's proposed guidelines the Debt Office, in collaboration with the Ministry of Finance, submitted a report to the Government that discussed principles for evaluating government debt management. The report noted that the Debt Office's actions within the limits of the guidelines that the Government states should, in principle, be evaluated in quantitative terms through comparisons using counterfactual calculations – in stylised terms – of the costs of alternative decisions.

The Government's report to the Riksdag concerning government debt management during 1999 illustrates this procedure by calculating the costs of having the same duration in SEK and foreign currency debt. These costs were compared with the costs of applying – as in the actual debt – a shorter duration in the foreign currency debt and a longer duration in the SEK debt. Both calculations were done in stylised terms. The purpose was thus not to make detailed comparisons with actual costs, but to try to judge whether the Debt Office's decision to choose internal benchmarks with different maturities was appropriate or not.

It should also be possible to apply this principle to the choice of currency structure in the benchmark for the foreign currency debt. A counterfactual

calculation here may conceivably be related to how the costs would have been affected, for example, by using a different allocation between EUR and USD.

In the view of the Debt Office, this type of counterfactual calculations should also continue to be used for quantitative evaluations of decisions on internal benchmarks. Consistent with the goal of holding down the absolute costs of the government debt, the calculations should be made in terms of current coupon costs. Costs including changes in market value may, however, be of interest and should be reported as a comparison.

It should be emphasised that such calculations easily assume an element of arbitrariness. In hindsight, it is always possible to find another portfolio that ended up resulting in lower costs. It is therefore necessary to make comparisons using benchmarks that, viewed in advance, appear reasonable. Extreme strategies, such as putting all foreign currency borrowing in one currency or using a very short duration in one of the sub-portfolios should thus not be included in the comparisons. In addition, counterfactual calculations should be viewed as one stage among many in the evaluation.

6.1.2 Evaluating the administration of the foreign currency mandate

According to the proposal in Section 5, the Debt Office is given an interval of SEK ± 15 billion around the benchmark for amortisation of its foreign currency debt. As indicated in Section 5.2.2, this interval gives the Debt Office the scope to adjust the pace of amortisation to surprises in the borrowing requirement that risk causing poorer borrowing terms in the SEK market. It also enables the Debt Office to smooth out its amortisations between years if new information about government finances arrives late in the budget year. The Debt Office should document and state its reasons for decisions to greatly alter the pace of amortisations in relation to the benchmark.

As the Debt Office maintained above, the interval around the benchmark for amortisation of its foreign currency debt should not be used for position taking in the SEK currency market. Consequently, there are no reasons either to evaluate deviations from the benchmark in terms of whether costs would have been influenced by swapping currencies at a different pace. In this case, a counterfactual calculation would therefore be misleading. Since the reasons for deviating from the benchmark are mainly of a qualitative nature, the evaluation of any deviations should also be qualitative and, for example, include an examination of the reasons given by the Debt Office for the decision.

6.1.3 Evaluation and feedback of duration interval management

The Debt Office proposes that an interval be stated around the duration benchmark. The reason is, first, that for cost and market maintenance reasons it is not considered appropriate to control the duration of the SEK debt continuously, and second, to make room for position taking in foreign currency debt management. Position taking in the foreign currency debt is evaluated against a separate benchmark; see Section 6.2.2. Movements within

the interval that are caused by the SEK debt should not be evaluated by means of comparisons with counterfactual calculations, since these deviations are not expressions of position taking based on assessments of interest rate developments.

If, over a long period, duration deviates sharply from the benchmark, for example if it remains at the outer edge of the interval for most of the year, there is reason to study the causes more closely. In some cases there may also be justification for quantifying the cost or gain of this deviation from the central value, in order to create material for discussion of whether the Debt Office's decision not to adjust duration was justified from a cost standpoint. The result of such studies shall be part of the Debt Office's background material for the Government's evaluation.

Discussions in these contexts create a natural basis for helping to assess what is a reasonable interval. To increase knowledge of how wide an interval is sensible in the long term, the causes and magnitudes of the variations should be documented, described and explained. This will then provides a basis for deciding whether the interval should be changed. Feedback of these experiences is therefore included as a natural element of the Debt Office's future proposed guidelines.

6.2 Control and evaluation issues at the Debt Office

The delegation system for government debt management means that the Government's decision on overall guidelines is to be translated in the next stage into more operational guidelines by a decision of the Debt Office's Board. Since these internal guidelines are also used in the overall evaluation of government debt management, in this section the Debt Office would like to describe briefly the main features of the guidelines that the Debt Office is currently planning to work with.

