RIKSGÄLDS KONTORET
THE SWEDISH NATIONAL DEBT OFFICE

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Central Government Debt Management

– Proposed Guidelines 2004

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Summary

In this memorandum, the Swedish National Debt Office submits to the Government its proposed 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. The main points in the proposal are:

- The ambition to reduce the percentage of foreign currency debt in the central government debt should remain in place. The proposed benchmark for amortisation of foreign debt during 2004 is SEK 25 billion. The Debt Office should be allowed to deviate from this benchmark by SEK ±15 billion. The preliminary benchmark for amortisation of foreign currency debt in 2005 and 2006 should be SEK 25 billion per year.
- The percentage of inflation-linked loans in the central government debt should increase in the long term. Inflation-linked borrowing should be weighed against the growth in demand for inflation-linked bonds and the borrowing costs of other types of debt, with due consideration to risk.
- The Debt Office proposes that the benchmark for average duration of the nominal krona and foreign currency debt should be unchanged at 2.7 years. The Debt Office should be allowed to decide on benchmarks providing an average duration for its nominal debt that deviates by a maximum of ±0.3 years from this benchmark. The Debt Office's inflation-linked borrowing should consist of securities with long maturities.
- The rule that borrowing should aim at ensuring that not more than 25 per cent of the debt will fall due within the next twelve months should be removed and be replaced by a new indicator of risk, known as Cost-at-Risk.

These proposals largely represent a continuation of the guidelines now in effect. In the analysis that underlies the proposed guidelines, the Debt Office devotes special interest to the choice of average maturity. Firstly, we discuss how the demographic shift of the coming decades should affect central government debt management over the next few years. The Debt Office observes that the most important adjustment to future strains will be to reduce the size of the central government debt. In a longer perspective, it may also be suitable to lengthen the maturity of this debt. This will decrease the risk level of the debt, which is reasonable if uncertainty about the central government's fiscal outlook otherwise increases. However, it is too early to draw any conclusions about the need for adjustment in central government debt management, among other things since no decision has been taken yet about the future surplus target.

Secondly, we discuss how the maturity of central government debt should be managed in a more short-term perspective. As the basis for its analysis, the Debt Office has developed a new quantitative risk measure known as Cost-at-Risk (CaR). Given the current debt structure and size, the Debt Office's calculations indicate that there is a 5 per cent risk that the costs of central government debt will be in the range of SEK 16 billion larger than expected. Given a decrease in annual maturities from 25 to 14 per cent, the risk measure falls to SEK 10 billion, but expected costs rise at the same time. Risk balancing is ultimately a political responsibility, but in the judgement of the Debt Office, the CaR analysis does not provide a basis for proposing a lengthening of maturity. If the debt ratio should not decline during the next five to ten years at a pace consistent with the government's budget policy targets, there may be reason to reduce the risks of sharply increased interest costs.

1. Points of departure for the proposed guidelines

1.1 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 Article 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.

In this section, the Debt Office presents the points of departure for the proposal. We report the important conclusions and positions adopted in earlier Government decisions on guidelines, as well as the priorities established in the analytical work in preparation for this year's proposal and how they are reflected in the year's proposed guidelines.

1.2 Analysis and conclusions to date

1.2.1 Cost and risk measures

The Government's decision on guidelines for central government debt is taken amidst uncertainty, since future interest rate and exchange rate movements as well as central government finances are unknown. Debt management must therefore be structured in such a way that there are margins for coping with negative surprises. This viewpoint is reflected in the legally mandated goal of central government debt management, which says that government debt shall be managed in a way that minimises long-term costs while taking into account the risks inherent in such management. The guideline decision thus embodies a trade-off between the expected costs and risks of the debt.

The question of how to measure the costs and risks of government debt has received considerable attention in earlier proposed guidelines and guideline decisions. In its guideline decision in 2000, the Government stated that in a consideration of the structure of government debt and its maturity, costs should be measured by the *average running yield* (average interest rate upon issue) and the risks as *running yield at risk* (distribution of average interest rate upon issue), which would provide a measure of the risk of rising issue rates. Running yields should also be used when evaluating central government debt management.

In this decision, the Government also stated that the risk should, moreover, be measured in terms of *the contribution that the debt portfolio makes to fluctuations in the budget balance and the debt.* This may be regarded as a *real* risk measure that supplements the above nominal risk measure. The Debt Office obtained inspiration for this risk measure from the asset and liability management (ALM) approach, in which the fundamental concept is that financial risks can be minimised by matching the characteristics of liabilities against those of assets. From the standpoint of debt policy, this means that the central government can reduce the risk in its debt portfolio by structuring the portfolio in such a way that interest costs co-vary with budget surpluses (excluding interest payments). This is based on the intuition that a debt portfolio that typically has low costs when government finances are strained, for example due to a deep economic downturn, is less risky than a portfolio in which the opposite is true.

1.2.2 Structure and maturity of the debt

In earlier proposed guidelines, the Debt Office has gradually analysed the issue of the structure and maturity of government debt. At the end of August 2003, this debt comprised approximately 28 per cent foreign currency debt and 14 per cent inflation-linked loans, with the remainder consisting of nominal krona debt. The Debt Office's analyses show that the percentage of foreign currency loans in the debt portfolio should decline in the long term, while the percentage of inflation should increase in the long term. The reason is that foreign currency debt is more risky than nominal krona debt, without yielding lower expected costs, while inflation-linked borrowing helps to reduce the risk level in the government debt.

In its guideline decisions, the Government has concurred with the Debt Office's assessment of central government debt structure. In its latest decision, the Government stated that foreign currency debt should be amortised by SEK 25 billion during 2003 and that its aim is to maintain the same pace during 2004 and 2005. The Government also decided that the share of inflation-linked loans shall increase in the long term, but that the pace of this increase shall be weighed against the demand for inflation-linked bonds and the borrowing costs of other types of debt, with due consideration to risk.

The Debt Office has also analysed the choice of maturity

(duration) of the nominal krona debt and foreign currency debt. The Debt Office's model simulations preparatory to the guideline decision for 2001 indicated that short-term borrowing in Swedish kronor might have advantages from both a cost and risk standpoint when costs are set in relation to gross domestic product (GDP). The reasons are that short-term interest rates are generally lower than long-term rates and that short-term domestic interest rates tend to co-vary positively with GDP growth. However, the potential gains from short-term borrowing must be weighed against the increased risk that short-term borrowing may cause. Considering that Swedish government debt is already relatively short-term and its duration was slightly shortened during 2000, the Debt Office has proposed no change in the existing maturity guidelines since then.

In earlier guideline decisions, the Government has concurred with the Debt Office's assessment of the duration of nominal krona and foreign currency debt. In its decision for 2003, the Government stated that the benchmark for the duration of nominal krona and foreign currency debt should remain unchanged at 2.7 years. The Government also decided that its aim for 2004 and 2005 would be unchanged duration.

1.3 Priorities in preparing this year's proposed guidelines

This year the Debt Office is placing special emphasis on the maturity of central government debt. Firstly, we have returned to the question of how the ALM approach might be developed and applied to central government debt management, a continuing mandate to the Debt Office from the Government. The point of departure is that to date, ALM-related elements in the analyses have been of a cyclical nature, linked to the economic cycle. However, the long-term economic position of the central government is affected to as high a degree by structural factors. As an illustration of one important structural factor we discuss whether, and in that case how, the demographic shift of coming decades should influence central government debt management during the next few years. As mentioned above, the emphasis is on whether there is reason to change the maturity of the debt. This analysis, which is carried out in verbal and qualitative terms, is presented in Section 2.

Secondly, in Section 3 we discuss how the maturity of government debt should be administered in a shorter time perspective. The point of departure is that the guidelines must continuously be adapted to the prevailing external circumstances and to the government's fiscal outlook. The current benchmark of 2.7 years (measured in terms of duration) has been unchanged since 2000. There is thus reason once again to examine the choice of maturity in strategic, tactical as well as operational terms. As the basis for this analysis, the Debt Office has developed a new quantitative risk measure, known as Cost-at-Risk (CaR). Referring among other things to this new measure, the Debt Office proposes (in Section 4) that the restriction in the maturity profile that has applied to date should be removed and replaced by an indicator based on the CaR measure.

Finally, in compliance with a mandate in the Government's letter of instruction, the report contains an appendix about the lessons learned from allowing the Debt Office since July 1, 2002 to make all exchanges between Swedish kronor and foreign currencies directly in the market, instead of via the Riksbank (Swedish central bank) as previously.

2. Maturity of government debt in an ALM perspective

2.1 Background and points of departure

In its proposed guidelines for 2001, the Debt Office presented asset and liability management (ALM) as a fruitful point of departure for its continued analysis of central government debt management. The Debt Office's conclusion stated (somewhat abbreviated):

> 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. 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, which determine the costs of government debt. 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, structural factors 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. 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.
>
> 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. The Office therefore intends to continue providing increasingly in-depth analyses in both qualitative and quantitative terms in its future proposals for guidelines.

The Government concurred in this assessment and gave the Debt Office a mandate to develop such an analysis and approach. In light of this, the question is what the next step in the development of the ALM approach should be.

The above quotation emphasises that both cyclical and structural factors must be taken into account in an ALM analysis of government finances. The analyses that the Debt Office has presented to date have focused on the cyclical aspects. This is clear, for example, from our use of simulation models based on the assumption that the economy moves between periods of high and low growth, respectively, according to a random pattern. Even though the simulations extend over a thirty-year period, the underlying economy is assumed to be unchanged, aside from a positive trend growth rate.

One crucial structural issue in the Swedish economy concerns the consequences of the demographic shift during the coming decades. As noted in a number of reports and government studies, the increase in the number of old people may, in various ways, lead to strains in public finances.[1] This may therefore serve as the point of departure for a more long-term analysis of the prerequisites for central government finances. As a first step, the Debt Office thus examines how demographic factors may affect government finances in the long term. The second step is to try to analyse what (if anything) these changes will mean for management of the central government debt over the next few years. The Debt Office uses a qualitative approach.

As in the above quotation, it should be emphasised that these discussions concern complex and partly unknown associations over a long time horizon. The conclusions thus focus more on what questions must be answered, rather than what answers should be given to these questions.

2.2 Government finances and debt policy in a demographic perspective

2.2.1 The government debt

The change in Sweden's population structure during the coming decades is well known and has been extensively discussed, for example in conjunction with the restructuring of the national public pension system. Due to the pension reform, central gov-

1) See, for example, Government Bill 2000/2001:1, Appendix 5, "Utvecklingen på lång sikt" (Long-term Developments).

ernment finances can be assumed to be relatively unaffected by how the costs of the pension system evolve. However, there are other ways in which a change in population structure will influence government finances.

Effects will arise both on the revenue and expenditure side. It will be a matter of slower growth in tax bases, especially if the number of people with jobs diminishes, and of rising expenditures for public sector services, such as health care. The principal responsibility for health care and social services formally rests with the municipalities and county councils, but increased demand for these local government services will inevitably impact the economic situation of the central government. Either state grants to local governments must be raised, or local income tax rates must be increased, thereby limiting the central government's room for taxation, both directly and indirectly. Changes in the funding of health care and social services may also be considered, for example a larger element of co-payments, but the central government nonetheless has far-reaching commitments in these fields.[2]

In light of this, among other factors, there have been discussions in recent years about raising the surplus target for Sweden's public sector finances. Larger public surpluses over the next five to ten years would strengthen the balance sheet of the public sector. Lower debt will mean that interest payments will decline and room for other central government expenditures will rise. Low debt may also create room for increased borrowing during the period when demographically related strains are at their peak. How large these strains will be is uncertain, if for no other reason because the estimates extend over several decades. However, this uncertainty may be viewed as a reason in itself for raising the surplus target, since a smaller debt will make public finances more resistant to unexpected disruptions as well.

Since the pension system is governed by allocation rules that are fixed, and local governments will probably not contribute any significant surplus (and according to the existing rules they may not run a deficit either), a higher target for the overall surplus presupposes that the central government will increase its savings during the coming years. Over the next few years, the central government's financial savings are expected to show a deficit equivalent to around 1 per cent of GDP in a balanced cyclical situation.[3] A higher surplus target might mean, for example, that the preparation of the budget will aim at achieving central government financial savings of around or slightly above zero over a business cycle. This would cause the debt ratio to fall rather quickly. A lower central government debt ratio would make government finances more resistant to both expected and unexpected strains.[4]

2.2.2 The management of central government debt

Points of departure

Central government debt management concerns the administration of a debt of a given size. How large the government debt should or can be permitted to be is analysed and decided in other contexts than in the guidelines for central government debt management, ultimately in the preparation of long-term budget policy by the Riksdag (Swedish Parliament). It is nevertheless important, in the analysis of how to manage the government debt, to weigh in what risks there are in central government finances as a whole. This follows from the ALM approach that guides government debt policy.

In a situation of robust government finances and little risk of disruptions, it may be reasonable to make a different trade-off between expected cost and risk in government debt management than if government finances appear less robust. The above-discussed factors have not been weighed into earlier proposals and decisions on the guidelines for debt management. Although the most important means of preparing government finances for the demographic changes of the coming decades is to reduce the debt ratio, there is reason to analyse how government debt management should be focused during the years until government finances start to be exposed to strains for demographic reasons.

One initial question is how to handle debt maturity. Among the fundamental elements of the fiscal scenario sketched above is a lengthy period of relatively large net borrowing requirements.[5] During the same period, it will be undesirable to also need to refinance (or refix the interest rates on) large portions of the debt each year. The gross borrowing requirement may become unmanageably large, which in itself may raise borrowing costs, and the impact of any higher interest rates on borrowing costs will be greater. Sweden's experience from the first half of the 1990s illustrates the risks in having a short average maturity in the government debt when the net borrowing requirement rises sharply and unexpectedly.

The simple conclusion is that with respect to risk, there may be reason to consider lengthening the maturity of the government debt as a preparation for future strains.[6] The Kingdom

2) See also, for example, the report of the Swedish Association of Local Authorities entitled "Kommunala framtider – en långtidsutredning om behov och resurser till år 2050" (Municipal Futures – a Long-Term Study of Needs and Resources Until 2050), posted in Swedish at www.svekom.se/ekonomi/publikat/Finanssektionen/Kommunala_framtider.pdf.
3) If we disregard differences between financial savings and the budget balance, this means that the central government debt is assumed to increase somewhat in krona terms. Central government debt as a percentage of GDP – the debt ratio – can still be expected to shrink, since nominal GDP is likely to grow by an average of about 4 per cent annually, given an inflation rate in line with the 2 per cent target.
4) Measures that cause economic growth to accelerate, labour market participation to rise etc. may also be of importance to the debt ratio and to central government finances, since GDP will thereby grow faster. For the following discussion of central government debt management, however, the reasons why the debt ratio declines are of lesser importance.
5) Government Bill 2000/2001:1, Appendix 5 (Chart 3.3) presents a scenario in which financial savings in the public sector fall from 2 per cent of GDP, which is assumed to be the target until 2015 (a target that will also be achieved), to –3 per cent around 2030.
6) The question of whether it will be more appropriate to use nominal or inflation-linked bonds (or both) for this purpose is discussed below.

of Sweden would thereby decrease its yearly gross borrowing requirement, along with its dependence on the interest rates prevailing during the period of strained finances.[7]

This must be weighed against the fact that it is normally more expensive to borrow long-term. In any case, this is true of nominal bonds. The nominal yield curve general has a positive slope, among other things because uncertainty about inflation is greater the longer the time horizon is. For inflation-linked bonds, uncertainty about inflation plays a smaller role, but financial investments that extend several decades ahead in time may also conceivably have a credit risk premium that grows with maturity.[8]

The choice of maturity consequently presupposes a trade-off between expected cost and risk. Of significance in this context are both how large cost increases may conceivably arise and what degree of risk the central government is prepared to take. The first question is difficult to estimate but, in principle, can be analysed in economic terms. We can at least quantitatively illustrate the consequences of various conceivable scenarios; see also Section 3 below.

The central government's willingness to take risks in debt management is fundamentally a political issue and must therefore be decided by the Government and the Riksdag. However, in light of the arguments presented above, it can be noted that *for a given approach to risk,* it is probably appropriate eventually to have a longer maturity in Swedish central government debt than at present. In a more uncertain fiscal situation – all else being equal – it is appropriate to reduce the risks that originate from central government debt management.

The course of events may obviously turn out differently than sketched above, and the risks of central government debt may decrease substantially for other reasons over the coming years. One method, as mentioned above, is to employ ambitious surplus targets or other factors that will cause government debt to decrease further. The smaller the debt, the smaller is the risk that the need to refinance it will become a source of disturbances. Due to political decisions that may be taken, the decline in financial savings resulting from consequence calculations based on (more or less) unchanged rules may not materialise.

On the other hand, there are also structural factors aside from demographic changes that may impact central government finances. One such factor is increased tax competition. Shrinking room for higher tax rates in Sweden than in other countries would weaken government finances and require an adjustment of expenditures. If these adjustment requirements coincide with increased demand for public services due to a growing percentage of older people, the difficulties of achieving long-term deficit and debt targets will grow further.

The overall conclusion about the maturity of central government debt thus depends upon a number of factors that are difficult to assess. The analysis is affected by decisions that have not yet been taken, especially official ambitions concerning the most important factor, the trend of the debt ratio. In addition, there is genuine uncertainty about how other factors that affect government finances, for example the degree of tax competition, will evolve. There is thus no basis today for issuing a clear recommendation.

However, in the judgement of the Debt Office, a lengthening of government debt maturity may have to be considered over the coming years. Uncertainty about the environment in which government debt management will occur may in itself be viewed as one reason for such a step. In this context, it may thus be of interest to discuss methods for achieving such a change and, in that case, when it should occur.