As in the system for 2000, the Debt Office proposes among other things that the Government should decide a target for the total duration of nominal government debt. During 2000, this has been operationalised by means of separate benchmarks for the nominal SEK debt and foreign currency debt, respectively. The Debt Office sees no reason to depart from this principle.

These two benchmarks and debt categories have been managed separately from a duration standpoint during the current year. A change of duration in one debt category has not been offset in the other debt category in order to ensure that the duration target set by the Government is met. In practice, this would have meant that autonomous duration changes in the nominal SEK debt would have been offset by actions involving the foreign currency debt. In order not to distort position taking in the foreign currency debt, this would presuppose continuously adapting the benchmark for duration in the foreign currency debt to what is happening with the SEK debt. Since the foreign currency debt has had a fixed duration benchmark of two years, such flexibility has not existed.

The advantage of such an arrangement would be that more uniform changes in duration at the overall level would probably be attained and that the interval around the benchmark could be decreased. The disadvantage is that it would lead to transaction costs. Due to differences in size – the foreign currency debt is half as large as the nominal SEK debt – major corrections in the duration of the foreign currency debt would be required even if small changes in the duration of the SEK debt had occurred. Considering the assessment that the long-term costs of the government debt are determined by yield to maturity – not short-term fluctuations in market values – it would not be justified to take on transaction costs in order to fine-tune duration with the help of the foreign currency debt, even though the costs and risks here are lower than if the transactions were made in the SEK debt. In light of this, the Debt Office does not intend to change its principles for controlling the duration of the aggregate SEK and foreign currency debt.

6.2.1 Nominal SEK debt

In Section 3, the Debt Office describes some fundamental preconditions that affect the design of the control and evaluation system for the nominal SEK debt. The most important is that there will be no position taking. From this, it follows that evaluation against a benchmark in market value terms is not meaningful. This eliminates the role of the benchmark as an evaluation instrument. Instead, the management of the nominal SEK debt should aim at achieving the lowest possible absolute cost by means of debt and market maintenance. The evaluation of the Debt Office's management should thus focus on its ability to handle these duties. A duration-based benchmark should also continue to be used as a control instrument.

Control

The duration of the SEK debt is affected from day to day by variations in the borrowing requirement, as well as by securities issues and maturities. The effect of these factors may periodically be very large but can still be forecasted with relatively great certainty. Deviations from the forecasts may obviously occur due to unforeseen events, for example changes in privatisation plans, which usually have a relatively rapid impact. The Debt Office can control duration through its choice of issue maturities and volumes, repurchases and the use of derivative instruments (primarily interest rate swaps). Due to the nature of the debt, in most cases its duration can be deliberately changed only at a slow pace.

The point of departure in the management of the SEK debt is market maintenance within the framework of a long-term duration target. The Debt Office's issue strategy is therefore based, among other things, on predictability and its ambition to maintain good liquidity in the bond market. It issues government securities on predetermined dates, according to a schedule that is published twice yearly. In practice, the Debt Office therefore has limited opportunities to offset short-term, daily fluctuations in debt duration by means of its issue activities. First, the terms of announced issues should not be

changed at short notice. Second, the issue volumes should not vary to any great extent from issue to issue.

The derivatives market also offers limited opportunities for control. Due to the size of the SEK portfolio, large-scale derivative contracts are required in order to have any significant impact on the duration of the debt. However, large amounts risk adversely affecting the Office's terms in the swap market and thereby making debt management more expensive. This implies a restriction on the possibility of utilising the swap market. In addition, opening and closing swap contracts and/or issuing and repurchasing loans in order to offset fluctuations in duration would lead to sizeable transaction costs, as a consequence of the difference between buy and sell interest rates. Short-term interest rate swap transactions are also risky. The Debt Office does not believe that it can justify burdening the government with these costs and risks.

Taken as a whole, market maintenance considerations and the size of the SEK portfolio mean that there is little opportunity to control the duration of the SEK debt on a daily basis. When formulating the benchmark for nominal SEK debt, this must be taken into consideration.

During 2000, the benchmark for the duration of SEK debt has been defined as a central figure surrounded by an interval. As long as the duration of the debt has been within this corridor, the portfolio has been on benchmark. The Debt Office has thus not had to offset short-term changes in duration. Daily fluctuations in the borrowing requirement have, however, affected duration more than foreseen, and the interval that was first established turned out to be too narrow. In addition, extraordinary events have affected duration, for example a number of changes in the government's privatisation plan for Telia. During the year, the benchmark has thus been changed on two occasions.