How and when to extend the maturity of government debt

When adopting a position on *how* and *when* any lengthening of maturity should be carried out, a number of questions arise. Two (stylised) main alternatives present themselves.[9]

The first alternative is to begin even during the next few years to issue very long-term bonds, for example with 30-year maturities. This would make possible a gradual lengthening of the debt and would result in known borrowing costs (in real and nominal terms, respectively) for portions of the debt over a long period. The disadvantage is that any increase in costs as a consequence of the government issuing more long-term loans will begin earlier.

The second alternative is to continue to have a relatively short-term debt for five or ten years and to lengthen the maturity only if and when borrowing requirements begin to rise. This will probably result in somewhat lower interest expenses over the next few years, which in itself will reduce the debt somewhat. Against this, we must weigh the fact that if the risk level then rises, the change – all else being equal – must be completed more quickly. One danger of waiting is also that if worse difficulties than expected should arise, it may be expensive to lengthen the maturity. Borrowing conditions may have then deteriorated, before the central government begins to act. There may also possibly be advantages in beginning early to build up a market for really long-term nominal bonds. In modern times, the Debt

7) The perspective on what is a suitable percentage of foreign currency debt in the total portfolio may also be affected. One aspect is that foreign currency debt in general is more risky than domestic debt. Increased general fiscal risks would therefore be an argument for a smaller percentage of foreign debt, all else being equal. The question is complicated, however, since the Debt Office should also take into account how exchange rates may conceivably be affected by the demographic shift. In addition, the time perspective here is so long that the question of whether the government will have a foreign currency debt can be regarded as open. The discussion in this section, which is still broad in scope and theoretical, is thus devoted exclusively to the choice of maturity.

8) Inflation-linked bonds are protected against unexpected inflation, but in a nominal tax system, where inflation compensation is also taxed, a portion of this purchasing power protection may be taxed away in case of high inflation.

9) Note that it is not sufficient to discuss the average maturity of the debt. For example, although the issuance of a large quantity of ten-year bonds over the next few years would lengthen the average duration of the debt here and now, these bonds would fall due before the expected strains on central government finances will begin.

Office has not issued nominal bonds with maturities of longer than 20 years.

One variant of this alternative is to begin the lengthening of average maturity by increasing the percentage of inflation-linked bonds in the overall debt portfolio. Since it is natural to issue inflation-linked bonds with longer maturities than nominal bonds, this would automatically lead to a somewhat diminished refinancing requirement. As mentioned above, the additional cost of issuing long-term inflation-linked bonds may also be lower than for the equivalent nominal loans.[10] In the inflation-linked market, 30-year loans are thus natural even in a Swedish perspective; the longest inflation-linked loan outstanding falls due in 2028 and was a 30-year loan when it was introduced.

Underlying such action must be the assessment that it is reasonable from a cost and risk standpoint to slowly increase the percentage of inflation-linked bonds in government debt. It is complicated to evaluate more generally the characteristics of inflation-linked bonds in a scenario including a growing share of older people. Many different courses of events are conceivable. Given that initially less than 15 per cent of central government debt is being financed with inflation-linked loans, however, an increase in the percentage of inflation-linked bonds can – as in the existing guidelines – be justified for pure diversification reasons. Seen from a short-term perspective in this context, a continued increase in the percentage of inflation-linked bonds may thus seem like a reasonable path in the medium term, without precluding a later decision on how maturities should be managed more generally.

2.3 Conclusions

The most important step in order to increase the resistance of central government finances to the strains that will appear in the long term, due to the demographic shift, is to reduce the central government debt ratio. If this occurs, it will increase the room to take somewhat larger risks in central government debt policy for the purpose of keeping down costs. On the other hand, if government finances appear sensitive to future strains, there is reason to decrease the risks in government debt management. These are simple conclusions, which follow from an ALM approach to the target for central government debt management.

Uncertainty as to what targets will be set for government finances and how their outcome will look over the next five to ten years make it difficult to identify steps in government debt management that would unambiguously improve the prospects for achieving the debt policy goal of low cost while taking into account risks.

In the long term, risk considerations may make it appropriate to lengthen the maturity of government debt. This will decrease the need to refinance loans that fall due during the period when the central government's net borrowing requirement is large. However, it is not certain that it is suitable to begin lengthening the debt as early as during the next few years. Firstly, the need for such actions will depend on the strength of the government finances that Sweden manages to build up over the next few years. Secondly, in order to have any effect on maturities during the relevant period, the Debt Office must in that case issue at least 30-year bonds. The disadvantage is that the lengthening of maturities may be expensive if it turns out that the demand for such long-term nominal loans is small.

Inflation-linked bonds may prove more attractive, since there should be a demand for very long-term loans that provide protection against unexpected inflation. In addition, the stock of inflation-linked bonds is more slow-moving. If the government wishes to increase the percentage of very long-term inflation-linked borrowing in its debt portfolio, it may thus be suitable to begin redirecting inflation-linked issues to the longest-term bonds and perhaps also introduce longer-running loans.

However, the market for inflation-linked loans is so small in relation to central government debt as a whole that there is little potential for influencing overall risk via inflation-linked borrowing. In order to influence average maturity more noticeably, nominal debt must be lengthened. There is, however, no basis for proposing such action today with reference to the structural factors discussed in this section.

In Section 4, the Debt Office will return to an overall assessment of how maturity should be managed in the next few years. This includes weighing in the more medium- and short-term factors that are discussed in Section 3.

10) The demand for inflation-linked bonds in Sweden has occasionally been concentrated on relatively short-term maturities. The theoretical reasons for assuming that long-term inflation-linked borrowing is relatively cheap are therefore not a foregone conclusion.

3. Maturity of government debt
– strategic, tactical and operational choices

3.1 Background and points of departure

The choice of maturity in nominal types of debt is an expression of a trade-off between expected cost and risk. The more short-term the debt, the lower the expected long-term costs will be, since yield curves generally have a positive slope. But at the same time, short-term interest rates are more variable. This means that the cost of a short-term debt are less foreseeable, since the loan cost per borrowed krona may vary greatly and since the interest rate on a larger percentage of overall debt is refixed during each period and thus influences current interest payments.[11]

In its proposed guidelines for 2000, the Debt Office presented its first detailed qualitative and quantitative analysis of the choice of maturities in central government debt. This led to a proposal to shorten the benchmark for the maturity of the overall nominal krona and foreign currency debt from 3.0 to 2.7 years. The motive was that in the interval in question, shorter-term debt can be expected to result in somewhat lower borrowing costs without a significant increase in risk. The Government followed this proposal.

Later analyses with the help of more thorough simulation models have not led to any change in this maturity. One observation in these analyses that actually strengthens the qualitative arguments for maintaining relatively short-term debt is that in many cases, short-term interest rates in domestic currency are low in periods when central government finances are strained. The reason is that the central bank seeks to stimulate demand during an economic slowdown with the help of interest rate cuts.

At the same time, it must be noted that the decision to set the benchmark at 2.7 years is not based on an overall analysis which states that this particular maturity is "correct" in a more fundamental sense. As the Debt Office has maintained in earlier guideline analyses, in practice it is not possible to deduce an optimal central government debt portfolio from the overall goal of debt management. The choice of maturity is consequently an expression of a relative assessment. At the margin, 2.7 years appeared better than 3.0 years by leading to lower expected cost without a significant increase in risk. And 3.0 years became the reference point for evaluation, although the only thing that can be said for certain about that maturity is that it had been acceptable during the period until the new decision.

These circumstances create inflexibility. Deviations from the benchmark maturity in force must be justified in each case, and the subsequent evaluation takes the status quo as the comparative norm. Since effects on costs are easier to assess and measure afterwards, it is also easy to propose a shortening of maturity. In normal cases, this will result in lower long-term costs. A lengthening of maturities, however, must generally be justified with risk arguments, which are more difficult to evaluate. In many cases, such a decision may also be criticised afterwards as costly, especially if the risks that were behind the lengthening do not materialise.

In light of this, in its proposed guidelines for 2004 the Debt Office is carrying out an updated analysis of the choice of maturities in the central government debt. The question of re-examining the current duration benchmark is also raised by certain external circumstances. Firstly, the outlook for central government finances is more uncertain than in the immediately preceding years, when the budget included large surpluses. Secondly, current market interest rates are relatively low, viewed in a longer time perspective. Both these factors might justify a lengthening of maturities, but there are also reasons to abstain. In addition, the underlying motives may justify different methods for achieving a possible change.

3.2 Maturity and risk – review of principles

Since the choice of maturity clearly forces decision-makers to weigh the expected cost against risk – the two dimensions of the overall goal of Swedish government debt management – it is a key issue in such management. In stylized terms, the problem can be formulated as follows:

Experience (and certain theoretical arguments) indicates that short-term nominal interest rates are lower on average over long periods than long-term interest rates. To achieve pure cost minimisation, the central government should thus have a debt

11) Here the emphasis is on interest rate refixing risk. It cannot be ruled out that short-term borrowing will put the central government in a situation where it has difficulty obtaining any loans at all, so-called refinancing risk. However, this is such an extreme situation that it can be disregarded in the present argument.

with short maturities.[12] This must be weighed against the fact that short-term interest rates are more variable than long-term ones and often move in a wider interval, since they are governed by the short-term interest rates that the central bank sets for monetary policy reasons.

Given fundamentally strong central government finances the government can, without problems, withstand an upturn in short-term interest rates caused by a tightening of monetary policy during a conventional business cycle. Difficulties may arise, however, if the tightening is unusually drastic and lengthy or if the net borrowing requirement rises substantially (or, in the worse case, if both things happen at the same time). With short-term debt, the costs of debt will then climb rapidly. In addition, unexpectedly large borrowing requirements in themselves lead to a shortening of debt, since Treasury bills serve as a buffer until it is clear that an increase is lasting and justifies larger issues of long-term bonds. The central government may thus end up in a situation where gross borrowing requirements begin to appear difficult to handle, which may further drive up long-term interest rates. In that situation, it may be expensive to do what is needed to reduce risk: to lengthen the maturity of the debt.

An illustration of these mechanisms can be seen in the first half of the 1990s. After a rapid, uncontrolled deterioration in central government finances, the government was then forced to lengthen the maturity of its debt in a situation of high interest rates, characterised by mistrust of both government finances and price stability. This was costly, but doing nothing might have been even more expensive. The lengthening of maturities helped decrease long-term uncertainty about the financing of government debt and thus lowered the credit risk premium.

Such crises are rare. This makes it difficult, when making strategic decisions about central government debt management, to find a consistent method for weighing in the risk that they may occur. At the same time, this is exactly the type of severe disruptions in which the fiscal and macroeconomic value of having a well-balanced central government debt portfolio is greatest.

This represents a crucial challenge to central government debt management: Ensuring during stable periods that government debt has a structure that can withstand the strains that arise if and when this calm is interrupted. Decision- makers are forced to carry out an assessment that ultimately is about what yearly insurance premium they are willing to pay in order to be better equipped if the unexpected occurs. This is primarily a policy challenge, since the decision cannot be based on unambiguous analytical conclusions.

As a basis for assessments, it is nevertheless possible to illustrate the risks of an extreme course of events in which the central government's interest costs rise sharply. For this purpose, the Debt Office has developed a new risk indicator, whose characteristics are described in the following sub-section.

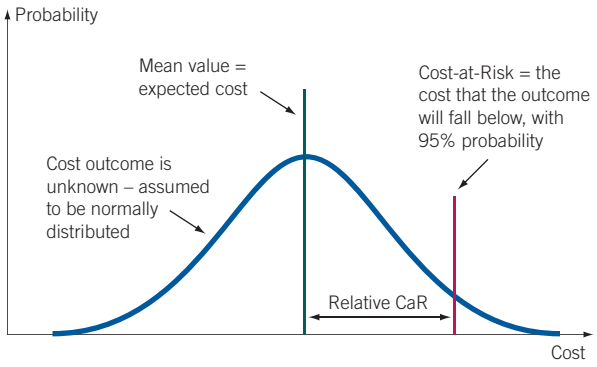
3.3 Cost-at-Risk – a new measure of government debt risks

3.3.1 What is Cost-at-Risk?

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

The biggest difference between VaR and CaR is what outcome figure they focus on. VaR calculations measure the risk that the market value of the debt will climb. CaR calculations measure the risk that the current interest costs of the debt will rise *without regard to market value effects*. Another difference is that CaR is usually calculated using a longer time horizon than VaR. For CaR, a normal time horizon is ten years, while for VaR it is shorter than one month.

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



Like VaR, CaR is always stated for a particular time period and probability. Probability is ordinarily expressed as a percentage. For example, a one-year 95 per cent CaR of SEK 70 billion means that there is a probability of 95 per cent that the cost of the debt within one year will be SEK 70 billion or less. There is consequently a 5 per cent risk that the cost will be SEK 70 billion or *higher*. Statistically, a 5 per cent risk is equivalent to costs being higher than the CaR estimate once in twenty years.

12) Here it does not matter whether these short-term loans are created by means of direct short-term borrowing, loans with interest rate refixing clauses or interest rate swaps. The important thing is that interest terms are tied to current short-term interest rates.

What best captures the risk of an unexpected cost upturn is the difference between Cost-at-Risk and expected cost. This measure is called *relative* CaR and states how much *higher than expected* the cost may be for a given time horizon. Relative Cost-at-Risk is abbreviated RCaR.

3.3.2 An analytic approximation of relative CaR[13]

The Debt Office has developed a simple model for arriving at an approximate RCaR figure for the Swedish central government debt. The method is not based on simulation, but on analytic calculations.[14] It is important to remember that both CaR and RCaR are always approximate measures, since they are based on statistical relationships and normal distribution assumptions that are not obviously valid. In practice, financial variables often have distributions in which extreme values are overrepresented. CaR measures are, moreover, dependent on what assumptions have been made concerning volatility and the correlations between interest rates and exchange rates, for example. Such relationships are often based on historical data that are not always good indicators of how the future will unfold.

The analytical RCaR figure shows how much higher than expected the government's interest costs may be in a one-year perspective. The expected interest cost is based on a situation where interest rates and exchange rates are unchanged, and the inflation rate is two per cent in keeping with the Riksbank's target.

The calculation of RCaR is based on three risk factors that influence the cost of central government debt: the interest rate (all types of debt), the exchange rate (foreign currency debt) and inflation (inflation-linked debt).

If the *interest rate* climbs during a year, average interest rate on the debt rises by the interest rate upturn multiplied by the portion of the debt whose interest rate is refixed. In this simple model, refixing of interest rates is assumed to be equal to what falls due. Swedish and foreign interest rates are assumed to be perfectly correlated, while real interest rates are assumed to vary half as much as nominal ones.

If the *krona* weakens during a year, coupon payments on the foreign currency debt rise, measured in Swedish kronor. In addition, the Debt Office realises a larger (smaller) exchange loss (exchange gain) on the portion of the foreign currency debt that falls due.[15]

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

On the basis of how much falls due during the coming year, the percentages of inflation-linked and foreign currency debt in the total debt and the average coupon of the debt, one can calculate how much the costs increase for one unit of increase in each risk factor. With the help of historical, market-based[16] or assumed relationships between factors, we can then calculate confidence intervals for cost upturns. In other words, in this way we can arrive at an *analytical approximation* of RCaR.

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

3.3.3 Relative Cost-at-Risk with various assumptions

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

Relative Cost-at-Risk
in a one-year perspective with 95 per cent confidence

	Primary balance	
	As expected	SEK 20 bn worse
Historical periods:		
1994-2002	16.3	17.9
1994-1997	19.4	21.3
1997-2002	12.6	13.9
Market implicit (Sep-03)	16.8	18.3

If the period 1994–2002 is assumed to be representative of the immediate future, there is a five per cent risk that costs will be just over SEK 16 billion *or more* higher than calculated. For example, if the forecast for interest costs on the government debt is SEK 50 billion, there is a five per cent risk that interest payments will instead be SEK 66 billion *or higher.* Since the first half of the period was more turbulent than the second, the equivalent figure based on the period 1994–1997 would be nearly SEK 70 billion, if the expected cost is SEK 50 billion.

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

If the primary balance is SEK 20 billion worse than expected, RCaR increases by between SEK 1.1 and 1.9 billion in a one-year perspective. If an increase in the primary borrowing requirement comes at the same time as interest rates, exchange rates and inflation perform unfavourably, there is a five per cent risk that the costs of the debt will be SEK 18 billion *or more* higher than forecasted. Note that these calculations are not based on any analysis of the probability that the primary borrowing requirement will rise.

13) Exactly how the measure is calculated is described in a separate report. Only an overall description is provided here.
14) Simulated CaR figures have been used, for example, by Danmarks Nationalbank (the Danish central bank). The risk figures calculated in the Debt Office's simulation model, used in earlier guideline analyses, are also based on this method.
15) By cost, we are referring here to economic costs. One difference compared to cash-basis costs is that exchange losses are considered realised when the loans fall due, regardless of whether the Debt Office repays the loan or not. If the approach were instead cash-basis, we would look at the share that was repaid rather than the share that falls due.
16) Here option prices have been used to infer the risk assessments of market players concerning interest rates and exchange rates. Inflation risk is still based on historical data.

3.3.4 Relative Cost-at-Risk in relation to the budget balance

Is a relative Cost-at-Risk of SEK 20 billion a lot or a little? Ultimately, this is a question for the Government and the Riksdag to address, based on how much risk they are willing to take in central government debt management. This risk can be examined by relating the figure to GDP and budget restrictions.

Twenty billion kronor is equivalent to less than one per cent of today's Swedish GDP. According to European Union rules, the deficit in public sector financial savings may not exceed 3 per cent of GDP. The National Institute of Economic Research forecast in June 2003 for financial savings in 2004 is a surplus of 1.1 per cent of GDP. Based on this simple RCaR calculation (and without taking other uncertainty factors into account), there is thus nearly a five per cent probability that the surplus will instead be close to zero (or worse) due to climbing interest payments and weakening krona exchange rates.