Despite the problems that have occurred this year, the Debt Office believes that a benchmark in the form of a corridor has many desirable features. The benchmark is replicable and it enables the Debt Office to state a desirable maturity in the SEK portfolio – defined on the basis of the cost and risk goal – which always can and will be observed. Management can focus on long-term control of duration based on market maintenance considerations. At present, the Debt Office therefore sees no reason during 2001 to abandon a benchmark based on a central figure with an interval. The interval should reflect a trade-off between a desired maturity and the need for room to absorb daily fluctuations in duration and to allow scope for market considerations.

Evaluation

For reasons presented in Section 3, the Debt Office believes that position taking in the Swedish market would conflict with the long-term cost minimisation goal. The Debt Office believes that the primary means of achieving the lowest-cost goal while taking into account risk in the management of SEK debt is debt and market maintenance. This can be defined as measures that the Debt Office undertakes to lower *absolute* interest cost to the government, as opposed to transactions that attempt to lower the

relative cost that is reflected when cost is measured against the benchmark. This concept may, however, include a number of different measures and is difficult to define unambiguously. Activities that lie outside actual borrowing transactions (issues and repurchases, debt administration via derivatives etc.) end up under the concept of market maintenance. For example, correct and adequate information to the market generates a sense of security that leads to lower risk premiums. The Debt Office's involvement in market restructuring issues, for example electronic trading, may lead to improved liquidity and thereby to lower liquidity premiums. These steps have in common that they help lower general interest rates. They are therefore difficult to evaluate in quantitative terms against a benchmark and should instead be evaluated qualitatively. A qualitative evaluation may, however, include quantitative elements.

A qualitative evaluation may risk being perceived as more subjective than a quantitative evaluation. It is therefore important to have a framework that creates preconditions for an objective evaluation. The market maintenance measures that the Debt Office is planning to implement will therefore be defined in advance (i.e. before the coming financial year) and their expected effects will be described to the greatest extent possible. Decisions on such plans should be made by the Debt Office's Board, like other operative guidelines for debt management.

The evaluation can then assess whether the planned measures could be expected to lead to the desired effects. In addition, it can verify to what extent these measures were actually undertaken and make an assessment of whether the desired effects were achieved. Changed conditions must obviously be taken into account. The planned measures may be regarded as operationalised targets, established for the purpose of achieving the overall goal.

Conceivable measures in preparation for 2001 might be for the Debt Office to work actively towards the launch of an electronic trading system for government bonds and towards broadening access to the fixed-interest market by offering the same instruments (Treasury bills, government bonds and inflation-linked bonds) as investment alternatives to both small and large investors. Other measures would be to develop and further improve what, in international terms, is already a fast and efficient auction process; investing even larger resources in improving information on government debt policy to investors (investor relations) etc. The Debt Office's view of evaluation (and control) systems does not differ from that of most national debt offices. For example in the United Kingdom, the Debt Management Office has defined a number of targets labelled "Indicators of Success", mostly of a qualitative nature. An evaluation then occurs on the basis of these targets.

The Debt Office intends to engage outside consultants in the evaluation of its operations during 2001. The task of these consultants may be, first, to assess goal fulfilment and the effects of the Debt Office's measures and, second, to evaluate in a comprehensive way how the Swedish government securities market functions.

6.2.2 Foreign currency debt

At present, the Debt Office has no plans to change its systems for controlling and evaluating the foreign currency debt in preparation for next year. It will thus continue to control this debt in relation to a benchmark that stipulates a certain currency allocation and duration. The evaluation takes place by measuring to what extent deviations from the benchmark have led to savings or to higher expenses. The calculation of the result reflects both realised flows and unrealised market value changes. This will continue to serve as the basis for the evaluation of foreign currency debt management.

6.2.3 Inflation-linked debt

Control

A (real-term) duration benchmark for inflation-linked debt would not be replicable. First, inflation-linked borrowing is largely demand-controlled. Second, in practice there are no derivative instruments. This means that the Debt Office has little opportunity to adjust the duration of the debt by means of its issue policies or derivatives, respectively. The Debt Office therefore believes that inflation-linked debt should be controlled without a formalised benchmark. The Government's decision on a guideline stating that this borrowing shall occur in long maturities is thereby sufficient as a control system.

Evaluation

In the evaluation of the inflation-linked debt, like the evaluation of nominal borrowing, a number of indicators will be identified in advance and their expected effects will be described in guidelines approved by the Board. As in the case of the nominal debt, the Office intends to allow outside consultants to evaluate its inflation-linked debt activities, both in relation to the indicators that it has stated in advance and through comparisons with how other issuers of inflation-linked bonds maintain their marketplaces.