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

As noted above, relative Cost-at-Risk is determined by a number of risk factors. If these are varied, the RCaR measure also changes. For example, RCaR increases with the percentage of debt falling due yearly. As a rule, shorter maturity thus lead to higher CaR.

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

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

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

	Maturity profile		
	10%	14%	25%
FX debt as % of total:			
10%			10.2
30%	8.0	10.4	16.3

[1] Based on the period 1994-2002

Decreasing yearly maturities from 25 per cent to 14 per cent leads to a reduction of RCaR by one third. Decreasing the foreign currency debt to 10 per cent of total debt has the same effect, given an unchanged maturity profile. The table also shows that if the maturity profile is set as narrowly as 10 per cent per year, and foreign currency debt is kept at today's level, RCaR declines to SEK 8 billion.

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

Since the yield curve is assumed to have a positive slope, longer borrowing leads to higher expected costs. Duration is also longer. The table shows effects on duration and yearly expected cost, compared to the current portfolio.

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

	Maturity profile		
	10%	14%	25%
Duration increase (yrs)	1.1	0.4	0
Costincrease (SEK bn/yr)	3.2	1.0	0

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

Decreasing the maturity profile from 25 to 14 per cent (increasing duration by 0.4 years) thus increases yearly interest payments by around SEK 1 billion. At the same time, RCaR decreases by SEK 6 billion. The yearly insurance premium against unexpected cost upturns is thus relatively low. But it must be remembered that the RCaR measure describes what will happen in an unfavourable situation that statistically (based on data from the period 1994–2002) occurs in one year out of twenty.

To be able to compare cost to risk, we must therefore add up the costs over the entire twenty-year period. The resulting picture is that a lengthening of duration by 0.4 years leads to a total cost increase of SEK 20 billion. When the risk scenario occurs, costs increase by approximately SEK 6 billion less than with the shorter maturity.

In the above analysis, the percentage of inflation-linked debt has been kept unchanged. However, it is true that RCaR declines as the percentage of inflation-linked debt increases. One explanation is that inflation-linked debt is assumed to fall due at a slower pace. This causes variations in inflation to affect mainly coupon payments. In addition, real interest rates and inflation have varied less than nominal interest rates and exchange rates during the periods on which the RCaR calculation is based. Furthermore, the total gross borrowing requirement is lower with a larger percentage of inflation-linked debt, since yearly maturities are smaller the larger the percentage financed by (long) inflation-linked bonds. This also decreases the impact of an upturn in nominal interest rates, for example.

This does not mean that we should obviously increase the percentage of inflation-linked debt. The RCaR measure that is presented here is stylised and only provides a rough idea of how much costs may increase in a one-year perspective. Furthermore, the measure is entirely nominal and does not take into account how costs co-vary with central government revenues. Decisions on the structure of the debt should be based on analyses of the characteristics of the debt in a larger context and in a longer perspective.

3.3.6 Summary

Stylised calculations show that relative Cost-at-Risk for central government debt of the current size and structure in a one-year perspective is close to SEK 20 billion. Every billion kronor in unexpected deterioration in the primary balance leads to a cost increase of nearly SEK 100 million in a one-year perspective.

Increased interest costs of SEK 20 billion in a single year are equivalent to nearly 1 per cent of GDP, which is obviously a major deterioration. It is likely that other components in the central government budget would also be adversely affected in those situations where interest costs rise so sharply, something that the calculations presented here do not take into account. On the other hand, Swedish public sector finances are in fact strong to start with. Even after a deterioration equivalent to 1 per cent of GDP in central government financial saving, the distance to the EU's critical limit of –3 per cent for public sector financial saving would be considerable. It should further be noted that the likelihood of deterioration on this scale is as low as 5 per cent.

The analysis in this section provides quantitative indications of the current financial risk level in the central government debt. It is important to recall that the CaR measure is based on simplified statistical relationships and is dependent on what assumptions we make about risks and co-variation between interest rates, exchange rates and inflation. The calculations presented here should thus not be perceived as an exact map of the risk characteristics that typify Swedish central government debt.

CaR is affected by all sources of risk, but for the purpose of focusing the discussion, the following arguments are presented in terms of the choice of maturity.[17] In that case, the larger the uncertainty about central government finances, the longer maturity the debt should have (all else being equal). At the same time, decision-makers must take into account how much it costs to lower the risk level of the debt. The lower long-term interest rates are, and the flatter the yield curve, the longer the debt should be (all else being equal).

In concrete terms, this means that even if 2.7 years is assumed to have been the right maturity until now, new circumstances may arise – or be expected to arise – that create reasons to change the benchmark. The question in the following sections is whether there are preponderant reasons for such a change.

3.4 Fiscal and macroeconomic factors

According to medium-term estimates, in the next few years the central government will have an average yearly borrowing requirement equivalent to about 1 per cent of GDP over a business cycle. Such a development is compatible with a continued fall in the debt ratio – central government debt as a percentage of GDP. This is true even in the case of low real growth, since it is reasonable to relate debt to nominal GDP, which is also affected by the rate of inflation.[18] In our main scenario, fiscal risks emanating directly from the central government debt will thus decrease.

However, the crucial question is whether the risks of events that deviate significantly from the main scenario may be regarded as having changed. Here it is possible to point to great uncertainty about global growth prospects, among other things attributable to the continued after-effects of asset price bubbles and high private indebtedness in a number of countries. There are fears of a period of weak growth and even of simultaneous deflation in a number of important economies, although these fears have eased in recent months. If these fears come true, growth and employment would also decline in other countries including Sweden, with further declines in global demand as a consequence. In such a lengthy recession scenario, Swedish central government finances would weaken.

In itself, such a development is no reason to lengthen the maturity of nominal debt. Short-term interest rates will be low, since central banks will set low key interest rates in order to stimulate demand. If long-term interest rates fall more than the equivalent of a reasonable future trajectory for short-term interest rates during the next few years, however, there is reason to increase the percentage of long-term borrowing in the debt portfolio. For example, this may be the case if market players greatly overestimate how long central banks will maintain very low key interest rates. Lengthening the maturity of the debt on the basis of such an assessment would be analogous to the Debt Office's decision in December 2000 to increase the percentage of dollar-denominated borrowing in its foreign currency debt. In both cases, it is a matter of seeking to take advantage of a kind of mispricing, caused by a presumed misjudgement of the future by market players. In the same way as the dollar position, such a situation should be managed by the Debt Office within the framework of the guidelines stated by the Government. See also Section 3.5 below.

Fears of a lengthy global recession may nevertheless conceivably justify an increase in the benchmark for the maturity of central government debt in the Government's guidelines. If the downturn is so lengthy and deep that government finances are undermined and the borrowing requirement climbs sharply, concern about the government's long-term payment capacity may arise. In that case, long-term interest rates in particular would climb as a consequence of a credit risk premium. This would be a sequence of events similar to what happened during the first half of the 1990s. One important difference, however, is that at that time the crisis was partly caused by worry about high inflation. In the current threat scenario, on the contrary,

17) This may be interpreted as meaning that we assume that the risks emanating from the foreign currency debt are constant. However, it should be noted that in itself, a lower percentage of foreign currency debt should increase the room to take risks by having relatively short maturities (all else being equal).

18) Given a large percentage of inflation-linked debt and foreign currency debt, it is not as obvious that high nominal growth will be sufficient to reduce the debt ratio. Inflation-linked debt rises with inflation. The value of foreign currency debt may also rise if inflation in Sweden is higher than in other countries, since this leads to a weakening of the exchange rate of the krona.

low inflation, perhaps even deflation, is the big problem. This decreases the risk of an upturn in long-term interest rates.

In addition, entering a low-inflation period with a large percentage of long-term nominal bonds is costly, measured in real terms, and unsuitable when viewed in relation to the shrinking resources of the central government in such a situation. If the government wishes to decrease its yearly refinancing needs, it is therefore probably more appropriate to issue a large percentage of long-term inflation-linked bonds instead. Via inflation-linked bonds, low inflation will result in lower interest payments for the central government.

The deflation scenario is not the only possible deviation from a stable main scenario. To the extent that worry about deflation causes economic policy to underestimate the vigour of the coming recovery, there is a risk that the expansion will be too rapid and turn into inflation and/or require drastic short-term interest rate hikes by central banks. In this case, it is advantageous to have issued long-term nominal bonds, since the central government can avoid borrowing so much at short-term interest rates and can avoid paying the inflation premium on inflation-linked loans. A reverse scenario thus leads to reversed conclusions about how the debt should be managed.

In the judgement of the Debt Office, the probability of a trend that is worse than the main scenario is larger than the probability of an inflationary trend. Taken together, however, the risks of a global recession are in themselves not sufficient to propose that the Government should increase the benchmark for the maturity of nominal debt. We will return to an overall assessment, which weighs together all factors, at the end of this section.

3.5 Characteristics of the yield curve

The position and the slope of the yield curve are crucial in determining whether it is appropriate to change the maturity of the central government debt. For example, if the debt is lengthened when the yield curve – and thus long-term interest rates – is temporarily at a low level, the central government can refix a larger percentage of the debt at favourable long-term interest rates. A lengthening of maturities may also be justified for reasons of risk if the yield curve is unusually flat and the risk level can thereby be reduced at a lower cost than normal.

A lengthening of the maturity unambiguously lowers refinancing risks. If short-term interest rates are lower than long-term rates, the lengthening of maturity has a cost in the form of the difference between the long-term interest rate and the short-term rate. The latter is what the central government would have had to pay if it had chosen not to increase the percentage of long-term borrowing in its debt portfolio. If that difference is large and it turns out that interest rates remain at a low level or even fall further, the intended saving from borrowing long-term may be transformed into an additional cost, even if the slope of the yield curve eventually reverts to a more normal situation. A lengthening of the maturity based on long-term interest rates being abnormally low assumes that market prices are incorrect. In most such situations, it is more appropriate to use the Debt Office's mandate to deviate from the benchmark for debt maturities than to make changes in the Government's yearly guideline decisions. The latter is too slow a process to take advantage of opportunities that may sometimes last for long periods but may as easily disappear quickly.

Parallels may be drawn to the Debt Office's dollar/euro position. It resembles the positions that the Debt Office takes within the framework of its active management of the foreign currency debt, but since this position was large and the Debt Office wanted to have the opportunity to await a correction of the exchange rate, there was a temporary adjustment of the foreign currency debt benchmark, decided by the Board. In a corresponding way, it would be logical for the Debt Office to change the duration, through a decision by the Board, if there are strong indications that there is a mispricing in the fixed-income market. Such an interest rate position should, like the dollar position, be evaluated in market value terms.

The Debt Office already has the opportunity to act in this way, since the Government's guidelines provide an interval of ±0.3 year around the duration benchmark. This maturity interval must be perceived as a risk mandate that the Government has delegated to the Debt Office. Within that framework, it is incumbent upon the Debt Office to achieve the lowest possible cost, while taking into account risk.

More complicated deliberations arise if the analysis indicates that the maturity should be lengthened for the purpose of lowering the risk level, even though this may lead to somewhat higher costs. In principle, such action is part of the mandate of the Debt Office, which after all is derived from the overall goal of cost minimisation while taking into account risk. But a changed risk assessment is often of another nature than a situation where reallocation of debt is expected to result in lower costs. The latter may be a temporary deviation, where a quick decision is a precondition for success. A changed view of what is a suitable risk level for the central government debt normally presupposes more lasting changes, for example in the fiscal outlook. In general, there is thus not the same need to act quickly. Furthermore, it is suitable for more essential risk trade-offs to be made by the Government. Decisions as part of the guideline process may therefore be appropriate.

Taken together, the Debt Office's assessment is that the existing guidelines are well-balanced. The Debt Office should retain its mandate to continuously assess the opportunities to lower the central government's borrowing costs (while taking into account risk) by changing the benchmark for its debt maturity within the ±0.3 year interval.

Since the Debt Office, in practice, establishes separate benchmarks for nominal krona debt and for foreign currency debt, this allows considerable flexibility. Especially if any mispricing of long-term bonds is not limited to the domestic

market, a position can quickly and easily be created with the help of derivative instruments that lengthen the maturity of the foreign currency debt. Such a position can also be wound down smoothly without repercussions on market interest rates. Here, too, there are parallels to the management of the dollar/euro position. It was created with the help of derivative instruments in a market where the Debt Office is a minor player.

3.6 Summation – what to do with the maturity of government debt

In this section, the Debt Office has discussed the choice of maturity from a number of standpoints. The fundamental question is how to view the trade-off between expected cost and risk. This is a complex trade-off, especially since periods when a short-term debt with low expected cost triggers problems are rare. As background for these deliberations, we present a new measure of risk in central government debt, Cost-at-Risk (CaR). In the judgement of the Debt Office, CaR calculations provide grounds for interpreting the current debt as relatively well-balanced. Nor does a qualitative analysis of the current fiscal outlook lead to the conclusion that the maturity guidelines should be changed.

The Debt Office's mandate to continuously assess whether the interest rate situation and interest rate prospects are such that average maturity ought to be changed should remain in place. Any decision to choose a different maturity should be dealt with as a position and be evaluated in market value terms.

4. Proposed guidelines

4.1 Introduction

In its guideline decision, the Government establishes overall limits for central government debt management. The main points of earlier guideline decisions are that the Government states benchmarks and limits for managing the amortisation of foreign currency debt and for inflation-linked borrowing. It follows from this that the remaining gross borrowing requirement must be covered by nominal krona borrowing. The Government also sets benchmarks for the duration of the aggregate krona and foreign currency debt, as well as for the maturity of new borrowing in the form of inflation-linked bonds. Beyond this, the Government has controlled the maturity profile by indicating how large a percentage of central government debt may mature during a rolling twelve-month period.

In this year's proposed guidelines, the Debt Office is mainly following the same structure as previously. One exception is that we propose that the restriction on the maturity profile should be removed.

The time perspective in the guidelines is three years. The Debt Office is thus presenting proposed guidelines for 2004 and preliminary guidelines for 2005 and 2006.

4.2 Foreign currency debt

The Debt Office's proposal: The ambition to reduce the percentage of foreign currency debt in the total debt portfolio should remain in place. The proposed benchmark for amortisation of foreign currency debt during 2004 is SEK 25 billion. The Debt Office should be allowed to deviate from this benchmark by SEK ±15 billion. The benchmark for amortisation of foreign currency debt in 2005 and 2006 should be SEK 25 billion per year.

4.2.1 Guidelines now in force

In November 2002, the Government decided that the benchmark for the Debt Office's amortisation of foreign currency debt during 2003 should be SEK 25 billion. It also decided that the Debt Office may deviate from this benchmark by SEK ±15 billion. This flexibility is to be used to promote the goal of minimising costs while taking into account risk. The Government established a medium-term benchmark for the pace of amortisation during 2004 and 2005 of SEK 25 billion per year.

4.2.2 Deliberations and proposal concerning 2005 and 2006

In its proposed guidelines for 2001, the Debt Office carried out an in-depth analysis of the characteristics and role of the foreign currency debt in the central government debt. Its conclusion was that the percentage of foreign currency debt should be reduced in the long term. The reason is that foreign currency debt is associated with greater risk than krona debt without having any cost advantages. In subsequent guideline decisions, the Government has concurred with the Debt Office's conclusion.

The guidelines for the pace of amortisation should be based on long-term and structural considerations, and ultimately on an assessment of what constitutes an appropriate central government debt structure. The Debt Office believes that it is still essential to reduce the risks in the central government debt by amortising the foreign currency debt. In last year's guideline decision, on the basis of such an analysis the Government stated that the benchmark for the pace of amortisation in 2004 and 2005 should be SEK 25 billion. In the opinion of the Debt Office, nothing new has emerged to indicate that this pace should be changed. For the same reason, the Debt Office makes the assessment that the pace of amortisation in 2006 should be SEK 25 billion.

Given current assessments of the central government's borrowing requirement during the period 2004–2006 (and assuming that the value of the krona is stable), this pace of amortisation would decrease foreign currency debt from 28 per cent of the debt portfolio to approximately 21 per cent by the end of 2006. In earlier proposed guidelines, the Debt Office has noted that the percentage of foreign currency debt is so high that detailed analyses of what seems reasonable in the long term can wait. The fact that a transition from the krona to the euro would have drastically cut the percentage of foreign currency debt was another reason why the Debt Office has postponed any decisions about the long-term percentage of foreign currency debt. In light of the outcome of the September 14, 2003 euro referendum (with a No vote that exceeded the Yes vote by 14 per cent of all ballots cast), and since Sweden has the potential over the next few years to implement a significant reduction in the percentage of foreign currency debt, in next year's proposed guidelines the Debt Office intends to present a more thorough analysis of foreign currency debt management in the medium term.

In light of this, the Debt Office proposes that the benchmark for amortisation of the foreign currency debt in 2005 and 2006 should be SEK 25 billion per year. This is the same medium-term aim that the Government stated in last year's benchmark decision.

4.2.3 Deliberations and proposal concerning 2004

The primary point of departure for the pace of amortisation during 2004 is the indicative decision that the Government took last year, i.e. SEK 25 billion. As maintained above, this figure is an expression of a desire to reduce the percentage of foreign currency debt in the long term. Variations in the krona exchange rate or the budget trend, for example, should generally be taken into account within the limits of the flexibility in the pace of amortisation that the Debt Office has. Otherwise the Government's guidelines may tend to assume the nature of short-term tactical decisions that need to be changed more or less often, rather than strategic guidelines for central government debt policy. Another part of the picture is that during 2003 the Debt Office is amortising foreign currency debt at the pace of the existing benchmark, i.e. we have not perceived the krona as incorrectly valued. There is thus a preponderance of reasons indicating that the benchmark for the pace of amortisation during 2004 should be the same as the medium-term benchmark the Government has stated, i.e. SEK 25 billion.

The Debt Office's flexibility in deviating from the Government's benchmark should remain at SEK ±15 billion. This interval will be utilised to promote the goal of minimising costs while taking into account risk. The exchange rate trend is an important factor in case of decisions to take advantage of this flexibility. The budget trend may also affect the pace of amortisation, for example in order to prevent too large a portion of borrowing from burdening the same borrowing instrument.

In light of this, the Debt Office proposes that the benchmark for amortisation of foreign currency debt during 2004 be set at SEK 25 billion, consistent with the Government's preliminary guidelines in last year's decision. As during 2003, the Debt Office should be allowed to deviate from this benchmark by SEK ±15 billion.

4.3 Inflation-linked debt

The Debt Office's proposal: The percentage of inflation-linked loans in government debt should increase in the long term. Inflation-linked borrowing should be weighed against the growth in demand for inflation-linked bonds and the borrowing costs of other types of debt, with due consideration for risk.

4.3.1 Guidelines now in force

The Government decided last year that the percentage of inflation-linked debt in government debt is to increase. Unlike foreign currency debt, however, it specified no quantitative goals, either for the percentage or for the pace of change. The Government instead stated that the rate of increase will be weighed against the growth in demand for inflation-linked bonds and the borrowing costs of other types of debt, with due consideration for risk.

4.3.2 Deliberations and proposal

The basis for the guidelines now in force is the conclusion that inflation-linked borrowing helps decrease the risk in the central government debt portfolio. The reason is that in many respects, inflation-linked borrowing is a mirror image of nominal borrowing. If inflation falls below expectations, inflation-linked borrowing becomes cheaper than nominal borrowing, whereas if inflation exceeds expectations, inflation-linked borrowing becomes more expensive than nominal borrowing. By including both nominal and inflation-linked loans in its debt portfolio, the central government can thus decrease the risk of excessive fluctuations in debt costs.

In principle, inflation-linked borrowing should also be cheaper on average in the long term than nominal borrowing. However, during some periods the difference between nominal and real interest rates, the so-called break-even inflation rate, has been substantially below the Riksbank's official inflation target of 2 per cent. This means that the expected real-term cost of nominal bonds, calculated on the assumption that the inflation target will be achieved, is lower than for inflation-linked bonds. One explanation may be that investors assume that inflation will be lower than the inflation target in the future, but the limited liquidity in the inflation-linked bond market is probably another reason why investors demand a certain extra return in order to hold inflation-linked bonds. Periodically, such a liquidity premium may more than offset the inflation risk premium. Inflation risk uncertainty, and thus the inflation risk premium, nevertheless varies over time.

During the past year, break-even inflation has been relatively close to 2 per cent, but variations occur. As a result, the Debt Office should continue to have room to adjust issue volumes in relation to the demand situation, among other things by taking break-even inflation into consideration. This presupposes that the Debt Office, as previously, is given the opportunity to assess the market situation and is not forced to issue inflation-linked bonds in situations when they appear unreasonably expensive.

In light of this, the Debt Office proposes that the guidelines for inflation-linked borrowing be kept unchanged. The goal should thus be that the percentage of inflation-linked loans in the central government debt must be weighed against the increase in demand for inflation-linked bonds, with due consideration for risk.

4.4 Nominal krona debt

The Debt Office's proposal: Having stated guidelines for inflation-linked borrowing and foreign currency borrowing, it follows by definition that the central government's financing requirements should otherwise be covered by nominal krona borrowing.

4.4.1 Guidelines now in force

The Government decided last year that the central government financing needs not covered by inflation-linked borrowing and foreign currency borrowing should be met by nominal krona borrowing.

4.4.2 Deliberations and proposal

The guidelines for central government debt management are based on dividing the debt into three components: inflation-linked loans, foreign currency loans and nominal krona loans. Having stated guidelines for inflation-linked borrowing and foreign currency borrowing, it therefore follows by definition that the remaining portion of the borrowing requirement should be met by nominal krona loans. Since the Debt Office regularly holds auctions for both bonds and Treasury bills, it is easy in this market to cope with changes in borrowing via other instruments or in the net borrowing requirement. The nominal krona market thus functions as a buffer in case of fluctuations in the borrowing requirement, or if plans for the other two types of debt should change.

4.5 Maturity

The Debt Office's proposal: The benchmark for average duration of the nominal krona and foreign currency debt should be unchanged at 2.7 years. The Debt Office should be allowed to decide on benchmarks providing an average duration for the nominal debt that deviates by a maximum of ±0.3 years from the benchmark. Inflation-linked borrowing should occur in securities with long maturities.

4.5.1 Guidelines now in force

The Government decided last year that the average duration of the nominal krona and foreign currency debt should be 2.7 years in 2003. The aim for 2004 and 2005 is for the duration to remain unchanged. In setting benchmark portfolios, the Debt Office may decide on an average duration for the nominal debt that deviates by a maximum of ±0.3 years from the benchmark. The Government also decided that inflation-linked borrowing should have a long duration. Newly issued inflation-linked bonds should therefore have maturities of at least five years.

4.5.2 Deliberations and proposal

Nominal krona and foreign currency debt

In earlier proposed guidelines, the Debt Office has concluded that the central government can achieve lower borrowing costs in its nominal krona and foreign currency debt by borrowing with comparatively short maturities, without thereby increasing risk excessively for that reason. A 2.7 year duration has been deemed suitable. Borrowing at even shorter maturities, however, has been regarded as too risky.

In Section 3 above, the Debt Office re-examines the issue of debt maturity from a number of different perspectives. The main conclusion (see Section 3.6) is that no circumstances have emerged that justify a change in the benchmark for the duration of nominal krona and foreign currency debt in 2004. The current maturity still appears well-balanced with respect to risk, although preparedness to change the maturity at a later date should exist. The Debt Office therefore proposes that the benchmark be kept unchanged at 2.7 years.

Nor have any justifications emerged for a change in the interval of ±0.3 years around the benchmark that the Government established earlier. The Debt Office therefore proposes that the duration interval also be left unchanged.

The Debt Office proposes that the aim should be that the maturity of nominal and foreign currency debt will be kept unchanged at 2.7 years during 2005 and 2006 as well.

Inflation-linked debt

The guidelines in force for the maturity of inflation-linked debt say that inflation-linked borrowing should have long maturities. In its guideline decision for 2002, the Government stated that inflation-linked borrowing should occur in long maturities and that this should be interpreted as meaning at least five years. Five years is a relatively short maturity for an inflation-linked bond, but it has turned out that the cost difference between short-term and long-term inflation-linked bonds is generally small. The guidelines in force give the Debt Office the opportunity to adjust bond issues to market demand in an appropriate way.

The Debt Office therefore finds no reason to change the interpretation of what is meant by "long maturity" and consequently proposes that the guidelines concerning the maturity of inflation-linked bonds be left unchanged.

4.6 Maturity profile

The Debt Office's proposal: The maturity profile restriction should be removed. A new indicator of risk should be introduced – the statistical risk measure known as Cost-at-Risk. No specific restriction should be connected to Cost-at-Risk. Instead, Cost-at-Risk should be used as an indicator and follow-up instrument by reporting the change in Cost-at-Risk retrospectively.

4.6.1 Guidelines now in force

The guidelines instruct the Debt Office to endeavour to achieve a smooth maturity profile in central government debt. Borrowing should aim at ensuring that not more than 25 per cent of central government debt will fall due during the next twelve months.

4.6.2 Deliberations and proposal

Since the guideline system was introduced in 1999, the Debt Office has had a limitation on how large a proportion of the debt may fall due within one year, the "maturity profile restriction" (referred to below as the MPR). The aim has always been that yearly maturities should be limited to 25 per cent of the debt. The purpose of the MPR has been to complement the duration target by

- guaranteeing that the debt is evenly distributed over different maturities and prevent the duration target from being achieved, for example, by means of a large percentage of very short-term borrowing and a small percentage of very long-term borrowing;

- limiting how much costs may increase during one year due to rising interest rates.

This year and during 2002, the Debt Office has pondered the function of the maturity profile as a debt management instrument. Last year's work was summarised in a separate report, *Duration, Maturity Profile and the Risk of Increased Costs for Central Government Debt,* which was submitted to the Government in conjunction with the proposed guidelines for 2003.

One important observation in the report was that the Debt Office's handling of interest rate refixing risk and the distribution of the debt over different maturities are not primarily governed by the MPR, but instead by market maintenance goals and principles for responsible debt management. The conclusion was that the maturity profile could be retained, but that there was no reason to make it more exact (for example regarding the distribution of maturities within the year).

The Debt Office has continued its analysis of the characteristics of the maturity profile and how it could be replaced by a more appropriate measure and management tool. The Debt Office finds that there are several reasons to abolish the MPR:

1. The MPR is not needed in order to guarantee a uniform distribution of the debt among different maturities. It is a natural element of sound central government debt management to try to limit risks by having approximately the same, and not an excessive, percentage of the debt falling due/undergoing interest rate refixing every year.

2. Market maintenance and pure cost minimisation reasons in themselves prevent a skewed distribution of volumes with different maturities. The Debt Office would probably incur higher borrowing costs if we concentrated our borrowing too much, since investors are aware of the risks that may then arise.

3. The current benchmark of 25 per cent was set on the basis of the maturity profile that the debt had when the decision was taken for the first time. Last year's analysis showed that duration and the MPR cannot be set independently of each other. A 25 per cent limit is rather tight, given the current duration target. The MPR may therefore lead to transaction costs that are not justified by risk considerations.

The MPR admittedly limits how much the costs of the debt may rise due to a change in interest rate, since it limits how large a percentage of the debt may be assigned a new interest rate during a given year. But as a measure of risk, the MPR has two shortcomings:

1. The MPR primarily limits the effect of interest rate movements. But the cost of central government debt may also rise as a consequence of a weaker krona exchange rate (via the foreign currency debt) or unexpectedly high inflation (via the inflation-linked debt).[19]

2. The MPR sets a limit on how much the cost may increase for a given increase in interest rate, but says nothing about how *probable* this interest rate increase is.

The Debt Office therefore proposes that the MPR be abolished. Cost-at-Risk, which is described in Section 3 above, should instead be introduced as an instrument of central government debt management. The Debt Office believes that Cost-at-Risk works better as an *indicator* than as a restriction. CaR is a statistical measure based on certain assumptions, primarily normally distributed variables, which are not obviously valid. The analytical approximation that is used in Section 3 also includes stylised assumptions about how the structure of the debt will affect the risk of cost increases. Finally, the model must be furnished with assumptions about risks and co-variations between interest rates, exchange rates and inflation for one year ahead in time.

The CaR measure is thus associated with such great uncertainty that it is unsuitable to set an explicit figure for how high it may be. It is nevertheless a valuable indicator and a useful point of departure for a goal-oriented dialogue concerning the trade-offs between cost and risk that must guide central government debt management.

19) See Section 3.3 page 10.

Appendix: Currency exchanges – a follow-up report

1 Introduction

The Debt Office needs to carry out exchanges between kronor and foreign currencies in conjunction with amortisations of foreign currency loans, interest payments and payments of collateral for swap agreements, among other things. All these exchanges previously took place via the Riksbank. Due to an amendment in the ordinance (1996:311) with the instruction for the Debt Office, which went into effect on July 1, 2002, the Debt Office may exchange kronor for foreign currencies via other counterparties. The Debt Office chose to take advantage of this opportunity from the same date, and we no longer carry out any exchanges via the Riksbank.

In its guideline decision for 2002, the Government stated that the Debt Office's handling of currency exchanges should be characterised by predictability and transparency, among other things by distributing the exchanges relatively evenly over time. The Government also wrote that the Debt Office should establish and make public guidelines for the operational management of these currency exchanges.

In its letter of instruction for 2003, the Government assigns to the Debt Office the task of reporting in this year's proposed guidelines the effects that the transfer of currency exchanges has led to, and to what extent the management and evaluation of these currency exchanges have worked as intended. In this Appendix, the Debt Office reports its experiences of managing currency exchanges under its own auspices.

2 Operative management

In compliance with the Government's guidelines, the Debt Office carries out currency exchanges that are basically evenly distributed between the months of a calendar year. Since the principles for the management of these exchanges are known and the Debt Office makes public the pace at which we intend to amortise the foreign currency debt and how large interest payments in foreign currency we have, market players know the approximate scale of our monthly net transactions in advance. In this way, the Debt Office ensures that the currency exchanges are characterised by predictability and transparency.

The scale of the exchanges is determined primarily by the payments in foreign currencies that the Debt Office makes as old loans fall due, new loans are raised and interest on outstanding loans is paid. These payments often occur in bunches. To smooth out its net currency exchanges, the Debt Office buys foreign currency with a delayed settlement (forward contracts). In this way, the dates of the exchanges can be adjusted in such a way that the net amount is approximately the same size each month, while payments can be made on the contractual dates.

This can be illustrated with an example: If an amortisation of USD 1 billion is to be made on December 15, for instance, the Debt Office can buy dollars in the forward market with a contract settlement date of December 15. Such forward transactions can be made on a number of dates. The scale of forward transactions is adjusted in such a way that the net exchanges are of approximately the same size every month. This decreases the risk that the transaction will affect market prices and thereby raise the Debt Office's cost of currency exchanges. By spreading the transactions over a number of dates, the Debt Office also decreases its dependence on the exchange rate on a given date, a diversification effect that also lowers its risks.

The Debt Office carries out foreign currency exchanges in accordance with a trajectory established by its Board. This is defined as the forecasted net exchange volume during the remainder of the year, divided by the number of remaining months. According to the Board's decision, actual currency exchanges may deviate by a maximum of SEK ±500 million during a given month. As long as the exchanges stay within this interval, the Debt Office has not taken any active position and the measured cost is thus zero by definition.

A number of factors make an interval necessary. A degree of flexibility is used in order to avoid carrying out transactions that are disadvantageous from a business standpoint, for example at the end of months, and avoid unnecessarily high transaction costs. Flexibility is also needed since exchange rate movements affect the value of the net exchanges in kronor. A margin is thus required in order to avoid unnecessarily high transaction costs. In addition, there are currency exchanges in conjunction with payments of collateral within the framework of the agreements that the Debt Office has concluded with counterparties, for example in the form of swap contracts. Since collateral amounts are affected by the market value of the outstanding contracts, which in turn depends on variations in interest rates and exchange rates, these payments are difficult to foresee. For this reason, they are included in the forecasted net exchange value as a zero value.

The Government's guidelines make it possible for the Debt Office to take active positions, for example on the basis of exchange rate assessments, by postponing or advancing the date of currency exchanges within established intervals. The Debt Office has chosen not to utilise this opportunity, however. The guidelines established by the Board thus say that the exchange amount should lie within the interval that defines the cost-neutral trajectory. The reason is that the Debt Office's judgement, this kind of short-term tactical positioning yields small profit opportunities. In addition, such action would decrease the predictability of the Debt Office's currency exchanges. In our judgement, the advantages of position-taking in currency exchanges do not offset the disadvantages. The Debt Office should – in the same way as it has to date – focus on varying the pace of foreign currency debt amortisations on the basis of strategic assessments of the long-term value of the krona.

3 Effects of the changeover

Since currency exchanges are made by the Debt Office, decisions on a change in the pace of foreign currency debt amortisation have an immediate impact on the scale of currency exchanges. Within the limits stated by the Government, the pace of amortisation can be adjusted in order to decrease the costs of central government debt management. If the krona is weak and is expected to strengthen in the future, there may be cost-related reasons to lower the pace of amortisation, and vice versa. However, a change has effects on the central government's aggregate costs only if the pace of currency exchanges is changed at the same time as the pace of amortisation. This connection was previously uncertain and unclear, since the Riksbank carried out these currency exchanges in a pre-announced amount every day.

Certain efficiency gains are also achieved because the Debt Office is carrying out the currency exchanges. Although in principle the net exchanges are distributed evenly over the year, there is a degree of flexibility. It is possible to adjust the transactions to such factors as variations in market liquidity. By taking advantage of the opportunity to exchange currencies when there is good liquidity, the Debt Office can reduce costs. The market knows the scale of the net exchanges, and thus any effects on exchange rates, in advance. However, the Debt Office's counterparties do not know what exchanges the Debt Office intends to carry out on each individual transaction date. This decreases the risk that counterparties will quote unfavourable prices.

The efficiency gains are difficult to quantify. However, according to indicative estimates, the foreign currency transactions that the Debt Office carried out during the first year following July 1, 2002 seem on average to have been carried out at more favourable prices than would have been the case with a mechanical daily currency exchange schedule.

The current system also has other advantages. The Debt Office has a more complete responsibility for central government debt management, which contributes to a unified approach to the administration of all stages in the management process. In addition, the boundary between the Riksbank and the Debt Office is clearer. Since the Riksbank no longer carries out currency exchanges on behalf of the Debt Office, this eliminates the risk of confusion between central government debt policy, on the one hand, and monetary and exchange rate policy, on the other.

The above-mentioned advantages were included in the analysis that led to the decision to change the allocation of responsibility. There was some concern that these would be offset by increased uncertainty in the foreign exchange market, among other things since the almost total predictability that characterised the Riksbank's actions disappeared. In our judgement, these fears have not come true. The Debt Office's handling of currency exchanges is not an issue that is discussed in the market, and no market effects as a consequence of the Debt Office's currency exchanges have been reported.

4 Conclusions

In the judgement of the Debt Office, our handling of the foreign currency exchanges has worked well and the predictability and transparency requirements established by the Government have been met. There are no speculations about any market effects of these currency exchanges. Since the exchanges are carried out at an even pace in a predictable way, there is no room for such speculations. The Debt Office has been able to take advantage of the increased flexibility that the new system nevertheless provides, in order to improve efficiency and make its currency exchange operations more professional, consistent with how another large financial market player with sizeable foreign exchange transactions would act.

The Debt Office has chosen not to take advantage of currency exchanges for active position-taking, but instead limits its flexibility to what is required to allow it to avoid directly unfavourable market situation, for example on individual days. The Debt Office believes that this is sufficient in order to achieve the advantages sought and that the potential gains from active short-term position-taking are small.